TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

This copy is a reprint which includes current pages from Changes 1 through 17.

HEADQUARTERS, DEPARTMENT OF THE ARMY

8 MAY 1980

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CHANGE No. 17

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 23 October 1983

Aviation Unit and Aviation Intermediate Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-87 and 1-88	1-87 and 1-88

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CHANGE
NO. 16

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WASHINGTON, D.C., 4 October 1983

Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

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	Remove pages	Insert pages
Chapter 6	6-87 and 6-88	6-87 and 6-88

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TM 55-1520-236-23-1
C 15

CHANGE NO. 15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 25 August 1983

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Warning	c and d	c and d
Chapter 1	1-11 and 1-12	1-11 and 1-12

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CHANGE No. 14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 19 August 1983

Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

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1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-87 and 1-88	1-87 and 1-88

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CHANGE NO. 13

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 23 June 1983

Aviation Unit and Aviation Intermediate
Maintenance Manual

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AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-87 and 1-88	1-87 and 1-88
Chapter 4	4-67 and 4-68	4-67 and 4-68
Chapter 5	5-149 and 5-150	5-149 and 5-150

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Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 2	2-112.1/2-112.2	2-112.1 and 2-112.2

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CHANGE NO. 11

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Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove Pages	Insert Pages
Chapter 1	1-63 and 1-64	1-63 and 1-64
Chapter 2	2-257 and 2-258	2-257 and 2-258
Chapter 3	3-3 thru 3-6	3-3 thru 3-6.1/3-6.2
Chapter 5	5-107 thru 5-108.1/5-108.2	5-107 thru 5-108.2

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Aviation Unit and Intermediate Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

NOTICE

When the following list of changes on TM 55-1520-236-23-Series manuals are received and incorporated into manuals they will supersede the TM 55-1520-239-23-Series manuals.

TM 55-1520-236-23-1, Changes 1 through 13
TM 55-1520-236-23-2, Changes 1 through 3
TM 55-1520-236-23-3, Changes 1 and 2
TM 55-1520-236-23-4, Changes 1 and 2

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 1	1-9 and 1-10	1-9 and 1-10
	1-13 thru 1-16	1-13 thru 1-16.1/1-16.2
	1-17 thru 1-20	1-17 thru 1-20
	1-23 and 1-24	1-23 and 1-24
	1-43 thru 1-46	1-43 thru 1-46
	1-49 thru 1-52	1-49 thru 1-52
	1-73 and 1-74	1-73 and 1-74
	1-77 and 1-78	1-77 and 1-78
	1-81 and 1-82	1-81 and 1-82
	1-85 thru 1-86.1/1-86.2	1-85 thru 1-86.2
Chapter 2	2-11 and 2-12	2-11 and 2-12
	2-55 and 2-56	2-55 and 2-56
	2-59 and 2-60	2-59 and 2-60
	2-77 and 2-78	2-77 and 2-78
	2-99 and 2-100	2-99 and 2-100
	2-109 and 2-110	2-109 and 2-110
	2-133 thru 2-136	2-133 thru 2-136
	2-149 and 2-150	2-149 and 2-150
	2-171 thru 2-174	2-171 thru 2-174
	2-195 and 2-196	2-195 and 2-196
	2-211 and 2-212	2-211 and 2-212
	2-217 thru 2-220	2-217 thru 2-220

	Remove pages	Insert pages
Chapter 3	3-7 and 3-8	3-7 and 3-8
	3-11 and 3-12	3-11 and 3-12
Chapter 4	4-5 and 4-6	4-5 thru 4-6.2
	4-11 and 4-12	4-11 and 4-12
	4-25 thru 4-32	4-25 thru 4-32.1/4-32.2
	4-33 and 4-34	4-33 and 4-34
	4-47 and 4-48	4-47 and 4-48
	4-55 and 4-56	4-55 and 4-56
	4-75 thru 4-80	4-75 thru 4-80
Chapter 5	5-9 thru 5-12.1/5-12.2	5-9 thru 5-12.1/5-12.2
	5-27 thru 5-30	5-27 thru 5-30
	5-70.1 and 5-70.2	5-70.1 and 5-70.2
	5-83 and 5-84	5-83 and 5-84
	5-95 and 5-96	5-95 and 5-96
	———	5-102.1/5-102.2
	5-103 and 5-104	5-103 and 5-104
	5-107 and 5-108	5-107 and 5-108
	5-109 and 5-110	5-109 and 5-110
	5-113 and 5-114	5-113 and 5-114
	5-119 and 5-120	5-119 and 5-120
	5-133 thru 5-134	5-133 thru 5-134
	5-145 and 5-146	5-145 and 5-146
	5-169 and 5-170	5-169 and 5-170
	5-177 and 5-178	5-177 and 5-178
	5-181 and 5-182	5-181 and 5-182
	5-187 and 5-188	5-187 and 5-188
	5-201 thru 5-206	5-201 thru 5-205/5-206
	5-213 and 5-214	5-213 and 5-214
Chapter 6	6-9 and 6-10	6-9 and 6-10
	6-23 and 6-24	6-23 thru 6-24.1/6-24.2
	6-27 and 6-28	6-27 and 6-28
	6-43 and 6-44	6-43 and 6-44
	6-44.3/6-44.4	6-44.3/6-44.4
	6-79 thru 6-84.1/6-84.2	6-79 thru 6-84.1/6-84.2
	6-129 and 6-130	6-129 and 6-130
	6-139 and 6-140	6-139 and 6-140
	6-151 and 6-152	6-151 and 6-152

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Change 9 is being printed prior to Change 8 because of priority. Change 8 will be forthcoming. TM changes must be inserted in numerical sequence.

CHANGE NO. 9

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 January 1983

Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

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1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 5	5-12.1/5-12.2	5-12.1/5-12.2

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CHANGE
NO. 8

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DEPARTMENT OF THE ARMY
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Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove Pages	Insert Pages
Warning Page	c/d	c and d
Chapter 1	1-7 and 1-8	1-7 thru 1-8.1/1-8.2
	1-45 and 1-46	1-45 and 1-46
	1-73 and 1-74	1-73 and 1-74
	1-87 thru 1-88.1/1-88.2	1-87 and 1-88
Chapter 5	5-5 and 5-6	5-5 and 5-6
Chapter 6	6-25 and 6-26	6-25 and 6-26
	6-99 and 6-100	6-99 and 6-100

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CHANGE }
NO. 7 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 26 November 1982

Aviation Unit and Aviation Intermediate
Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove Pages	Insert Pages
Chapter 1	1-63 and 1-64	1-63 thru 1-64.1/1-64.2
Chapter 5	5-11 and 5-12	5-11 thru 5-12.1/5-12.2
	5-107 and 5-108	5-107 thru 5-108.1/5-108.2

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CHANGE No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
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Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

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1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 5	5-5 and 5-6	5-5 and 5-6
	5-11 and 5-12	5-11 and 5-12

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TM 55-1520-236-23-1
C 5

CHANGE No. 5

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WASHINGTON, D.C., 7 June 1982

Aviation Unit and Aviation Intermediate Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-17 and 1-18	1-17 and 1-18
	1-87 and 1-88	1-87 and 1-88
Chapter 3	3-17 and 3-18	3-17 and 3-18
	3-27 and 3-28	3-27 and 3-28
Chapter 5	5-109 and 5-110	5-109 and 5-110

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TM 55-1520-236-23-1
C 4

CHANGE No. 4

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 11 March 1982

Aviation Unit and Intermediate Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-75 and 1-76	1-75 and 1-76
	1-81 and 1-82	1-81 and 1-82
	1-85 and 1-86	1-85 thru 1-86.1/1-86.2
	1-87 and 1-88	1-87 thru 1-88.1/1-88.2

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TM 55-1520-236-23-1
C 3

CHANGE No. 3

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 6 July 1981

Aviation Unit and Intermediate Maintenance Manual

ARMY MODEL

AH-1S (PROD)

AH-1S (ECAS)

AH-1S (MODERNIZED)

HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-57 thru 1-60	1-57 thru 1-60
	1-75 and 1-76	1-75 and 1-76
	1-83 thru 1-88	1-83 thru 1-88

2. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

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CHANGE NO. 2

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Maintenance Manual

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AH-1S(ECAS)
AH-1S(MODERNIZED COBRA)
HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Table of Contents	i thru iii/iv	i thru xxi/xxii
Chapter 1	1-1 and 1-2	1-1 thru 1-2.3/1-2.4
	1-5 thru 1-8	1-5 thru 1-8
	1-11 and 1-12	1-11 thru 1-12.1/1-12.2
	1-15 and 1-16	1-15 and 1-16
	1-21 thru 1-40	1-21 thru 1-24
	1-45 thru 1-52	1-45 thru 1-52
Chapter 2	2-1 and 2-2	2-1 and 2-2
	2-33 and 2-34	2-33 thru 2-34.4
	2-79 and 2-80	2-79 thru 2-80.2
	2-81 and 2-82	2-81 and 2-82
	2-87 and 2-88	2-87 and 2-88
	2-111 and 2-112	2-111 thru 2-112.1/2-112.2
	2-119 and 2-120	2-119 and 2-120
	2-175 thru 2-178	2-175 thru 2-178
	2-205 and 2-206	2-205 thru 2-206.1/2-206.2
	2-209 and 2-210	2-209 and 2-210
	2-221 and 2-222	2-221 thru 2-222.1/2-222.2
	2-225 and 2-226	2-225 and 2-226
	2-245 thru 2-250	2-245 thru 2-250.1/2-250.2
	2-257 thru 2-282	2-257 and 2-258
Chapter 4	4-43 and 4-44	4-43 thru 4-44.5/4-44.6
	4-47 thru 4-50	4-47 thru 4-50.2
	4-79 and 4-80	4-79 and 4-80
Chapter 5	5-5 and 5-6	5-5 and 5-6
	5-70.1 and 5-70.2	5-70.1 and 5-70.2
	5-89 and 5-90	5-89 and 5-90
	5-133 and 5-134	5-133 thru 5-134.1/5-134.2
	5-135 and 5-136	5-135 and 5-136
Chapter 6	6-25 thru 6-28	6-25 thru 6-28
	6-39 and 6-40	6-39 and 6-40
	6-43 and 6-44	6-43 thru 6-44.3/6-44.4
	6-45 and 6-46	6-45 thru 6-46.2
	6-55 and 6-56	6-55 and 6-56

Remove pages	Insert pages
6-63 and 6-64	6-63 and 6-64
6-73 and 6-74	6-73 and 6-74
6-83 and 6-84	6-83 thru 6-84.1/6-84.2
6-87 and 6-88	6-87 and 6-88
6-99 and 6-100	6-99 and 6-100
6-107 and 6-108	6-107 and 6-108
6-125 and 6-126	6-125 and 6-126
6-155 thru 6-160	6-155 thru 6-160

2. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

3. Retain these sheets in front of manual for reference purposes.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Organizational Maintenance Requirements for AH-1S(PROD) aircraft.

URGENT

TM 55-1520-236-23-1
C 1

CHANGE }
No. 1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 13 February 1981

Aviation Unit and Intermediate
Maintenance Manual

ARMY MODEL

AH-1S (PROD)

AH-1S (ECAS)

AH-1S (MODERNIZED COBRA)

HELICOPTERS

TM 55-1520-236-23-1, 8 May 1980, is changed as follows:

1. Remove and insert pages as indicated below:

	Remove pages	Insert pages
Chapter 1	1-73 thru 1-76	1-73 thru 1-76
	1-81 and 1-82	1-81 and 1-82
	1-85 thru 1-88	1-85 thru 1-88
Chapter 5	5-11 and 5-12	5-11 thru 5-12.1/5-12.2

2. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

3. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Organizational Maintenance requirements for AH-1S (PROD) aircraft.

URGENT

WARNING

Personnel performing operations, procedures, and practices which are included or implied in this technical manual shall observe the following warnings. Disregard of these warnings and precautionary information can cause serious injury, or death.

Warnings, cautions, and notes are used to emphasize important and critical instructions and shall be used for the following conditions:

WARNING

An operating procedure, practice, etc., which, if not correctly followed, could result in personal injury or loss of life.

CAUTION

An operating procedure, practice, etc., which if not strictly observed, could result in damage to or destruction of equipment.

NOTE

An operating procedure, condition, etc., which it is essential to highlight.

STARTING ENGINE

Starting and Operation of the helicopter will be performed only by authorized personnel in accordance with AR 95-1

HIGH VOLTAGE

The helicopter should be electrically grounded when parked. Turn off all power switches before making electrical connections or disconnections. Serious burns and electrical shock can result from contact with exposed electrical wires or connectors.

RADIATION HAZARD

Self-luminous dials contain radioactive materials. If such an instrument is broken or becomes unsealed, avoid personal contact. Use forceps or gloves made of rubber or polyethylene to pick up contaminated material. Place material and gloves in a plastic bag. Seal bag and dispose of it as radioactive waste in accordance with AR 755-15 and TM 3-261 (TB 43-0108). Repair procedures shall conform to requirements in AR 700-52.

DANGEROUS CHEMICALS

Exposure to high concentrations of fire extinguishing agents can cause severe irritation of eyes and nose.

Corrosive Battery Electrolyte (Potassium Hydroxide). Wear rubber gloves, apron, and face shield when handling leaking batteries. If potassium hydroxide is spilled on clothing, or other material, wash immediately with clean water. If spilled on personnel, immediately start flushing the affected area with clean water. Continue washing until medical assistance arrives.

Use solvents or chemicals in a well ventilated area. Do not inhale vapors or allow to come in contact with skin or eyes. Observe proper fire prevention rules.

LASER LIGHT

The laser beam is dangerous and can cause blindness if it enters the eye either directly or reflected from a shiny surface. Crewmen shall wear approved laser protective visors whenever in controlled area when laser rangefinder or laser target designators are being used. Laser shall be used only in controlled areas by qualified personnel.

NOISE LEVEL

Sound pressure levels in the helicopter during some operating conditions exceed the Surgeon Generals hearing conservation criteria as defined in TB MED 251.
Hearing, protection devices, such as the aviator helmet or ear plugs, are required to be worn by all personnel in and around the helicopter during its operation.

ASBESTOS FIBERS

Avoid creating dust. Breathing asbestos dust may cause serious bodily harm.

ARMAMENT

When working on, or near an armed helicopter, take all possible precautions to avoid accidental firing of armament.
Personnel shall not occupy possible firing pattern in front of or up to 20 feet behind rocket pods.
Munitions shall be handled by authorized personnel only.
All weapons shall be dry-fired. Dummy ammunition shall not be used.

JETTISON

All ground safety pins must be removed before flight.
Failure to do so will prevent emergency jettison of stores.

Jettison circuit may be activated with BAT switch OFF and pilot WING STORES JTSN circuit breaker OPEN. For positive deactivation of jettison circuit, open both the PLT JTSN circuit breaker and the GNR JTSN circuit breaker located in the aft electrical compartment. Serious injury can result from accidental ground jettison

SANDING DUST

Sanding on reinforced laminated glass produces fine dust that may cause skin irritations. Observe necessary protective measures.

TRANSMISSION LEVELING

Do not attempt to level transmission with "Jacks Only"
Hoist must be used in conjunction with jacks while lifting transmission.

EXTERNAL STORES

Prior to any helicopter maintenance functions that require external stores be removed JETTISON cartridge shall be removed.
Remove jettison cartridges from pylon stores ejection device prior to placing helicopter in a hangar, to prevent injury to personnel and damage to equipment.
Exception: Removal is not necessary when helicopter is to be stored in hangar for short-term, providing both PLT JTSN and GNR JETSN circuit breakers in aft electrical compartment are OPEN, and warning signs indicate that helicopter has an armed jettison system

CANOPY REMOVAL SYSTEM

Ground safety pins must be installed in pilot and gunner arming firing handles of canopy removal system whenever the helicopter is on the ground. Pins should be installed by crew.

HANDLING HYDRAULIC FLUID (MIL-H-83282)

When handling hydraulic fluid (MIL-H-83282), Table 1-3, Item 61, observe the following:

— Prolonged contact with liquid or mist can irritate eyes and skin.

— After any prolonged contact with skin, immediately wash contacted area with soap and water. If liquid contacts eyes, flush them immediately with clear water.

— If liquid is swallowed, do not induce vomiting; get immediate medical attention.

— Wear rubber gloves when handling liquid. If prolonged contact with mist is likely, wear an appropriate respirator.

— When fluid is decomposed by heating, toxic gases are released.

EPOXY BASED ADHESIVE

Epoxy based adhesive, P/N EA934, contains an asbestos filler which could be inhaled or ingested during grinding, cutting, or sanding operations on cured epoxy material.

TECHNICAL MANUAL

No. 55-1520-236-23-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 8 May 1980

Aviation Unit and Intermediate Maintenance Manual

ARMY MODEL
AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

NOTE

This manual is printed in four volumes, as follows:

TM 55-1520-236-23-1, consisting of Table oc Contents, Preface Chapters 1 through 6.

TM 55-1520-236-23-2, consisting of Table of Contents, Chapters 7 through 17, Appendix A through C.

TM 55-1520-236-23-3, consisting of Table of Contents, Appendix D through F, and Index.

TM 55-1520-236-23-4, consisting of Table of Contents, FO-1 thru FO-142.

The Preface, Appendices and Index are applicable to all volumes.

*This manual together with TM 55-1520-236-23-2, 8 May 1980, TM 55-1520-236-23-3, 8 May 1980, and TM 55-1520-236-23-4, 8 May 1980, supersedes TM 55-1520-236-23-1, 30 June 1977 and TM 55-1520-236-23-2, 30 June 1977.

Technical Manual

No. 55-1520-236-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 8 May 1980

AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

ARMY MODEL

AH-1S (PROD)
AH-1S (ECAS)
AH-1S (MODERNIZED COBRA)
HELICOPTERS

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U. S. Army Troop Support & Aviation Materiel Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you.

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PREFACE

P-1. GENERAL.

a. This manual is the official document for Aviation Unit and Intermediate Maintenance of Army Model AH-1S Helicopters. Refer to the following for serial number effectivity.

1. AH-1S (Production)
   (Coded P)
   76-22567 through 76-22610
   76-22692 through 76-22713
   77-22729 through 77-22762

2. AH-1S (Enhanced Cobra Armament System)
   (Coded E)
   78-22763 through 78-22810
   78-23043 through 78-23092

3. AH-1S (Modernized Configuration)
   (Coded M)
   78-23093 through 78-23125

b. The purpose of this manual is to familiarize you with the maintenance functions to be performed at the Aviation Unit and Intermediate Maintenance levels. The Table of Contents for this manual is provided to assist in determining the chapter in the manual in which individual functions are covered. This manual provides all essential information for personnel to accomplish Aviation Unit and Intermediate Maintenance on the complete airframe, its components, and systems, excluding armament and avionics subsystems, as indicated for Aviation Unit and Intermediate Maintenance activities in the Maintenance Allocation Chart (MAC). Refer to Appendix B.

c. Designator symbols are used in conjunction with text contents, text headings and illustration titles to show limited effectivity of material. Designator symbols may precede a text heading or illustration title to indicate proper effectivity, unless the material applies to all series and configurations within the manual. Designator symbols precede procedural steps and designated material in the text. If the material applies to all series and configurations, no designator symbols will be used. Where practical, descriptive information is condensed and combined for all models to avoid duplication. Data in this manual are coded as follows:

(1) P AH-1S (Production)

(2) E AH-1S (Enhanced Cobra Armament System)

(3) M AH-1S (Modernized Configuration)

(4) No Code - All models.

(5) B540 Bell Helicopter Textron Main Rotor Blades

(6) K747 Kaman Aircraft Corporation Main Rotor Blades

d. Changes, except as noted below, to the text and tables, including new material on added pages, are indicated by a vertical line in the outer margin extending close to the entire area of the material affected. Symbols show current changes only. A miniature pointing hand symbol is used to denote a change to an illustration. However, a vertical line in the outer margin, rather than miniature pointing hands, is utilized when there have been extensive changes made to an illustration. Change symbols are not utilized to indicate changes in the following:

(1) Introductory material.

(2) Indexes and tabular data where the change cannot be identified.

(3) Blank space resulting from the deletion of text, an illustration, or a table.

(4) Correction of minor inaccuracies, such as spelling, punctuation, relocation of material, etc., unless such correction changes the meaning of instructive information and procedures.

P-2. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).

Personnel will assure proper maintenance has been performed by verifying dimensions and tolerances contained throughout this technical manual have been complied with.

P-3. DESCRIPTION.

a. Fuselage. The helicopter is a two-place assault type with a narrow fuselage, single main and tail rotors, short wings, and provisions for a variety of armament. The forward fuselage is built up on two main longitudinal beams with lateral bulkheads, floors, shear panels, and decks of honeycomb panel construction, forming a box beam. Crew compartments are arranged in tandem, with the pilot seated behind and above the gunner, and are covered by a transparent canopy with two doors. Both doors are sections of the canopy, hinged at top with the gunner door opening at left and the pilot door opening at right side. Both seats are protected by armor on backs, seats and sides of supports. The compartment area is ventilated by forced air from a transmission-drive blower. The short wings provide support for armament mounting pylons and also aid maneuverability by providing lift at higher airspeeds.

b. Tailboom Section. The tailboom section, attached to the forward fuselage by four bolts, is a tapered semimonocoque structure with a vertical fin slanting up and aft at the rear end to support the tail rotor. Ballast is added to the aft end of tailboom to control helicopter center of gravity limits. Lead shot is added inside the tailskid on P coded helicopters. Tail rotor driveshafts and gearboxes are mounted under covers along the top of the tailboom and front of the vertical fin. A controllable elevator is also mounted on the tailboom.

c. Propulsion System. The propulsion system consists of a gas turbine engine, main driveshaft, transmission and mast, main rotor, and tail rotor with driveshafts and gearboxes. The transmission and engine are mounted on the fuselage aft of the crew compartment and covered by cowling and fairing. The engine drives the transmission through the main driveshaft, rototating the mast and main rotor. Power is also taken off the transmission to drive the tail rotor, which compensates for main rotor torque to control the helicopter heading. Fuel tanks consist of two interconnected cells, located in the fuselage.

d. Flight Controls. Flight controls are direct mechanical linkages from sticks and pedals at pilot and gunner stations, assisted by hydraulic cylinders powered by transmission-driven hydraulic pumps. A stabilization and control augmentation system is also incorporated in the control linkage to steady the helicopter during use of armament.

e. Armament Provisions. Armament provisions include mounting, wiring, and hydraulic lines for an armament turret under the forward end of the fuselage, an ammunition compartment immediately aft of the turret location, sights and control panels at crew stations, and mounting pylons for external armament pods on each wing. Helicopters coded P utilize hydraulically operated armament turrets. Helicopters coded E and M utilize electrically operated armament turrets.

f. Landing Gear. Landing gear is skid type with arched cross tubes attached to the fuselage. Exposed portions of cross tubes are covered by streamlined fairings to reduce drag. A tail skid is provided to warn the pilot in the event of a tail-low landing.

P-4. Destruction of Army Material to Prevent Enemy Use.

For destruction of Army material to prevent enemy use, refer to TM 750-244-1-5.

P-5. Maintenance of Forms and Records.

Maintenance of forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

P-6. Authority for Substitution.

Substitution or interchange of items of materiel for maintenance of Department of the Army helicopter shall not be authorized, nor shall orders be issued for shipment. Substitution or interchangeability shall only be authorized by U.S. Army Troop Support and Aviation Readiness Command (TSARCOM).

P-7. Special Tools and Equipment.

Aviation Unit and Intermediate Maintenance special tools and equipment will be found in TM 55-1520-236-23P (Repair Parts and Special Tools List). Use of special tools and equipment for complex tasks is described in this manual.

P-8. Calibration.

Equipment requiring calibration shall be indicated and reference made to publications containing the applicable procedures.

a. Helicopter components, accessories, and instruments requiring calibration shall be specified in Chapter 1.

b. Special tools and test equipment shall be calibrated as specified in TB 750-25, Army Metrology and Calibration System.

P-9. Storage.

Refer to TM 740-90-1 and Appendix E for Storage of helicopter.

P-10. Engineering Authorization.

All requests for engineering authorization, when required by this manual will be forwarded to USA TSARCOM, ATTN: DRSTS-ME, 4300 Goodfellow Blvd., St. Louis, MO., 63120. Urgent requests shall be clearly identified to insure priority handling and response. The requests shall include detailed information on the problem, e.g., sketches, photographs, dimensional data, etc., to assist in the evaluation and prompt reply.

CHAPTER 1

AIRCRAFT GENERAL

SECTION I. SERVICING

1-1. SERVICING.

1-2. DESCRIPTION — SERVICING.

Servicing information and procedures are presented by system or components in the following paragraphs. Points used in frequent servicing and replenishment of fuels, oil, hydraulic fluid, and other materials are shown on figure 1-1.

1-3. SERVICING — FUEL SYSTEM.

a. The fuel supply tank consists of two cells, located in the fuselage forward and aft of the wings, interconnected by a crossover and vented through a common outlet line. Each cell has a sump and a fuel pump with drains (figure 1-1) accessible through doors in the fuselage lower skin. The fuel tank filler cap and static ground receptacle serve both tanks. P E The cap and adapter assembly allows for gravity refueling. M A closed circuit fueling receiver allows for closed port or open port gravity refueling.

b. Total tank capacity for the fuel system is **262** U.S. gallons, and normal service capacity is **260** U.S. gallons.

WARNING

Servicing personnel shall comply with all safety precautions and procedures specified in FM 10-68, Aircraft Refueling field manual.

c. *Closed Circuit Refueling (Power Off).*

(1) Refer to Figure 1-1 for fuel filler location .

(2) Assure that fire guard is in position with fire extinguisher.

(3) Ground servicing unit to ground stake.

(4) Ground servicing unit to helicopter.

(5) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.

(6) Remove fuel filler cap, and assure that refueling module is in locked position (refer to figure 1-1.1).

(7) Remove nozzle cap and insert nozzle into fuel receptacle and lock into position.

(8) Activate flow control handle to ON or FLOW position. Fuel flow will automatically shut off when fuel cell is full. Just prior to normal shut off, fuel flow may cycle several times, as maximum fuel level is reached.

(9) Assure that flow control handle is in OFF or NO FLOW position and remove nozzle.

(10) Replace fuel nozzle cap.

(11) Replace fuel filler cap.

(12) Disconnect fuel nozzle ground.

(13) Disconnect ground from helicopter to servicing unit.

(14) Disconnect servicing unit ground from ground stake.

(15) Return fire extinguisher to designated location.

c.1. Gravity or Open-Port Refueling (Power Off).

(1) Refer to Figure 1-1 for fuel filler location.

(2) Assure that fire guard is in position with fire extinguisher.

(3) Ground servicing unit to ground stake.

(4) Ground servicing unit to helicopter.

(5) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.

(6) Remove fuel filler cap.

(7) Using latch tool, attached to filler cap cable open refueling module if equipped with closed circuit receptacle (refer to figure 1-1.1).

(8) Remove nozzle cap and insert nozzle into fuel receptacle.

(9) Activate flow control handle to ON or FLOW position.

(10) Assure that flow control handle is in OFF or NO FLOW position and remove nozzle.

(11) Replace fuel nozzle cap.

(12) Close refueling module by pulling cable until latch is in locked position, if equipped with closed circuit receptacle (refer to figure 1-1.1).

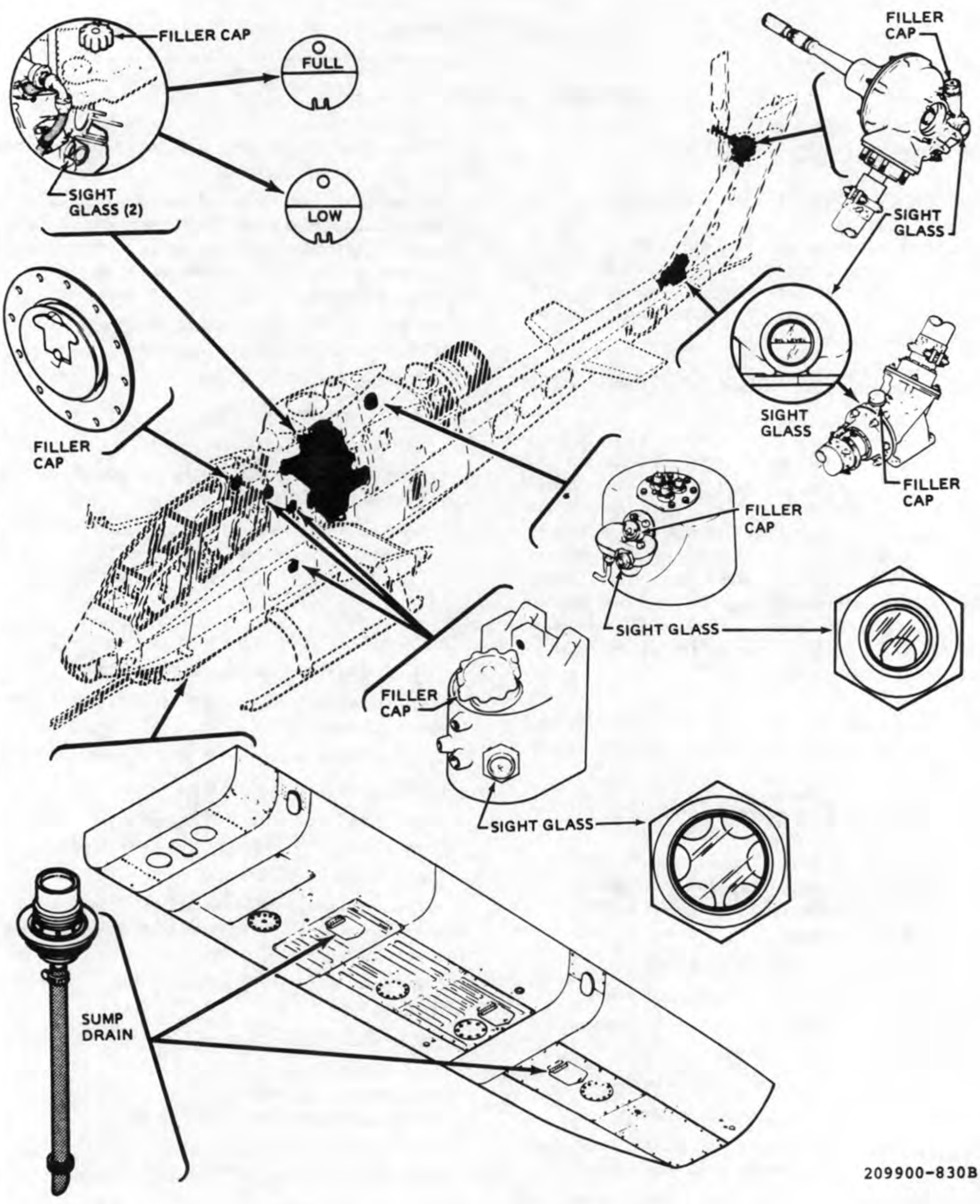


Figure 1-1. Servicing Points Diagram (Typical)

(13) Replace fuel filler cap.

(14) Disconnect fuel nozzle ground.

(15) Disconnect ground from helicopter to servicing unit.

(16) Disconnect servicing unit ground from ground stake.

(17) Return fire extinguisher to designated location.

c.2. Rapid (Hot) Refueling (Closed Circuit).

(1) Before RAPID Refueling.

(a) Throttle — Idle.

(b) FORCE TRIM Switch — FORCE TRIM.

WARNING

In case of helicopter fire, observe fire emergency procedures in Chapter 9 of TM 55-1520-236-10.

(2) During RAPID Refueling. A crewmember, shall observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required. One crewmember shall remain in the helicopter to monitor controls. Only emergency radio transmission should be made during (rapid) refueling.

(3) Refer to figure 1-1 for fuel filler location.

(4) Assure that fire guard is in position with fire extinguisher.

(5) Ground servicing unit to ground stake.

(6) Ground servicing unit to helicopter.

(7) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.

(8) Remove fuel filler cap, and assure that refueling module is in closed position (refer to figure 1-1.1.)

(9) Remove nozzle cap and insert nozzle into fuel receptacle and lock into position.

(10) Activate flow control handle to ON or FLOW position. Fuel flow will automatically shut off when fuel cell is full. Just prior to normal shutoff, fuel flow may cycle several times, as maximum fuel level is reached.

(11) Assure that flow control handle is in OFF or NO FLOW position and remove nozzle.

(12) Replace fuel nozzle cap.

(13) Replace fuel filler cap.

(14) Disconnect fuel nozzle ground.

(15) Disconnect ground from helicopter to servicing unit. AFTER RAPID REFUELING. The pilot shall be advised by the refueling crew that fuel cap is secure and grounding cables have been removed.

(16) Disconnect servicing unit ground from ground stake.

(17) Return fire extinguisher to designated location.

c.3. RAPID (HOT) GRAVITY Refueling.

(1) Before RAPID Refueling.

(a) Throttle — Idle.

(b) FORCE TRIM Switch — FORCE TRIM.

WARNING

In case of helicopter fire, observe fire emergency procedures in Chapter 9 of TM 55-1520-236-10.

(2) During RAPID Refueling. A crewmember, shall observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required. One crewmember shall remain in the helicopter to monitor controls. Only emergency radio transmission should be made during (rapid) refueling.

(3) Refer to figure 1-1 for fuel filler location.

(4) Assure that fire guard is in position with fire extinguisher.

(5) Ground servicing unit to ground stake.

(6) Ground servicing unit to helicopter.

(7) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.

(8) Remove fuel filler cap.

(9) Using latch tool, attached to filler cap cable open refueling module if equipped with closed circuit rapid refueling receptacle (refer to figure 1-1.1).

WARNING

During RAPID GRAVITY Refueling, exercise extreme caution to prevent fuel splashing from fuel cell or fuel nozzle. Any fuel leakage could be extremely hazardous if ingested into engine air intake.

(10) Remove nozzle cap and insert nozzle into fuel receptacle.

(11) Activate flow control handle to ON or FLOW position. Fuel flow will automatically shut off when cell is full.

(12) Assure that flow control handle is in OFF or NO FLOW position and remove nozzle. Close refueling module by pulling cable until latch is in locked position, if equipped with closed circuit receptacle (refer to figure 1-1.1).

(13) Replace fuel nozzle cap.

(14) Replace fuel filler cap.

(15) Disconnect fuel nozzle ground.

(16) Disconnect ground from helicopter to servicing unit. AFTER RAPID REFUELING. The pilot shall be advised by the refueling crew that fuel cap is secure and grounding cables have been removed.

(17) Disconnect servicing unit ground from ground stake.

(18) Return fire extinguisher to designated location.

d. **Defueling.**

(1) Remove lower section of drain valve from aft fuel cell.

NOTE

Aft fuel drain valve assembly is a two piece valve which will automatically close valve opening when lower valve is removed.

(2) Install AN815-12D fitting, with flexible hose installed, in valve assembly in bottom of cell. Valve will open as fitting is being installed.

(3) After defueling, remove AN815-12D fitting. Install lower section of valve and lockwire (C137).

e. **Fuel Requirements.** Fuel requirements for the engine are listed in table 1-1. A general listing of acceptable fuels is provided in table 1-2. The fuels listed in table 1-2 for each type have nearly identical characteristics. All of the fuels are compatible and may be mixed in aircraft fuel tanks. The use of fuels shall be in accordance with TB 55-9150-200-25.

WARNING

Turbine engine fuels, as well as gasoline, form explosive mixtures readily. To ensure safety of personnel, aircraft handling and filling operations shall conform to TM 10-1101 and FM 10-68.

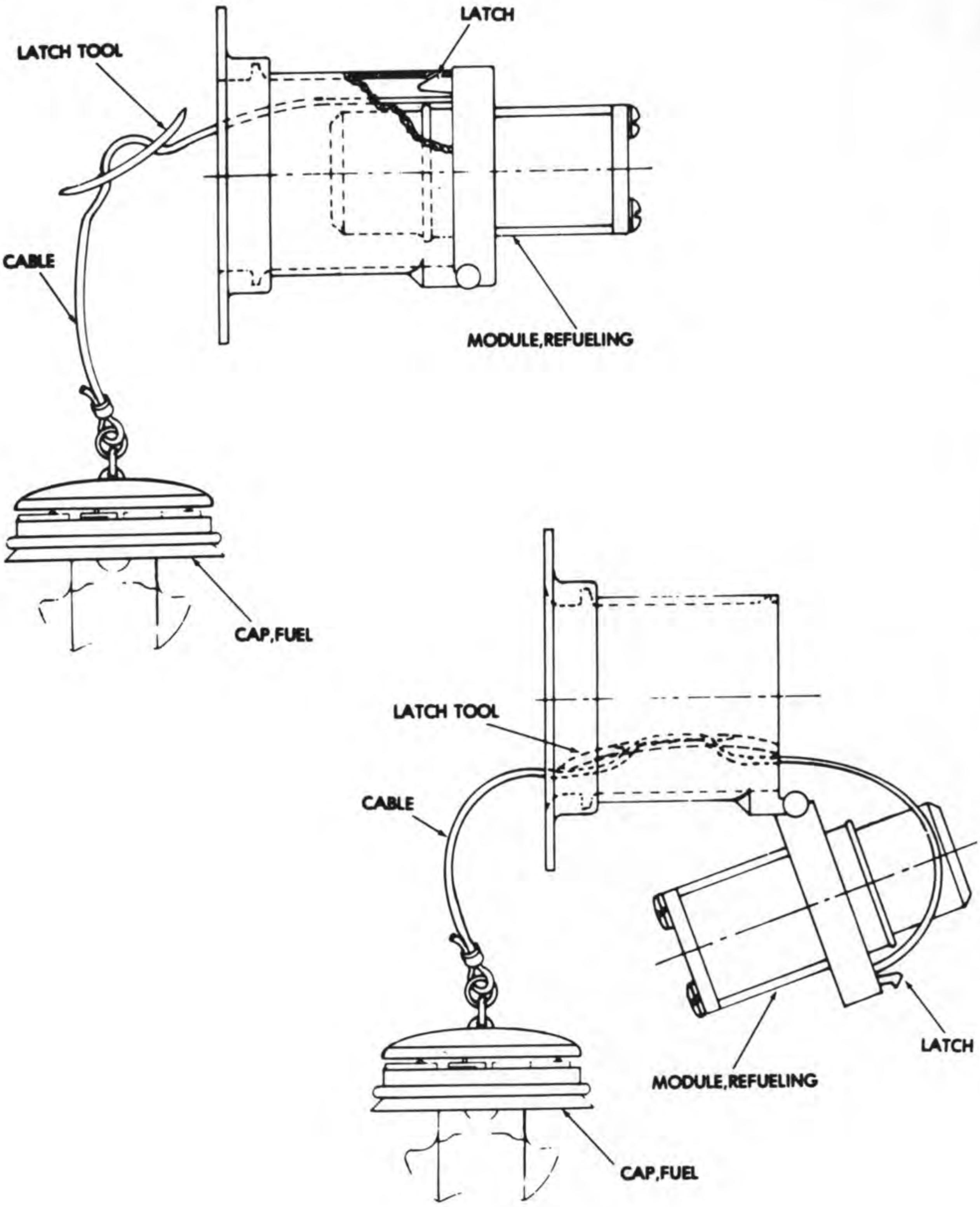


Figure 1-1.1. Receiver and Cap Assembly

Table 1-1 Engine Fuel Specifications

ARMY STANDARD FUEL		
MIL-T-5624	Grade JP-4	NATO Code F-40
ALTERNATE FUEL		
MIL-T-5624	GRADE JP-5	NATO Code F-44
MIL-T-83133	GRADE JP-8	NATO Code F-34

Note: JP-5 and JP-8 fuels may be added to JP-4 fuels in any quantity in helicopter fuel system.

EMERGENCY FUEL		
MIL-G-5572	AVIATION GASOLINE	NATO Codes F-12, F-18, and F-22
		Refer to TB 55-9150-200-25

Notes:
1. Make an entry on DA Form 2408-13 if emergency fuel is used.
2. Any mixture containing aviation gasoline is considered emergency fuel.
3. Maximum allowable engine operating time when using aviation gasoline without TCP is 50 hours.
4. Maximum allowable engine operating time when using aviation gasoline with TCP is 25 hours.

f. Fuel Types. Fuels are classified as Army Standard, Alternate, or Emergency.

(1) Army Standard Fuels: These are the Army designated primary fuels adopted for worldwide use, and will be the only fuels readily available in the Army support system.

(2) Alternate Fuels: These are fuels which can be used continuously when Army Standard fuel is not available, without reduction of power output. Power setting adjustments may be required when an alternate fuel is used.

(3) Emergency Fuels: These are fuels which can be used if Army Standard and approved Alternate fuels are not available. Their use is subject to a specific time limit. Refer to TM 55-1520-236-10.

g. Use of Fuels. There is no special limitation on the use of Army Standard fuel, but certain limitations are imposed when emergency fuels are used. For the purpose of record, fuel mixtures shall be identified as to the major component of the mixture (except when the mixture contains leaded gasoline) and recorded on DA Form 2408-13 (Aircraft Inspection and Maintenance Record). A fuel mixture which contains over 10 percent leaded gasoline shall be recorded as all leaded gasoline.

(1) The use of kerosene fuels (JP-5/JP-8) in turbine engines dictates the need for observance of special precautions. Both ground starts and air restarts at low temperature may be more difficult due to low vapor pressure. Kerosene fuels having a freezing point of -40 degrees F (-40 degrees C) limit the maximum altitude of a mission to 28,000 feet under standard day conditions. Those having a freezing point of –55 degrees F (–48 degrees C) limit the maximum altitude of a mission to 33,000 feet under standard day condition.

Table 1-2. Approved Fuels

SOURCE	PRIMARY OR STANDARD FUEL	ALTERNATE FUEL	
US MILITARY FUEL	JP-4 (MIL-T-5624)	JP-5 (MIL-T-5624) or JP-8 (MIL-T-83133)	
NATO CODE NO.	F-40 (WIDE CUT TYPE)	F-44 or F-34 (High Flash Type)	
COMMERCIAL FUEL (ASTM-D-1655)	JET B	JET A	JET A-1 NATO F-34
American Oil Co.	American JP-4	American Type A	
Atlantic Richfield	Aerojet B	Aerojet A	Aerojet A-1
Richfield Div		Richfield A	Richfield A-1
B.P. Trading	B.P.A.T.G.		B.P.A.T.K.
Caltex Petroleum Corp.	Caltex Jet B		Caltex Jet A-1
Cities Service Co.		CITGO A	
Continental Oil Co.	Conoco JP-4	Conoco Jet-50	Conoco Jet-60
Gulf Oil	Gulf Jet B	Gulf Jet A	Gulf Jet A-1
EXXON Co., USA	EXXON Turbo Fuel B	EXXON A	EXXON A-1
Mobil Oil	Mobil Jet B	Mobil Jet A	Mobil Jet A-1
Phillips Petroleum	Philjet JP-4	Philjet A-50	
Shell Oil	Aeroshell JP-4	Aeroshell 640	Aeroshell 650
Sinclair		Superjet A	Superjet A-1
Standard Oil Co.		Jet A Kerosene	Jet A-1 Kerosene
Chevron	Chevron B	Chevron A-50	Chevron A-1
Texaco	Texaco Avjet B	Avjet A	Avjet A-1
Union Oil	Union JP-4	76 Turbine Fuel	
FOREIGN FUEL	NATO F-40	JP-5 (NATO F-44 (High flash type)) JP-8 (NATO F-34 (High flash type)	
Belgium	BA-PF-2B		
Canada	3GP-22F	3-6P-24e	
Denmark	JP-4 MIL-T-5624		
France	Air 3407A		
Germany (West	VTL-9130-006	UTL-9130-007/—TL 9130-010	
Greece	JP-4 MIL-T-5624		
Italy	AA-M-C-1421	AMC-143	
Netherlands	JP-4 MIL-T-5624	D. Eng RD 2493	
Norway	JP-4 MIL-T-5624		
Portugal	JP-4 MIL-T-5624		
Turkey	JP-4 MIL-T-5624		
United Kingdom (Britain)	D. Eng RD 2454	D. Eng RD 2498	

NOTE

Anti-icing and Biocidal Additive for Commercial Turbine Engine Fuel — The fuel system icing inhibitor shall conform to MIL-I-27686. The additive provides anti-icing protection and also functions as a biocide to kill microbial growths in helicopter fuel systems. Icing inhibitor conforming to MIL-I-27686 shall be added to commercial fuel not containing an icing inhibitor during refueling operations regardless of ambient temperatures. Refueling operations shall be accompanied in accordance with accepted commercial procedures. This additive (prist or eq.) is not available in the Army Supply System, but will be locally procured when needed.

(2) The use of straight unleaded gasoline may shorten the operating life of combustor parts; therefore, its use between scheduled internal (hot end) inspections is limited. When the time limit has been reached, the use of unleaded gasoline must be discontinued pending result of internal inspection.

NOTE

Two parts of unleaded gasoline mixed with one part of kerosene fuel (JP-5/JP-8) produce a fuel which is preferred above straight unleaded gasoline. In the fueling record, this mixture should be identified as unleaded gasoline.

Unleaded gasoline leaves combustor parts clean; therefore, no special cleaning is required between sceduled internal (hot end) inspections.

(3) Leaded gasoline, either straight or mixed with other fuels in any proportion, will deposit a layer of lead oxide on combustor parts. The lead oxide attacks the underlying metal and also acts as an insulator which reduces combustion efficiency and causes the formation and deposition of carbon. Therefore, the operating time between scheduled internal (hot end) inspections is limited. If the permissible accumulated operating time is exceeded, a special cleaning and inspection is mandatory (TM 55-2840-229-24).

NOTE

Special cleaning and inspection may be delayed for 10 operating hours provided that only Army Standard fuel is used during the delay.

1-4. SERVICING — ENGINE OIL SYSTEM.

The engine oil tank is located above the engine in the aft fairing. Oil level sight gage and filler cap (figure 1-1) are on front of tank, accessible through doors on pylon center fairing. Tank drain valve is accessible through the engine compartment, and has an overboard drain line.

a. Fill engine oil tank to spill-over for normal servicing. Sight gage is positioned to show low oil level. When oil level is below spillover level the tank should be filled. Useful capacity of tank is **2.25** U.S. gallons, with expansion space of **1.15** gallons.

b. Before adding oil, determine whether system contains oil (C79) or oil (C80). Type of oil used should be shown on DA Form 2408-13. If type oil is not known, comply with paragraph **c**. Maximum oil consumption for T53-L-703 engine is **0.3** gal./hr. (2.4 US pints). The oil level sight gage is provided for the purpose of determining a low oil condition. When oil level is at sight gage level, oil supply is 2.75 ± 0.25 quarts low. When servicing oil tank, fill completely to a spill-over condition. The system warning light will come ON and the bypass valve will open when the oil is down 3.8 quarts low from spill-over.

c. Usage of Oils. It is not advisable to mix oil (MIL-L-23699) (C80) and oil (MIL-L-7808) (C79) except when an emergency exists and conditions warrant. If mixing becomes necessary, the engine oil system shall be drained within 6 hours of operations and refilled with the appropriate oil. (See subparagraphs (1) and (2) below for oil usage.) If engine oil system is to be replenished proceed in accordance with paragraph 1-4, step b. When changing from oil (C79) to oil (C80), proceed in accordance with paragraph 1-4, step d (1), steps (a) through (i). When changing from oil (C80) to oil (C79) proceed in accordance with paragraph 1-4, step d (2), steps (a) thru (i). Transmission oil system shall be serviced in accordance with paragraph 1-5. Gearboxes shall be serviced in accordance with paragraph 1-7.

(1) Oil (C80) used in engine, main transmission, and gearboxes oil systems is authorized and directed for ambient temperatures above minus 32 degrees C (minus 25 degrees F).

(2) Oil (C79) used in engine, main transmission, and gearboxes oil systems is specified for operation in ambient temperatures below minus 32 degrees C (minus 25 degrees F). This oil may also be used when oil (C80) is not available.

CAUTION

Under no circumstances shall MIL-L-23699 oil be used at temperatures below minus 32 degrees C (minus 25 degrees F).

d. Procedure for Changing Engine Oils.

(1) When changing from oil (C79) to oil (C80) in engine oil system, accomplish steps below.

(a) Take oil sample.

(b) Drain oil from system.

(c) Remove, inspect, clean, and reinstall all engine oil filters and strainers.

(d) Fill engine oil tank to lip of filler neck with oil (C80). Motor engine to pump oil into cooler and lines. Check tank level and refill. Repeat until level does not change, indicating the cooler and lines are refilled.

(e) Operate engine for **30** minutes to **1** hour. Shut down engine.

(f) Remove, inspect, clean, and reinstall all engine oil filters and strainers.

1 If oil filter was contaminated, accomplish all steps below.

2 If oil filter was not contaminated, omit steps (g) and (h) and accomplish steps (i) through (j) below.

(g) Drain all oil from engine oil system and discard oil.

(h) Fill engine oil system with new oil (C80) and release helicopter for use.

(i) After **5** hours operation, inspect and clean all engine oil filters and strainers.

(j) After **15** hours operation since oil change, remove, inspect, and clean all engine oil filters and strainers.

(k) Revert to normal schedule of inspections of engine oil filter and strainers.

(2) When changing from oil (C80) to oil (C79) in engine oil system, accomplish the following:

(a) Take oil sample.

(b) Drain oil (C80) from system.

(c) Remove, inspect, clean, and reinstall all engine oil strainers and filters.

(d) Fill engine oil tank with oil (C79); motor engine to pump oil into cooler and lines. Check tank level and add oil. Repeat until tank level does not change, indicating that cooler and lines are filled.

(e) Operate engine until oil reaches operating temperature. Shut down engine.

(f) Remove, inspect, clean, and reinstall all engine oil strainers and filter. Release helicopter for service use.

(g) After **5** hours of operation, inspect and clean all engine oil strainers and filter.

(h) After **15** hours of operation since last oil change, inspect and clean engine oil strainers and filter.

(i) Revert to normal interval of inspection for engine oil strainers and filter.

1-5. SERVICING — TRANSMISSION OIL SYSTEM.

a. The transmission oil supply is contained in the sump case. A double sight glass (figure 1-1) sump can be viewed through a small transparent plastic window in the right-hand pylon cowling door, using a light controlled by a push-button below the door. Before servicing transmission sump to upper sight glass level, determine whether system containing oil (C79) or oil (C80). If unable to determine type of oil used, comply with paragraph 1-4, step c. System capacity is 2.25 US gallons when filled to center of the upper sight glass. When filling is required, open the cowling door for access to the filler cap on the transmission support case. The sump drain valve is accessible by removing an access panel on fuselage below either wing.

b. When changing from oil (C79) to oil (C80) or from oil (C80) to oil (C79) accomplish the following steps:

(1) Take oil sample.

(2) Drain oil.

(3) Remove external filter element and inspect for contamination. Install new filter element.

(4) Remove, inspect, clean, and reinstall primary oil filter.

(5) Refill with appropriate oil (paragraph 1-4).

1-6. SERVICING — MAIN AND TAIL ROTOR SYSTEMS.

Main and tail rotor systems require no normal servicing. Lubrication requirements are covered in paragraph 1-28.

1-7. INTERMEDIATE AND TAIL ROTOR DRIVE GEARBOXES.

The intermediate gearbox is under a removable cover, located between driveshaft covers of tailboom and vertical fin. An oil level sight glass (figure 1-1), a chip detector, and drain plug, are on the right side of the gearbox; a vented filler cap is on the top side of the gearbox. The tail rotor drive gearbox is covered by two removable fairings near upper end of the vertical fin. An oil level sight glass (2) is provided on lower left side, a chip detector and drain plug at bottom, and a vented filler cap on the aft side of the gearbox.

a. Before servicing either gearbox to indicated sight glass level with lubricating oil, determine whether system contains oil (C79) or oil (C80). If unable to determine type of oil used, refer to paragraph 1-4.

b. When changing from oil (C79) to oil (C80) or from oil (C80) to oil (C79) accomplish the following steps:

(1) Take oil sample.

(2) Drain oil.

(3) Perform normal inspection.

(4) Refill with appropriate oil (paragraph 1-4).

1-8. SERVICING — HYDRAULIC RESERVOIRS.

Reservoirs (figure 1-1) for hydraulic systems No. 1 and No. 2 are located in a compartment just aft of the canopy. Access doors are provided at both sides of the fuselage. Fluid level sight glasses on both reservoirs are visible through left side door. Each reservoir has a filler cap accessible from nearest door. The reservoir for the electrical emergency hydraulic system is located behind a panel on the fuselage below the right wing. For systems serviced with fire resistant hydraulic fluid, refer to TB 55-1500-334-25.

WARNING

When handling hydraulic fluid (MIL-H-83282), Table 1-3, Item 61, observe the following:

— Prolonged contact with liquid or mist can irritate eyes and skin.

— After any prolonged contact with skin, immediately wash contacted area with soap and water. If liquid contacts eyes, flush them immediately with clear water.

— If liquid is swallowed, do not induce vomiting; get immediate medical attention.

— Wear rubber gloves when handling liquid. If prolonged contact with mist is likely, wear an appropriate respirator.

— When fluid is decomposed by heating, toxic gases are released.

a. Open access doors and remove panel to gain access to hydraulic reservoirs.

WARNING

To avoid contamination, a sealed can of fluid must be opened and used. Do not use previously opened cans of hydraulic fluid.

b. Service reservoirs with hydraulic fluid (C60 or C61).

c. Close access door or reinstall panel.

1-9. SERVICING — GROUND HANDLING GEAR.

a. Lubricate assemblies with grease (C58) through fittings on wheels, actuating arms, and cradles as frequently as operating conditions warrant.

b. Repair tires and tubes in accordance with TM 55-2620-200-24. Inflate with compressed air to **50 psi.**

c. Check and fill hydraulic pump as required.

(1) Hold handling gear assembly so that pump is vertical with filler hole at upper end. Remove screw from filler hole.

(2) Fill pump to filler hole level with hydraulic fluid (C62). Reinstall screw in filler hole.

1-10. SERVICING — BATTERY.

WARNING

- **Corrosive Battery Electrolyte (Potassium Hydroxide). Wear rubber gloves, apron and face shield when handling leaking batteries. If potassium hydroxide is spilled on clothing, or other material, wash immediately with clean water. If spilled on personnel, immediately start flushing the affected area with clean water. Continue washing until medical assistance arrives.**

- **Battery failure and explosions may be caused by an excess of electrolyte in the cells. The specific gravity of a nickel-cadmium battery remains constant when the battery is in either a charged or discharged condition, consequently the state of charge cannot be determined by a test of the electrolyte. Neither can the state of charge be determined by a voltage test, due to the fact that the voltage remains constant over 90 percent of the discharge time. Since the state of charge cannot be determined by a check of either voltage or the electrolyte, the charging input to a completely discharged battery must be monitored in both current and time until the ampere hour capacity of the battery has been reached.**

The nickel-cadmium battery is mounted in BATTERY compartment. The battery is a 24 volt 22 ampere-hour battery unit. It is connected to the helicopter electrical system through a relay which is controlled by the battery switch on the pilot console. Two overflow, or vent, tubes extend from the battery to the outside of the fuselage. Access to the battery is gained through a door in the helicopter battery compartment. The battery shall be removed from the helicopter at 100 hour intervals or 120 calendar day inspection, whichever comes first, and sent to the Battery Shop for inspection, repair, charging capacity test, and adjustment of electrolyte level. For additional servicing instructions refer to TM 11-6140-203-15-2.

1-11. CLEANING OF HELICOPTER.

1-12. DESCRIPTION — CLEANING OF HELICOPTER.

Cleaning procedures and information are presented in the following paragraphs. Helicopter must be grounded prior to any cleaning maintenance, disassembly, or preservation. See TM 55-1500-333-24 for additional cleaning information.

CAUTION

To preclude damage to bonded panels, solvents and water are to be applied at the minimum pressure required to maintain a constant flow suitable for washing and rinsing. Steam is not to be utilized.

NOTE

Additional cleaning procedures are covered in this manual under individual components.

1-13. CLEANING — INTERIOR.

Clean the interior of the helicopter to prevent debris from falling into operating mechanisms. If the seats and cushions need cleaning, use mild soap (C113) and water. To remove grease or oil spots use cleaning compound (C133). Wipe dry with a clean cloth. Finally, thoroughly clean the helicopter with a vacuum cleaner.

1-14. CLEANING — EXTERIOR.

Clean the exterior structure by applying a mixture of one part cleaning compound (C33) and three to seven parts water. Use the stronger mixtures for exhaust outlet areas and other very dirty surfaces. Wash a small area at a time making sure to rinse thoroughly with water under pressure. If allowed to dry or if not completely rinsed off, streaking will occur.

1-15. CLEANING — ACRYLIC PLASTIC.

CAUTION

Do not use compounds other than those specified. Avoid excessive scrubbing of plastic panels during washing operation.

a. Clean all transparent acrylic plastic with cleaning compound (C33) mixed with three to seven parts of water.

b. Gently free all caked mud or dirt with fingers. Do not use sponges or coarse cloths. Rinse the area continuously while removing the mud.

WARNING

Solvent shall be used with adequate ventilation and prolonged breathing of the vapors shall be avoided. The solvent shall not be used near open flames or heat as the products of decomposition are toxic and very irritating. Avoid contact with skin. Wear rubber gloves.

CAUTION

To prevent plastic discoloration do not use aliphatic naphtha (Type 1).

c. Remove grease or oil with aliphatic naphtha, Type 2 (C75).

d. Allow surfaces to drip dry.

e. Minor scratches may be reduced or removed (TB 55-1560-276-24/1).

f. Apply repellant and conditioner (C94).

1-16. CLEANING — ROTOR BLADES.

CAUTION

Clean K747 main rotor blades only in accordance with paragraph 5-28.

NOTE

Do not spray or rinse main rotor hub with water under pressure.

a. Wash rotor blades with one part cleaning compound (C33) and nine parts water.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Remove stubborn deposits with a cloth dampened with solvent (C112).

1-17. TREATMENT OF ALUMINUM AND MAGNESIUM ALLOY CORROSION.

Aluminum and magnesium alloy corrosion will be treated in accordance with TM 43-0105. Apply the protective paint finish to the affected area immediately after drying of chemical treatment in accordance with TB 746-93-2.

1-18. REMOVAL OF SNOW AND ICE.

CAUTION

Do not chip ice off, as damage to helicopter may result.

a. Check entire helicopter for snow, frost, and ice accumulation. Snow can be removed from airframe and rotor blades by using a bristle brush or equivalent. Ensure that helicopter skids are not frozen to ground.

CAUTION

Extreme care must be exercised when melting ice and frost with applied heat. Water accumulation may flow into critical areas in proximity to heat application. If heat gun is used, exercise caution to prevent excessive heat from damaging rotor blades, bonded panels, metal surfaces, and paint.

b. Frost or Moderate Ice. Apply heat to ice accumulations and dry with rags as melting occurs.

c. Severe Ice Accumulation. Helicopter should be moved into a warm hangar, when possible, for natural de-icing.

WARNING

De-icing fluids are toxic irritants; protective precautionary measures apply.

CAUTION

Because of adverse effects of heated de-icing fluid, precaution must be taken to protect bearings, plastic windows, covers, and boots.

d. Apply de-icing/defrosting fluid (C48) to remove ice or heavy accumulations and to retard recurrence. Fluid may be applied with a low pressure spray or a brush, and will provide retarding protection for approximately 10 hours.

e. Upon completion of de-icing procedures, check all controls for ice and freedom of movement.

1-19. CONSUMABLE MAINTENANCE SUPPLIES AND MATERIALS.

1-20. DESCRIPTION — CONSUMABLE MAINTENANCE SUPPLIES AND MATERIALS.

Consumable maintenance supplies and materials are listed in table 1-3 in alphabetical order. Each consumable also has an item number assigned for ease of location and reference. When an item number is unknown, you may locate any consumables used within this manual through its alphabetical arrangement. When an item number is referenced in the manual, you may locate the item through its C designator and item number. C designators are used only with consumable maintenance supplies and materials; tables are found only in this chapter; therefore, the table number will not be referenced in the text.

Table 1-3. Consumable Maintenance Supplies and Materials

The supplies and material listed in this table are required for maintenance support of this equipment and are authorized to be requisitioned by SB 700-50.

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
1	Acid, Chromic, Type II	O-C-303	6810-00-264-6517
2	Acid, Hydrochloric (Muriatic)	O-H-765	6810-00-222-9641
3	Acid Nitric	O-N-350	6810-00-237-2918
4	Adhesive, AS401-1	(94565)	
5	Adhesive, A-6 with Activator A	A6 (98911)	8040-00-691-1322
6	Adhesive, EC-776	MMM-A-122	8040-00-664-0439
7	Adhesive, EC2216-BA Scotchweld	(94960)	8040-00-145-0019
8	Adhesive, Metalset A-4	MMM-A-1754	8040-00-944-7292
8.1	Adhesive Epoxy, RP1258	MMM-A-1754	8040-00-944-7292
9	Adhesive, Organocerams No. 4-3011. Type I	(92707)	

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
10	Adhesive, PS-30	(77902)	8040-00-526-1910
11	Adhesive, RTU 108, Type I	(01139)	8040-00-843-0802
12	Adhesive, Rubber Base, EC2126	MMM-A-1617	8040-00-281-1977
13	Adhesive Sealant, Silicone RTV, General Purpose (RTV732)	MIL-A-46106A, Type 1	8040-00-833-9563
14	Adhesive, Two-Part	EA934NA	8040-01-102-2098
15	Adhesive, EA9309	299-947-125 Type I (33564)	
15.1	Adhesive, EA9320	299-947-125, Type II, Class 2 (33564)	
16	Adhesive, Two-Part Dapcotac 3300, Type I	(92807)	8040-00-936-4672
17	Adhesive, Uralane (Part A and B) EC3549, Type I	(55101)	6810-00-275-6010
18	Alcohol, Methyl	O-M-232F	6810-00-275-6010
19	Alcoholic Phosphoric Solution, Type A	MIL-C-490	
20	Aluminum Wool	MIL-A-4864, Type	5350-00-286-4851
21	Antiseize Compound	MIL-A-907	8030-00-597-5367
22	Barrier Material, Grease-Proofed	MIL-B-121, Grade A	8135-00-224-8885
23	Barrier Material, Waterproof, Vaporproof	MIL-B-131, Class 1	8135-00-282-0565

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
24	Bungee Cord, Type I	MIL-C-5651	8305-00-267-3119
25	Cadmium Plate Process, Dulic or Selectron Brush	(13429)	
26	Cap, Protective	NAS816-158	5340-00-815-0890
27	Cellophane		
28	Cement (EC1357)	MMM-A-121 (76381)	8040-00-165-8614
29	Cement, 3230	MIL-A-9117 (89373)	8040-00-262-9060
30	Cheesecloth	CCC-C-440 (81348)	8305-00-267-3015
31	Chemical Film, Alodine No. 1200S	MIL-C-81706 (84563)	8030-00-057-2354
32	Cleaning and Polishing Compound, Biodegradable	P-P-560	7930-00-634-5340
33	Cleaning Compound, Aircraft Surface, Alkaline, Waterbase	MIL-C-25769	6850-00-935-0995
34	Cleaning Compound, Aluminum Nonflame Sustaining	MIL-C-5410	6850-00-282-6770
35	Cleaning Compound, Oil Cooler Solvent	MIL-C-6864	6850-00-551-3694
36	Cloth, Abrasive	P-C-451	5350-00-192-5050
37	Cloth, Crocus	P-C-458	5350-00-221-0872
38	Cloth, Fiberglass, Type VIII A, Class 2 (0.010 inch thick)		
39	Coating, Erosion Guard	(03481)	
40	Corrosion Preventive, Aircraft Engine, Type III	MIL-C-6529	6850-00-281-2031
41	Corrosion Preventive Compound, Cold Application, Solvent Cutback, Grade 1	MIL-C-16173	8030-00-231-2345

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
41	Corrosion Preventive Compound, Cold Application, Solvent Cutback, Grade 1	MIL-C-16173	8030-00-231-2345

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
42	Corrosion Preventive Compound DOW 19	MIL-M-3171, Type VI	
43	Corrosion Preventive Compound, Cold Application, Solvent Cutback, Grade 11	MIL-C-16173	8030-00-244-1297
44	Corrosion Preventive Compound, Hot Application, Class 3, 424450 PC7	MIL-C-11796	8030-00-231-2353
44.1	Corrosion Preventive Concentrate (Brayco 599)	(98308)	6850-00-142-9582
44.2	Corrosion Preventive Fingerprint Remover	MIL-C-15074	8030-00-664-4017
45	Corrosion Removing and Metal Conditioning Compound (Phosphoric Acid Base)	MIL-C-10578	6850-00-854-7952
46	Cushioning Material, Bound Fiber, Type VI, Class A	PPP-C-1120	8135-00-989-9888
47	Cushioning Material, Fiber, Type IV	MIL-C-7709	
48	De-icing/Defrosting Fluid	MIL-A-8243	6850-00-558-1248
49	Desiccant, Packaging	MIL-D-3464	6850-00-264-6573
50	Detergent, General Purpose	MIL-D-16791	7930-00-985-6911
51	Etchant, Tetraetch	Tetraetch (17217)	6850-00-431-8662
52	Fabric, Sandwich, 5060	(89373)	
53	Fabric, Synthetic, Buna N Impregnated — 506b	(89616)	
54	Gloves, White Cotton	MIL-G-3866	
55	Grease, Aircraft, Oscillating Bearing	MIL-G-25537	9150-00-478-0055
56	Grease, Extreme Pressure (Tube Pack)	204-040-755-5 (97499) or (ASN TECH 3913-GI)	9150-00-506-8497

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
57	Grease (Lubriplate)	Aerolubriplate (73219)	9150-00-068-6268
58	Grease, Aircraft Multipurpose	MIL-G-81322	9150-00-944-8953
59	Grease Silicone, Dow Corning II, or Equivalent	8490010	9150-00-616-9212
60	Grease, Ball and Roller	DC33 Fluid (71984) ASUM 100 (78510)	9150-00-823-8048
61	Hydraulic Fluid, Fire Resistant	MIL-H-83282	9150-00-149-7431
62	Hydraulic Fluid, Petroleum Base	MIL-H-5606	9150-00-180-6181
63	Hydraulic Fluid Preservative, Petroleum Base, Type 1	MIL-H-6083	9150-00-935-9807
64	Isopropyl Alcohol	TT-I-735	6810-00-855-6160
65	Lacquer, Acrylic Black, 37033	MIL-L-19538	8010-00-527-2884
66	Lacquer, Camouflage Gray, 36231	TT-L-20	8010-00-515-1568
67	Lacquer, Acrylic, Low Reflective, Aircraft Green	MIL-L-46159, Type I	
67.1	Lacquer, Acrylic Resin	MIL-L-46159ATY2, Olive Drab	8010-01-016-1488
68	Lacquer, Acrylic, Olive Drab, Camouflage, X34087	MIL-L-81352	8010-00-144-9998
69	Lacquer, Acrylic, Orange-Yellow, 33538	MIL-L-19538	8010-00-530-6387
70	Lacquer, Aluminized	MIL-L-81352	
71	Lacquer, Acrylic Red, 31136	MIL-L-81352	
72	Lacquer, Acrylic White, 37875	MIL-L-81352	
73	Lubricant	ASU-M100 (78511)	9150-00-823-8048
74	Methyl-Ethyl-Ketone (MEK)	TT-M-261	6810-00-281-2785
75	Naphtha, Aliphatic, Type 2	TT-N-95	6810-00-238-8119

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
76	Oil, Corrosion Preventive, Grade B	MIL-C-8188	6850-00-273-2395
77	Oil, Lubricating, Jet Engine (Grade 1010)	MIL-L-6081	9150-00-273-2388
78	Oil, Lubricating, Low Temperature, General Purpose	MIL-L-7870	9150-00-263-3490
79	Oil, Lubricating, Synthetic Base	MIL-L-7808	9150-00-782-2627
80	Oil, Lubricating, Synthetic Base	MIL-L-23699	9150-00-180-6266
81	Oil, Penetrating	VV-P-216	9150-00-261-7899
82	Pads, Abrasive, Nylon Web	L–P–0050 (27713) (76381)	7920-00-659-9175
83	Peel Ply	(88730)	
84	Pigment, Aluminized	TT-P-320	8010-00-687-4019
85	Plastilube, Moly No. 3	Plastilube Moly 3 (02307)	9150-00-141-4481
86	Polycarbonate Material	(19511), (15601), (97993)	
86.1	Polyurethane, Color Black, 37038	MIL-C-81773	8010-00-181-8220
87	Primer, A934B	A934B (03481)	8040-00-943-2502
88	Primer, Epoxy Polyamide	MIL-P-23377	8010-00-082-2450
89	Primer, Silicone Adhesive, 1200RTV	SS4004 (01139)	8010-00-701-9616
90	Primer, Silicone Adhesive S–2260	(02988)	
91	Primer, Zinc Chromate	TT-P-1757, MIL-P-8585	8010-00-297-0593
92	Prussian Blue Paste, Bearing Surface (thinned with oil)	MIL-P-30501	8010-00-281-4105
93	Putty, Zinc Chromate	MIL-P-8116	8030-00-664-4968

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
94	Rain Repellent Windshield	MIL-W-006882	6850-00-139-5297
95	Remover, Paint	TT-R-248B	8010-00-515-2258
96	Remover, Paint, Epoxy System	MIL-R-81294	8010-00-926-1488
97	Repair Kit, Infrared Suppression System	205-706-083-1 (97499)	1560-00-103-3459
98	Resin Epoxy, Liquid EA 828 and Catalyst Diethylenetramine (DTA)	MIL-R-9000 O-D-1271	8040-00-822-6430 6810-00-995-4804
99	Rubber, Polyurethane	MIL-R-83397	
100	Rubber, Silicone, RTV	(71984)	
101	Rubber Strip, Type II, Grade A, Soft	MIL-R-6130	9320-00-814-4583
102	Sandpaper	P-P-101	5350-00-224-7205
103	Scotchbrite, Type I, Class 1, Size I	L-P-0050 (81348)	7920-00-659-9175
104	Deleted — Replaced by C107		
105	Sealant, Polysulfide (Proseal 890, Class B-2)	EC 1675B2 (04963)	8030-00-140-9573
106	Sealing Compound, Locking and Retaining, Single Component	MIL-S-22473	8030-00-081-2326
107	Sealing Compound, Low Adhesion (Proseal 706)	MIL-S-8784 Proseal 706B2 (83527)	8030-00-616-9191
107.1	Sealing Compound Brushable CLA-1/2	Mil-S-8784	8030-00-291-8380
107.2	Sealing Compound Brushable CLA-2	Mil-S-8784	8030-00-152-0062
107.3	Sealing Compound Extrudable CLB-1/2	Mil-S-8784	8030-00-152-0022
107.4	Sealing Compound Extrudable CLB-2	Mil-S-8784	8030-00-680-2041

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
108	Shellac, Type 2, Grade A, Body 1	TT-S-300	8010-00-577-4816
109	Shot, Lead No. 8	10511620(19200)	9650-00-312-6640
110	Silicone Compound	MIL-S-8660	6850-00-880-7616
111	Smoother, Aerodynamic, EA960, Type I, RP-1257-3	EA 960A-B (38564)	8010-00-006-7089
112	Solvent, Dry Cleaning, Type 1	P-D-680	6850-00-264-9038

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
113	Soap, Liquid (Detergent)	P-S-624	8520-00-228-0598
114	Soap, Toilet, Cake	P-S-620	8520-00-531-6484
115	Steel Wool	FF-W-1825	5350-00-240-2920
116	Stone, India, Fine	SSS736	5345-00-144-6894
117	Talc, Technical	MIL-T-50036	
118	Tape, Antichafe Teflon	5490 (76381)	7510-00-923-0591
119	Tack Rag	(91106)	
120	Tape, Dissimilar Metal Separation	MIL-T-23142	7510-00-472-4021
121	Tape, Electrical, Black	MIL-I-24391	5970-00-419-4290
122	Tape, Insulation Spiral Wrap (0.006 x 1.0 inch)	MIL-I-18746	5970-00-935-0098
123	Tape, Masking	PPP-T-42	7510-00-290-2026
124	Tape Mystic, 7455	(83301)	7510-00-180-6288
125	Tape, Pressure Sensitive	Y9265A (76381)	7510-00-145-0171
126	Tape, Pressure Sensitive, Flame Resistant Glasscloth No. 360, 2 inch wide	(76381)	
127	Tape, Pressure Sensitive, Waterproof, Type II	PPP-T-60	7510-00-663-0199
128	Tape, Teflon, Self-Adhesive	MIL-I-23594	5970-00-812-7387
129	Thinner, Acrylic Lacquer	MIL-T-19544	8010-00-527-2897
130	Toluene	TT-T-548	6810-00-281-2002

Table 1-3. Consumable Maintenance Supplies and Materials (Cont)

ITEM NO.	DESCRIPTION/ NOMENCLATURE	REFERENCE NUMBER, AND FSCM	NSN
131	Toluene-Methyl Isobutyl Ketone Mixture	MIL-T-19588	6810-00-286-0458
132	Trichloroethylene Technical	O-T-634	6810-00-184-4800
133	Trichlorotrifluoroethane Cleaning Compound	MIL-C-81302	6850-00-033-8851
134	Varnish, Alkali-Resistant	MS35637-1	8010-00-597-7856
135	Wax, Solvent-Type Waterproof, Aircraft	MIL-W-18723	7930-00-267-5588
136	Wire, Steel (Lockwire)	MS20995C20	9505-00-221-2650
137	Wire, Steel (Lockwire)	MS20995C32	9505-00-293-4208
138	Wire, Steel (Lockwire)	MS20995C41	9505-00-804-3814
139	Trichloroethane, Technical, Inhibited	O-T-620C	6810-00-664-0387

1-21. SPECIAL TOOLS AND TEST EQUIPMENT.

1-22. DESCRIPTION — SPECIAL TOOLS AND TEST EQUIPMENT.

Special tools and test equipment are listed in table 1-4 in alpha-numeric order. Each tool or piece of test equipment has an item number assigned for ease of location and reference. When an item number is unknown, you may locate special tools and test equipment through alphanumeric arrangement within the table. When an item is referenced in the manual, you may locate the item through its T designator and item number. T designators are used only with special tools and test equipment. The special tools and test equipment table is found only within this chapter; therefore, the table number will not be referenced within the text. A complete listing of all special tools and test equipment authorized for use to perform maintenance on helicopter/accesories are contained in the helicopter parts manuals.

1-23. USABILITY CODES/CALIBRATION.

The usability code identifies the purpose(s) for which the tool is designed. Codes are:

A - Assembly

AD - Adjustment

D - Disassembly

I - Inspection

IN - Installation

R - Removal

RP - Repair/Replace

S/P - Storage/Preservation

T - Testing

Table 1-4. Special Tools and Test Equipment

ITEM NO.	PART NO.	NOMENCLATURE	USABILITY CODE CALIBRATION	FIGURE REFERENCE
1	AN/USM-23	Milliammeter	T	
2	AN/USM-223	Multimeter	T	
3	AN/USM-303A	Multimeter	T	
4	AN8514-2	Spanner Wrench	R/IN	
5	D9T626	Round Fire Simulator (G.E)	T	
6	204-011-178-1	Crash Rescue Clevis	R/IN	1-6
7	F-50	Air Pressure Gage	T	
7.1	JTB Model 33FS (or equivalent)	Frequency Meter	T	
8	K747-401-1	Blade Repair Tool Set	RP	
9	LTCT 773	Engine Sling	R/IN	
10	MB1	Airspeed Simulator	T	

Table 1-4. Special Tools and Test Equipment (Cont)

ITEM NO.	PART NO.	NOMENCLATURE	USABILITY CODE CALIBRATION	FIGURE REFERENCE
11	MJ2A	Portable Hydraulic Test Stand	T	
12	MP1	Pressure Tester (0-150 PSI)	T	
13	M1A1	Gunner Control Quadrant	T	
14	NC2A	Auxiliary Power Unit	T	
15	PD1201	Torque Multiplier	R/IN/D/A	
16	PD2659	Mast Nut Socket	R/IN/D/A	
17	PD2660	Reaction Adapter	R/IN	
18	RO2-4CO-RMM-AU	Regulator	T	
19	SWE13851	Stand, Engine and Transmission	D/A/RP	
20	TK-100/G	Tool Kit	T	
21	TTU-27E	Tachometer Test Set	T	
22	141000310-1	Torque Fixture	R/IN	7-13
23	T100619-2	Torque Fixture	R/IN	7-13
24	T100220	Sling, Rotor	R/IN	
25	T101306	External Spline Wrench, Main Driveshaft	R/IN	
26	T101307	Wrench Assembly	D/A	
27	T101308	Jackscrew Set	R	
28	T101338	Jackscrew Set	R	
29	T101356	Build-up Bench, Main Rotor	R/IN/D A/AD	
30	T101401	Scope Assembly	AD	
31	T101414	Blade Bolt Wrench	R/IN	
32	T101419	Alignment Tool Set	T	
33	T101420	Holding Fixture	T	

Table 1-4. Special Tools and Test Equipment (Cont)

ITEM NO.	PART NO.	NOMENCLATURE	USABILITY CODE CALIBRATION	FIGURE REFERENCE
34	T101421	Adapter Plate	R/IN/D/A/AD	5-6
35	T101440	Jack Set	AD	
35.1	T101447	Holding Fixture	D/A	
36	T101449	Wrench, Transmission Fan Drive Quill	D/A	
37	T101455	Holding Plate Assembly	D/A	6-44, 6-45
38	T101467	Scope Assembly Support	AD	
39	T101468	Flap Stop	AD	
40	T101475	Bearing Tool	RP	
41	T101485	Bending Gage	AD	
42	T101487	Bearing and Seal Tool	RP	
43	T101488	Input Quill Wrench	D/A	
44	T101491	Hub Bearing Puller	RP	
45	T101520	Hoist Assembly	R/IN	
46	T101524	Rigging Fixture, Flight Controls	AD	
47	T101525	Tab Bender, Main Rotor Blade	AD	
48	T101530	Staking Tool	RP	
49	T101549	Holding Fixture, Transmission	D/A	
50	T101550	Disassembly Tool, Transmission	D	
51	T101551	Puller	D	
52	T101553	Tool Set	A	
53	T101559	Grip Spacing Gage	AD	

Table 1-4. Special Tools and Test Equipment (Cont)

ITEM NO.	PART NO.	NOMENCLATURE	USABILITY CODE CALIBRATION	FIGURE REFERENCE
54	T101577	Staking Tool	RP	
55	T101600	Duplex Bearing Nut Wrench	R/IN/D	
56	T101726	Backlash Tool	I	
57	T101727	Holding Fixture	D/A	
58	T101736	Duplex Bearing Nut Wrench	D/A	
59	T101864	Grip Lock, Main Rotor	R/IN/D/ A/AD	
60	T100929	Jackscrew Set	R	
61	T102095	Bearing Staking Tool Set	RP	
62	ZM4AU	Resistance Bridge	T	
63	ZU4BU	Resistance Bridge	T	
64	1520-EG-007	Installation Tool, Damper Seal	I	
65	188F680	Turret Handling Adapter	R/IN	
66	209-071-239-1	Wrench, Rack Release	R/IN	
66.1	209-071-244	Pin, Ground Safety	T	
67	209-071-244-1	Wrench, Rack Release	R/IN	16-2
68	BH112JB53	Tester Exhaust Gas Temperature	T	
69	2480	Field Indicator, (Magnetometer), or equivalent	I	
70	3234107-100	TOW Simulator Evaluation Missile (HAC)	T	
71	3B5000B	MJ-3(SP) Lift Truck	R/IN	
72	42M76	Transmission Stand	R/IN	

Table 1-4. Special Tools and Test Equipment (Cont)

ITEM NO.	PART NO.	NOMENCLATURE	USABILITY CODE CALIBRATION	FIGURE REFERENCE
73	7A050	Rotor Balance Kit	AD	
74	7HEL066	Adapter Kit, Main Rotor Balancing	AD	
75	7HEL074	Plate, Tail Rotor Balancing	AD	
76	94251	Seal Installation Tool	IN	
77	USM-273	Multimeter	T	
78	N-3A	Electric Thermometer Tester, Field Type	T	
79	387991-003	Field Calibration Unit	T	
80	S22	Packing Seating Tool, Ground Handling Gear Cylinder	I	
81	S135	Packing Seating Tool, Ground Handling Gear Cylinder	I	
82	209-071-275	Ejector Rack Alignment Fixture		
83	114-99194	TSU Boresight Device		
84		Packing Nut Tool (Workaid)	AD	
85	S69	Windshield Maintenance Kit	RP	
86	EAB20	Acrylic Plastic Polishing Kit	RP	
87	1045864	Corrector Lens Assembly (HAC)	T	
88	1045882 or 1045879	IR Target Assembly (HAC)	T	
89	50-T	Sealing Iron FCM 19838		

1-24. SUPPORT EQUIPMENT.

1-25. DESCRIPTION — SUPPORT EQUIPMENT.

All support equipment is listed on table 1-5 in alphanumerical order. S designators and item numbers are used in text to identify support equipment.

Table 1-5. Support Equipment

ITEM NO.	PART NO.	NOMENCLATURE
1	AF5	Dispenser, Hydraulic Fluid
2	D-5A	Test Stand, Hydraulic
3	1214-30B	Jack, Hydraulic, Hand 10 Ton
4	204-011-178-1	Clevis Assembly Rescue
5	204-050-200-5	Ground Handling Gear Assembly
6	209-030-195-1	Jack Fitting, Aft
7	209-030-245-1	Jack Fitting, Fwd
8	209-030-405-1	Jack Fitting, Wing
9	50K25177 (B5)	Jack, Hydraulic Tripod
10	51E24854	Maintenance Platform
11	601364-1	Tow Bar
12		Electrical Auxiliary Power Unit
13		Gage, Hydraulic Pressure 0-3000 PSI
14	30FC10	Manometer, Water
15		Regulator, Air Flow

1-26. SURFACE FINISHES.

1-26A. DESCRIPTION — SURFACE FINISHES.

Surface finish can be identified by one of the following methods: Root Mean Square (RMS), Roughness Height Rating (RHR), or Micro-Inches. These methods refer to the average linear deviation of the actual surface. This manual will list the surface finish by the RMS method and this finish can be obtained using the appropriate abrasive grit as listed in table 1-6.

Table 1-6. Root Mean Square/Abrasive Grit Equivalency

NOTE

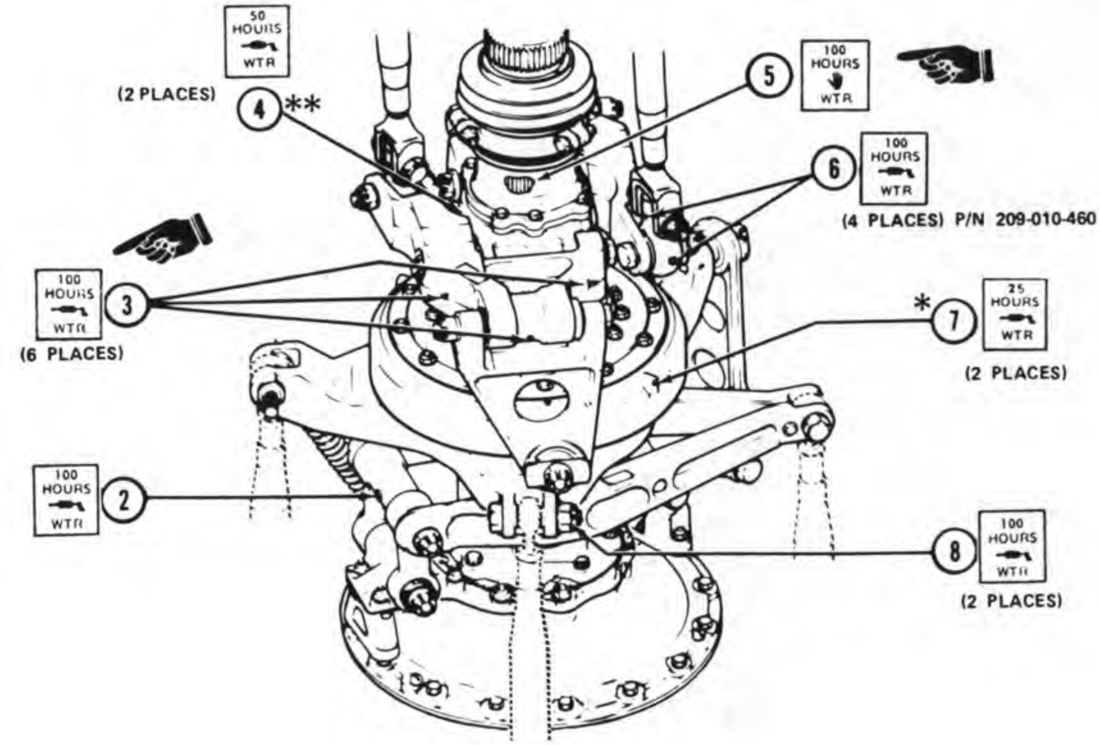
This table was developed by USATSARCOM Engineering as a ready reference means of achieving the various Root Mean Square (RMS) finishes specified in this manual.

4 - 16 Micro-Inches (RMS)	500 Abrasive Grit
10 - 32 Micro-Inches (RMS)	320 Abrasive Grit
15 - 63 Micro-Inches (RMS)	240 Abrasive Grit
85 Maximum Micro-Inches (RMS)	180 Abrasive Grit
125 Maximum Micro-Inches (RMS)	120 Abrasive Grit
250 Maximum Micro-Inches (RMS)	60 Abrasive Grit

1-27. ADHESIVE MIX RATIO, POT LIFE AND CURE CYCLES.

When bonding procedures are required, refer to table 1-11 for instructions for proper use of adhesives.

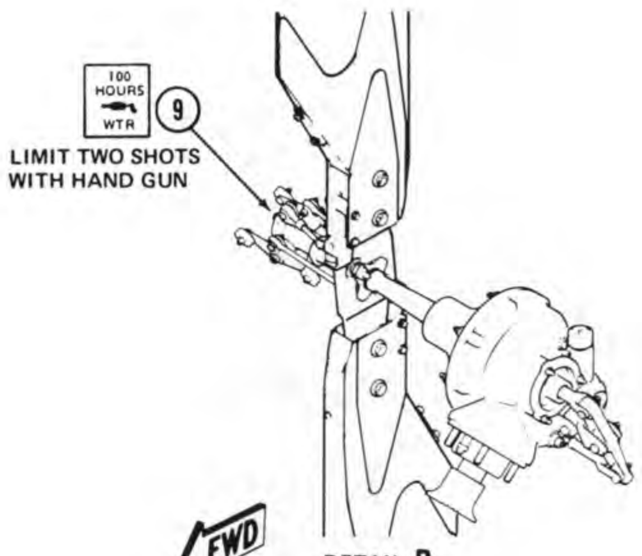
All data on pages 1-25 through 1-40, including figures 1-2 through 1-4 and tables 1-7 through 1-10, deleted.



DETAIL **A**
PYLON CONTROLS

* DISCONNECT DRIVE LINKS ROTATE SWASHPLATE, GREASE AT 30° INTERVALS THROUGH FULL 360°.

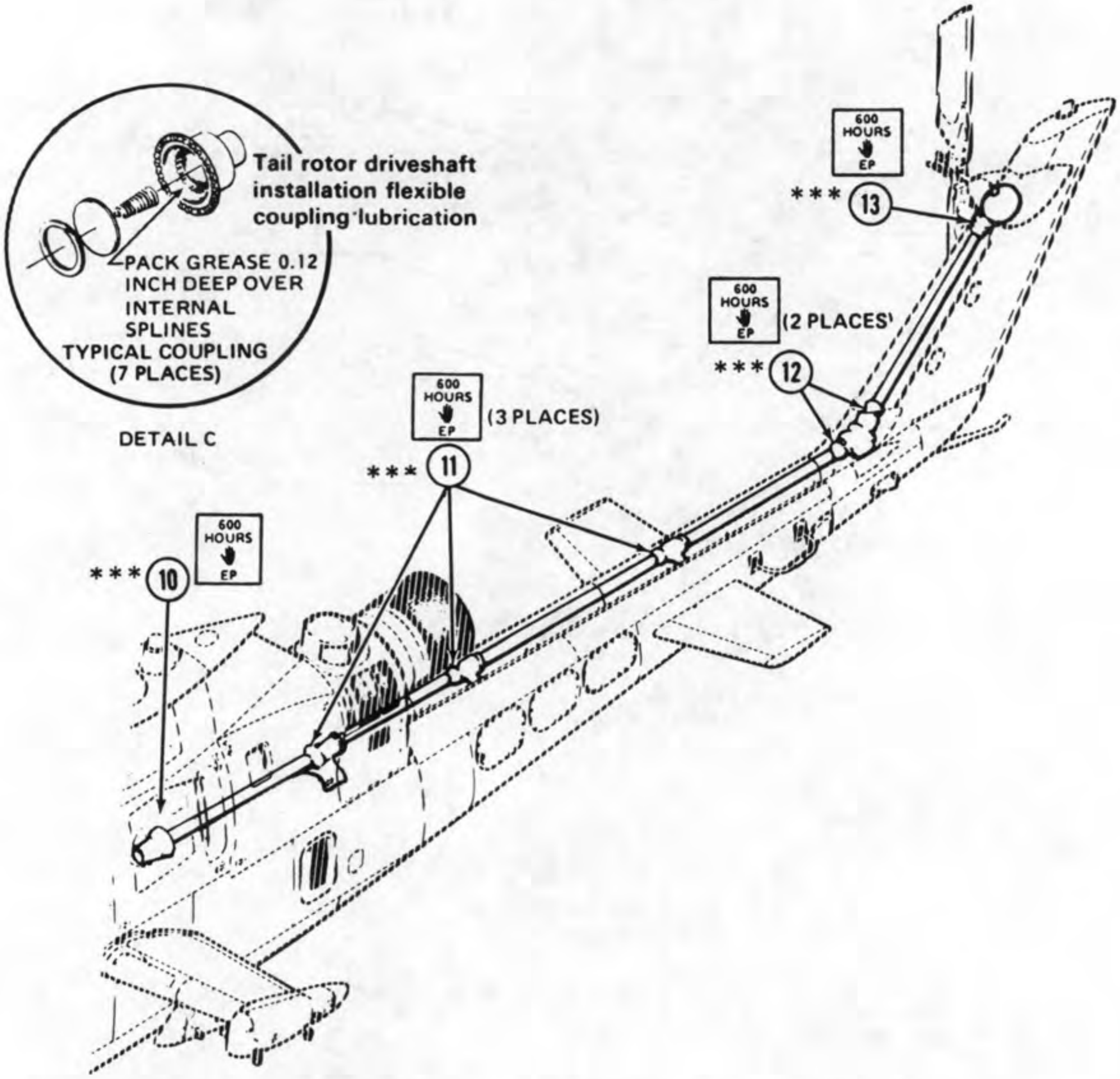
** ROTATE MAIN ROTOR BY HAND AND GREASE AT APPROXIMATELY 30° INTERVALS UNTIL ASSEMBLY HAS BEEN ROTATED ONE FULL TURN TO ENSURE THOROUGH PURGING OF BEARINGS.



DETAIL **B**
TAIL ROTOR

209900-491-2B

Figure 1-5. Lubrication Chart (Typical) (Sheet 2 of 3)



*** Lubrication interval for flexible couplings on seven tail rotor driveshaft couplings and two main driveshaft couplings is as follows:

1. **Maximum interval from last lubrication date is 600 hours or 12 months.**
2. **Inspect and lubricate flexible couplings in main and tail rotor drive systems at time of installation of coupling on helicopter (chapter 6).**
3. **Make entry on DA form 2408-18 to indicate date that next 12 month lubrication is required.**

209900-491-3C

Figure 1-5. Lubrication Chart (Typical) (Sheet 3 of 3)

SECTION III. HANDLING, JACKING, MOORING, HOISTING AND SLING LOADING

1-30. GROUND HANDLING.

1-31. DESCRIPTION — GROUND HANDLING.

WARNING

Before any work in cockpit area of a helicopter with explosive canopy removal system, ensure that ground safety pins are installed in pilot and gunner arming firing mechanisms.

Ground handling includes hoisting, jacking, mooring, parking, towing, and application of external electrical power.

Premaintenance Requirements for Ground Handling

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	(T45)
Test Equipment	None
Support Equipment	(S4) (S5) (S6) (S7) (S8) (S9) (S11)
Minimum Personnel Required	Four
Consumable Materials	None
Special Environmental Conditions	None

1-32. TOWING.

1-33. TOWING PROCEDURES.

The helicopter can be equipped for towing with an approved tow vehicle by attachment of two ground handling gear assemblies (8, figure 1-6) on landing gear skids. Attach a standard aircraft tow bar (S11) to the tow rings (9) on the forward end of each skid tube. A work aid for moving ground handling gear assemblies to and from parked helicopters can be locally fabricated (figure 1-7). The device is a small tow bar, with lugs to fit on mounting pins of ground handling gear which can then be pulled or pushed on its own wheels.

WARNING

Prior to use of ground handling gear assure serviceability. Keep clear of area above handling gear as much as possible when weight of helicopter is on wheels, to avoid injury if mounting pins are not securely engaged.

CAUTION

Aircraft must sit for 25 minutes to prevent possible damage to ASN 43 gyro, or turn power on to gyro and allow 5 minutes to build gyro back up before moving aircraft.

a. Install ground handling gear (S5) as follows:

(1) Position handling gear assembly (8, figure 1-6) with a spring loaded pin aft, over landing gear skid between eyebolts.

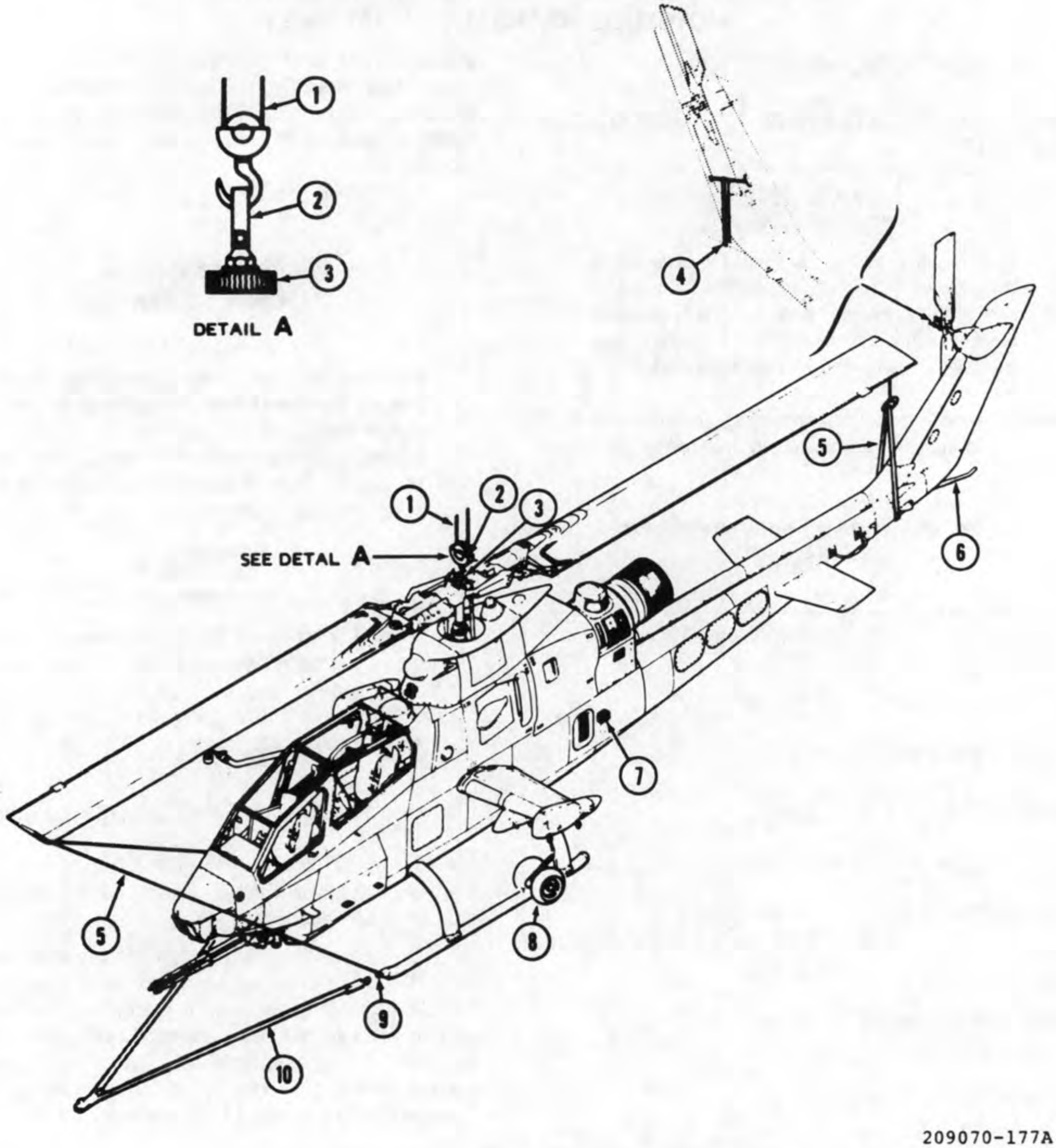
(2) Release enough hydraulic pressure, by turning T-handle of pump valve to allow alignment of cradle mounting pins with eyebolts. Insert fixed pin in aft eyebolt, then engage spring-loaded pin securely in forward eyebolt. Install safety pin in spring-loaded pin. Spring-loaded pin can be moved by means of flat-headed release pin.

(3) Install handling gear on opposite skid.

(4) Station personnel at tail skid to steady helicopter and to force tailboom down as handling wheel pumps are actuated.

(5) On both sets of handling gear, close pump valve and operate handle to extend wheels until skids are raised.

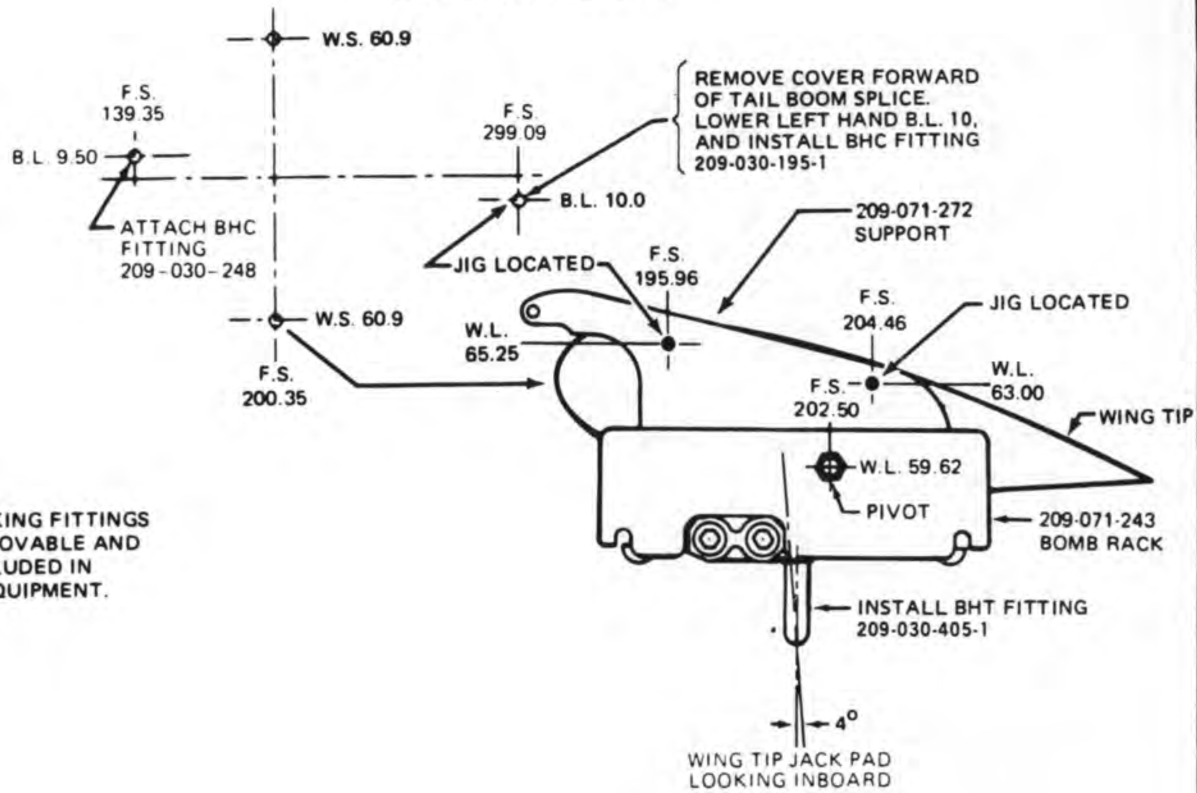
b. Attach tow bar (10) to rings (9) on forward ends of landing skids. Attach tow bar to approved tow vehicle.



1. Hoisting cable and clevis
2. Clevis, crash rescue (S5)
3. Main rotor retaining nut
4. Tail rotor tiedown
5. Main rotor tiedown
6. Tail skid
7. External power receptacle
8. Ground handling gear
9. Tow ring
10. Tow bar
11. Lateral leveling pads
12. Fore and aft leveling pads

Figure 1-6. Ground Handling Diagram (Sheet 1 of 2)

JACK PAD LOCATION DATA

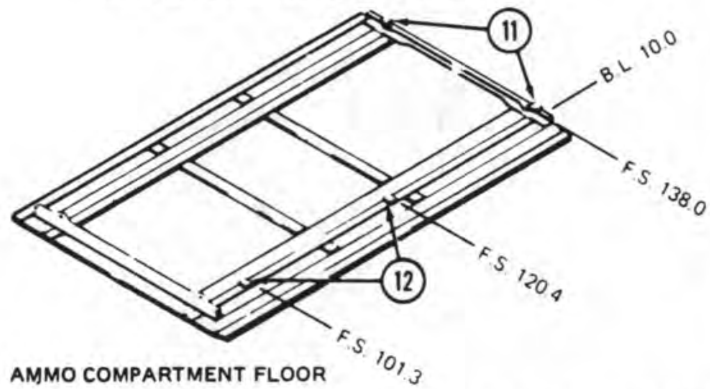


NOTE:
ALL JACKING FITTINGS ARE REMOVABLE AND ARE INCLUDED IN LOOSE EQUIPMENT.

NOTE

USE SCALES UNDER ONLY THREE OF THE JACK PADS. ONE UNDER EACH OF THE WING JACK PADS AND ONE UNDER EITHER THE FORWARD OR AFT JACK POINT DEPENDING UPON THE C.G. LOCATION (e.g. IF THE C.G. IS AFT OF F.S. 200.35, USE THE AFT PAD). ALWAYS PLACE A JACK UNDER THE REMAINING JACK PAD AS A PRECAUTION AGAINST TIPPING. THIS FOURTH JACK MUST BE ADJUSTED TO CARRY NO LOAD. WHEN JACKING HELICOPTER, THE BOMB RACK SHOULD BE IN THE 4° NOSE UP ATTITUDE.

HELICOPTER LEVELING PROVISIONS



AMMO COMPARTMENT FLOOR

(1) PADS FOR HORIZONTAL LEVELING LOCATED IN DEPRESSION NEAR LEFT SIDE OF FLOOR, PALLET MUST BE REMOVED.

(2) PADS FOR LATERAL LEVELING LOCATED ON TOP OF AFT AND FORWARD AMMO PALLET TRACK.

209900-467-2A

Figure 1-6. Ground Handling Diagram (Sheet 2 of 2)

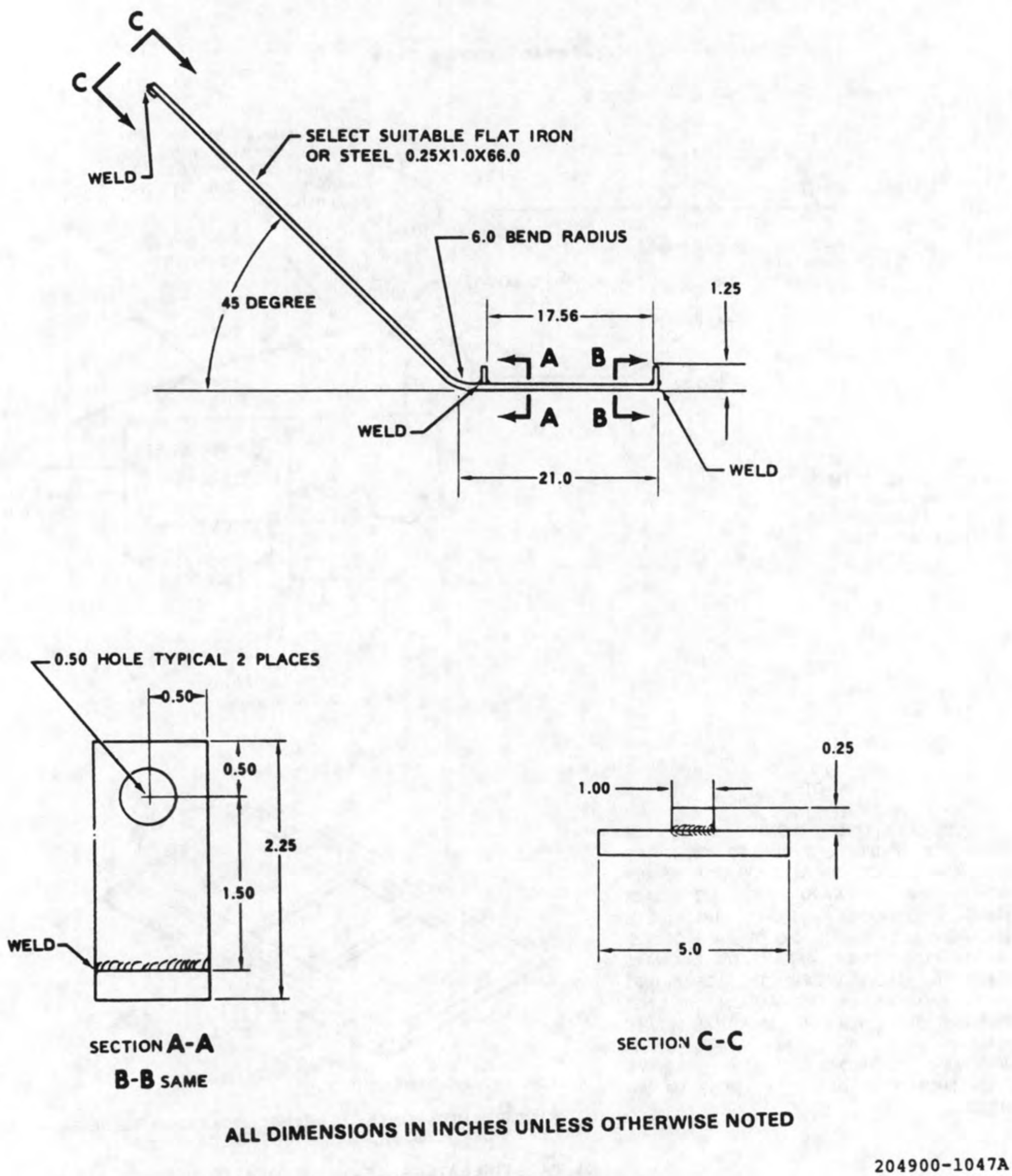


Figure 1-7. Work Aid for Towing Ground Handling Gear

CAUTION

Ground handling forces should not exceed 450 pounds (vertical direction) and 150 pounds (horizontal direction) pressure exerted on tailboom.

c. Station a person at aft end of tailboom to balance helicopter on handling gear and to assist in control while towing.

CAUTION

Towing the helicopter on ground handling gear over prepared surfaces at a gross weight in excess of 9660 pounds may cause permanent set in the aft cross tube. Do not tow helicopter on unprepared surfaces at gross weights in excess of 7500 pounds. Caution should be exercised when towing on unprepared surfaces at any gross weight. Do not tow at speeds in excess of 5 miles per hour. Avoid sudden starts and stops.

d. Tow helicopter to desired area.

e. Remove ground handling gear as follows:

(1) Station a person at tailboom to assist by steadying helicopter.

(2) Release hydraulic pressure by turning T-handle of pump valve on each set of handling gear, allowing wheels to retract and landing skids to rest on ground. Close valve.

(3) Push release pin on rear of cradle to disengage spring-loaded mounting pin from eyebolt. Pull front pin free of eyebolt and remove handling gear assembly. Remove opposite ground handling gear in the same manner.

(4) Remove tow-bar.

1-34. JACKING.

1-35. JACKING PROCEDURES.

Four jack fittings with mooring shackles attached are provided as loose equipment for use at two jack points on the fuselage and inboard of wing pylons (figure 1-8). The forward jack fitting is attached by bolts under the structure of the right main beam and the ammunition compartment rear bulkhead. The aft jack fitting is screwed into a socket on the left main beam ahead of the tailboom attach splice. Wing pylon jack fittings are substituted for ejector tube assemblies in outboard armament racks.

WARNING

Do not jack helicopter in open area during windy or gusty conditions.

CAUTION

Outboard articulated pylons must be in the stowed position (four degrees up) when the helicopter is to be jacked for any purpose. Jacking fitting (S8) must be installed.

CAUTION

All structural panels must be installed prior to jacking and leveling. Helicopter must be leveled prior to removing structural panels. Do not lower jacks until structural panels have been reinstalled to prevent possible permanent set to helicopter structure.

a. Remove aft section (item 46, figure 2-3) of bottom forward electrical access panel. Remove heat sink (station 138.7) approximately 10 inches right of center. Carefully secure heat sink to one side using masking tape to prevent damage to the wire connectors for transistors (8Q5 and 8Q6). Remove three screws to gain access to the jack fitting mounting nutplates. Install jack fitting (S8), using three bolts and washers provided with fitting.

b. Remove aft jack fitting cover plate. Select jack fitting (S7) with threaded end approximately **1.0** inch long, from shoulder to end. Install fitting in aft jack point socket, on bottom of left main beam just forward of tailboom.

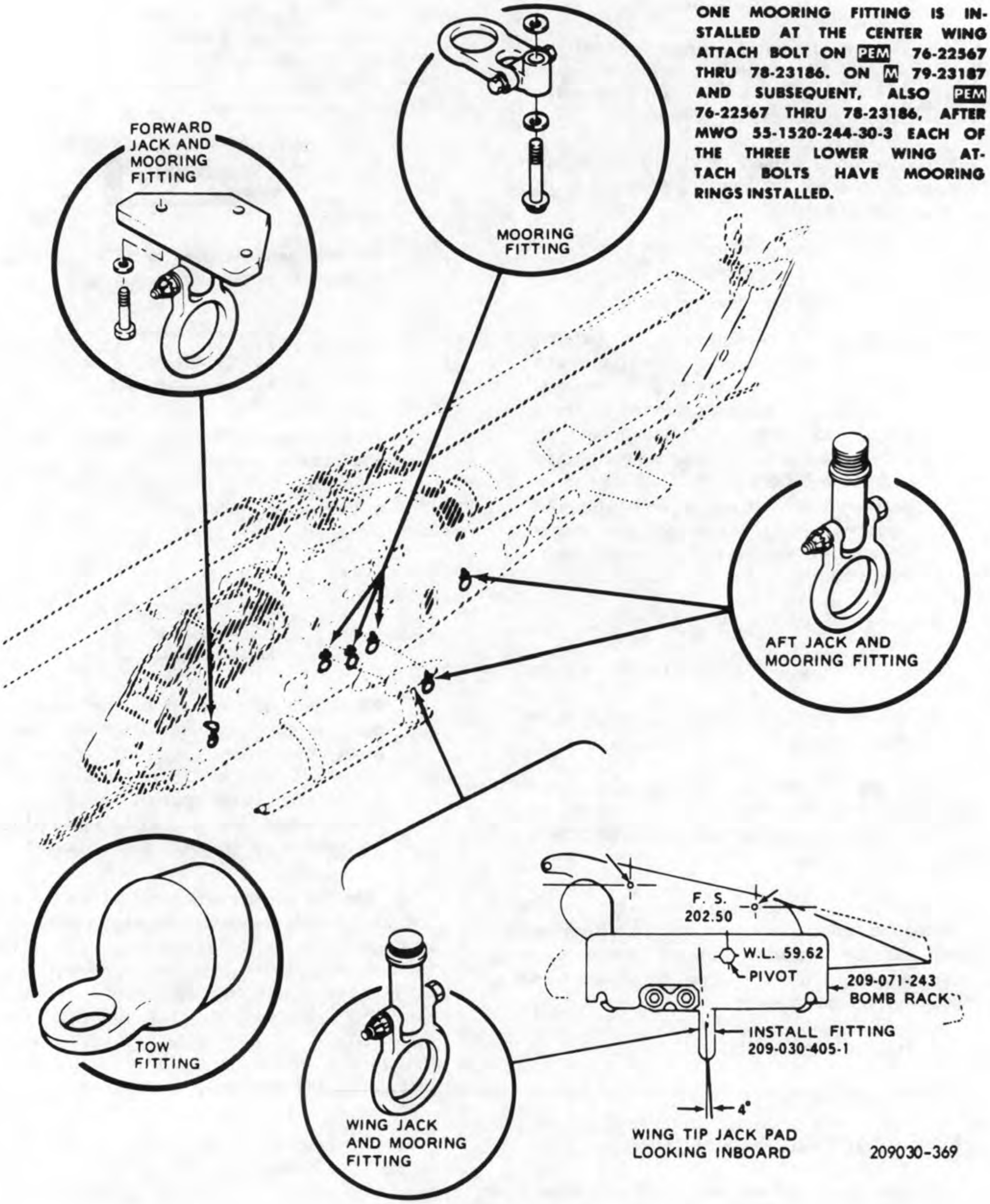


Figure 1-8. Jacking and Mooring Fittings

c. Remove outboard armament pods (paragraph 16-22). Check that two remaining jack fittings (S8), for wing jack points are similar to fitting used in step b. except for shorter threaded ends approximately 0.49 inch long.

WARNING

Ejector cartridges must be removed before installing jack fittings in outboard wing pylons.

d. At each outboard rack, remove lockwire and remove complete ejector tube assembly (paragraph 16-41). Install jack fitting.

e. Place jacks under four jack point fittings. If removing landing gear, align all jacks with inboard legs parallel at approximately 27 degrees to axis of fuselage.

CAUTION

High center of gravity makes it imperative that all jacks be raised evenly with wings level.

f. Raise helicopter slowly and evenly.

g. Observe the following precautions while helicopter is on jacks.

(1) Rope off area around helicopter and prominently display warning signs stating CAUTION: HELICOPTER ON JACKS.

(2) All personnel in immediate area shall exercise extreme caution not to bump or otherwise disturb helicopter while raised or supported on jacks.

(3) Personnel shall not climb into or onto helicopter while raised or supported on jacks.

h. After necessary work, lower helicopter slowly and evenly. Remove jacks.

i. Remove jack fittings from outboard pylon ejector racks. Reinstall and lockwire ejector tube assemblies. Reinstall cartridges (paragraph 16-36).

j. Remove forward jack fitting with bolts and washers. Reinstall screws in jack point bolt holes.

k. Install heat sink and aft section of forward electrical access panel.

l. Remove aft jack fitting. Install aft jack fitting cover plate. Return all fittings to loose equipment.

m. Install outboard armament pods.

1-36. LEVELING.

Leveling pads located in the ammunition compartment floor are used with a bubble protractor when it is necessary to level the helicopter. Pallet must be removed for access. For fore-and-aft leveling, use two pads (12, figure 1-6), located in depression near left side of floor. For lateral leveling, use two pads (11), located left and right on top of aft ammunition pallet track. Apply jacking procedures to correct helicopter position (paragraph 1-35).

NOTE

If leveling pads are damaged or missing, refer to paragraph 2-280 for pad replacement.

1-37. PARKING.

1-38. DESCRIPTION — PARKING.

Parking, as used in this manual, is defined as the condition in which helicopter will be secured while on the ground. Direction of heading and location of helicopter is normally determined by ease of maintenance and servicing, to allow removal of any one helicopter from parking area and to permit ready access of mobile fire fighting equipment within area. Although parking arrangements may vary according to local facilities, the general procedures in the following paragraph should be observed.

1-39. PARKING PROCEDURES.

a. Double-row lateral parking, with front and rear helicopter of each double row placed tail to tail, should be used where possible.

b. Helicopter should be parked not less than 750 feet from ends of center line of nearest runway, and not less than 250 feet from edge of connecting taxi strips.

c. Width of fire lanes between each double row should be slightly greater than rotor span of parked helicopters. This spacing will facilitate removal of any helicopter from parking area, as well as permitting greater ease of movement of mobile fire fighting equipment within area.

d. Fire lanes having a minimum width of **50** feet should be provided to cross main fire lanes and isolate blocks of **10** helicopters or less.

e. Helicopters parked on concrete ramps or aprons should be placed to utilize mooring rings when available.

f. Parked helicopter will be provided with a static ground.

g. Under normal conditions park the helicopter as follows:

(1) Park helicopter on a level surface, whenever possible, so that load will be evenly distributed on landing gear.

(2) Retract or remove ground handling wheels to allow helicopter to rest on landing skids.

NOTE

If helicopter is to remain parked more than 14 days, use suitable blocks or shoring to raise skids slightly off supporting surface.

(3) Align main rotor blades fore and aft, and tail rotor blades parallel to vertical fin.

NOTE

If the collective stick is position in other than full down, place EMER HYD switch to EMER HYD PUMP and BAT switch to ON and fully lower collective stick. Place both switches to OFF after collective is lowered.

(4) Engage hook of main rotor tiedown (6, figure 1-6) in hole of fitting on each end of rotor blade and position blade above tailboom. Pull on tiedown to remove the spanwise slack from the rotor system and secure rotor by wrapping tiedown strap firmly around tailboom on aft end. Tie forward tiedown strap to tow rings (10) on landing gear skid. Additional security of the main rotor tiedown can be accomplished by inserting an AN416-2 safety pin through a 0.060 inch hole drilled through the hook of the main rotor tiedown. The hole is drilled perpendicular to the plane of the handle 0.25 inch from the insertion end of the hook. Secure the safety pin to the hook handle with a six inch piece of NAS1455B30-6 chain and safety wire. Insert the pin through the hook after inserting the hook through the rotor blade fitting.

(5) Attach tail rotor tiedown strap (5) to tail rotor and secure to loop provided on side of vertical fin.

(6) Install TSU cover (9).

WARNING

Before entry into cockpit area, ensure that canopy removal system ground safety pins are installed in pilot and gunner arming/firing mechanisms.

(7) Check that all switches are OFF and external power disconnected; close all doors and access plates. Lock ignition and canopy doors. Remove keys.

(8) Install pitot tube cover (2, figure 1-9), engine air inlet shields (4), and P E exhaust cover (3) or M exhaust cover/IR duct cover (7).

NOTE

If required and available, install canopy cover (1).

h. Under turbulent weather conditions, park the helicopter as follows:

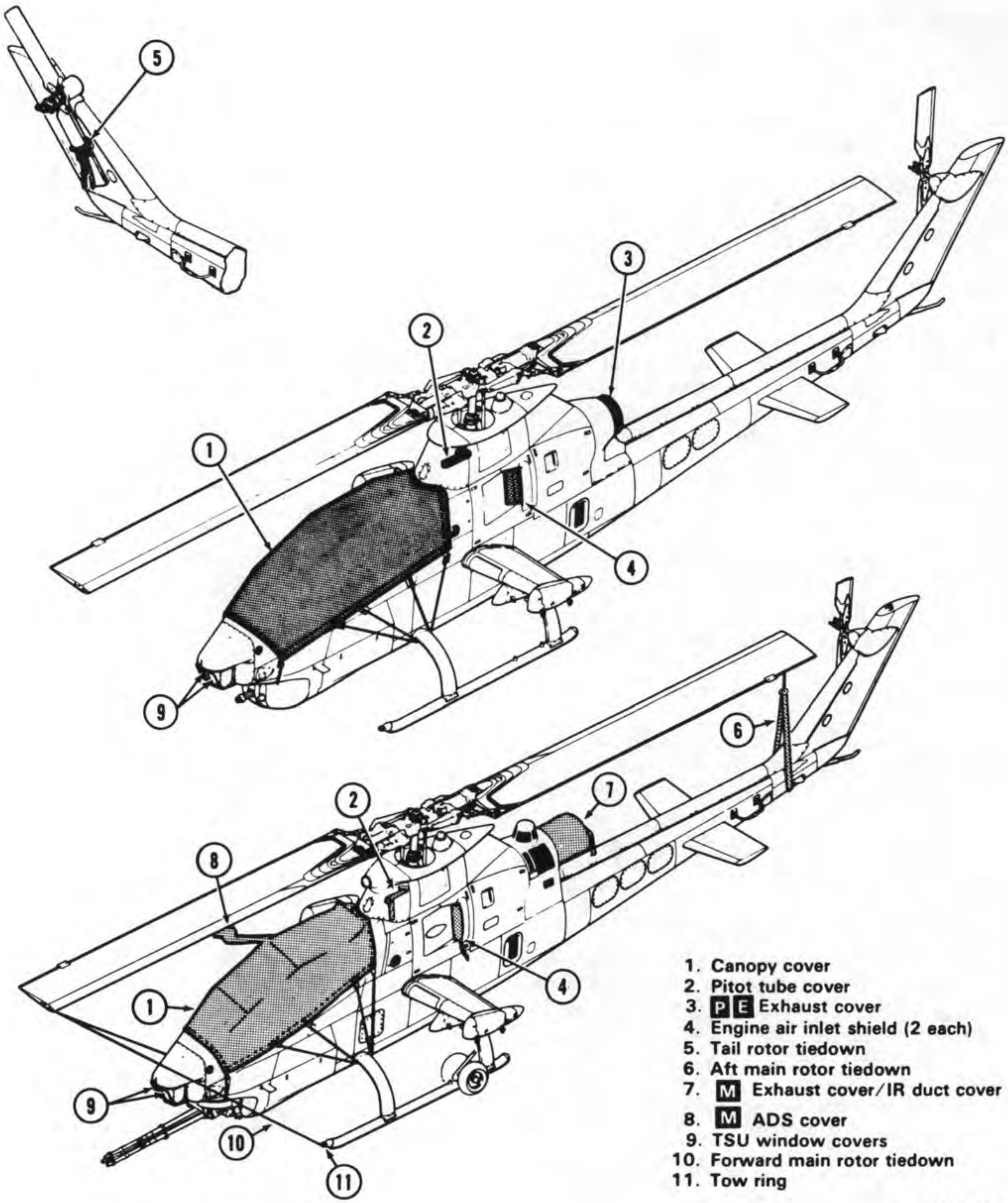
CAUTION

Structural damage can occur from turbulent weather conditions. Anchoring and mooring should be accomplished when wind is expected to exceed 45 knots. When possible, helicopter should be evacuated to a safe weather area if a tornado, hurricane or wind condition above 75 knots is expected.

(1) Park helicopter.

(2) Moor helicopter in accordance with paragraph 1-39.

(3) Fill fuel cell to capacity if time permits.



1. Canopy cover
2. Pitot tube cover
3. P E Exhaust cover
4. Engine air inlet shield (2 each)
5. Tail rotor tiedown
6. Aft main rotor tiedown
7. M Exhaust cover/IR duct cover
8. M ADS cover
9. TSU window covers
10. Forward main rotor tiedown
11. Tow ring

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Figure 1-9. Covers Diagram

(4) Disconnect battery. Secure all loose equipment. Moor all ground support equipment at safe distance from helicopter.

(5) After high winds have passed, inspect helicopter for damage.

1-40. MOORING.

1-41. DESCRIPTION — MOORING.

Mooring is a process of securing parked helicopter to avoid damage by high winds or turbulent weather. Mooring fittings are provided at locations shown on figure 1-10. Where properly spaced rings are not available, mooring can be accomplished with a standard mooring kit. Refer to paragraph 2-267 for description of mooring fittings.

1-42. MOORING PROCEDURE.

a. Park helicopter on unpaved parking area, headed in direction of highest winds forecast.

b. Install Mooring Fittings.

(1) Assemble mooring fittings (figure 1-8) for installation at wing attach points by assembling two parts of fitting and installing bolt, nut and washer.

(2) Position mooring fitting on helicopter at wing attach point (figure 1-8) and install bolt and washer. Torque bolt to **400** inch-pounds. Back off to zero torque or until threads disengage. Tighten bolt until contact occurs between bolt head and washer or until torque begins to increase. Record torque value. Apply **100** inch-pounds torque above torque value recorded before, but do not apply more than **450** inch-pounds torque. Install opposite fitting in the same manner.

(3) Install aft jack and mooring fitting at aft jack point (paragraph 1-35).

(4) Position forward jack and mooring fitting (figure 1-8) on helicopter fuselage. (paragraph 1-35).

(5) Install wing jack and mooring fittings (figure 1-8) (paragraph 1-35).

c. Assemble and install anchor rods.

(1) Screw anchor rod (1, figure 1-10) into arrow (3).

(2) Slip driving rod (2) over anchor rod and into socket of arrow.

(3) Turn cam of driving rod so that prongs of arrow are not spread by driving.

(4) If necessary, loosen surface of ground.

(5) Position driving rods as shown in figure 1-10.

(6) Drive each arrow into ground until driving rod handle is approximately three inches above surface.

(7) Rotate driving rod handle approximately 90 degrees and give it a sharp blow to spread arrow prongs.

(8) Return driving rod to driving position and remove it from anchor rod.

(9) Align squared socket of eye (4) with squared end of anchor rod. Fit in place and tighten knurled nut.

(10) Set arrow prongs by pulling up on eye assembly.

d. Secure helicopter to anchor rods with quarter-inch cables or one-inch manila rope, as shown on figure 1-10.

e. Remove mooring cables or ropes installed in step d.

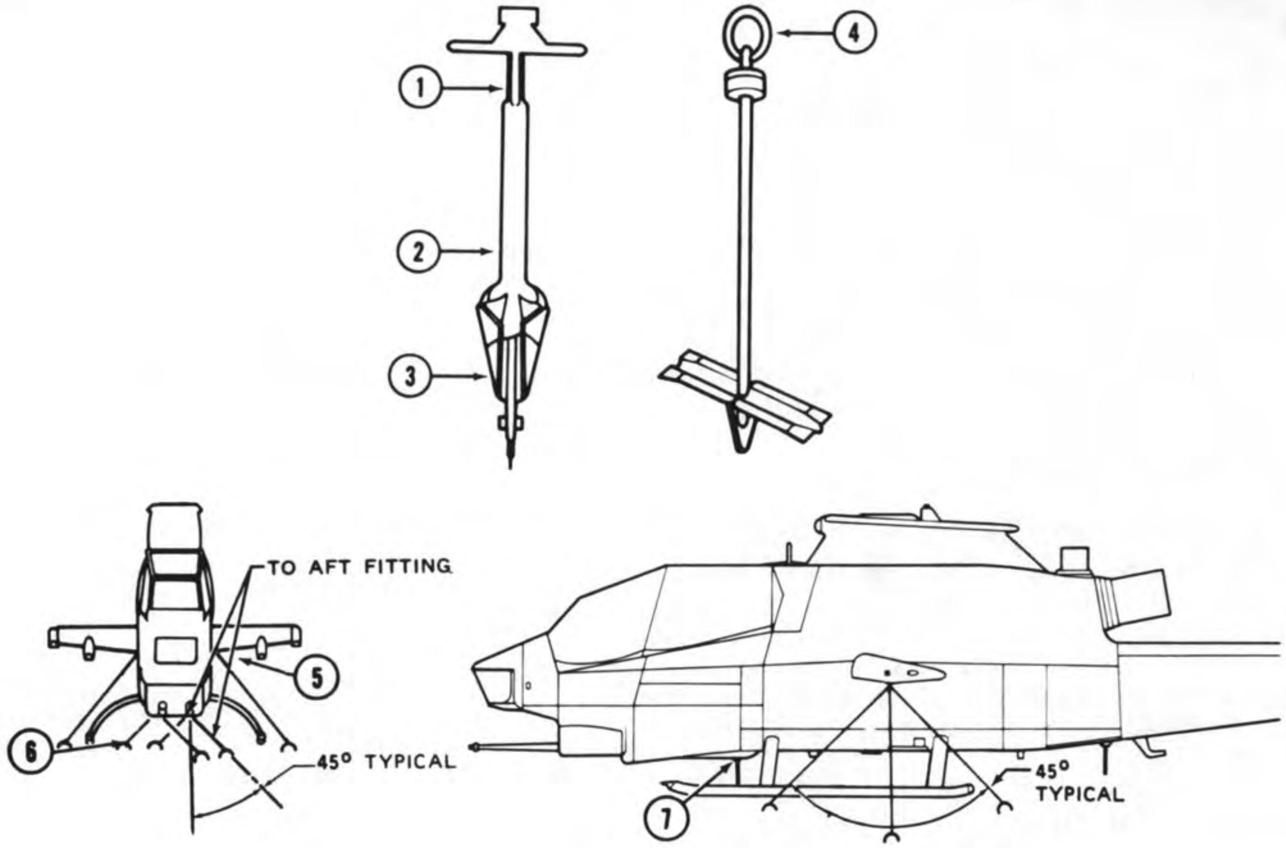
f. Remove anchor rods installed in step c.

g. Remove mooring fittings from helicopter as follows:

(1) Remove combination mooring and jack fittings (figure 1-8) from aft jack mounting points and wing jack mounting points by rotating the mooring and jack fitting in a counterclockwise direction.

(2) Remove combination jacking and mooring fittings (figure 1-8) from forward jack mounting point by removing three bolts and washers.

(3) Remove mooring fitting at wing attach points (figure 1-8) by removing bolt and washer.



1. Anchor rod
2. Driving rod
3. Arrow
4. Eye
5. Mooring fitting
6. One inch rope or one-fourth inch cable
7. Forward jack and mooring fitting

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Figure 1-10. Mooring Diagram

1-43. HELICOPTER COVERS.

1-44. DESCRIPTION — HELICOPTER COVERS.

The helicopter covers consist of the canopy cover, pitot cover, exhaust cover, and the engine air inlet shields (figure 1-9). The pitot cover, exhaust cover, and engine air inlet shields should be installed whenever helicopter is parked outside. The canopy cover is made of vinyl coated cloth with elastic cord straps attached. The canopy cover should be installed during extended outside parking or when stormy weather is expected.

1-45. HOISTING.

1-46. DESCRIPTION — HOISTING.

The entire helicopter can be lifted by a suitable hoist attached to an eye provided on the main rotor retaining nut at top of the mast. This hoisting point can also be used to lift out the mast assembly (with or without the main rotor and rotating controls assemblies), or the complete mast and transmission assembly.

1-47. HOISTING — HELICOPTER.

a. Attach a hoisting clevis (S5) or cable to lifting eye on main rotor retaining nut (figure 1-6). Connect a suitable hoist and take up slack.

b. Station a person at tail skid to steady helicopter against swinging or turning when hoisted. If lifting beyond reach, attach a suitable rope for this purpose.

c. Hoist slowly, maintaining a steady lifting force.

1-48. HOISTING — COMPONENTS.

a. For hoisting or handling tailboom as a separate component use straps or slings at both ends of boom. Use tail skid for steadying boom.

b. To hoist engine, main rotor, or mast and transmission from helicopter use maintenance hoist (T45) or other suitable hoist.

1-49. MAINTENANCE HOIST.

1-50. DESCRIPTION — MAINTENANCE HOIST.

A maintenance hoist (T45), designed to mount on left side of the fuselage, is provided for use in removing and installing main rotor, mast, transmission, or engine assemblies. The hoist consists of a tube assembly, a hub assembly, and attaching parts. The tube assembly has a hand-operated winch, with cable, pulleys and weighted hook. The hub is a socket made from larger diameter tubing, with attachment fittings, sleeve bearings, and a platform to aid the operator. The tube assembly rests on a steel ball in the hub, and can be rotated by means of the crossbar handle to move the hook into position.

WARNING

Do not exceed maximum hoist hook load of 935 pounds and maximum cable angular displacement of 10 degrees from the vertical.

1-51. INSTALLATION — MAINTENANCE HOIST.

a. At left side of fuselage, remove two screws and washers from bolt holes of upper hoist supports, located just ahead of engine forward firewall. Remove six screws and washers from lower support bolt holes, located in vertical rows of three ahead of and behind landing gear aft crosstube.

CAUTION

Prior to installation of maintenance hoist inspect hoist and support visually for cracks and other damage which may affect function. Replace parts if damaged.

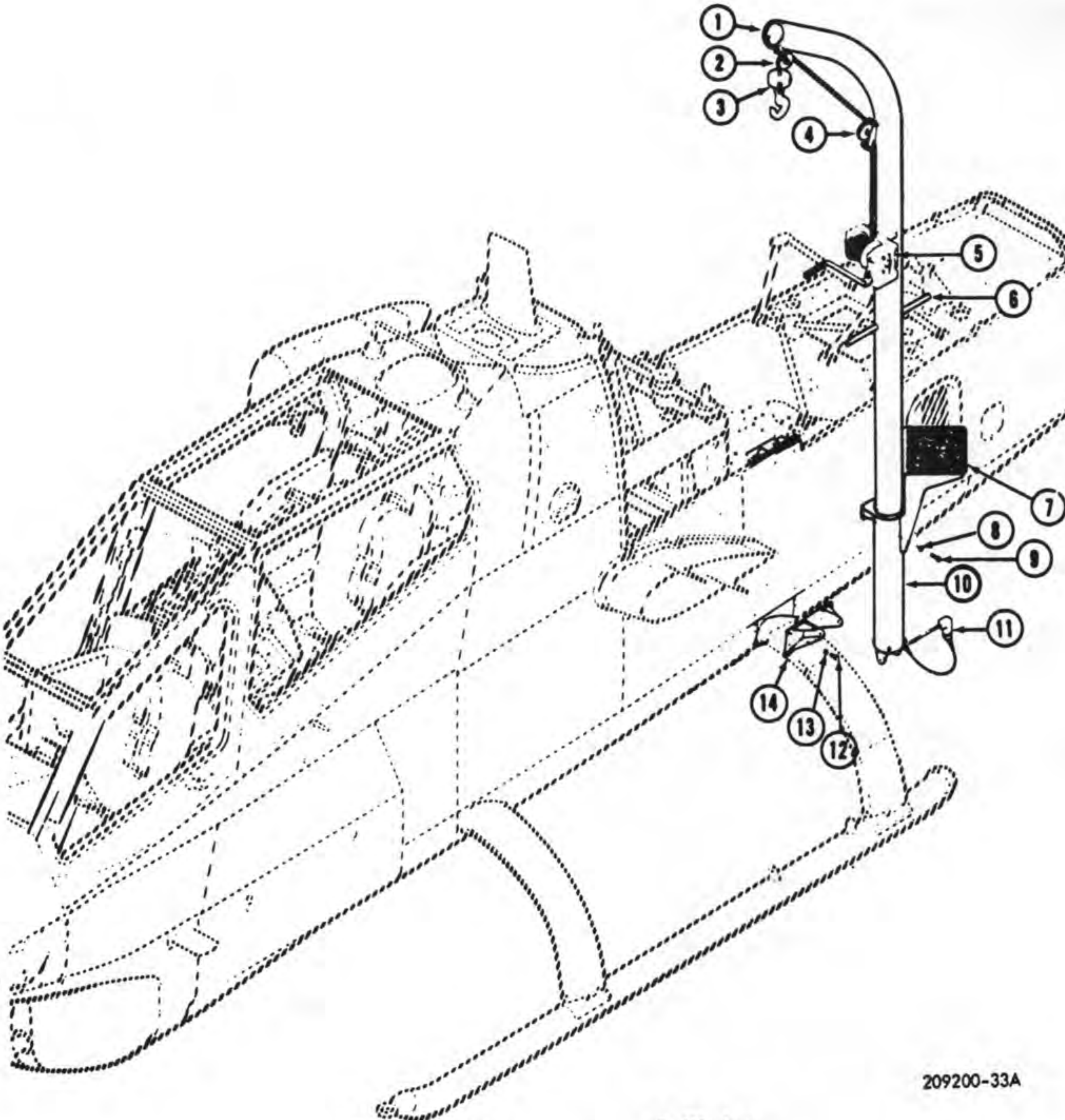
b. Install bracket (10, figure 1-11) above landing gear crosstube, using six bolts and washers instead of screws removed in preceding step.

c. Insert lower end of tube assembly (1) into hub assembly (8). Align lower fitting of hub in support bracket and install pin (9).

d. Raise hoist assembly. Attach upper fitting of hub to upper supports, using two bolts and washers instead of screws previously removed.

WARNING

Handle hoist with care to avoid personal injury or damage to aircraft.



1. Tube assembly
2. Universal joint and puller
3. Hook weight
4. Cable guide and puller
5. Winch assembly
6. Handle
7. Platform
8. Washer
9. Bolt
10. Hub assembly
11. Pin
12. Bolt
13. Washer
14. Bracket

Figure 1-11. Maintenance Hoist, T101520

1-52. REMOVAL — MAINTENANCE HOIST.

a. Detach hub fitting from upper supports by removing two bolts and washers.

b. Carefully swing top of hoist assembly outward and down until resting on ground. Remove tube assembly (1, figure 1-11) from hub assembly (10).

c. Detach lower fitting of hub from bracket (14) by pulling out pin (11). Remove hub assembly.

d. Remove bracket with attaching bolts and washers from fuselage. Bracket can be attached with pin to hub for convenience.

e. Reinstall screws and washers in bolt holes of upper and lower support points.

1-53. SLING LOADING.

Refer to TM 55-413.

1-54. APPLICATION OF EXTERNAL POWER.

An external power receptacle (7, figure 1-6) for application of external 28 Vdc power is located in left side of the fuselage at station 274, covered by a spring-loaded access door. When the door is open, a switch causes the EXTERNAL POWER caution panel segment to be lighted. Battery switch should be at OFF position. Use a 28 Vdc power source capable of delivering 650 amperes. When cable connector from power source is connected to the receptacle, the external power relay in the helicopter DC circuit will be energized and power will be supplied to the main bus for distribution.

NOTE

If battery charge is less than 24 volts, external power may be required to avert hot starts.

a. On E M when an external power source is providing electrical power, the helicopter battery should be connected to the essential bus. During extended armament checks, the condition of the battery should be checked every 30 minutes. If an overheated battery is suspected or detected, external power should be disconnected and BATTERY switch turned to OFF position. No attempt should be made to disconnect or remove an overheated battery.

b. E M The BATTERY switch should be in the RUN position, only during armament checks when external power is being applied to the helicopter. At completion of armament testing the external power should be disconnected. The BATTERY switch should be returned to OFF position, and battery should be disconnected. Hours accumulated on the battery during armament testing with battery on the line should be added to DA Form 2408-18.

SECTION IV. INSPECTION REQUIREMENTS

1-55. GENERAL INFORMATION.

This section contains complete requirements for special inspections, overhaul and retirement schedule, and standards of serviceability applicable to the aircraft. The inspections prescribed in this chapter shall be accomplished at specific periods by aviation unit maintenance activities with the assistance of intermediate maintenance activities when required. Daily inspections are contained in TM 55-1500-220-PMD, Preventive Maintenance Daily Check List. Phased maintenance inspections are contained in TM 55-1500-220-PM, Phased Maintenance Checklists.

1-56. STANDARDS OF SERVICEABILITY.

Standards of serviceability to be utilized in the day-to-day inspection and maintenance of the helicopter can be found as fits, tolerances, wear limits, and specifications in the applicable chapter. Standards of serviceability for transfer of helicopters are contained in TM 55-1500-326-25.

CAUTION

The special inspections defined in paragraph 1-57, step a., are applicable only to helicopters with BHT 540 series main rotor blades installed.

1-57. SPECIAL INSPECTION.

This section supplements the schedules inspections contained in TM 55-1500-220-PM, Phased Maintenance requirements. This section also includes inspection of items which are required to be inspected at intervals not compatible with airframe operating time or airframe inspection intervals. Refer to TM 38-750 for applicable forms, records, and worksheets required for these inspection intervals. Typical of this type inspection items are:

a. An inspection which is contingent upon specific conditions or incidents that arise, and only because of these conditions or incidents, whose immediate inspection is required to ensure safe flight. Typical of these conditions are hard landings, overspeed, and sudden stoppage.

b. Inspection of components of airframe on a calendar basis: firt aid kits, weight and balance check, aircraft inventory, etc.

Special Inspections are listed in the following Aircraft Inspection Checksheet. Use figure 1-12 with the Aircraft Inspection Checksheet to locate component to be inspected.

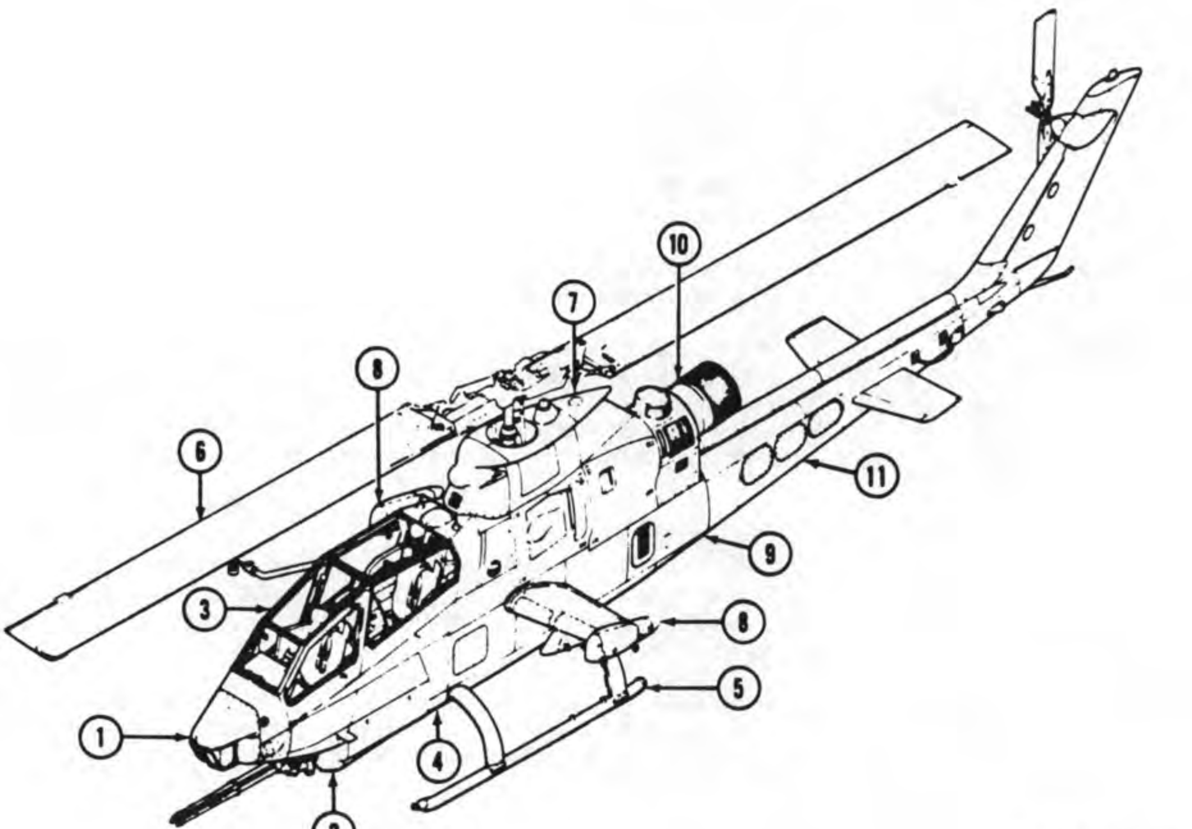


Figure 1-12. Inspection Area Diagram (Typical) (Sheet 1 of 2)

AREA NO. 1:	Nose Area	All surfaces, components, and equipment in nose compartment and on exterior ahead of forward edge of gunner door.
AREA NO. 2:	Turret Area	All surfaces, components, and equipment inside and outside of armament turret and ammunition compartment.
AREA NO. 3	Gunner and Pilot Area	All surfaces, components, and equipment inside and outside the gunner-pilot compartment. Includes items stowed in cabin aft of pilot seat.
AREA NO. 4:	Lower Forward Fuselage Area	All surfaces, components, and equipment contained in, and on exterior of, lower forward portion of fuselage between ammunition compartment and aft cabin bulkhead (Sta 186.25) except forward fuel cell.
AREA NO. 5:	Landing Gear Area	All surfaces, components, and equipment which constitute the landing gear and attachments.
AREA NO. 6:	Main Rotor Area	All components of the main rotor hub and blade. Does not include the mast.
AREA NO. 7:	Pylon Area	All surfaces, components, and equipment contained in, and on the exterior of, the hydraulic and transmission compartments to the bottom of the transmission. Includes transmission cowling, mast, mounts, rotating controls, and main (input) driveshaft.
AREA NO. 8:	Wing Area	All surfaces, components, and equipment in and on the wings. Includes all external fittings and attachments.
AREA NO. 9:	Center Fuselage Area	All surfaces, components, and equipment in and on the fuselage below the engine deck (WL 65.00) and between the cabin area (Station 186.25) and tailboom attachment bulkhead (Station 299.57). Includes forward and aft fuel cells, compartment below transmission, oil cooler, and compartments accessible through side doors and panels on fuselage.
AREA NO. 10:	Engine Area	All surfaces, components, and equipment associated with engine installation located above engine deck (WL 65.00) and within engine cowling, tailpipe fairing, and aft fairing.
AREA NO. 11:	Tailboom Area	All surfaces, components, and equipment located in and on the tailboom and vertical fin. Includes tail rotor, synchronized elevator, control linkages, driveshafts, gearboxes, electronic gear, and cooling fan.

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Figure 1-12. Inspection Area Diagram (Typical) (Sheet 2 of 2)

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 1	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas	**AFTER A HARD LANDING**			

AFTER A HARD LANDING

Definition: Hard landing is defined as any accident or incident in which ground impact of the helicopter causes severe pitching of main rotor, allowing hard contact of hub with mast, or results in cracking or yielding of the mounting lugs of the transmission support case or noticeable yielding or cracking of fuselage pylon support structure or landing gear. This definition is confined only to those accidents not involving sudden stoppage of main rotor or tail rotor.

Inspections: When a probable hard landing incident has occurred, proceed as follows:

a. Inspect main and tail rotor blades for evidence of strike damage. If such evidence is found on either rotor, perform AFTER SUDDEN STOPPAGE Special Inspection.

b. Visually inspect underside of fuselage and tailboom for evidence of ground contact.

c. Inspect landing gear for yielding of cross tubes to cause skid tube deflection to exceed allowable dimensions. If not obvious, determine condition by measurements according to instructions in chapter 3.

(1) If crosstubes have yielded, remove landing gear and inspect supports and structure to which they are attached for signs of yielding or other damage. Inspect crosstubes and retaining plates for cracks using fluorescent penetrant or ultrasonic shear wave inspection methods.

(2) If supports and attaching structure are undamaged, replace landing gear.

(3) Penetrant inspect tubes for cracks in area from saddle fittings to fuselage mount.

d. Inspect mast for evidence of hard rotor hub contact sufficient to cause yielding or deformation. None is acceptable.

e. Inspect supports of dampers under pylon aft mounts for loose rivets or other damage.

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 2	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
		AFTER A HARD LANDING (CONT)		
		f. If no damage other than yielded landing gear crosstubes has been found at this point, it can reasonably be decided that a true hard landing did not occur. Complete a careful Daily Inspection and return helicopter to operation if no further evidence of damage is found.		
		g. If damage other than yielded landing gear crosstubes was found in preceding steps, a hard landing has occurred, and the following steps must be performed.		
		h. Remove main (input) driveshaft. Tag shaft with reason for removal and send to next higher maintenance level.		
		i. Remove transmission. Tag assembly with reason for removal, and send to next higher maintenance level.		
		j. Remove and inspect mast.		
		(1) If there is yielding or deformation in area which might be contacted by main rotor hub, or if there is other obvious damage, the mast should be considered unserviceable and non-reparable and disposed of locally.		
		(2) If such damage is not found, tag mast assembly with reason for removal and send to next higher maintenance level.		
		k. Perform thorough visual inspection of the following components, which may be kept in service if no discrepancy or damage is found.		
		(1) Main Rotor Blades		
		(2) Main Rotor Hub		
		(3) Tail Rotor Blades		
		(4) Tail Rotor Hub		
		(5) Intermediate Gearbox		
		(6) Tail Rotor Drive Gearbox		
		(7) Tail Rotor Driveshafts		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 3	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION.	

AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET
		AFTER A HARD LANDING (CONT)		
		(8) Tail Rotor Driveshaft Hanger Assemblies		
		(9) Swashplate and Support Assembly		
		(10) Scissors and Sleeve Assembly		
		l. Remove cowling. Inspect all cowl attachment fittings.		
		m. Make complete inspection of pylon support structure (including damper supports) for loose rivets, cracked forgings, and buckled or cracked support angles and webs.		
		n. Check each pylon mount damper for yielding, by measuring clearances according to instructions in paragraph 2-236. Replace dampers if yielded.		
		o. Make complete inspection of lift link, attachment fitting, and lift beam for cracks, buckling, or other evidence of damage.		
		p. Make complete inspection of area where tailboom is attached to forward fuselage section. This includes both sets of attachment fittings, and the longerons, beam caps, skins, webs, bulkhead flanges, and other structural members. Check torque on attachment bolts to determine if yielding has occurred. Refer to paragraph 2-286.		
		q. Conduct a complete inspection of engine mount for yielding or other damage of tubes, rod ends, and attaching parts. Inspect trunnions and airframe attachment fittings by magnetic-particle method. If damage exceeding that defined in step g is incurred, remove engine and send to next higher maintenance level for inspection.		
		r. If no significant damage has been found, no further inspection is necessary.		
		s. If significant damage has been found in any area of the airframe, inspection should be expanded in those areas until it extends beyond the zone of damage.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 4	NO. OF PAGES
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET
		t. Inspect pitch change tube upper bearing for marks on lower surface face and outer race, indicating metal to metal contact.		
		(1) If such contact is evident, remove the tube assembly and inspect bearing and tube. Test tube for straightness by procedures in figure 5-54 and for cracks by procedures in TM 43-0103, Chapter 6.		
		(2) Inspect bearing for damage, axial and radial play by limits in figure 5-54. The deformed areas should be marked with Prussian Blue or an equivalent substitute to preclude further inspection of an already inspected damage.		
		(3) If pitch change tube passes inspection, the assembly may be retained in service.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 4	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
6 & 7		**AFTER SUDDEN STOPPAGE (Power On or Power Off)**		

Sudden Stoppage is defined as an instantaneous shock load applied to the drive train and rotor systems either POWER ON or POWER OFF.

Shock loads result from:

- Blade(s) striking an object.
- Seizures which occur as a foreign object passes through a drive train component.
- Engine compressor stall.

After a sudden stoppage, one of the following special inspections shall be conducted, depending on origin of shock load.

a. Main Rotor Blade Strike.

(1) No visible damage to either blade.

(a) Wipe upper and lower surfaces of main rotor blades with a clean, soft cloth and inspect both surfaces for cracks, distortion, or bond separation.

(b) Visually inspect hub assembly and mast for damage.

(c) If no damage is found, inspection is complete. If damage is found in either of the above inspections, proceed to paragraph (2) below:

(2) Mir or damage to either blade.

NOTE

This category includes both field repairable damage and skin tears whether repairable or not.

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 5	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET
	AFTER SUDDEN STOPPAGE (Power On or Power Off) (CONT)			
		(a) Inspect and replace the following items if damage is found:		
		1 Main rotor hub trunnion cap attach bolts and drag brace jamnuts and attach bolts for security.		
		2 Flight control system, from rotor to servo cylinder, for bent or damaged tubes.		
		3 Scissors levers drive links for damage.		
		4 Swashplate gimbal mounting for damage.		
		5 Collective friction collet assembly for free travel.		
		6 Structure at transmission mounting points. (Use ten-power magnifying glass for cracks.)		
		7 Lift link and structure for damage, security, and distortion.		
		8 Main driveshaft.		
		9 Mast.		
		10 Transmission sump oil filter, external oil filter, and chip detector for metal particles.		
		a Positive indications are cause for replacing transmission.		
		b If no metal particles are found, continue operation for 5 hours, then repeat inspection. If no positive indications are found, resume normal operation.		
		11 Intermediate and tail rotor drive gearboxes for metal particles.		
		12 Tail rotor driveshafts and hanger assemblies for obvious damage.		

AIRCRAFT INSPECTION CHECKSHEET			TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 6	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.			INSPECTION NO.	DATE OF INSPECTION	
AREA NO.	REQUIREMENT EVERY	ITEM		STATUS	RECORDED ON WORKSHEET
	AFTER SUDDEN STOPPAGE (Power On or Power Off) (CONT)				
		13 Tail rotor hub and blade assemblies.			
		a Repair/replace blades as required.			
		b Inspection complete.			
	(3)	Major damage to either blade.			
		NOTE			
		This category is restricted to non-repairable damage other than skin tears. For skin damage, see Minor Damage Inspection (figures 2-44 and 2-49).			
		(a) Replace the following: (Disposition as noted.)			
		1 Main rotor hub assembly (overhaul).			
		2 Main rotor blades (scrap).			
		3 Mast (overhaul).			
		4 Swashplate (overhaul).			
		5 Scissors and sleeve assembly (scrap).			
		6 Control tubes (scrap).			
		7 Control rods (rotor to scissors levers) (scrap).			
		8 Transmission (overhaul).			
		9 Engine: Refer to TM 55-2840-229-24 for required inspection.			
		(b) Inspect and repair/replace the following as required:			
		1 Tail rotor blades.			
		2 Intermediate and tail rotor drive gearboxes (inspect for damage to gears and input/output couplings).			

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 7	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET

AFTER SUDDEN STOPPAGE (Power On or Power Off) (CONT)

3 Tail rotor hanger assemblies (inspect for internal and curvic coupling damage).

4 Helicopter structure.

5 Tail rotor driveshaft.

6 Main driveshaft (inspect for internal and curvic coupling damage).

7 Tail rotor hub assembly.

(c) Inspection comolete.

b. Tail Rotor Blade Strike.

(1) No visible damage to either blade.

(a) Inspect doublers for bonding separation, attachment area for distortion.

(b) Tail rotor hub assembly for damage.

(c) Inspect tail rotor rotating controls for damage.

(d) Inspect intermediate and tail rotor drive gearboxes for metal particles.

(e) Tail rotor driveshafts and hangers for obvious damage.

(f) If no damage is found, inspection complete. If damage is found, proceed to paragraph (2) below:

(2) Visible damage to either blade.

(a) Scrap both blades.

(b) Replace intermediate and tail rotor drive gearboxes and return for overhaul.

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	AFTER SUDDEN STOPPAGE (Power On or Power Off) (CONT)			
		(c) Inspect and replace the following items if damage is found.		
		1 Tail rotor hub assembly.		
		2 Tail rotor rotating controls.		
		3 Tail rotor driveshafts.		
		4 Tail rotor hanger assemblies (inspect for internal spline and curvic coupling damage).		
		5 Transmission sump oil filter, external oil filter, and chip detector for metal particles.		
		a Positive indications are cause for replacing transmission.		
		b If no metal particles are found, continue operation for 5 hours, then repeat inspection. If no positive indications are found, resume normal operation.		
		6 Main driveshaft.		
		7 Tailboom attachment points.		
		8 Mast assembly.		
		9 Main rotor rotating controls.		
		10 Main rotor blades		
		11 Main rotor hub trunnion cap attach bolts and drag brace jamnuts for security.		
		12 Engine: Refer to TM 55-2840-229-24 for required inspection.		
	(3)	Inspection Complete.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET

AFTER SUDDEN STOPPAGE (Power On or Power Off) (CONT)

c. Internal Failure of Drive Train Component.

(1) Replace the following: (Disposition as noted).

(a) Transmission (overhaul).

(b) Mast assembly (overhaul).

(c) Intermediate gearbox (overhaul).

(d) Tail rotor drive gearbox (overhaul).

(e) Engine: Refer to TM 55-2840-229-24 for required inspection.

(f) Main rotor hub assembly (overhaul).

(2) Inspect and repair/replace the following as required:

(a) Main rotor blades.

(b) Main rotor rotating controls.

(c) Tail rotor blades.

(d) Tail rotor hub assembly.

(e) Main driveshaft (inspect for internal and curvic coupling damage).

(f) Tail rotor driveshafts.

(g) Tail rotor hangar assemblies (inspect for internal and curvic coupling damage).

(h) Helicopter structure.

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AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET

ENGINE COMPRESSOR STALL

Engine compressor stall (surge) is characterized by a sharp rumble or a series of loud, sharp reports, severe engine vibration, and a rapid rise in exhaust gas temperature (EGT) depending on the severity of the surge.

a. Perform Engine Compressor Stall Inspection in accordance with TM 55-2840-229-24.

b. Inspect intermediate gearbox for damage to gears, unusual wear pattern on either coast or driveside of gears and damage to input/output coupling internal and curvic coupling spines.

(1) No damage to intermediate gearbox. Visually inspect remaining tail rotor driveshaft components. If no damage is found, inspection complete.

(2) Damage to intermediate gearbox or other drivetrain component. Perform inspection requirements of paragraph (3) below:

c. Inspect and replace the following items if damage is found:

(1) Tail rotor drive gearbox (Inspect for damage to gears, unusual wear pattern on either coast of drive side or gears and damage to input/output coupling internal and curvic coupling splines).

(2) Tail rotor hanger assemblies (Inspect for internal spline and curvic coupling damage).

(3) Tail rotor driveshafts.

(4) Main rotor driveshaft.

(5) Transmission sump oil filter, external oil filter, and chip detector for metal particles.

(a) Positive indications are cause for replacing transmission.

(b) If no metal particles are found, continue operation for five hours and then repeat instruction. If no positive indications are found, resume normal operation.

(6) Mast assembly.

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET

ENGINE COMPRESSOR STALL (CONT)

(7) Helicopter structure including tailboom attachment area and vertical fin.

(8) Replace main rotor hub trunnion attach bolts.

(9) Tail rotor blades.

(10) Tail rotor hub assembly.

d. Inspection complete.

HELICOPTER STRUCK BY LIGHTNING

a. General Inspection Requirements.

(1) Inspect fuselage interior and exterior, the landing gear, rotor systems and static ground wire for burn marks, cracks, pitting, or other signs of high temperature stress to determine lightning entry and exit points.

(2) Trace path of lightning strike to extent possible, using a field indicator (magnetometer) (T64.1).

(3) Check magnetic compass for accuracy (the degree of inaccuracy may serve as an indicator of severity of strike).

(4) Inspect wiring in tunnel areas and exposed areas for burns.

(5) Inspect antennas for burns and pitting.

(6) Inspect all electrically operated components and lighting system for damage.

(7) Inspect communications and navigation equipment for damage.

(8) If the preceding steps (1) through (7) reveal major damage has occurred, proceed as follows:

(a) Bench test all avionics and electrical systems and components.

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HELICOPTER STRUCK BY LIGHTNING (CONT)

(b) Perform a Megger check and continuity check on all wiring and cables.

(c) Perform a Voltage Standing Wave Ratio (VSWR) check on all antennas, antenna cables, and connectors.

(9) Perform specific inspections/replacements as required.

(10) Perform a ground run operational check on aircraft. Functionally check flight control system and all avionics, electrical, lighting, communication, and navigation systems.

(11) Repair any damage and replace damaged components as required, using standard maintenance practices.

(12) Inspection complete.

b. **Specific Requirements.**

(1) Whenever lightning strike is evident on main rotor system:

(a) Inspect blades for damage such as burns, pitting, skin separation, etc. If damage is evident, replace damaged blade(s).

(b) Remove hub assembly and return for overhaul.

(c) Replace all bearings (or next higher assembly if required) in the fixed and rotating control system located above the servo cylinders.

(d) Remove swashplate assembly, mast assembly, and transmission assembly, and return for overhaul.

(e) Check main driveshaft for residual magnetism. If magnetized, remove, disassemble and visually inspect short shaft for damage and remove engine and return for overhaul. Repair or replace main driveshaft as required.

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET

HELICOPTER STRUCK BY LIGHTNING (CONT)

(2) Whenever lightning strike is evident on tail rotor system:

(a) Inspect blades for damage such as burns, pitting, skin separation, etc. If damage is evident, replace damaged blade(s).

(b) Inspect tail rotor hub for arcing damage. If damaged, replace.

(c) Remove and condemn pitch change links, counterweight links, crosshead bearing.

(d) Inspect crosshead, idler, lever, bellcranks, counterweight assemblies, and control rod for any indications of arcing. Replace as necessary.

(e) Remove both the intermediate and tail rotor drive gearboxes and return for overhaul.

(f) Check hangers for residual magnetism. Replace any magnetized hanger bearings.

1 If all hangers are magnetized, remove transmission and return for overhaul.

2 Check main driveshaft for residual magnetism. If magnetized, return engine for overhaul and tear down main driveshaft for inspection. Repair or replace main driveshaft as required.

AFTER MAIN ROTOR OVERSPEED

Inspection and/or replacements are required after any report that main rotor has exceeded **104.5** percent limit. When **106** percent has been exceeded, additional requirements apply.

MAIN ROTOR OVERSPEED LESS THAN 106 PERCENT.

Inspect the following:

a. Main rotor blades for damage, bond separation, and distortion.

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
6 & 11		**AFTER MAIN ROTOR OVERSPEED (CONT)**		
		b. Tail rotor blades for damage, bond separation, and distortion.		
		MAIN ROTOR OVERSPEED EXCEEDING 106 PERCENT:		
		a. Inspect main rotor blades as follows:		
		(1) Inspect blade bolt holes for elongation. Inspect inboard hole of root fitting for maximum elongation of 0.002 inch. Maximum hole diameter shall not exceed 2.5025 inch.		
		(2) Visually inspect blade skins. Any wrinkle or deformation found should be reported to TSARCOM Engineering.		
		(3) Visually inspect for evidence of looseness of inertia weight inside blade spar. Inspect for loose attaching screws or distorted holes. Remove tip cap and inspect inertia weight. Any evidence of looseness of weight is cause for blade replacement.		
		K747(4) Remove tip cap. Inspect balance weights. If weights are deformed, reshape and secure.		
		K747(5) Visually inspect for any crescent shaped raised areas on the upper and lower inertia weight repair patches roughly corresponding to a segment of a two-inch diameter circle (not to exceed 0.060 inch in height).		
		(6) Blades which pass these inspections are acceptable for further service. Return faulty blades to next higher maintenance level with details of overspeed incident.		
		b. Replace main rotor hub assembly. Send removed hut to depot maintenance with information on overspeed incident. Bolts should remain with hub.		
		c. Deleted.		
		d. Inspect tail rotor blades:		
		(1) Bond separation anywhere on the blade is cause for replacing blades. Send removed blades to next higher maintenance level.		
		(2) If any movement of the tip or root end balance weights has occurred, dispose of the blade locally.		
		(3) Check the retention bushings for evidence of looseness. If any bushing is loose, dispose of the blade locally.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
6&11		**AFTER MAIN ROTOR OVERSPEED (CONT)**		

(4) If blade passes the above inspection requirements and no other discrepancies exist, then the blade is serviceable.

e. Perform a thorough visual inspection of tail rotor hub. If no discrepancies are found, the hub may be retained in service.

f. Visually inspect the following components,which may be considered satisfactory for continued use if no visible damage is found:

(1) Transmission assembly

(2) Intermediate gearbox

(3) Tail rotor drive gearbox

(4) Tail rotor driveshafts and hangers

(5) Main driveshaft

(6) Mast

(7) Swashplate assembly

(8) Scissors and sleeve assembly

(9) Tail rotor hub

AFTER MAIN ROTOR INSTALLATION

Between five (5) and ten (10) flight hours after installation of main rotor, verify torque on main rotor mast retaining nut, 520 TO 780 foot-pounds.

NOTE

Torque verification of main rotor mast retaining nut is not required if power wrench PD1201 (T15) was used during installation of nut.

AFTER MAIN ROTOR BLADE INSTALLATION

Retorque blade retaining bolt after first **20 TO 25** hours of operation (paragraph 5-12).

MAIN ROTOR HUB INSPECTION

The following inspection shall be performed whenever external indications of hub problems exist, i.e., unusual noises, excessive heat, vibrations, etc.

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a. Removal hub assembly from helicopter and disassemble to the extent required to determine the serviceability of the following components:

(1) Feathering axis Teflon bearings.

(2) Extension sleeves.

(3) Radius rings.

(4) Inboard bearing housing seals.

(5) Outboard dust seals.

b. Replace items as required, reassemble hub assembly, and reinstall on helicopter.

10&11 EVERY 20 - 25 HOURS

a. Disconnect pitch change links at pitch horns and inspect feathering axis bearings for squeaking, binding, and/or ratcheting while feathering grips to each limit of travel.

b. Reconnect pitch links, para 5-14q(4).

AFTER ENGINE OVER- TEMPERATURE

NOTE

If engine cannot be operated without exceeding turbine gas temperature (TGT) limits as specified in TM 55-2840-229-23"Engine Operating Limits Table", this is indication of engine malfunction or instrument error. Refer to TM 55-2840-229-23 troubleshooting chart to determine cause and corrective action required. An over-temperature inspection may not be required.

WHEN ENGINE OIL TEMPERATURE LIMITS ARE EXCEEDED

a. At ambient temperatures above 86 degrees F (30 degreeC), a steady state engine "OIL IN" temperature of 212 degree F (100 degree C) is acceptable, provided the following requirements and limitations are observed.

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
	WHEN ENGINE OIL TEMPERATURE LIMITS ARE EXCEEDED (CONT)			
		(1) Inspect number 2, 3 and 4 bearing oil strainers and main oil filter every **15** hours of engine operation for excessive carbon accumulation of metal particles.		
		(2) Change engine oil every **50** hours of engine operation.		
		b. Temperature **94 TO 130** degree C for **ten** minutes or less. Inspect number 2, 3, and 4 bearing oil strainers and main oil filter.		
		c. Temperature **94 TO 130** degree C for more than **ten** minutes but less than **30** minutes. Change engine oil, clean numbers 2, 3, and 4 bearing oil strainers and main oil filter and ground run engine for **30** minutes. Recheck main oil filter and screens. If contamination is found, change engine oil, clean oil strainers and filter, and ground run engine.		
		d. Temperature **94 TO 130** degree C for more than **30** minutes. Ship engine to next higher maintenance level.		
		e. Temperature in excess of **130** degree C. Ship engine to next higher maintenance level.		
10	**AFTER ENGINE OVERSPEED**			
		Perform an engine overspeed inspection. Refer to TM 55-2840-229-23 for overspeed limits and inspection procedure.		
10	**INTERNAL INSPECTION OF ENGINE**			
		Perform T53-L-703 engine hot-end inspection at 900 hour intervals. Refer to TM 55-2840-229-23.		
	AFTER HELICOPTER IS FLOWN IN A LOOSE GRASS ENVIRONMENT.			
		Any time the helicopter is flown in a loose grass environment, inspect the engine for grass blockage in accordance with TM 55-2840-229-23.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
10	**ENGINE POST INSTALLATION INSPECTION**			
		a. Check installation of power control linkage in accordance with chapter 4, section 7.		
		b. Perform turbine gas temperature (TGT) system test. Refer to TM 55-2840-229-24 and TM 55-4920-244-14.		
		c. Perform a daily inspection.		
		NOTE		
		The following step d. need not be performed if engine has been removed and reinstalled for reasons other than engine maintenance. However, engine should be inspected for leaks and security of mounting provisions, hoses, and accessories prior to flight.		
		d. Perform inspection before and after initial check-run. Refer to TM 55-2840-229-24.		
		e. Perform a limited test flight (TM 55-1520-236-MTF).		
		f. Perform an engine vibration test. Refer to TM 55-2840-229-24.		
10	**ENGINES DROPPED DURING HANDLING**			
		If an engine is dropped during handling, perform inspection. Refer to TM 55-2840-229-24.		
	AFTER OVERTORQUE			
		Overtorque is defined as any incident in which torsional loads are introduced into the helicopter dynamic system in excess of 100 percent as determined on the engine torquemeter.		
	AFTER OVERTORQUE IN EXCESS OF 100 PERCENT BUT NOT EXCEEDING 112 PERCENT			
		Inspect and/or replace components as follows. Records of replaced components shall show overtorque condition as reason for removal.		
		a. Replace main rotor trunnion bearing bolts.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
		AFTER OVERTORQUE IN EXCESS OF 100 PERCENT BUT NOT EXCEEDING 112 PERCENT (CONT)		
		b. Inspect main transmission sump oil filter, external oil filter, and chip detector for metal particles.		
		(1) If metal particles are found indicating internal failure, replace transmission and send it to next higher maintenance level stating reason for removal.		
		(2) If there are no positive indications of failure, continue operation for 5 hours, then repeat inspection. If no indications of failure are then found, resume normal operation.		
		c. Perform thorough visual inspection of the following components; each may be kept in service if no discrepancy or obvious damage is found. Replace any damaged component.		
		(1) Main rotor blades		
		(2) Main rotor hub		
		(3) Tail rotor blades		
		(4) Tail rotor hub		
		(5) Intermediate gearbox		
		(6) Tail rotor drive gearbox		
		(7) Tail rotor driveshafts		
		(8) Tail rotor driveshaft hangers		
		(9) Swashplate assembly		
		(10) Scissors and sleeve assembly		
		(11) Main driveshaft		
		(12) Mast		
		(13) Drive links		

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AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET
		AFTER OVERTORQUE IN EXCESS OF 112 PERCENT		
		a. Replace the following components and send to next higher maintenance level with records showing overtorque as reason for removal.		
		(1) Transmission		
		(2) Main driveshaft		
		(3) Mast		
		(4) Main rotor blades		
		(5) Main rotor hub		
		b. Perform thorough inspection of the following components; each may be kept in service if no discrepancy or obvious damage is found.		
		(1) Tail rotor blades		
		(2) Tail rotor hub		
		(3) Intermediate gearbox		
		(4) Tail rotor drive gearbox		
		(5) Tail rotor driveshafts		
		(6) Driveshaft hangers		
		(7) Swashplate assembly		
		(8) Scissors and sleeve assembly		
		(9) Drive links		
7		**AFTER ENGINE OVERTORQUE**		
		When the engine has exceeded overtorque limits, perform engine overtorque inspection in accordance with TM 55-2840-229-24.		

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AFTER ENGINE OVERTORQUE (CONT)

CAUTION

The following limits are engine torque limits only. Pilot monitoring is necessary to prevent the engine from exceeding dynamic components (airframe) limits.

a. Output shaft torque limits:

(1)	Intermediate (30 minutes)	64 PSI	114 Percent
(2)	Normal (continuous)	60 PSI	107 Percent
(3)	Transient operation (2 seconds of less)	86 PSI	153 Percent

AFTER TAIL ROTOR DRIVE SYSTEM OVERTORQUE

NOTE

If tail rotor rigging is known to be correct, flight maneuvers with maximum allowable engine power which result in insufficient tail rotor control can cause a possible overtorque.

a. Remove output quill assembly from intermediate gearbox, and inspect output gear teeth for damage as described in chapter 6. If no scoring or scuffing is found, and if there are no other indications of damage, reassemble gearbox and retain in service. If gear teeth are scored or scuffed, or if there are other indications of damage, replace gearbox and perform inspection in step b.

b. Remove output quill assembly from tail rotor gearbox, and inspect condition of gears as in step a. If no scoring or scuffing is found and if there are no other indications of damage, reassemble gearbox and retain in service. If gear teeth are scored or scuffed, or if there are other indications of damage, replace gearbox and perform inspection in step c.

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
	AFTER TAIL ROTOR DRIVE SYSTEM OVERTORQUE (CONT)			
		c. Remove transmission tail rotor drive quill and inspect condition of gear teeth. Evidence of scoring or scuffing is cause for replacement of main transmission assembly. If it is necessary to replace the transmission assembly, then the tail rotor hanger bearing assemblies and tail rotor driveshafts must also be replaced.		
		d. Tag any removed components with reason for removal before turning in through normal supply channels to next higher maintenance level.		
7	**AFTER TRANSMISSION OIL OVER TEMP**			
		a. Troubleshoot transmission oil system to determine cause (paragraph 6-21).		
		b. Replace transmission, mast, oil cooler, and external oil filter if cause is due to tranmission internal failure. If cause is due to oil system external to transmission and oil temperature did not exceed **130** degrees C (**266** degrees F) for **15** minutes, correct cause of overheating and drain and refill transmission oil system.		
		c. If temperature exceeded above limits, replace transmission and mast. If abnormal contamination is present, also replace oil cooler and external oil filter and flush system lines with solvent (C 112).		
7	**AFTER COMPLETE LOSS OF TRANSMISSION OIL**			
		a. Troubleshoot transmission oil system to determine cause.		
		b. Replace transmission and mast, if engine power was applied after complete loss of oil. Also replace oil cooler and external oil filter if abnormal contamination is present and flush system lines with solvent (C 112).		
8	**AFTER FIRING EJECTOR CARTRIDGES. Refer to paragraphs 16-46 and 16-53.**			

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas		**AFTER PROBABLE EXPOSURE TO RADIOACTIVITY** Accomplish the following: a. Survey helicopter for level of radioactivity. b. Decontaminate helicopter as required. Refer to TM 3-220.		
9		**AFTER INDICATION OF UNUSUALLY HIGH OR LOW FUEL CAPACITY OR UNUSUALLY HIGH OR LOW FUEL CONSUMPTION** Perform inspection of fuel cells with special attention to possible self sealing material and/or inner liner separation.		
11		**AFTER INSTALLATION, REMOVAL OR RELOCATION OF EQUIPMENT OR MAJOR MODIFICATION WHICH RESULTS IN UNKNOWN CHANGE IN BASIC WEIGHT AND BALANCE OR AFTER REPORT OF UNSATISFACTORY FLIGHT CHARACTERISTICS.** Weigh helicopter and accomplish necessary entries in Weight and Balance Data, DD Form 365. Refer to AR95-16 and TM 55-405-9.		
9		**AFTER OVERFLOW OF BATTERY** a. Refer to TM 43-0105 for treatment of affected areas. b. Sheet metal surfaces and overlaps, both internal and external for damage. c. Rivets, bolts, screws, and other hardware for damage. d. Troubleshoot battery system to determine cause.		
4		**AFTER M65 TOW MISSILE HAS BEEN FIRED (ONE OR MORE)** Inspect tailboom skins for nicks, dents, scratches, creases, and cracks.		

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AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET
All Areas	**AFTER THE HELICOPTER HAS BEEN SUBJECTED TO SALT WATER OR SALT WATER SPRAY**			
		Wash entire helicopter with fresh water, particularly inside of engine compartment doors, wash all compartments which were exposed to salt water; make a detail check of all surfaces for corrosion. Apply corrosion preventive compound (C41) to exposed nonpainted, anodized, or cadmium plated assemblies. Water-wash engine internally, per TM 55-2840-229-24.		
3	**AFTER WASHING HELICOPTER**			
		Check pitot-static system for moisture.		
All	**WHEN OVERHAULS, MAJOR MODIFICATIONS OR MAJOR AIRFRAME REPAIRS ARE ACCOMPLISHED, ANY SPECIAL EQUIPMENT HAS BEEN ADDED TO OR REMOVED FROM THE BASIC AIRFRAME OR WHEN WEIGHT AND BALANCE DATA ARE SUSPECTED TO BE IN ERROR**			
		For general weight and balance information, refer to TM 55-405-9, Army Aviation Maintenance Engineering Manual and AR 95-16. Weight and Balance, Appendix B. Maintenance Allocation Chart should be consulted for responsibility of weighing and balancing of the aircraft.		
All	**WHEN HELICOPTER IS TRANSFERRED, RECEIVED, PLACED IN STORAGE, OR REMOVED FROM STORAGE.**			
		Inventory helicopter for availability of inventoriable property (TM 38-750).		
All	**UPON TRANSFER AND UPON RECEIPT OF A HELICOPTER; UPON EXPIRATION OF 12 MONTHS ELAPSED TIME SINCE LAST INVENTORY; UPON PLACING A HELICOPTER IN STORAGE AND UPON REMOVAL FROM STORAGE (HELICOPTER NEED NOT BE INVENTORIED WHILE IN STORAGE)**			
		Perform an inventory check. Refer to DA Form 2408-17 and Appendix C.		

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AREA NO	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
A		**DAILY WHEN OPERATING IN HIGH HUMIDITY OR SALT-LADEN AIR**		
		Wash main and tail rotor with mild detergent (C113), rinse with clear water and dry.		
9		**EVERY 30 DAYS OR 25 FLIGHT HOURS, WHICHEVER OCCURS FIRST**		
		Perform preventive maintenance checks and services on nickel-cadmium battery (TM 11-6140-203-14-2).		
7		**EVERY 25 HOURS OF OPERATION**		
		a. Retorque alternator V-band attaching bolts 65 to 70 inch-pounds.		
		b. Remove transmission primary oil filter (wafer disk) and electrical chip detector; check for contamination (determine the source, if metal particles are present), then clean and reinstall.		
10		**EVERY 50 HOURS**		
		a. Deleted.		
9		*b.* Inspect and clean engine oil filters and chip detectors. Determine source of chips if any are present.		
5		*c.* Inspect nonstandard locally manufactured heavy duty skid shoes exceeding 20 pounds in weight.		
		(1) Perform inspection using liquid fluorescent dye penetrant method. This inspection to be conducted by AVUM with assistance from AVIM as required to gain access to inspection area.		
		(a) Jack airframe and remove landing gear assembly IAW specified procedures.		
		(b) Conduct visual inspection for nicks, scratches, or gouges over entire cross tube surface. Refer to Chapter 3 for allowable damage criteria.		
		(c) Remove blind rivets securing cross tube/fuselage attachment fittings to cross tubes and remove fittings. Save fittings for reuse.		
		(d) Fluorescent dye penetrant inspection is required on cross tube surface of an area completely around cross tube at support fitting locations and adjacent area one inch out from each end of support fittings. A one inch band around cross tubes at chem-milled step area adjacent to skid tube saddle fitting will also be dye penetrant inspected.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP (Daily, Intermediate, etc.) SPECIAL	PAGE NO.	NO. OF PAGES
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
		(e) Prepare the surface and conduct a liquid fluorescent dye penetrant inspection IAW TM 43-0103, utilizing penetrant kit, NSN 6850-00-782-2740.		
		(f) Wash and remove all excess penetrant and developer from cross tube surfaces.		
		(g) Recoat surface of cross tube to be covered by the attachment fittings with sealant (C105).		
		(h) Reinstall attachment fittings to cross tubes. Diameter and length of rivets to be determined at time of installation.		
		(2) Cross tubes with crack indications will be scrapped. All cross tubes with no crack indications are to be returned to service.		
3	EVERY 100 HOURS OF OPERATION			
		Check FAT (free air temperature) gage for correct calibration. Refer to TM 55-1500-204-25/1.		
9	EVERY 100 HOURS OR 120 CALENDAR DAYS, WHICHEVER OCCURS FIRST			
		a. Perform preventive maintenance checks and services on nickel-cadmium battery (TM 11-6140-203-14-2).		
		b. Check voltage regulator setting. Adjust for temperature as required, in accordance with TM 55-1500-204-25/1.		
5	*EVERY 150 HOURS*			
		Inspect nonstandard locally manufactured heavy duty skid shoes weighing 20 pounds or less using same procedures as 50 hours inspection on same item of more weight.		
	EVERY 450 HOURS			
9		a. Replace oil cooler blower turbine bearings.		
7		*b.* Remove and dispose of hydraulic system module filter elements. Clean filter bowls. Install new filter elements.		
7 & 11	EVERY 600 HOURS OF OPERATION OR 1 YEAR, WHICHEVER OCCURS FIRST.			
		a. Inspect main driveshaft for internal corrosion.		
		b. Lubricate tail rotor drive train flexible couplings.		
		c. Visually check splines for wear and nicks.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 16	NO. OF PAGES 26
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIRE-MENT EVERY	ITEM	STA-TUS	RECORDED ON WORKSHEET
		d. Visually check flexible coupling seal for proper installation, cuts and tears.		
		e. Inspect hangar bearings for evidence of grease leakage, corrosion, overheating (discoloration of adjoining metal), and notching.		
		f. Remove, disassemble, clean, inspect, lubricate, assemble, and reinstall main driveshaft assembly.		
6	EVERY 30 DAYS OR 50 HOURS OF OPERATION (WHICHEVER IS FIRST)			
		Wash main and tail rotor blades with mild soap detergent (C113), rinse with clear water and dry.		
3	EVERY 6 MONTHS			
		a. Weight check CF3BR fire extinguisher. Refer to TM 55-1500-204-25/1.		
		b. Inspect and test connector receptacle (ground). Refer to TM 55-1500-323-25.		
3	EVERY 12 MONTHS			
		a. Deleted.		
		b. Replace ejector rack cartridges. Refer to paragraph 16-40.		
		c. Magnetic compass for discoloration of liquid and proper calibration; recompensate if necessary.		
		d. Gyromagnetic compass system for proper calibration; recompensate if necessary (TM 55-1500-204-25/1).		

AIRCRAFT INSPECTION CHECKSHEET		TYPE OF INSP (Daily, Intermediate, etc.) SPECIAL	PAGE NO.	NO. OF PAGES
AIRCRAFT AND SERIAL NO.		INSPECTION NO.	DATE OF INSPECTION	

AREA NO	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
2	**EVERY 24 MONTHS**			
		a. Pitot-Static System — Inspect and test per TM 55-1500-204-25/1.		
		NOTE Computer calendar time from date stamped on instrument case of altimeter and airspeed indicator.		
		b. Altimeter — Inspect and test per TM 55-1500-204-25/1.		
		c. Airspeed Indicator — Inspect and test per TM 55-1500-204-25/1.		
		d. Deleted.		
		e. First Aid Kit - Inspect per TM 55-1500-328-25.		

SECTION V. OVERHAUL AND RETIREMENT SCHEDULE

1-58. OVERHAUL AND RETIREMENT SCHEDULE.

This section lists units of operating equipment that are to be overhauled or retired at the period specified. Removal of equipment for overhaul may be accomplished at the inspection nearest the time when overhaul is due unless otherwise specified in TM 55-1500-328-25.

WARNING

Refer to TM 55-1500-328-25 concerning mutilation/destruction of items when they have reached the established life expectancy (finite life) before the items are forwarded for property disposal.

AREA FIGURE 1-12		PART NUMBER & ITEM	OVERHAUL INTERVAL	RETIREMENT SCHEDULE
		Power Plant		
10	209-062-120-101	Tripod Engine Mount		2500
		Canopy		
3	209-033-008-101	Arming/Firing Mechanism		5 years*
		Transmission		
7	212-040-001 51	Transmission Assembly	1100	
7	212-040-001-39	Transmission Assembly	1100**	
7	205-040-263-3	Main Input Quill	1500	
7	205-040-263-111	Main Input Quill	1500	
7	212-040-365-33	Hydraulic Pump Quill	1100	
7	212-040-365-25	T/R Output Quill	1100	
7	209-040-069-1	Alternator Drive Quill	1100**	
		Tail Rotor & Drive System		
11	212-040-003-23	Intermediate Gearbox	1200	
11	212-040-004-9	Tail rotor drive gearbox	1200	
11	212-010-704-5	Yoke Assembly		2400
11	212-010-744-5	Yoke Assembly		2400
11	212-010-750-11	Blade Assembly		2400
		Main Rotor		
6	K747-003-205	Main Rotor Blade		10,000
6	K747-003-209	Main Rotor Blade		10,000
6	540-015-001-1	Main Rotor Blade		1100
6	540-011-101-25	Main Rotor Hub	1200	
6	540-011-153-17	Extension, Main Rotor Hub		3600
6	204-012-122-3	Retention Straps		2400
6	204-012-122-7	Retention Straps		2400
6	540-011-102-5	Yoke, Main Rotor Hub		3600
6	204-012-112-7	Hub Retention Strap		2400
6	2601400	Hub Retention Strap		2400
6	540-011-113-1	Fitting Strap		2400
6	540-011-177-1	Nut, Strap Fitting		2400
6	540-011-112-5	Pin, Inboard		2400
6	540-011-112-7	Pin, Outboard		2400
6	K747-072-1	Fitting Assembly, Drag Strut		5000
6	K747-061-5	Fitting Assembly, Root		5000
6	NAS464P8-36	Fitting Bolt, Drag Strut		1800

AREA FIGURE 1-12	PART NUMBER & ITEM		OVERHAUL INTERVAL	RETIREMENT SCHEDULE
8	ARD 863-1	Ejector Racks		12 Months***
	P7911-2	Cartridges		
		Mast Controls		
7	212-040-136-1	Mast Bearing		1500
7	209-010-401-11	Scissors & Sleeve Assembly	1200	
7	209-010-405-7	Scissors Lever		3600
7	209-010-400-1	Swashplate & Support Assembly	1100	
7	209-010-402-1	Inner Ring		3300
7	209-010-403-1	Outer Ring		3300
7	209-010-460-3	Pitch Control Tube		600
7	209-040-366-3	Mast Assembly	1100	
7	204-040-136-7	Mast Bearing		1500
7	204-040-136-9	Mast Bearing		1500
7	204-076-428-1,-3,-5	Rod End Bearing		1650
7	209-001-358-13	Tube Assembly		3300
7	209-001-358-17	Tube Assembly		3300
7	209-001-358-21	Tube Assembly		3300
7	204-076-317-1,-5,-7	Bearing Housing		3300
7	100328	Cylinder Barrel		3300
7	205-040-263-105	Quill Assembly	1500	
7	41000310-001	Cylinder Actuator		3300

* 5 Year retirement life for installed items begins with date of installation. Life is not to exceed 5 years installed or 7 years from date of manufacture.

** The 212-040-001-39 transmission is the same as the 212-040-001-51 transmission without the 204-040-069-1 alternator drive quill. The alternator drive quill must be ordered separately and installed in the 212-040-001-39 transmission to make the 212-040-001-51 configuration.

*** Not to exceed expiration date and/or 10 removals.

AREA FIGURE 1-9	PART NUMBER & ITEM		OVERHAUL INTERVAL	RETIREMENT SCHEDULE
7	209-040-366-3	Mast Assembly	1100	
7	204-040-136-7	Mast Bearing		1500
7	204-040-136-9	Mast Bearing		1500
7	204-076-428-5	Rod End Bearing		3300
7	209-001-361-1	Rod End Bearing		3300
7	209-001-358-13	Tube Assembly		3300
7	209-001-358-17	Tube Assembly		3300
7	209-001-358-21	Tube Assembly		3300
7	204-076-317-7	Bearing Housing		3300
7	100328	Cylinder Barrel		3300

* 5 Year retirement life for installed items begins with date of installation. Life is not to exceed 5 years installed or 7 years from date of manufacture.

** The 212-040-001-39 transmission is the same as the 212-040-001-51 transmission without the 204-040-069-1 alternator drive quill. The alternator drive quill must be ordered separately and installed in the 212-040-001-39 transmission to make the 212-040-001-51 configuration.

*** Not to exceed expiration date and/or 10 removals.

CHAPTER 2

AIRFRAME

SECTION I. STRUCTURAL REPAIR

2-1. GENERAL INFORMATION — AIRFRAME.

a. This chapter contains airframe instructions for AVUM (Aviation Unit Maintenance) and AVIM (Aviation Intermediate Maintenance) on the army model AH-1S single rotor, single engine, attack helicopter. The airframe consists of the fuselage, tailboom, and wings (figure 2-1).

b. Qualified Engineering Authority, as used in this manual, is TSARCOM Engineering. Engineering Authority may be contacted by writing to:

HEADQUARTERS
U.S. Army Troop Support and Aviation
Materiel Readiness Command
Attn: DRSTS-ME(2)
4300 Goodfellow Blvd.
St. Louis, Mo. 63120

CAUTION

The structural panels shown on figure 2-2 must be installed prior to helicopter ground run, flight, jacking, towing, or hoisting. Non-structural panels must be installed prior to flight operations.

NOTE

Install all fasteners in structural panels. Non-structural panels (figure 2-3) may have every third fastener missing; however, no panel shall have more than thirty-three percent of the total number of fasteners missing.

c. This chapter contains the following sections:

Section I — Structural Repair
Section II — Fuselage
Section III — Tailboom
Section IV — Wings
Section V — Deleted

d. Structural repair of the airframe is covered in Section I. Maintenance functions other than structural repair are covered in the applicable sections II thru IV.

e. Structural repairs described in this section are intended for use in conjunction with TM 55-1500-204-25/1, General Aircraft Maintenance Manual.

f. The limitations in the following note should be observed when performing structural repair on the airframe.

NOTE

Repair at (AVUM) is limited to minor repair of sheetmetal cracks, scratches, corrosion, and loose or missing hardware. These repairs can be accomplished using the airframe repairman's tool kit and portable hand tools. If any extensive damage occurs or major repair is required, repairs shall be accomplished by (AVIM). Repair at (AVIM) is limited to repair of sheet metal cracks, scratches, corrosion, holes, and loose or missing hardware. If major damage occurs requiring jigs and fixtures, repairs shall be accomplished by next higher maintenance level.

2-2. TYPE OF CONSTRUCTION — AIRFRAME.

The AH-1S model attack helicopter basic structural configuration is composed of four main groups.

a. **Main and Tail Rotor Group.** The bonded, all-metal main rotor blade assembly consists of a main spar, a honeycomb core, aluminum skins, and laminated root plates to provide rigid support for mounting to the hub. Tail rotor blades are of similar construction. Maintenance and repair procedures for the main and tail rotor group are covered in chapter 5.

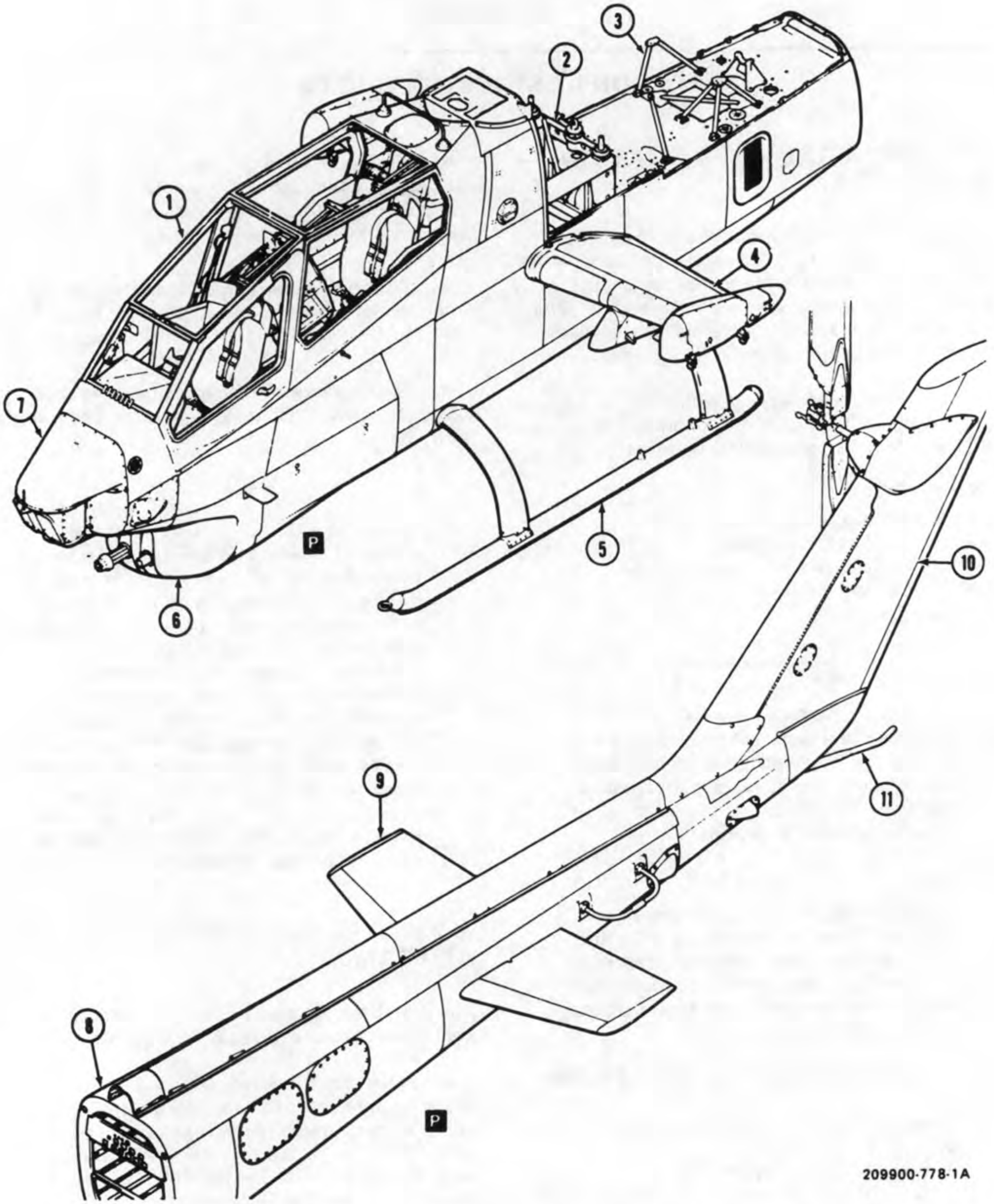

Figure 2-1. Fuselage Components and Tailboom (Sheet 1 of 2)

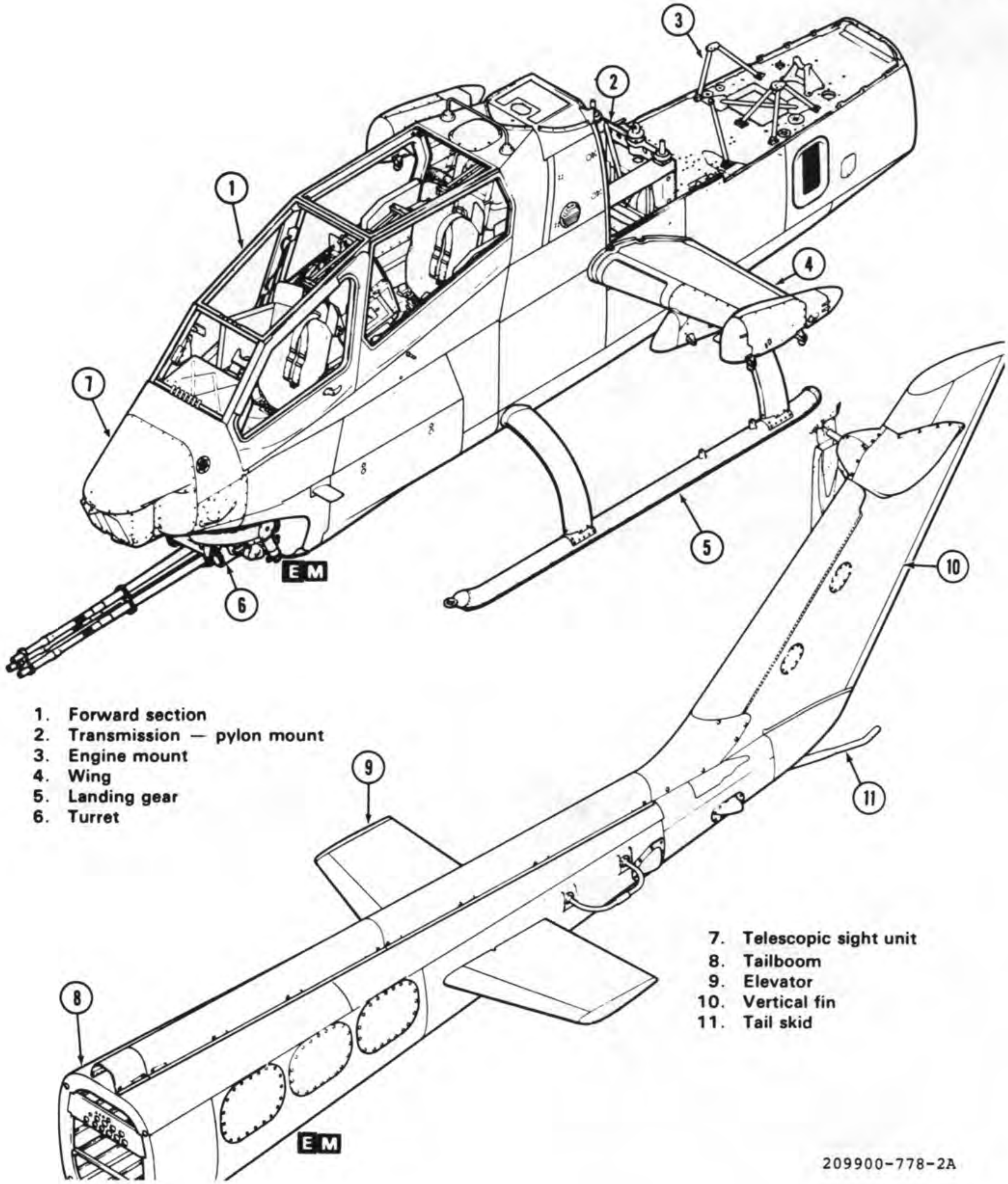

Figure 2-1. Fuselage Components and Tailboom (Sheet 2 of 2)

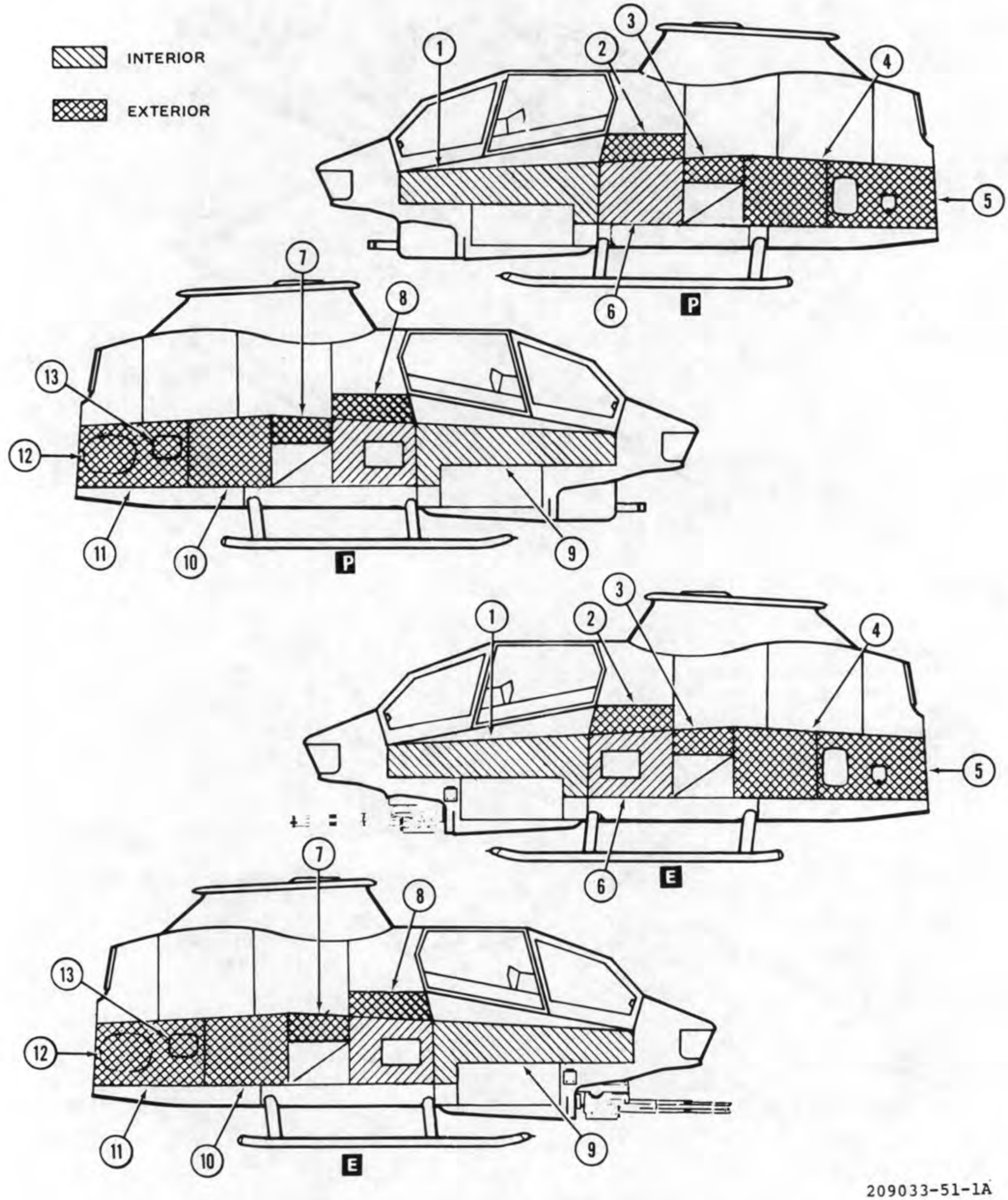

Figure 2-2. Structural Panels (Sheet 1 of 4)

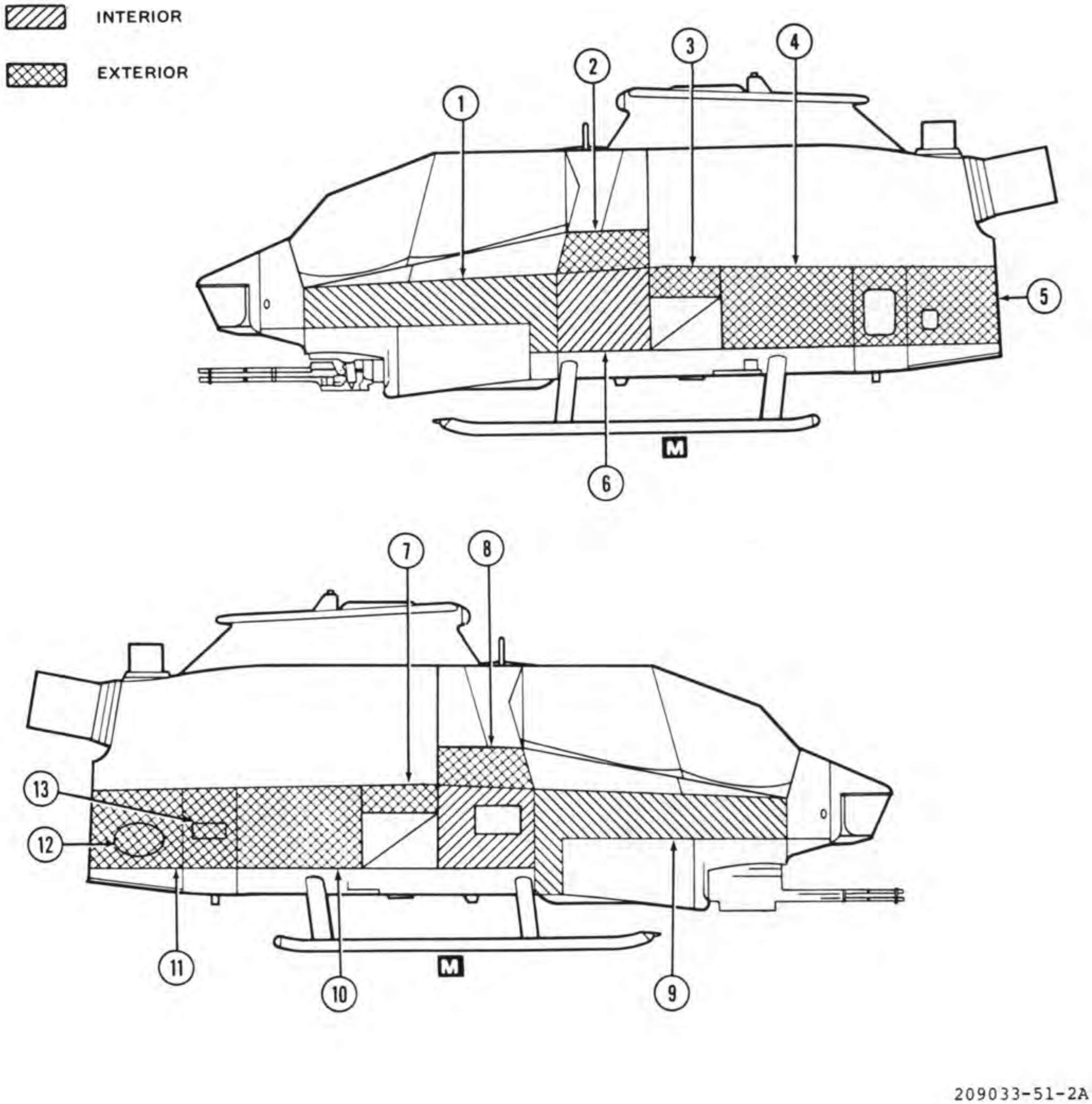

Figure 2-2. Structural Panels (Sheet 2 of 4)

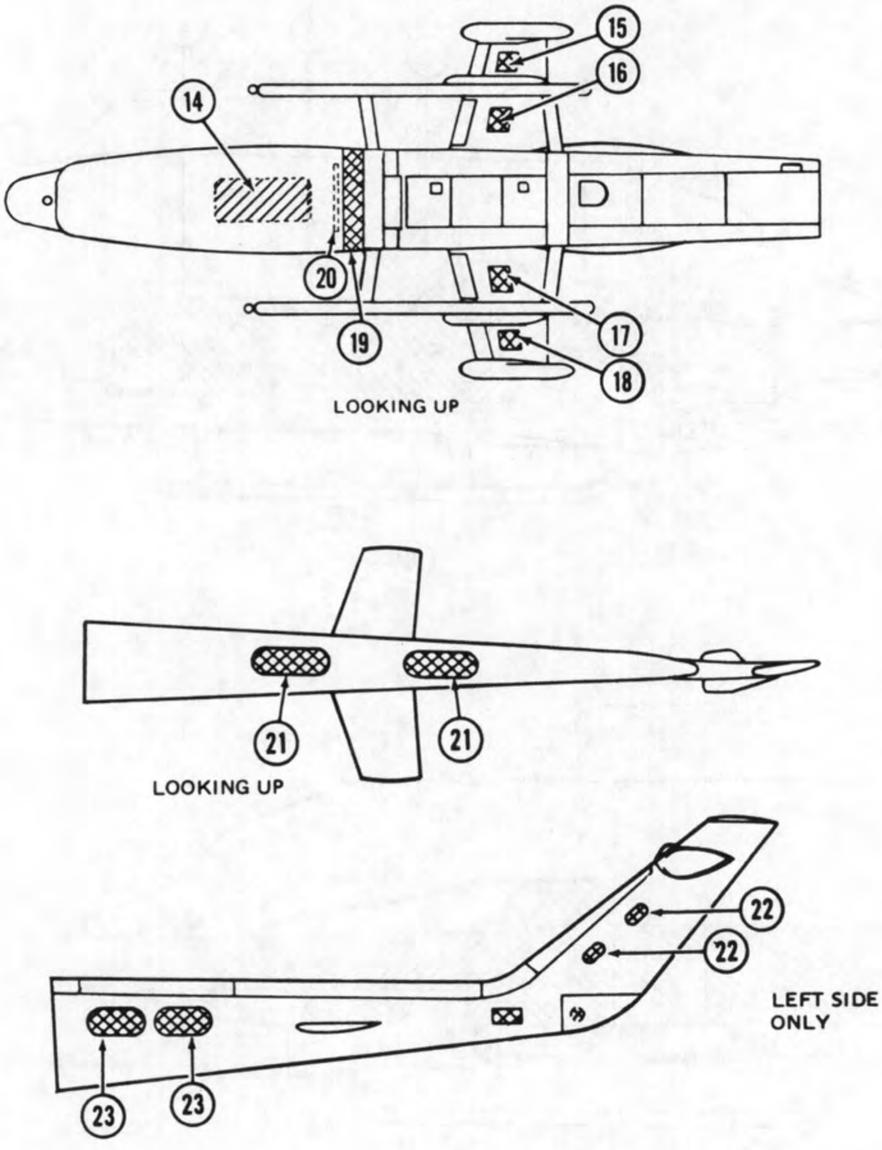

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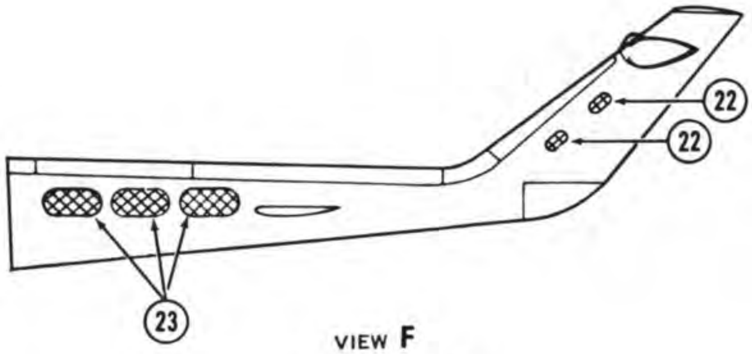
Figure 2-2. Structural Panels (Sheet 3 of 4)



VIEW F

AH-1S E M

ITEM		TYPE FASTENER	ACCESS TO:
1.	Beam panel	Rivets	—
2.	Upper fuel cell panel	Screws	Forward fuel cell
3.	Pylon support panel	Rivets	—
4.	Beam panel	Rivets	Aft fuel cell
5.	Beam panel	Rivets	—
6.	Fuel cell access panel	Screws	Forward fuel cell
7.	Pylon support panel	Rivets	—
8.	Upper fuel cell panel	Rivets	—
9.	Beam panel	Rivets	—
10.	Fuel cell access panel	Screws	Aft fuel cell
11.	Beam panel	Rivets	—
12.	Access panel	Fasteners	Aft electrical compartment, tail rotor actuator
13.	Access panel	Screws	Oil cooler, AN/ARN-89 ADF receiver
14.	Ammunition compartment upper panel	Screws	Heating and ventilating ducts and valves
15.	Wing outboard access covers (left)	Screws	TOW hydraulic and electrical instalaltion
16.	Wing inboard covers (left)	Screws	TOW hydraulic and electrical installation
17.	Wing inboard access covers (right)	Screws	TOW hydraulic and electrical installation
18.	Wing outboard covers (right)	Screws	TOW hydraulic and electrical installation
19.	Forward crosstube fairing	Screws	Forward crosstube and supports
20.	Ammunition compartment aft panel	Screws	Servo electronic control unit
21.	Tailboom access door	*Screws	Control linkage, synchronized elevator supports, TOW cooling fan, avionics, electronic equipment
22.	Access cover	Screws	Tail rotor control linkage
23.	Avionics compartment door (left side only)	Screws	Avionics, electronic equipment and cooling fan

NOTE: Legend applies to all views.

* And AT-844/APX-44 antenna connector

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Figure 2-2. Structural Panels (Sheet 4 of 4)

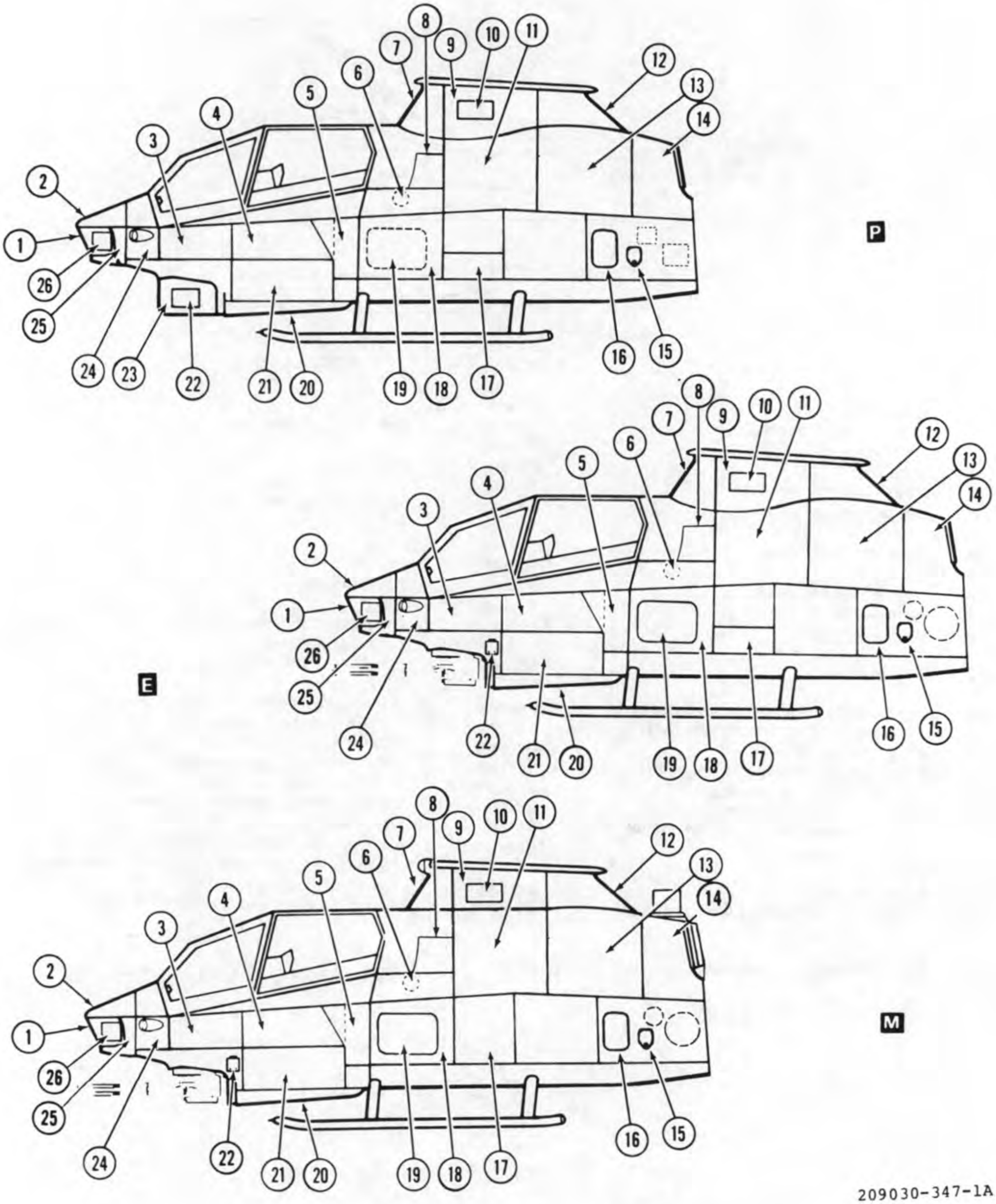


Figure 2-3. Nonstructural Access Panels, Doors, and Fairings (Sheet 1 of 4)

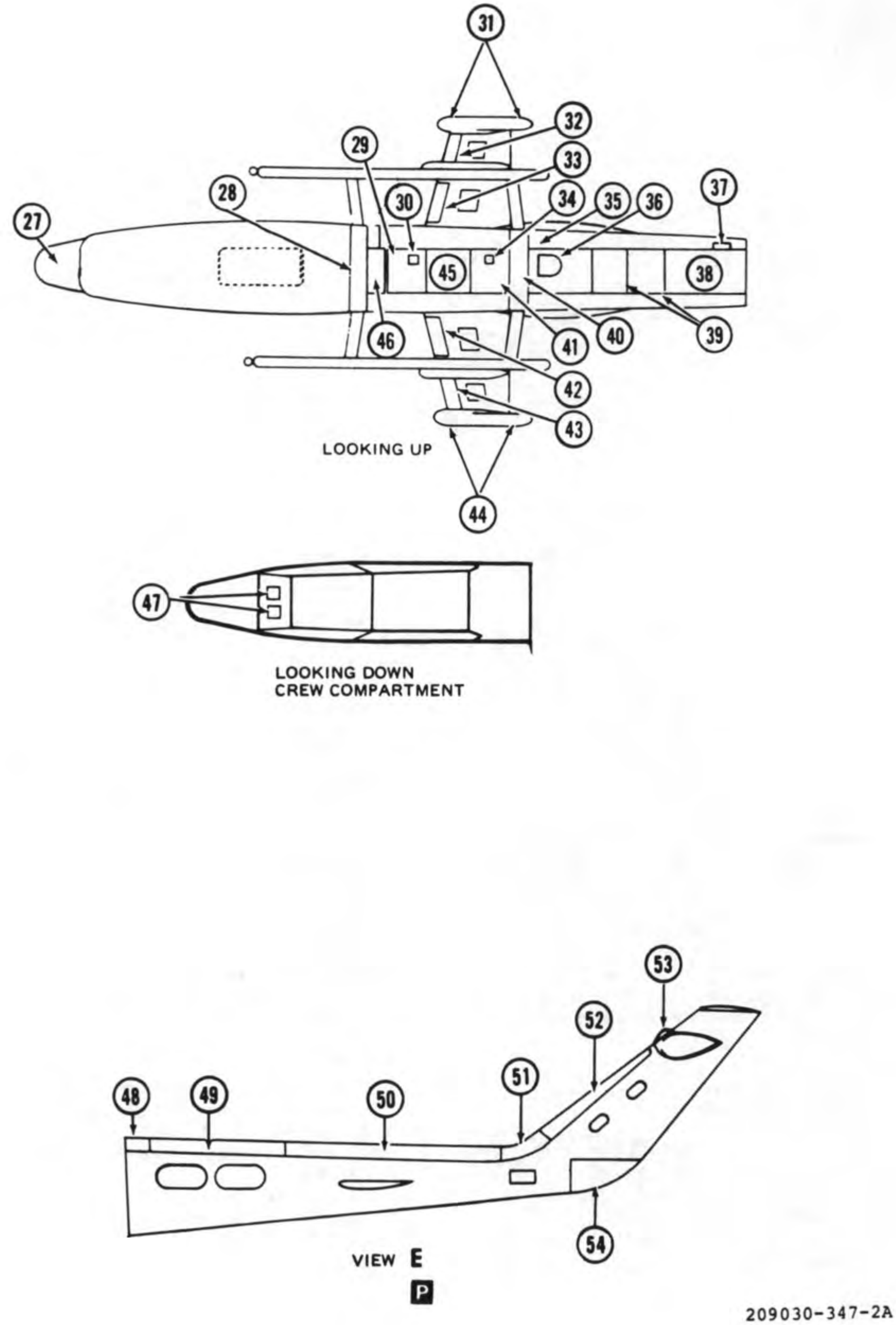
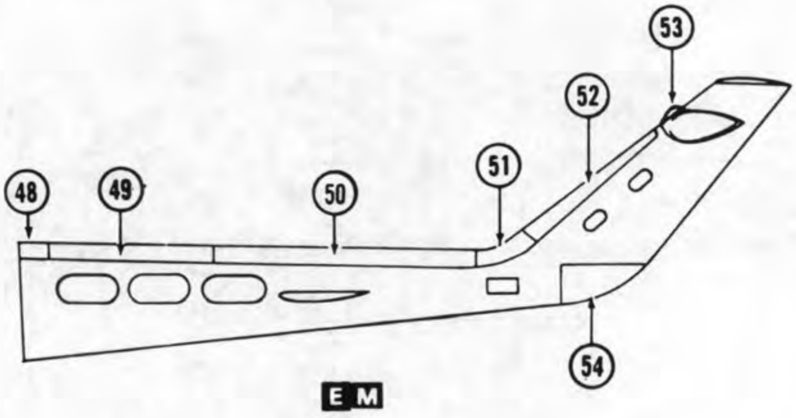


Figure 2-3. Nonstructural Access Panels, Doors, and Fairings (Sheet 2 of 4)



ITEM	ACCESS TO:
1. Forward fairing	Telescopic sight unit
2. Upper fairing	Telescopic sight unit
3. Outer panel (left and right)	Flight controls
4. Outer panel (left and right)	Flight controls
5. Outer panel (left and right)	Flight controls
6. Fuel filler cap (right side only)	
7. Forward pylon fairing	Airborne laser tracker, cabin air intake
8. Access door (left and right)	Hydraulic reservoirs and modules, air distribution duct, and ECU
9. Center pylon fairing (left and right)	Rotating controls, anti-collision light
10. Access door (left and right)	Rotating controls
11. Transmission cowl assembly (left and right)	Transmission, driveshaft, engine air induction
12. Aft pylon fairing	Engine oil tank
13. Engine cowl assembly (left and right)	Engine compartment
14. P E Tailpipe fairing	Exhaust tailpipe, tail rotor driveshaft
14. M IR suppressor cowling	AN/ALG 144 Connections
15. External power door (left side only)	External power receptacle
16. Oil cooler duct panel (left side only)	Oil coolers, turbine fan, and fresh air vent
17. Access panel assembly (left and right)	Lower transmission, lift beam, hydraulic units, control linkage
18. Outer panel (left and right)	Fuel cell panel
19. Access panel (left side)	M197 turret logic control unit
19. E M Access panel (right side)	Interface control unit
20. Access panel (bottom)	Telescopic sight unit wiring
21. Ammunition compartment door (left and right)	Ammunition stowage, leveling points
22. Turret access door (left and right)	Armament
23. P Turret fairing (left and right)	Turret exterior
24. Access panel	Controls — gunner and antennas
25. Outer fairing (left and right)	Telescopic sight unit
26. Coverplate (left and right)	Nose antenna location

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Figure 2-3. Nonstructural Access Panels, Doors, and Fairings (Sheet 3 of 4)

ITEM	ACCESS TO
27. Access panel	APR 39 Receiver
28. Crosstube fairing	Forward crosstube and supports
39. Lower skin panel	Forward fuel cell sump
30. Drain cover	Forward fuel drain
31. Pylon access panels	Pylon hydraulic and electrical units, ground intercom panel
32. Left cover (LE, outboard)	Electrical wiring
33. Left cover (LE, inboard)	Electrical wiring
34. Drain cover	Aft fuel cell
35. Lower skin panel	Control linkages
36. Drain cover	Fuel sump drain door
37. Jack point opening (left side only)	Jack and mooring point
38. ADF sense antenna	Antenna and SCAS control tube
39. Lower skin panel	Electrical cables
40. Aft crosstube fairing	Aft crosstube and supports
41. Lower skin panel	Aft fuel cell sump
42. Right cover (LE, inboard)	Electrical wiring
43. Right cover (LE, outboard)	Electrical wiring
44. Pylon access panel	Pylon hydraulic and electrical units, ground intercom panel
45. Lower skin panel	Control linkages
46. Access panel	Avionics wiring
47. Gunner floor access panel	Armament turret
48. Driveshaft forward cover	Tail rotor driveshaft
49. Driveshaft center cover	Tail rotor driveshaft
50. Driveshaft aft cover	Tail rotor driveshaft
51. Gearbox cover	Intermediate gearbox
52. Driveshaft cover	Tail rotor driveshaft
53. Gearbox fairing and cover	Tail rotor drive gearbox
54. Aft tail fairing	Tail structure

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Figure 2-3. Nonstructural Access Panels, Doors, and Fairings (Sheet 4 of 4)

b. **Body and Wing Group.** The body is divided into a forward fuselage section and a tailboom. In the forward fuselage, titanium, aluminum, and fiberglass honeycomb deck panels and main beams form a primary box beam structure which is covered with aluminum alloy skin and honeycomb sandwich panels. The forward fuselage structure supports the engine, pylon assembly, tailboom, landing gear, wings, fuel tanks, weapons turret, and the tandem cockpit. The cockpit enclosure is an acrylic plastic canopy incorporating crew access doors. The wings, which provide additional lift and support for external stores, are constructed of two main spars, ribs, and aluminum skin. The tailboom is semi-monocoque construction with bulkheads, longerons, stringers, and aluminum skin. The tail fin, built up of spars, ribs, and skin, is an integral part of the tailboom. The tailboom is attached to the forward fuselage section with four bolts and supports the aft section of the tail rotor drive system, the tail rotor, and elevator.

c. **Landing Gear Group.** The aluminum alloy skid-type landing gear consists of two skid tubes and two arched cross tubes and is bolted to the primary structure of the forward fuselage section at four points. Maintenance and repair procedures for the landing gear are covered in chapter 3.

d. **Power Plant Group.** The power plant is supported by a horizontal titanium deck on the upper aft part of the forward fuselage section. This group, which includes the engine, transmission, and related accessories, is enclosed by hinged fiberglass and aluminum cowling. Maintenance and repair procedures for the power plant are covered in chapter 4.

2-3. INVESTIGATION OF DAMAGE — AIRFRAME.

a. Remove grease, dirt, and paint in area of damge so that the extent of damage can be determined.

b. Inspect structure for dents, scratches, abrasions, punctures, cracks, distortion, and corrosion. Deep scratches, nicks, and abrasions shall be treated as a crack.

c. Inspect all riveted and bolted joints in vicinity of damage area for sheared, loose, or missing rivets and bolts. Inspect for elongated rivet and bolt holes. If there is any doubt whether a rivet or bolt has failed, remove the fastener for inspection.

d. Inspect all adjacent structure for secondary damage that may have resulted from a shock load transmitted from the primary damage.

2-4. CLASSIFICATION OF DAMAGE AND TYPE REPAIR — AIRFRAME.

a. Negligible Damage. Damage that can be permitted to remain as is or damage repairable by simple procedure, such as removing dents, stop drilling short cracks in non-critical structure, temporary patches, etc., without placing restrictions on flight.

b. Damage Repairable by Patching. Damage exceeding the specified negligible limits may be repairable by application of a patch.

c. Damage Repairable by Insertion. Damage to a member which is repairable by removing the material at the point of damage and applying a newly fabricated insert having identical characteristics to that removed, plus the necessary reinforcement.

d. Damage Necessitating Replacement of Parts. Damage which cannot be repaired or damage so severe that the repair thereof would not warrant the time expended.

e. Riveted Repairs. The finished aluminum alloy parts and magnesium alloy sheets used in the helicopter are heat treated. Only rivets and/or bolted repairs shall be permitted. For instruction on the use and installation of rivets, refer to General Aircraft Maintenance Manual, TM 55-1500-204-25/1.

f. Welded Repairs. For welded repair information to components such as tailpipe and spot welds, refer to TM 55-1500-204-25/1.

2-5. SUPPORT OF STRUCTURE DURING REPAIR — AIRFRAME.

CAUTION

When replacing any riveted structural honeycomb panels or the right aft fuel cell panel which is installed with screws, structural loads must be relieved to maintain alignment of airframe.

a. Use the following procedures to ensure that airframe alignment is maintained.

CAUTION

Do not use aircraft structure as work platform when structural panels or engine decks are removed because airframe warpage may result.

(1) Attach hoist to mast retaining nut and support the main rotor by hoisting vertically until the lift link retaining bolt can be freely rotated. A free lift link retaining bolt indicates that the load has been removed.

Alternate method: Remove main rotor, mast, controls, and transmission.

(2) Attach engine sling (T9) and hoist (T45) to engine. Loosen pillow blocks on engine mounts. Support the engine by hoisting vertically until engine is loose in the pillow blocks.

Alternate method: Remove engine. Refer to paragraph 4-12.

(3) Support tailboom at two locations, forward and aft, to remove load from forward fuselage.

Alternate procedure: Remove tailboom.

CAUTION

All structural panels must be installed prior to jacking or lowering on jacks, to prevent possible warpage. Refer to paragraphs 1-34 and 1-45 for hoisting and jacking instructions.

(4) Place jacks (S3 and S9) under jack points and raise until hand-tight against jack fittings (S6, S7, and S8).

CAUTION

Remove and install the panels listed in the following step one at a time unless a work aid fixture is used to restrain the structure and maintain alignment, or damage to the fuselage may result.

b. Replacement of structural panels is restricted to only one at a time unless a work aid fixture is used to restrain the structure and prevent misalignment. Panels that can be replaced one at a time without the use of a fixture are listed below.

Table 2-1. Main Beam Panels (Structural)

FIGURE 2-2 INDEX NO.	SIDE	FUSELAGE STATION REF.
1	Left	61.25 to 148.50
2	Left	148.50 to 186.25
3	Left	186.25 to 213.94
4	Left	213.94 to 250.00
5	Left	250.00 to 300.68
6	Left	148.50 to 186.25
7	Right	186.25 to 213.94
8	Right	148.50 to 186.25
9	Right	61.25 to 148.50
10	Right	213.94 to 250.00
11	Right	250.00 to 300.68

c. If the engine deck panel must be replaced, contact TSARCOM DRSTS-ME(2) for information.

2-6. LOCATION OF LEVELING POINTS — AIRFRAME.

Refer to paragraph 1-34 for leveling procedure.

2-7. PRINCIPAL DIMENSIONS — AIRFRAME.

Refer to figure 2-4 for principal dimensions of the helicopter.

2-8. REFERENCE LINES — AIRFRAME.

Refer to figure 2-5 for major reference lines of the helicopter. Definitions of reference lines are as follows:

a. **Fuselage Station Lines.** Station lines (FS) are vertical reference lines against the helicopter which are used to locate major assemblies and parts of the structure. FS numbers indicate the distance in inches from the reference datum line, which is located **24.4** inches forward of the most forward nose contour and designated as Station 0.

b. **Boom Station Lines.** Boom station lines (BS) are reference lines perpendicular to the center line of the tailboom. Boom stations indicate the distance in inches from the reference datum line, which is located **41.37** inches forward of the most forward surface of the boom structure.

c. **Water Lines.** Water lines (WL) are horizontal reference lines (viewed from the side or front of helicopter) used to locate major assemblies and parts of the structure by a number indicating the distance in inches from a line of origin, located **21.62** inches below the lower contour of the turret fairing and designated as water line 0.

d. **Butt Lines.** Butt lines (BL) are vertical reference lines as viewed from front of helicopter used to locate major assemblies and parts of the structure by a number indicating the distance in inches on each side of the helicopter centerline, which is designated as butt line 0.

e. **Wing Station Lines.** Wing station lines (WS) are vertical reference lines as viewed from front of helicopter and are used to locate parts of the wing structure by a number indicating the distance in inches from the helicopter centerline (BLO).

2-9. STRUCTURAL REPAIR MATERIALS.

Structural repair materials are listed in table 2-2 in alphabetical order.

2-10. CORROSION CONTROL — AIRFRAME.

a. This paragraph contains information required for identification and control of corrosion. Refer to TM 43-0105 for additional information. Preventive maintenance for corrosion control should include the following procedures:

(1) Periodic inspection to detect corrosion in the early stages.

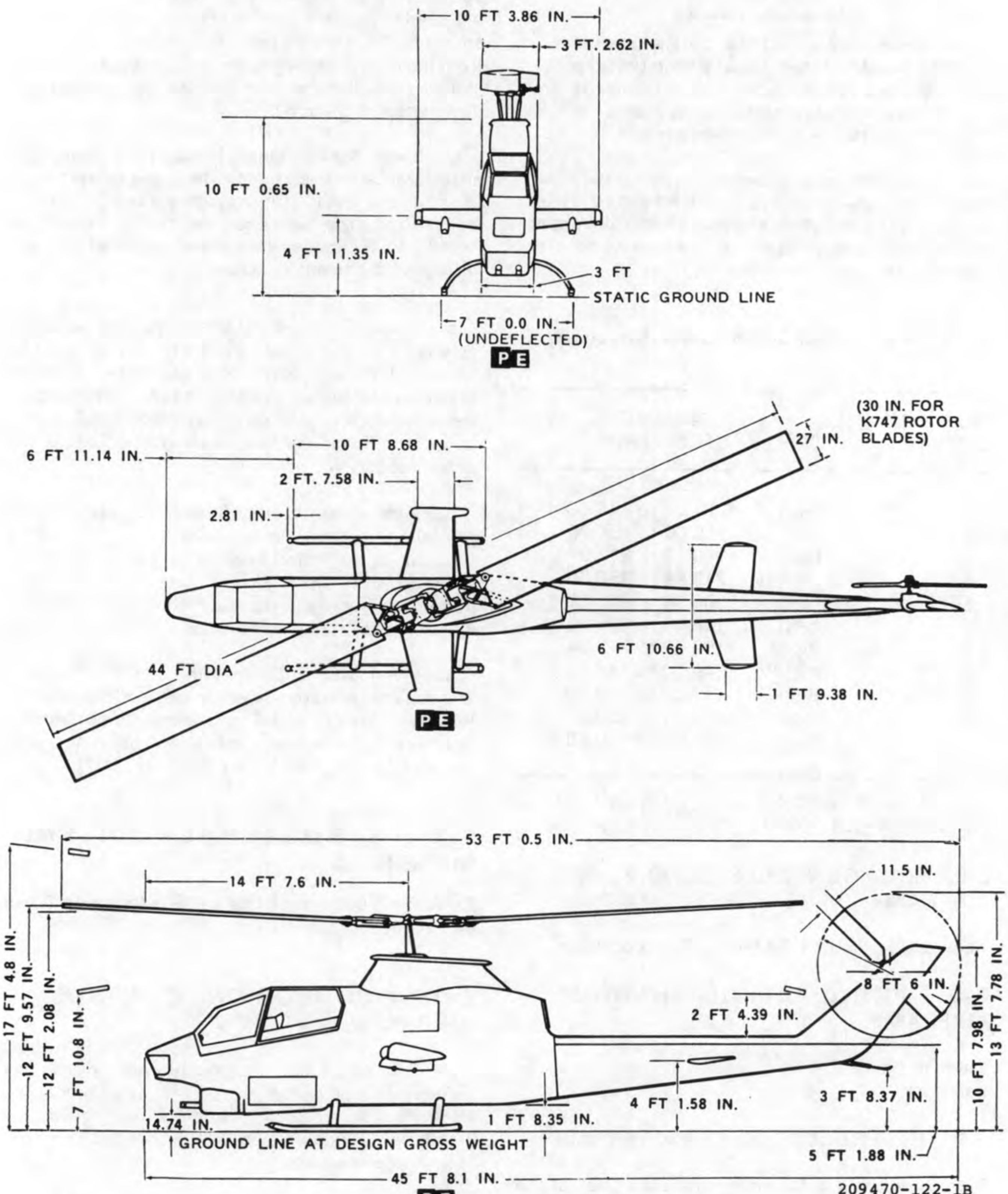


Figure 2-4. Principal Dimensions — Airframe (Sheet 1 of 2)

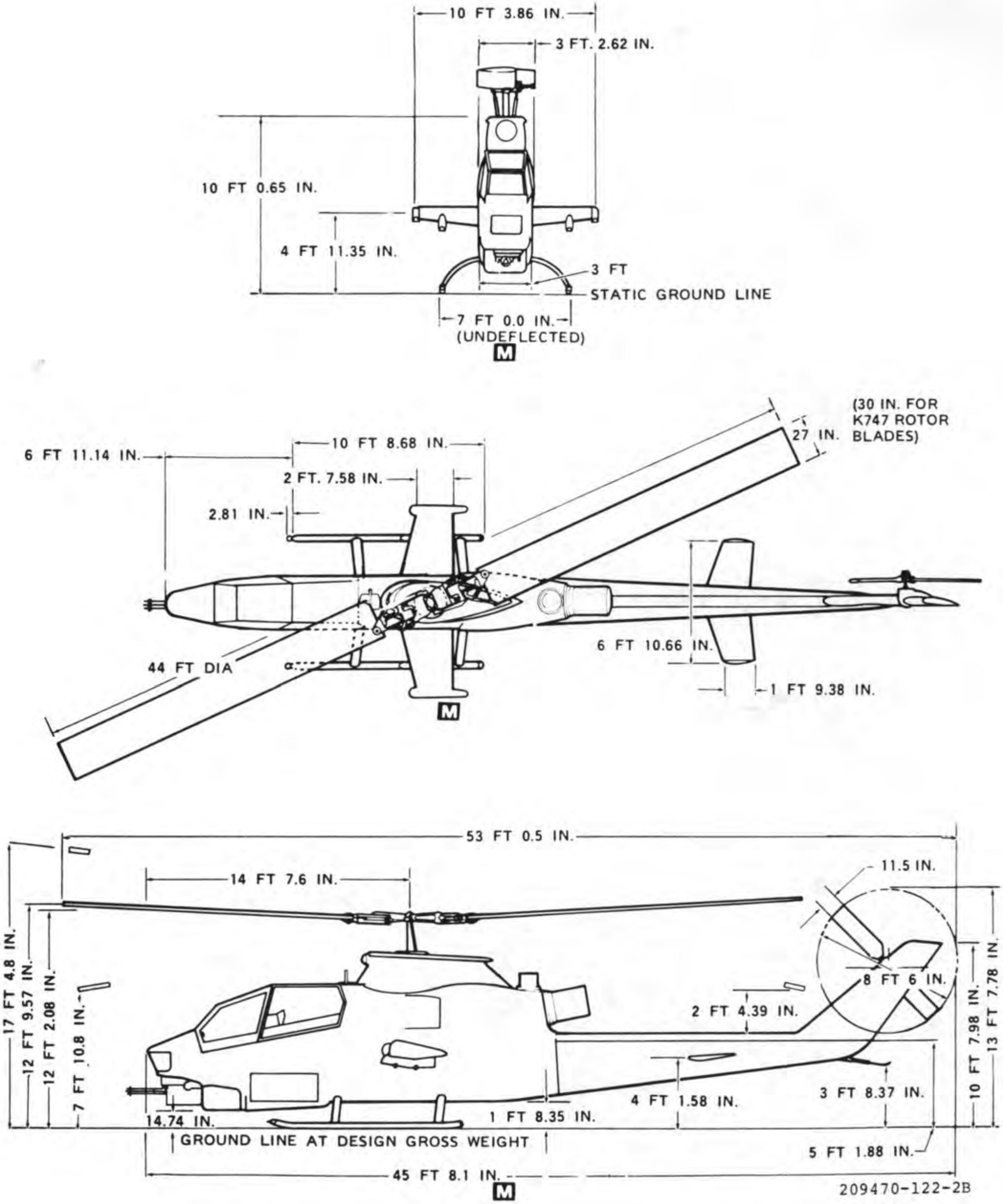


Figure 2-4. Principal Dimensions — Airframe (Sheet 2 of 2)

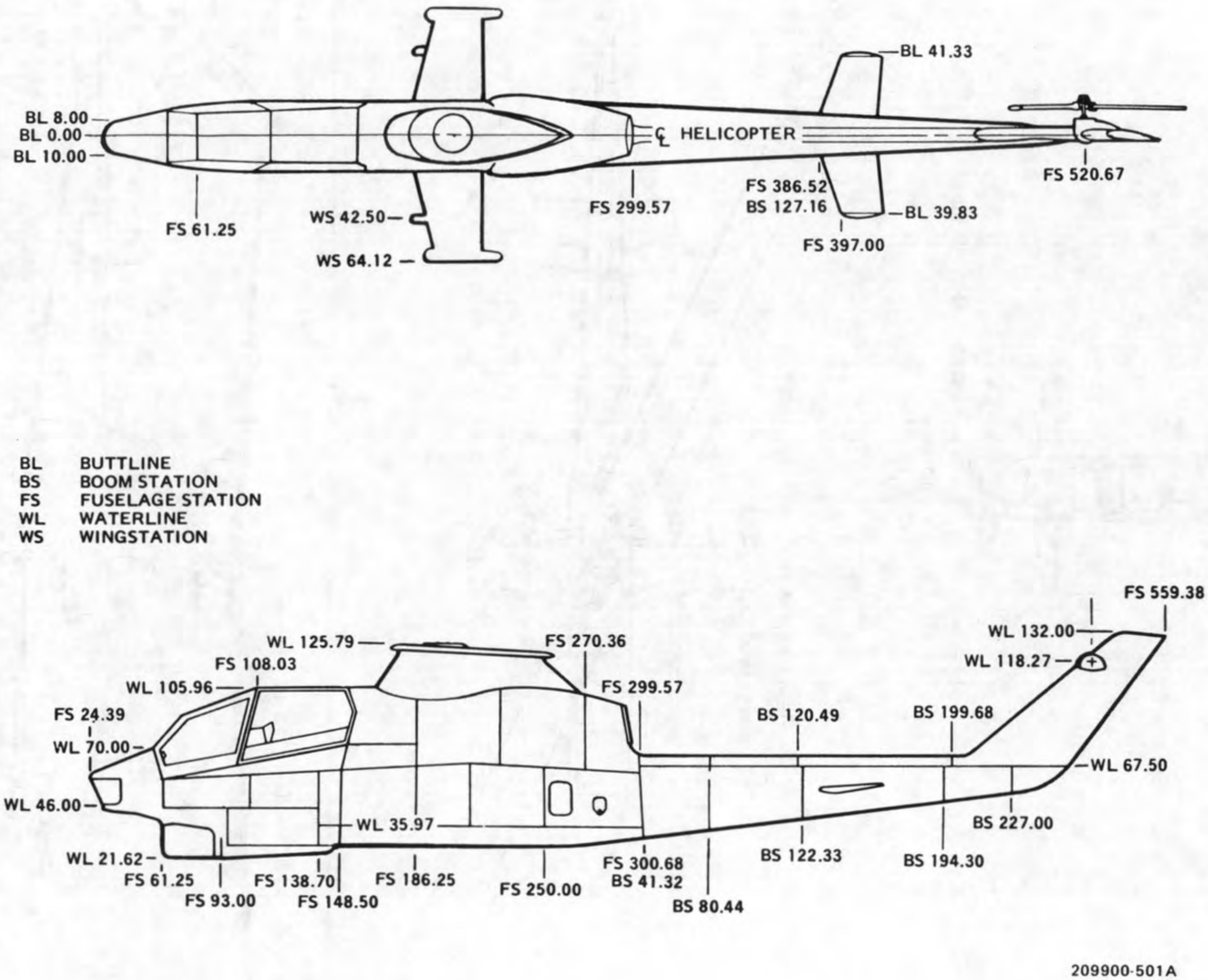


Figure 2-5. Reference Lines — Airframe

(2) Adequate cleaning of helicopter to minimize the effects of corrosion.

(3) Removal and treatment of corrosion.

(4) Draining of moisture entrapment areas.

(5) Sealing of watertight areas.

(6) Preservation, including paint touch-up and replacement of finishes.

b. Types of Corrosion.

(1) Uniform etch corrosion. The surface effect produced by most direct chemical attacks (as by an acid) is a uniform etching of the metal. On a polished surface, this type of corrosion is first seen as a general dulling of the surface. If such corrosion is allowed to continue, the surface becomes rough and possibly frosted in appearance.

Table 2-2. Structural Repair Materials

ITEM NO.	DESCRIPTION	REF. NO. AND FSCM	NSN
1	Aluminum Alloy Sheet, 0.010 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-01-024-1983
2	Aluminum Alloy Sheet, 0.012 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2274
3	Aluminum Alloy Sheet, 0.016 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-232-0543
4	Aluminum Alloy Sheet, 0.020 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2277
5	Aluminum Alloy Sheet, 0.025 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2278
6	Aluminum Alloy Sheet, 0.032 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-086-9729
7	Aluminum Alloy Sheet, 0.040 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2280
8	Aluminum Alloy Sheet, 0.050 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-232-0569
9	Aluminum Alloy Sheet, 0.063 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-01-049-0763
10	Aluminum Alloy Sheet, 0.071 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-106-0609
11	Aluminum Alloy Sheet, 0.080 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-232-0398
12	Aluminum Alloy Sheet, 0.100 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-288-0675

Table 2-2. **Structural Repair Materials (cont)**

ITEM NO.	DESCRIPTION	REF. NO. AND FSCM	NSN
12.1	Aluminum Alloy Sheet, 0.040 inch thick, 2024-T0	QQ-A-250/5 (81348)	9535-00-167-2267
13	Aluminum Alloy Sheet, 0.020 inch thick, 5052-H32	QQ-A-250/8 (81348)	9535-00-242-8598
14	Aluminum Alloy Sheet, 0.025 inch thick, 5052-H34	QQ-A-250/8 (81348)	9535-00-832-1868
15	Aluminum Alloy Sheet, 0.040 inch thick, 5052-H32	QQ-A-250/8 (81348)	9535-00-232-6864
16	Aluminum Alloy Sheet, 0.025 inch thick, 6061-T6	QQ-A-250/11 (81348)	9535-00-250-6502
17	Aluminum Alloy Sheet, 0.032 inch thick, 6061-T6	QQ-A-250/11 (81348)	9535-00-085-4133
18	Aluminum Alloy Sheet, 0.010 inch thick, 7075-T6	QQ-A-250/13 (81348)	
19	Aluminum Alloy Sheet, 0.012 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-236-7091
20	Aluminum Alloy Sheet, 0.016 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-084-4438
21	Aluminum Alloy Sheet, 0.020 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-086-9808
22	Aluminum Alloy Sheet, 0.025 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-086-9864
23	Aluminum Alloy Sheet, 0.032 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-249-5811
24	Aluminum Alloy Sheet, 0.040 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-084-4581
25	Aluminum Alloy Sheet, 0.050 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-086-9465
26	Aluminum Alloy Sheet, 0.063 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-088-6599
27	Aluminum Alloy Tubing (4" Dia.) 0.083 thickness, 2024-T3	QQ-A-300-3B	

Table 2-2. Structural Repair Materials (cont)

ITEM NO.	DESCRIPTION	REF. NO. AND FSCM	NSN
28	Magnesium Alloy	AMS4350	
29	Rivet, Blind, Flush Head	CR2263-4-1 (11815)	
30	Rivet, Blind, Flush Head	CR2248-4 (11815)	
31	Rivet, Blind, Flush Head	CR2248-6-3	5320-00-916-9534
32	Rivet, Universal	CR2249-6-3 (11815)	5320-00-779-0300
33	Rivet, Blind, Flush Head, Monel Sleeve and Inconel Nickle Spindle	NAS1739MW5 (80205)	
34	Rivet, Blind, Protruding Head	NAS1738B-4 (80205)	
35	Rivet, Blind, Protruding Head	NAS1738B-5 (80205)	
36	Rivet, Blind, Protruding Head	NAS1738B-6 (80205)	
37	Rivet, Blind, Protruding Head, Locked Spindle	NAS1398-6 (80205)	
38	Rivet, Blind, Structural Pull, Stem, Protruding Head	MS20600BK-1 (80205)	
39	Rivet, Blind, Structural Pull, Stem, Protruding Head	MS20600-B4-W1 (80205)	5320-00-582-3273
40	Rivet, Blind, Structural Pull, Stem, Protruding Head	MS20600M6 (80205)	
41	Rivet, Blind, Universal Head	CR2249-3 (11815)	
42	Rivet, Blind, Universal Head	CR2249-4-1 (11815)	5320-00-866-6114
43	Rivet, Blind, Universal Head	CR2249-4-5 (11815)	5320-00-349-5132

Table 2-2. Structural Repair Materials (cont)

ITEM NO.	DESCRIPTION	REF. NO. AND FSCM	NSN
44	Rivet, Blind, Universal Head	CR2249-6-3 (11815)	5320-00-779-0300
45	Rivet, Hi-Lok	HL2086W-5 (73197)	
46	Rivet, Hi-Lok	HL2086W-6 (73197)	
47	Rivet, Solid, Aluminum Alloy, Flat Head	MS20426AD3 (80205)	
48	Rivet, Solid, Aluminum Alloy Flat Head	MS20426AD4 (80205)	5320-00-117-6948
49	Rivet, Solid, Aluminum Alloy, Flat Head	MS20426AD5 (80205)	
50	Rivet, Solid, Aluminum Alloy, Flat Head	MS20426DD4 (80205)	
51	Rivet, Solid, Aluminum Alloy, Universal Head	MS20470AD3 (80205)	
52	Rivet, Solid, Aluminum Alloy, Universal Head	MS20470-AD4 (80205)	
53	Rivet, Solid, Aluminum Alloy, Universal Head	MS20470-AD5 (80205)	
54	Rivet, Solid, Aluminum Alloy, Universal Head	MS20470-DD6 (80205)	
55	Rivet, Solid, Universal Head	MS20615-3M3 (80205)	
56	Rivet, Solid, Universal Head	MS20615-3M4 (80205)	
57	Rubber, Type II, Grade A Soft, 0.125 x 0.190	MIL-R-6130	
58	Rivnut P/N 2R1393		
59	Steel Sheet, Stainless, 0.016 inch thick	MIL-S-5059A	

Table 2-2. Structural Repair Materials (Cont)

ITEM NO.	DESCRIPTION	REF. NO. AND FSCM	NSN
60	Steel Sheet, 0.032 inch thick, N-155	AMS5532	
61	Steel Sheet, 0.063 inch thick, 4130 COND-N	MIL-S-18729	
61.1	Titanium Alloy, 80.000 PSI, 0.020 inch thick	MIL-T-9046 Type I, Comp B	
61.2	Titanium Alloy, 65 Min. 0.020 inch thick	MIL-T-9046 Type I, Comp B	
61.3	Titanium Alloy, 80 Min. 0.050 inch thick	MIL-T-9046 Type I, Comp B	
61.4	Titanium Alloy, 80 Min., 0.070 inch thick	MIL-T-9046 Type I, Comp B	
62	Titanium	MIL-T-9046 Type 1, Comp. C	

(2) **Pitting Corrosion.** The most common effect of corrosion on aluminum and magnesium alloys is called pitting. It is first noticeable as a white or gray powdery deposit, similar to dust, which blotches the surface. When the deposit is cleaned away, thin pits or holes can be seen in the surface. Pitting corrosion may also occur in other types of metal alloys.

(3) **Intergranular Corrosion.** This type of corrosion is selective and attacks along the grain boundries of metal alloys. Aluminum alloys which contain appreciable amounts of copper and zinc and some stainless steels are vulnerable to intergranular corrosion. Piano hinges are an example of aluminum extrusions which are vulnerable. Lack of uniformity in the alloy structure caused by heat treating procedures or localized overheating, such as from fire damage, may result in intergranular corrosion. This corrosion may exist without visible evidence on exterior surfaces and serious structural weakening may occur without detection. In cases of intergranular corrosion, it is almost impossible to be sure all corrosion has been removed except through metallurgical examination.

(4) **Exfoliation Corrosion.** Exfoliation is a form of intergranular corrosion. It shows itself by lifting up the surface grains of a metal by the force of expanding corrosion products occuring at the grain boundaries just below the surface. It is visible evidence of intergranular corrosion. It is most often seen on extruded sections where grain thicknesses are usually less than in rolled forms.

(5) **Galvanic Corrosion.** Galvanic corrosion occurs when dissimilar metals are in contact and an external circuit is provided by the presence of a buildup of corrosion at the joint between the metals. For example, aluminum and magnesium skins riveted together form a galvanic couple if moisture and contaminations are present. When aluminum pieces are attached with steel bolts or screws, galvanic corrosion can occur between the aluminum and the steel.

(6) **Stress Corrosion Cracking.** Stress corrosion cracking is caused by the simultaneous effects of tensile stress and corrosion. Stress may be internal or applied. Internal stresses are produced by

nonuniform deformation during cold working, by unequal cooling from high temperatures, and by internal structural rearrangement involving volume changes. Stresses induced when a piece is deformed, those induced by press and shrink fits, and those in rivets and bolts are internal stresses.

(7) Fatigue Corrosion. Fatigue corrosion is a special case of stress corrosion caused by the combined effects of cyclic stress and corrosion. No metal is immune to some reduction of its resistance to cyclic stressing if the metal is in a corrosive environment. Damage from fatigue corrosion is greater than the sum of the damage from both cyclic stresses and corrosion.

(a) Fatigue corrosion failure occurs in two stages. During the first stage, the combined action of corrosion and cyclic stresses damages the metal by pitting and cracking to such a degree that fracture by cyclic stressing will ultimately occur, even if the corrosive environment is completely removed. The second stage is essentially a fatigue stage in which failure proceeds by propagation of the crack and is controlled primarily by stress concentration effects and the physical properties of the metal.

(b) Fracture of a metal part due to fatigue corrosion generally occurs at a stress far below the fatigue limit in laboratory test, though the amount of corrosion is very small. For this reason, protection of all parts subject to alternating stress is particularly important when practical, even in environments that are only mildly corrosive.

(8) Fretting Corrosion. This type of corrosive attack develops when two heavily loaded surfaces in contact with each other are subject to slight vibratory motion. The rubbing contact removes small particles of virgin metal from surface. These particles will usually oxidize to form abrasive materials. The continuing motion prevents formation of any protective oxide film, and in conjunction with the abrasive formed, creates a prime area of further corrosion to occur. Fretting is evident at an early stage by surface discoloration and the presence of corrosion products in any lubricant present. Continued fretting will ruin bearing surfaces, destroy critical dimensions, and may be serious enough to eventually cause cracking and fatigue failure. Fretting may be controlled by preventing slippage of two surfaces or by lubricating the surfaces.

c. Surface Maintenance.

(1) Helicopter External Surfaces. The helicopter should be cleaned as often as necessary to keep surface free of salt, soil, and other corrosive deposits. The term "clean" means to do the best job possible using the materials and facilities available. A wipe down with water or oil soaked cloth is better than no cleaning at all. The importance of frequent cleaning when operating in coastal areas cannot be overemphasized. The cleaning procedure used should be the mildest method which will produce the desired results. For example, steam cleaning is a very effective soil and grease remover, but it also may erode paint and damage electrical insulation. In the following instructions a specific cleaning method is outlined. Refer to cleaning chart, figure 2-6 and TM 55-1500-204-25/1.

(2) Fuselage and Tailboom. Clean the painted areas of the helicopter fuselage and tailboom as indicated in the cleaning chart, figure 2-6.

(3) Helicopter Interior Surfaces. Clean the cabin compartment, engine compartment, fuselage compartment, beneath the engine, and the tailboom with materials indicated on the cleaning chart, figure 2-6.

(4) Clear Plastic Surfaces. Clean clear plastic surfaces, where polishing for scratch removal is not required, as follows:

CAUTION

Remove rings or any object from the hands which might scratch the plastic surface.

(a) Flush plastic with fresh water, using the bare hand to dislodge dirt and solid particles.

(b) Wash with mild soap (C113) and water solution. Be sure that the solution is free of abrasive material. Go over the surface with the bare hand to detect any abrasive material.

(c) Dry with a clean damp chamois or soft clean cloth. Do not continue rubbing after plastic is dry.

CAUTION

Do not rub plastic with a dry cloth. This builds up an electrostatic charge which attracts dust particles to the surface.

CLASSIFICATION OF SURFACES

CLASSIFICATION OF SOILS

	Fuselage and Tail Boom	Rotor Blades Main and Tail	Aluminum	Magnesium	Steel	Plastics Clear	Rubber	Fabric	Helicopter Interior Surfaces
Grease	1, 3, 4, 5, 10, 7	1, 3, 4, 5,7,8,10	1, 2, 4, 5, 10, 7	1, 2, 4, 5, 10, 7	1, 2, 4, 5, 10, 7	5, 6 + 11	5, 6	4, 5, 8	3, 4, 5 6, 7
Oil	1, 3, 4 5, 10, 7	1, 3, 4 5,7,8,10	1, 2, 4 5, 10, 7	1, 2, 4 5, 10, 7	1, 2, 4 5, 7, 10	5, 6 + 11	5, 6	4, 5, 8	3, 4, 5, 6, 7
Preservation Compounds	1, 3	1, 3, 8	1, 2, 4	1, 2, 4	1, 2, 4				
Waxes	1, 3, 10	1, 3, 8 10	1, 2, 10	1, 2, 10	1, 2, 10	5, 6 + 11			
Carbon	1, 18	1, 8	1, 18	1, 18	1				
Combustion Products	1, 18	1, 8	1, 18	1, 18	1				
Gun Combustion	1, 18	1, 8	1, 18	1,18	1				
Mud	1, 3, 4 5, 6, 7	1, 3, 4 5, 6, 7	1, 3, 4 5, 6, 7	1, 4, 5 7	1, 2, 4, 5	5, 6 + 11	5, 6	4,5,8	3, 4, 5 6, 9, 7
Sand	1, 3, 4 5, 6, 7	1, 3, 4 5, 6, 7	1, 2, 3, 4 5, 6, 7	1, 2, 4, 5, 7	1, 2, 4 5, 7	5, 6 + 11	5, 6	4, 5,8	9
Operational Film	1, 3, 4 5, 7, 10	1, 3, 4 5,7,8,10	1, 2 13,7	1, 2, 4, 5, 7	1, 2, 4 5, 7	5, 6 + 11	5, 6		
Industrial Film	1, 3, 4 5, 11	1, 3, 4 5, 8, 10	1, 2, 11 + 13	1, 2, 4, 5, 10	1, 2, 4, 5, 10	5, 6 + 13	5, 6		
Internal Soils	1, 3, 4, 5 6, 9, 16		3, 4, 5 6, 7	3, 4, 5 6, 7	4, 5	6		3, 4, 5, 8	3, 4, 5 6, 9, 16
Battery Acids	14, 15, 6	6, 14, 15	15,14,6	14, 6	14, 15 + 6				
Paint Removal	3, + 6 18,22,24	3, 6 22,24	2, 3, + 6 18,22,24	2,3, + 6 18,22,24	2,3, + 6 18,22,24		2,3, + 6 19		
Corrosion-Aluminum	12,25 6	25 6	12, 25 6						
Corrosion-Magnesium	12, 25 6			12, 25 6					
Corrosion-Steel	23, 4 20 + 6				23, 4, 20, + 6				
Salt Deposits	1, 3, 4 5, 6, 7,10	1, 3, 4 5,6,7,10	1, 2, 3, 4, 12	1, 2, 3, 4, 15	13, 12 + 6		5, 6	4, 5, 8	

ACCEPTABLE CLEANERS

Item No. Materials

1. Solvent Emulsion Clng. (P-C444A)
2. Steam Cleaning (P-C-437A)
3. Detergent (MIL-C-25768)
4. Solvent Wipe Down (P-D-680)
5. Soap Hand Wash (P-S-577A)
6. Fresh Water Scrub
7. Water Emulsion Clng. (MIL-C-43616)
8. Naphtha-Aliphatic (TT-N-95-2)
9. Vacuum Cleaning
10. Waterless Cleaner (Mil-C-22550)
11. Plastic Cleaner
12. Skin Brightener (Mil-C-5410)
13. Skin Aluminum polish (Mil-P-6888)
14. Ammonium Hydroxide (O-A-451)
15. Chromic Acid (O-C-303)
16. Disinfectant Cleaners
17. Polish & Wax (Mil-W-18723)
18. Paint Stripper (Mil-R-25134)
19. Paint Stripper (Mil-R-18553)
20. Abras., Buffing Cmpd. Alum. Oxide (325 Grit)
21. Corrosion Remover (Mil-C-5410)
22. Lacquer Thinner Wipedown (TT-T 266)
23. Pumice, Ground (SS-P-821) Grade FF
24. Epoxy Paint Remover (Alkline Type) (MIL-R-81294)
25. Abrasive Sandpaper (Silicon Carbide)

204900-215D

NOTES :

1. Numbers shown in blocks indicate acceptable cleaners as itemized.
2. Non-specular painted surfaces shall not be polished or waxed.

CLEANING CHART

CAUTION

Main rotor blade data on this figure applies to BHT 540 main rotor blades only. Clean K747 main rotor blades only in accordance with paragraph 5-28.

Figure 2-6. Cleaning Chart

(d) Clean plastic with an approved cleaner (C32).

NOTE

If cleaner is not available, rinse with clear water, in a shaded area if possible, to prevent water spotting.

d. **Corrosion Removal and Treatment.**

WARNING

Paint strippers are highly toxic. Use in well ventilated area and avoid skin contact by use of protective clothing and appropriate eye protection. If stripper comes in contact with skin or eyes, promptly flush with water and seek medical attention.

CAUTION

Corrosion removal must be complete. Failure to remove all corrosion allows corrosion to continue even after cleaning and refinishing. All surfaces to be treated must be clean, unpainted, and free from oil and grease. Care must be taken not to exceed the limits of corrosion removal established for a particular part.

(1) Clean aluminum parts which are corroded in accordance with figure 2-6. Treat and refinish anodized and painted aluminum parts as indicated in the following steps. Anodized aluminum parts have been treated to form a supplemental film of aluminum oxide on the surface of the part. When processing anodized surfaces, avoid unnecessary destruction of the oxide film.

CAUTION

Use of steel wool, steel wire brushes, or severe abrasive materials is prohibited on any aluminum surface.

(a) Brush paint remover (C96) on area to be stripped. Allow remover to remain on surface for a sufficient length of time for paint to loosen (do not allow remover to dry on surface). Scrub the area with a bristle brush, wet with paint remover, to loosen any paint still adhering to the metal. Repeat as required until all paint is removed.

(b) Flush paint remover from area with fresh water and a long handle brush. Remove any residual paint with a non-metallic scraper. Remove masking materials and thoroughly rinse area.

(c) Clean stains and lightly corroded areas with cleaning compound (C34). Use aluminum wool, aluminum wire brushes, or stiff fiber brushes to clean more severely corroded areas.

WARNING

Acid is extremely dangerous. Avoid contact with skin or clothing. Avoid breathing fumes. Rubber gloves should be used when handling and applying any acid solution.

(d) Treat corroded areas with a solution of **10** percent chromic acid (C1), to which **20** drops of lead acid battery electrolyte per gallon has been added. Apply the solution with a bristle brush and scrub to ensure penetration to the bottom of any pits. Allow solution to remain in place 5 to 20 minutes then rinse or wipe off with a damp cloth. Alcoholic phosphoric acid (C19) may be used as an alternate for the chromic acid solution.

(e) Wipe the area dry with a clean cloth and inspect with a magnifying glass to ensure that all corrosion has been removed and that the corrosion damage limits have not been exceeded.

(f) Smooth all rough edges with a burnishing tool or an aluminum oxide impregnated rubber wheel.

(g) When skin seams and other places subject to water leakage are involved seal with sealant (C105). Use zinc chromate putty (C93) as an alternate material in small areas if necessary.

(h) Repaint the area.

NOTE

Protect surrounding areas from overspray with paper and masking tape. In addition, ensure that an in-line water separator is in the compressed air line to the spray equipment.

(2) Steel parts which are corroded should be cleaned and treated as follows:

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

CAUTION

Methods used for corrosion removal on highly stressed parts shall not be used, if the method results in scratches or overheating of the part.

(a) Clean affected area with solvent (C112).

(b) Remove rust corrosion with abrasive cloth (C36). Refer to cleaning chart, figure 2-6. Remove abrasive residue.

(c) Apply alcoholic phosphoric acid solution (C19) to affected area.

(d) Rinse and dry.

(e) After drying, restore protective coating of primer and paint or corrosion preventive compound. Refer to TB 746-93-2.

(f) If the part was originally protected only by cadmium plate (example main rotor mast or controls above transmission) apply primer (C88 or C91) and two coats of aluminized lacquer. Aluminized lacquer is one gallon of clear lacquer (C71) mixed with 12 ounces of aluminum pigment (C84).

(3) **Magnesium Touch-Up.**

(a) Clean affected area. Refer to cleaning chart, figure 2-6.

(b) Remove light corrosion products with abrasive pads (C82). Heavy corrosion may be removed by hand scraping with a suitable carbide tipped scraper.

CAUTION

Do not use carbon steel brush or carbon steel wool on magnesium surfaces. Tiny dissimilar metal particles will become embedded in the metal, causing further corrosion and subsequent damage to equipment.

(c) After all visible corrosion has been removed, additional material must be removed to ensure that no corrosion products remain. The procedure is to remove twice the depth of the corrosion. The surface of the repaired area should blend smoothly and evenly with the surrounding original surface so that a saucer shaped depression is formed to eliminate sharp transition and possible stress concentration. It must also be at least as smooth as the original surface.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(d) Following corrosion removal, the area should be wiped with a clean damp cloth followed by wiping dry with a clean, dry, lint-free cloth. The area may also be cleaned with MEK (C74) and/or blown dry with oil-free air. The area under treatment should also be kept as clean as possible during repair so as not to allow a build-up of metallic or corrosion particles in the working area.

CAUTION

Never use alcohol or materials containing alcohol on magnesium alloys due to severe corrosion effect.

(e) Treat magnesium alloy by applying corrosion protection in accordance with MIL-M-3171, Type I.

1 Apply solution to affected area with a brush and allow to remain for 1 minute. Add more solution when necessary to keep surface wet. The temperature of the solution must be from 65 degrees to 90 degrees F (18 degrees to 32 degrees C).

2 Proper application time will be the least time required to produce desired finish color (iridescent or dark brown). Treat surface for at least 30 seconds and not longer than three minutes. Excessive time will cause deposits affecting paint adhesion.

3 Wipe off solution with a damp, lint-free cloth, frequently rinsing with clean water. Air dry surface. Drying may be accelerated by use of low pressure clean air or gaseous nitrogen.

NOTE

Parts containing bronze, steel, or cadmium plated inserts may be treated by process in preceding steps 1 through 3.

2-11. FORWARD FUSELAGE ASSEMBLY.

2-12. CLASSIFICATION OF DAMAGE — FORWARD FUSELAGE ASSEMBLY.

Classification of damage and repair limits for the forward fuselage are given on table 2-3.

Table 2-3. Forward Fuselage Classification of Damage

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
1. RIVETS, NUTPLATES, FASTENERS, AND THREADED INSERTS.	Damaged, loose, missing, sheared, or improperly installed.		Replace as required.	
2. FORWARD FUSELAGE EXTERIOR SKINS (EXCLUDING HONEYCOMB PANELS)	a. Dents	a. Smooth contoured dents, free of cracks or gouges. Depth and diameter not to exceed: Depth Diameter 0.016 IN 1.0 IN 0.047 IN 2.0 IN 0.063 IN 3.0 IN Nicks and scratches in a dent not to exceed 10 percent of material thickness after polishing. Dents shall come no closer than 1.0 inch to internal structure and have a minimum of 3.0 inches of undamaged material between dents. NOTE: Dents closer than 1.0 inch are classed as one dent.	a. Damage exceeds negligible limits but does not exceed 25 percent of total area for a single skin panel (including prior repairs). Damage is 6.0 inches minimum from a similar repair and comes no closer than 2.0 inches to support structure.	a. Damage exceeds repairable limits between any two bulkheads. Damage and subsequent repair interferes with supporting structure.

Table 2-3. Forward Fuselage Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
2. FORWARD FUSELAGE EXTERIOR SKINS (EXCLUD-ING HONEY-COMB PANELS) (Cont)	b. Corrosion	b. Not to exceed **10** percent of material thickness and less than **4.0** square inches after clean up. Damage **1.0** inch minimum from internal structure.	b. Damage exceeds negligible limits. Cleanup shall not exceed **5** percent of skin panel area. and come no closer than **2.0** inch to supporting structure.	b. Damage exceeds repairable damage limits.
	c. Holes, cracks or tears.	c. None	c. Cracks or tears no longer than **25** percent of shortest skin dimension. Holes **3.0** inch max. dia. Cleanup no closer than **2.0** inch to supporting structure and affect no more than **5** percent of skin area.	c. Damage exceeds repairable limits.
	d. Nicks and scratches.	d. No deeper than **10** percent of material thickness and less than **4.0** square inches after cleanup.	d. Same as preceding step c.	d. Damage exceeds repairable limits.
	e. Trapped or stretched skin.	e. Inward or out-ward bulges located in a sectional area, that can be corrected by removing attach-hardware, allow-ing skin to shift. Mismatch of rivet holes shall not exceed that which can be cleaned up by drill-ing and installing one size larger rivet and maintain proper rivet edge distance. However, if condition does not disappear after unloading	e. Creased dents not classified as oil can or stretched skin, not exceeding **25%** of a sectional area and no closer than **1.0** inch to a supporting structure. Oil can condition, free of sharp dents or creases and not extending over or into supporting structure, may be repaired by inserting a backup stiffener over the damaged area.	e. Stretched skin, oil cans, or creased dents that cannot be repaired by unloading, insertion repair or back up stiffeners.

Table 2-3. Forward Fuselage Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
2. FORWARD FUSELAGE EXTERIOR SKINS (EXCLUDING HONEYCOMB PANELS) (Cont)	e. Trapped or stretched skin (Continued)	panel, area is stretched or oil canned and must be replaced or repaired. Oil canning or stretched condition can be determined by pressing in on a sectional area and that section remains depressed and a bulge appears in that section or adjacent structure.		
3. FORWARD FUSELAGE HONEYCOMB PANELS, INCLUDING BULKHEADS, BEAM PANELS, AND ENGINE DECK	a. Dents	a. Dents smooth contoured dents up to 5 percent of panel thickness provided: 1. Total damage does not exceed **5** percent of panel area. 2. No voids exist under dents.	a. Damage exceeds negligible damage limits. If no cracks, holes, or voids exist, see figure 2-7 for limits. Void limits are shown on figure 2-8. Limits for sharp dent or dents which penetrate panel surfaces are shown on figures 2-9 and 2-10.	a. Damage exceeds repairable limits. Corrosion in honeycomb core.
	b. Voids.	b. Voids up to **0.25** square inch (0.50 x 0.50) provided: 1. No more than two such areas can be encompassed by a **4.0** inch circle. 2. The edge of any void is a minimum of **3.0** inches from supporting structure, panel edge bevel or insert or fitting. NOTE: Voids closer than **1.0** inch are	b. Damage exceeds negligible limits. See figure 2-8.	b. Damage exceeds repairable limits.

Table 2-3. Forward Fuselage Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
3. FORWARD FUSELAGE HONEY-COMB PANELS IN-CLUDING BULKHEADS BEAM PANELS, AND ENGINE DECK (Cont)	b. Voids. (cont)	classed as one void. Edge separation is never classed as negligible damage.		
	c. Nicks and scratches	c. Nicks and scratches not exceed-ing **10** percent of metal facing thick-ness and **4.0** inches square after cleanup. Damage **1.0** inch minimum form supporting structure after cleanup.	c. Damage exceeds negligible limits. See figure 2-7 for damage not penetrating surface. See figure 2-9 for damage penetrating surface.	c. Damage exceeds repairable limits. Replace any panel having evidence of water or corrosion in the core.
	d. Corrosion.	d. Corrosion no to exceed **10** percent of metal facing thickness and **4.0** square inches after cleanup. Damage minimum **1.0** inch from supporting structure.	d. Damage not to exceed **20** percent of panel area. Maximum diameter of any area after cleanup is **1.0** inch. One repair per bay allowed. Min. distance between repairs is **3.0** inches. No repair within **1.0** inch of supporting structure, inserts, or beveled edge.	d. Same as preceding step c.
	e. Cracks, holes, punctures.	e. None.	e. Cracks, holes or punctures. 1. Damages affect only one skin and core. (See figure 2-9 for limits.) 2. Damages affect both skins and core. (See figure 2-10 for limits.)	e. Same as preceding step c.
	f. Loose or damaged inserts.	f. None.	f. Replace as required.	

Table 2-3. Forward Fuselage Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
4. COWLING AND FAIRING ENGINE & TRANS-MISSION.	a. Dents.	a. Same as Item 2, for exterior skins.	a. Same as Item 2, exterior skins, cracks, or holes in dent.	a. Damage exceeds **25** percent of panel area or repair affects the function and serviceability of cowling.
	b. Cracks, holes, or tears.	b. None.	b. Cracks or tears longer than **25** percent of the shortest dimension of the panel. Holes not to exceed **3.0** inch dia. after cleanup. Total repairs (including prior repairs) not to exceed **25** percent of panel area.	b. Same as dents.
	c. Corrosion.	c. Damage less than **10** percent of material thickness and less than **5** percent of panel area and clear of supporting structure after cleaning and treatment.	c. Damage exceeds negligible less than **20** percent of panel thickness but does not exceed **5** percent of panel area after repair. Cleanup comes no closer than **2.0** inches to supporting structure.	c. Damage exceeds repairable limits or repair affects function and serviceability of cowling.
	d. Damaged screens.	d. None.	d. None.	d. Replace when damaged.
	e. Damaged seals and gaskets.	e. None.	e. Bonding of loose seals or gaskets.	e. Replace when damaged.
5. AIR INDUCTION BAFFLE ASSEMBLY.	a. Dents, nicks, and scratches.	a. Dents, nicks, and scratches that do not puncture metal.		
	b. Cracks, tears, and holes.		b. Cracks, tears, and holes can be repaired by patching or insertion using standard aluminum repair procedures in TM 55-1500-204-25/1.	b. Repairs that do not warrant the time expended or repairs that would interfere with attaching parts require replacement of parts.

Table 2-3. Forward Fuselage Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
5. AIR IN- DUCTION BAFFLE ASSEMBLY (CONT)	c. Torn or damaged seals or gaskets.			c. Seals and gaskets torn or damaged to the extent that their function is affected must be replaced.
6. FORWARD FIREWALL, AFT FIRE- WALL AND TAIL ROTOR DRIVESHAFT FIRESHIELD	a. Dents, nicks, and scratches.	a. Dents, nicks, and scratches that do not puncture metal.		
	b. Cracks, tears, and holes.		b. Cracks, tears, and holes can be repaired by patching or inser- tion using standard titanium repair procedures in TM 55-1500-204-25/1.	Repairs that do not warrant the time expended or repairs that would interfere with mating parts require replacement of parts.
	c. Torn or damaged seals or gaskets			c. Seals and gaskets torn or damaged to the extent that their function is affected must be replaced.
7. FUSELAGE TAILBOOM ATTACH FITTINGS	a. Nicks, scratches, and gouges.	a. Nicks, scratches, and gouges in fuselage tailboom fitting may be polished out if they do not exceed these limits (1) Axial damage (parallel to bolt holes) must not exceed **0.020** inch in depth and **0.300** inch in length. (2) Radial damage (normal to bolt axis) must not exceed **0.010** inch in depth or **0.300** inch in length. (3) Nicks, scratches or gouges are not permitted within one diameter of bolt hole.		a. Damage exceeding negligible limits.
	b. Corrosion.			b. No corrosion allowed.

Table 2-3. Forward Fuselage Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
7. FUSELAGE TAILBOOM ATTACH FITTINGS (Cont)	c. Bolt hole elongation.			c. Inspect tailboom attachment bolt holes in forward fuselage tailboom attach fittings for wear. Maximum diameter permitted for holes is **0.516** inch.
	d. Cracks.			d. Any cracks in the fuselage fittings (tail-boom attach) or damage exceeding limitations, requires the part to be replaced by next higher maintenance level.
8. FUSELAGE WING FITTINGS	a. Nicks, scratches, and gouges.	a. Nicks, scratches, and gouges on the wing fittings, inboard of BL 14.00, each side, may be polished out provided, they do not exceed **0.025** inch in depth and **0.50** inch in length after cleanup.		a. Damage exceeding negligible limits. Any damage to wing attach lugs outboard of BL 14.00 is cause for replacement.
	b. Worn bushings in wing attachment lugs.			b. Wear exceeding limits in section IV is cause for replacement.
9. BEAM CAPS (PRIMARY STRUC-TURAL CAPS) FORWARD FUSELAGE ASSEMBLY. See fig-ures 2-11 and 2-12	a. Cracks, corrosion dents, holes, tears, nicks and scratches.	None.	Any damage found must be examined and repair recommendations made by qualified engineering authority.	No repairs permitted except with specific approval by engineering authority. Replace damaged beam caps per their instructions.

Table 2-3. Forward Fuselage Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
10. ENGINE DECK (FORWARD FUSELAGE ASSEMBLY) See figure 2-26	a. Cracks b. Corrosion c. Dents d. Holes and tears e. Nicks and scratches f. Buckled or wrinkled.	See figure 2-26.	See figure 2-26.	Authorized repair to the engine deck installation only by qualified engineering authority.
11. M SUPPRESSOR COWLING MOUNT BRACKETS, ROD END BEARINGS, AND CLEVIS PINS. See figures 2-51 and 2-52.	a. Cracks	a. None	a. None	a. Replace if cracked.
	b. Bracket lug hole elongation.	b. Total out-of round condition does not exceed 0.015 inch. Diameter must not exceed 0.323 inch.	b. None	b. Damage exceeds negligible limits.
	c. Loose fasteners.	c. None	c. Replace as required.	
	d. Corrosion.	d. Damage less than 5 percent of material thickness and less than 5 percent of area.	d. Damage less than 10 percent of thickness of area after cleaning with crocus cloth and treatment.	d. Pitting corrosion.
	e. Nicks and scratches.	e. Nicks and scratches less than 0.060 deep 1.0 inch long.	e. Nicks and scratches 0.060 deep and greater than 1.0 inch long. Dress out, polish-zinc	e. Damage exceeds repairable limits.

Table 2-3. Forward Fuselage Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
11. M SUPPRESSOR COWLING MOUNT BRACKETS, ROD END BEARINGS, AND CLEVIS PINS. See figures 2-51 and 2-52 (Cont)	e. Nicks and scratches less than **0.060** deep and less than **1** inch long.		chromate and paint to suit surroundings.	
	f. Bearing for elongation.	f. Less than **0.006** inch TIR.	f. None	f. Damage exceeds negligible limits.
	g. Radial play in bearing.	g. Less than **0.010** inch.	g. None	g. Damage exceeds negligible limits.
	h. Axial play in bearing.	h. Less than **0.012** inch.	h. None	h. Damage exceeds negligible limits.
	i. Clevis pin worn.	i. Diameter not less than **0.303** inch.	i. None	i. Damage exceeds negligible limits.
12. M SUPPRESSOR ASSEMBLY—UNFINNED AREAS.	a. Cracks.	a. Cracks in sheet metal surfaces not exceeding **one** inch and non-triangulating.	a. Cracks one to three inches in length-stop drill and weld. Cracks greater than three inches in length - patch and weld.	a. N/A
	b. Holes.	b. No more than **3** holes each less than **5/16** inch diameter.	b. Patch and weld holes greater than **5/16** inch but less than **2** inches diameter.	b. Holes greater than **two** inch diameter.
	c. Skin dents.	c. Dents with no cracks or gougles: Depth **0.250** inch maximum. Diameter **3.0** inches.	c. Dents in excess of serviceable limits that can be straightened, or cut out and patched.	c. Dents that cannot be restored to serviceable limits

Table 2-3. Forward Fuselage Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
13. M SUPPRESSOR ASSEMBLY—EXTERNALLY FINNED ALUMINUM SECTION.	a. Loose rivets.	a. Three loose/missing rivets. No more than two adjacent.	a. If more than three, remove and replace loose rivets and replace missing rivets.	a. N/A.
	b. Skin dents.	b. Dents with no cracks or gouges: Depth 0.250 inch. Diameter 3.0 inches.	b. Dents in excess of serviceable limits that can be straightened.	b. Dents that cannot be restored to serviceable limits.
	c. Skin cracks.	c. Cracks not exceeding one inch in length and non-triangulating.	c. Triangulating cracks and cracks less than four inches in length that can be contained by stop drilling at each end.	c. Damage exceeds repairable limits.
	d. Bent fins.	d. Bent fins covering a total area of less than 12 square inches on the total duct assembly.	d. Bent fins that exceed serviceable limits and can be straightened.	d. N/A.
	e. Loose or missing fin sections.	e. Missing fin sections covering a total area of less than 12 square inches on the duct assembly.	e. Fins separated from duct skin for more than one inch may be cut out to the maximum serviceable limits.	e. Missing fin sections in excess of serviceable limits.
14. M SUPPRESSOR ASSEMBLY—INTERNALLY FINNED PANEL SECTIONS.	a. Cracks.	a. Cracks not exceeding one inch and non-triangulating.	a. Cracks one to three inches length-stop drill (unlimited). Cracks greater than 3 inches in length - repair by welding 0.50 inch oversize patch over affected area.	a. Limit of three weld repairs per panel.

Table 2-3. Forward Fuselage Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
14. M SUP-PRESSOR ASSEMBLY—INTERNALLY FINNED PANEL SECTIONS. (CONT)	b. Crushed finned panel inlet or outlet.	b. Crushed length less than two inches.	b. Crushed length greater than two inches - straighten with common hand tools.	b. Areas which cannot be straightened to serviceable limits.
	c. Holes.	c. No more than 3 holes, each less than 5/16 inch diameter.	c. No more than five holes total, each less than one inch diameter. Repair by welding 0.50 inch oversize patch over affected area.	c. Holes greater than one inch diameter or in excess of five holes.
15. M SUP-PRESSOR ASSEMBLY—PLUG-STRUT CLIP (OUTER)	a. Cracks in plug strut clip from braze relief hole to outboard edge of clip.	a. One clip per strut may be cracked (maximum four clips cracked). One strut may have both clips cracked while any other strut may have one clip cracked (maximum three clips cracked).	a. Cracks in excess of negligible damage limit must be weld repaired prior to next flight.	a. N/A.
	b. Cracks in plug-strut clip from inboard edge, thru the braze relief hole and continuing to the outboard edge of clip.	b. A maximum of two nonadjacent clips may be cracked.	b. Cracks in excess of negligible damage limit must be weld repaired prior to next flight.	b. N/A.
	c. Cracks in plug-strut clip to plug compound contour panel joint.	c. A maximum of two nonadjacent joints may be effectively cut.	c. Not repairable.	c. Damage in excess of the negligible damage limit.

Table 2-3. Forward Fuselage Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
16. M SUPPRESSOR ASSEMBLY— CHANNEL AND CLIPS	a. Cracks in channel from braze relief hole to outboard cap.	a. One channel per strut may be cracked (maximum of four channels cracked). One strut may have both channels cracked while any two of the remaining (non-adjacent) channels may be cracked (maximum of four channels cracked).	a. Damage in excess of the negligible damage limit must be weld repaired prior to the next flight.	a. N/A.
	b. Cracks in channel from inboard edge through braze relief hole and continuing to the outboard cap.	b. A maximum of two non-adjacent channels may be cracked.	b. Damage in excess of the negligible damage limit must be weld repaired prior to the next flight.	b. N/A.
	c. Cracks along the junction of the channels and the main mount ring.	c. A maximum of two non-adjacent channel junctures may be cracked.	c. Damage in excess of the negligible damage limit must be weld repaired prior to the next flight.	c. N/A.
17. M SUPPRESSOR ASSEMBLY-STRUTS (AFT PORTION)	Cracks in the inner or outer skins of the strut internally finned aft portion.	Cracks not exceeding one inch and non-triangulating in any one or all skin surfaces.	Cracks one to three inches in length in not more than one skin per strut, not more than two struts, must be stop drilled prior to next flight.	Damage in excess of repairable damage limit.

Table 2-3. Forward Fuselage Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
18. M SUPPRESSOR ASSEMBLY—MAIN MOUNT RING AND BRACKET	Cracks.	Cracks which effectively eliminate any one fastener.	Cracks which effectively eliminate more than one fastener must be patch and weld repaired prior to next flight.	N/A.
19. M SUPPRESSOR ASSEMBLY—PLUG-STRUT CLIP (INNER)	Cracks.	A maximum of two non-adjacent clips may be cracked through. A maximum of four clips may be partially cracked.	Damage in excess of negligible limits shall be weld repaired.	N/A.

2-13. REPAIR — FORWARD FUSELAGE.

Repair of specific areas of the forward fuselage is covered in the following paragraphs. Refer to table 2-3 for classification of damage and limitations.

2-14. REPAIR — SHEET METAL PANELS AND SKINS, FORWARD FUSELAGE.

NOTE

Repair is limited to repair of cracks, holes, scratches, corrosion, and replacement of loose or missing hardware. If damage requires use of jigs and fixtures, repairs must be made by depot maintenance.

a. Replace loose, missing, or cocked rivets if no other structural damage is present.

b. Repair cracks, holes, and tears less than three inches in length.

(1) Stop drill cracks.

(2) Smooth out edges of holes and tears.

(3) Apply a lay-on patch of like material. Install a minimum of four rivets on each side of patch. Refer to TM 55-1500-204-25/1 for standard repair instructions.

c. Repair cracks, holes, and tears more than three inches in length as follows:

(1) Remove all the damaged skin and fabricate a filler plate of the same material as the skin to match the hole in the skin. Fabricate a backing patch of the same material.

(2) Rivet filler plate and backing patch in place. Refer to TM 55-1500-204-25/1 for standard repair instructions.

d. Repair corrosion damage.

(1) Polish out minor corrosion damage.

(2) Apply chemical film (C31) to bare aluminum surfaces.

(3) Prime repaired area with silicone primer (C89).

(4) Touch up paint to match surrounding area. Refer to TB746-93-2 for paint instructions.

2-15. REPAIR — HONEYCOMB PANELS, FORWARD FUSELAGE.

Repair mechanical damage to fuselage and tailboom fin honeycomb panels as outlined in this paragraph. Damage to honeycomb panels varying from minor dents to penetration completely through the panel is classified as type A, type B, type C, or type D damage. The damage descriptions, damage limits, and repair procedures are shown in figures 2-7 through 2-10. When type A through type D damage is present on a panel and is in the "repair permissible" area as shown on figures 2-13 through 2-26, repair the damage as shown on figures 2-7 through 2-10 as applicable.

a. Accomplish standard patch repair on honeycomb panels.

(1) Use the same materials to fabricate paches that were used in the original construction with the two following exceptions:

(a) Stainless steel sheet (59, table 2-2) 1/4 hard or harder may be used to repair honeycomb panels which have titanium skin.

(b) Other material substitutions can be made when qualified engineering authority approves the substitute material.

(2) Repair damage that is within limits shown on figures 2-13 through 2-26 and figures 2-7 through 2-10. Materials required and repair procedures are shown on the illustrations. The chemicals, adhesives, and compounds required are listed in the consumable materials table (table 1-3). Instructions for using these materials are on the containers.

b. Accomplish repair of edge damage that is within limits as shown on figure 2-13 through 2-26. Comply with the following additional instructions for fiberglass and metal faced panels shown on figures 2-27 through 2-30.

(1) Fiberglass.

(a) Use only fiberglass cloth (C38) 0.010 inch thick when making edge repairs. The repair must equal or exceed the number of plies lost.

(b) Remove all old finish from repair area with varying grades of sandpaper (C102).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(c) Clean sanded area with clean cloth moistened with MEK (C74).

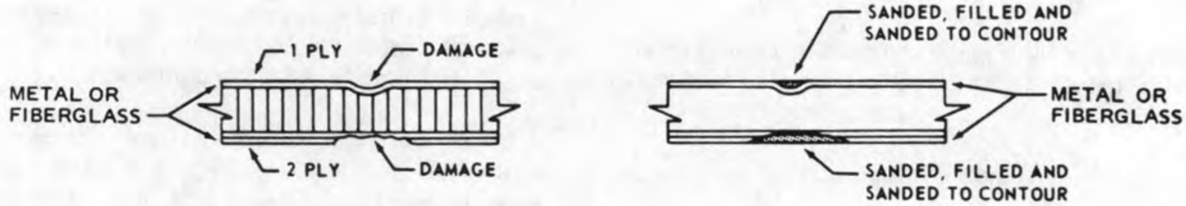
(d) Cut fiberglass cloth (C38) to correct size and saturate with epoxy resin (C98) and apply as a patch.

(e) If multiple layers of fiberglass are required, overlap each successive patch for a minimum distance of one inch.

(2) Metal (aluminum alloy, titanium or stainless steel).

(a) Stainless steel sheet (59, table 2-2) 1/4 hard or harder may be substituted for titanium. Use stainless steel of same thickness as that specified for titanium patch.

(b) The minimum thickness of patches is specified on figures 2-27 through 2-29.

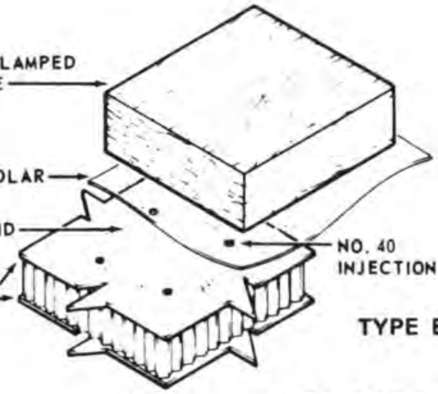


FIBERGLASS OR METAL FACINGS

FIBERGLASS FACED PANELS	METAL FACED PANELS
DESCRIPTION	
Dents, scratches, scars, or erosion in facings with no holes, cracks, or voids.	Smooth dents or depressions in the skins with no holes or cracks. (See Type C damage for repairs to penetrating damage.)
LIMITS — REPAIRABLE DAMAGE	
1. Maximum depth: 25 percent of panel thickness. 2. Minimum distance from an edge bevel: 0.5 inch.	1. Maximum diameter of damage: 0.50 inch. 2. Maximum depth: 20 percent of panel thickness. 3. Maximum area of all dents combined: 5 percent of panel surface area. 4. Maximum of five dents in a 3.0 square inch area. 5. No voids may be present under the damage.
REPAIR PROCEDURES	
1. Smooth out damaged area by lightly sanding using sandpaper (C102). 2. Clean with MEK (C74) and allow to dry. 3. Brush on smoother (C111) level to contour and allow to cure. 4. When cured, sand smooth and refinish if required with sandpaper (C102).	SAME AS FIBERGLASS REPAIR

209030-332A

Figure 2-7. Type A — Damage, Body Panel Repairs



CLAMPING REPAIR

TYPE B DAMAGE LIMITS AND REPAIRS — HONEYCOMB BODY PANELS

DESCRIPTION

Voids between the facings and core and separations between laminations of facings on metal or fiberglass panels.

LIMITS — REPAIRABLE DAMAGE

FIBERGLASS FACED PANELS

1. Maximum area of all damage: 4.0 square inches or 5 percent of panel surface area whether as a single void or combination of separate voids.
2. Maximum length of a void: 4.0 inches in any direction.
3. Damage is not repairable within 0.50 inch of any beveled edge.

METAL FACED PANELS

1. Maximum area of all damage: 5 percent of total area of panel with aluminum or stainless steel skin and 3 percent with titanium skin.
2. Maximum area of single void: 1.5 square inches for aluminum and stainless steel, 1.0 square inch for titanium.
3. Voids within 3.0 inches of any structural member and within 0.50 inch of a beveled edge are not repairable.
4. Maximum length of a void 3.0 inches in any direction for aluminum and stainless steel and 2.5 inches for titanium.

REPAIR PROCEDURES

FIBERGLASS FACED PANELS

1. Drill No. 40 (or smaller) holes around edge of damage a minimum of 1.0 inch apart. Use as many holes as required to ensure complete filling of cavity.
2. Inject epoxy resin (C98) with hypodermic syringe until resin is forced out opposite hole.
3. Cover repair with cellophane and level out by clamping with blocks. Allow to cure.
4. Seal holes with smother (C111).
5. Clean up and smooth with fine sandpaper (C102). Refinish if required.

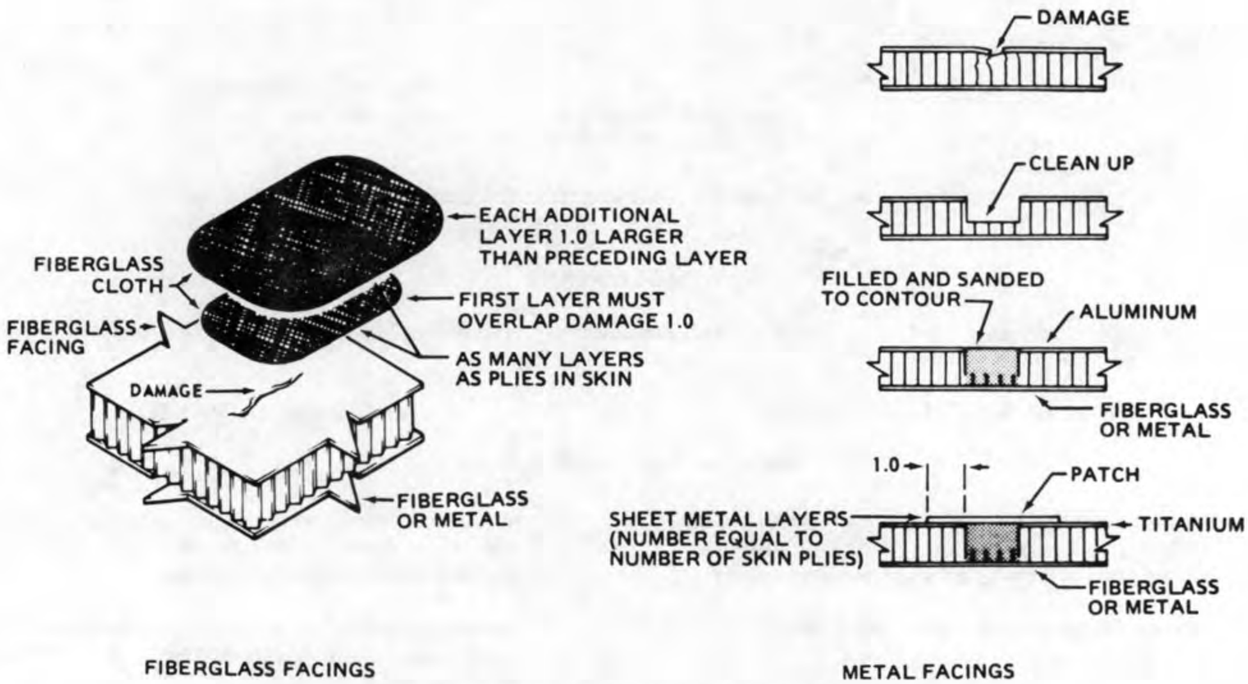
METAL FACED PANELS

SAME AS FIBERGLASS REPAIR

Except use adhesive (C14) in lieu of (C98) for metal to metal bonding.

209030-328-A

Figure 2-8. Type B — Damage, Body Panel Repairs



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

DESCRIPTION

FIBERGLASS FACED PANELS

Tears, fractures, and holes through fabric skins with no damage to core. (See Type D damage limits for core damage.)

METAL FACED PANELS

Sharp dents and dents containing holes and cracks but not extending completely through panel. (See Type D for through limits and damage greater than 0.50 inch diameter.)

LIMITS — REPAIRABLE DAMAGE

FIBERGLASS FACED PANELS

1. Maximum area of damage: 9.0 square inches or 5 percent of total panel area whether a single area or combination of separate areas.

METAL FACED PANELS

1. Maximum diameter of hole after clean up: 0.50 inch. (See Type D for damage over 0.50 inch.)
2. Maximum number of repairs per panel: One.
3. Minimum distance from structural member fitting, or insert: 1.0 inch.
4. Minimum distance from beveled edges: 0.50 inch.

209030-21-1H

Figure 2-9. Type C — Damage, Body Panel Repairs (Sheet 1 of 2)

REPAIR PROCEDURES

FIBERGLASS FACED PANELS

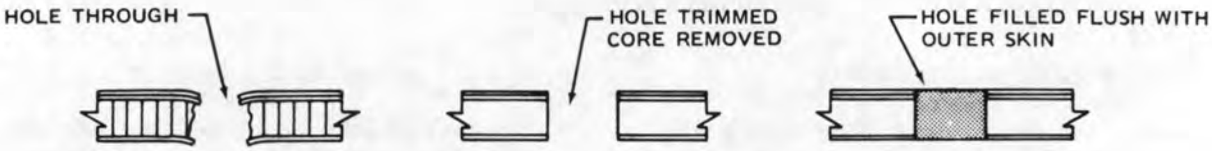
1. Smooth damaged surface by light sanding with sandpaper (C102).
2. Cut the required number of plies from fiberglass cloth (C38).
3. Saturate each ply with epoxy resin (C98) and place over damage.
4. Cover patch with cellophane (C27). Press down to smooth and allow to cure.
5. If necessary sand repair to smooth out and refinish if required.

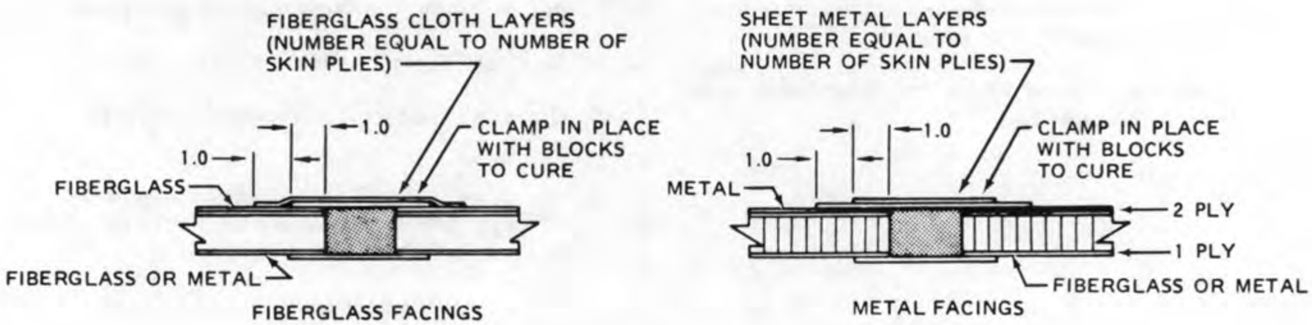
METAL FACED PANELS

1. Counterbore area to the diameter and depth required to clean out damage. (Maximum diameter 0.50 inch.)
2. Pack cavity with adhesive (C14).
3. Level out flush with skin and cure.
4. Titanium skin only — cut required number of doublers from the same material as the skin.
5. Bevel the edges of doublers on top side.
6. Clean all surfaces with methyl-ethyl-keytone (C83).
7. Apply adhesive (C14) and center doublers over damage. Clamp smoothly with blocks and allow to cure. Refinish if required.

209030-329-A

Figure 2-9. Type C — Damage, Body Panel Repairs (Sheet 2 of 2)





ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

DESCRIPTION

FIBERGLASS FACED PANELS

Damage penetrating the facings and extending into core. Same limits apply to damage through one skin only and damage completely through panel.

METAL FACED PANELS

Damage penetrating metal skins greater than 0.50 inch diameter, and damage extending completely through panel.

LIMITS — REPAIRABLE DAMAGE

FIBERGLASS FACED PANELS

1. Maximum damaged area after clean up: Total of 9.0 square inches or 5 percent of panel surface area per panel. Applies whether a single area or combination of separate areas.
2. Maximum length of damage: 4.0 inches in any direction.
3. Minimum distance from an edge bevel: 0.50 inch.

METAL FACED PANELS

1. Maximum area of damage after clean up: 4.0 square inches, whether a single area or combination of separate areas.
2. Maximum length: 3.0 inches in any direction.
3. Minimum distance from structural members or other repair: 3.0 inches.
4. Minimum distance from an edge bevel: 0.50 inches.

209030-22-1K

Figure 2-10. Type D — Damage, Body Panel Repairs (Sheet 1 of 2)

REPAIR PROCEDURES

FIBERGLASS FACED PANELS

1. Clean up damage with counterbore or hole cutter. If damage is limited to one side of panel, counterbore only deep enough for proper cleanup.
2. Pack hole with smoother (C111). Level out flush with surface of panel. Allow to cure.
3. Cut required number of patch layers from fiberglass cloth (C38).
4. Saturate each cloth layer with epoxy resin (C98) and place over damage.
5. Cover patch with cellophane (C27). Press down smoothly and allow to cure.
6. If necessary, sand smooth and refinish using sandpaper (C102).

METAL FACED PANELS

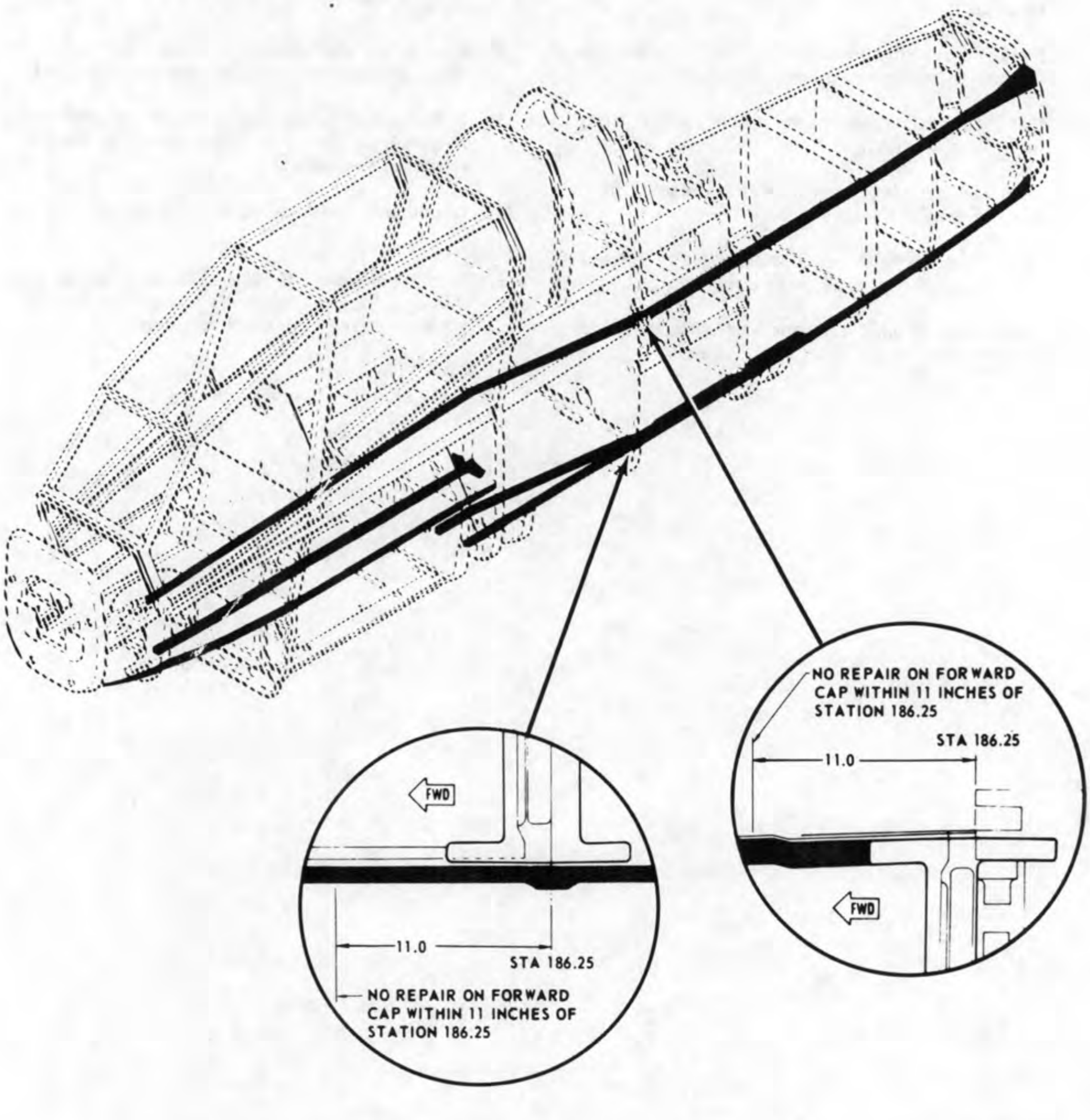
1. Clean up damage with counterbore or hole cutter. If damage is limited to one side of panel, counterbore only deep enough for proper cleanup.
2. Pack cavity with adhesive (C14). Smooth flush with surface of panel and allow to cure.
3. Cut required number of doublers from the same material as the skin. Use stainless steel for repairing titanium skin.
4. Clean all surfaces with MEK (C74).
5. Apply adhesive (C14) and center doublers over damage. Clamp smoothly with blocks and allow to cure. Refinish if required.

209030-330A

Figure 2-10. Type D — Damage, Body Panel Repairs (Sheet 2 of 2)

Primary structural caps. No repairs permitted except with specific approval by engineering authority.

Refer to TB 746-93-2 for paint instructions.



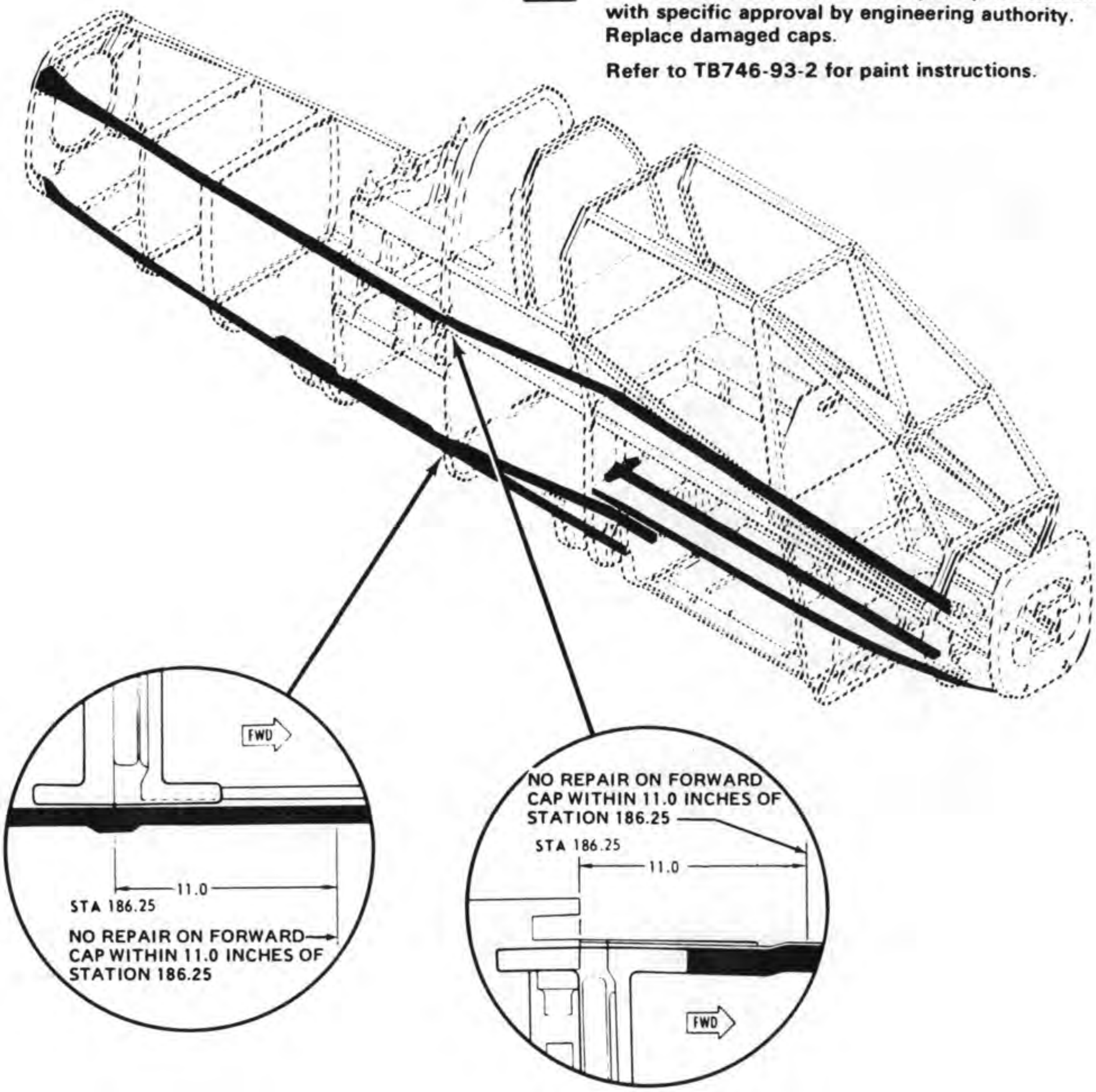
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-8-2A

Figure 2-11. Primary Structural Caps — Left Side

Primary structural caps. No repairs permitted except with specific approval by engineering authority. Replace damaged caps.

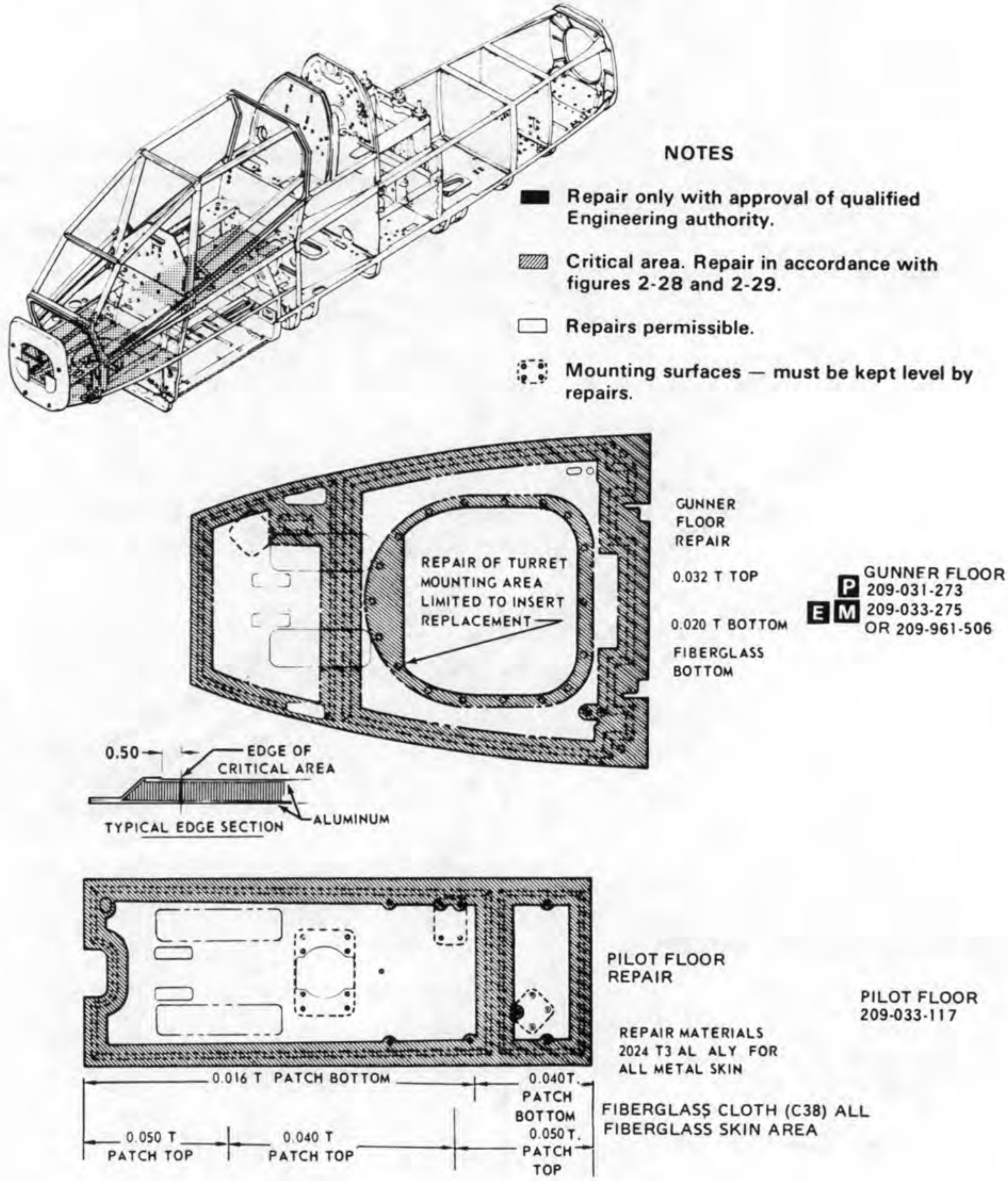
Refer to TB746-93-2 for paint instructions.



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-8-1A

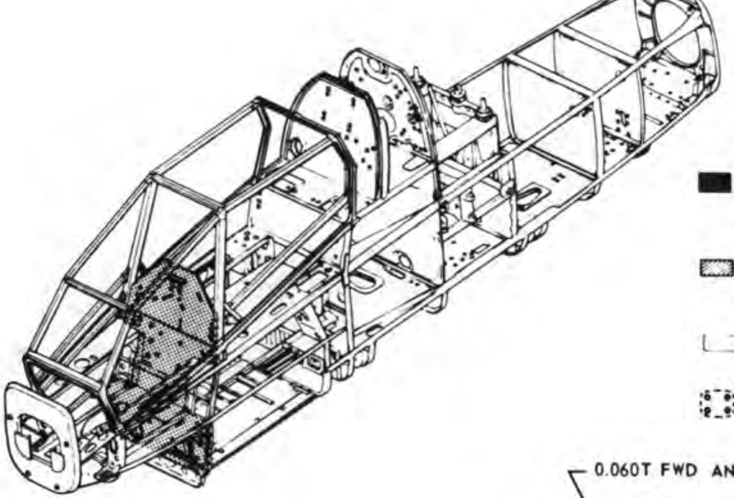
Figure 2-12. Primary Structural Caps — Right Side



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-9B

Figure 2-13. Pilot and Gunner Floor Panels



NOTES

■ Repair only with approval of qualified Engineering authority.

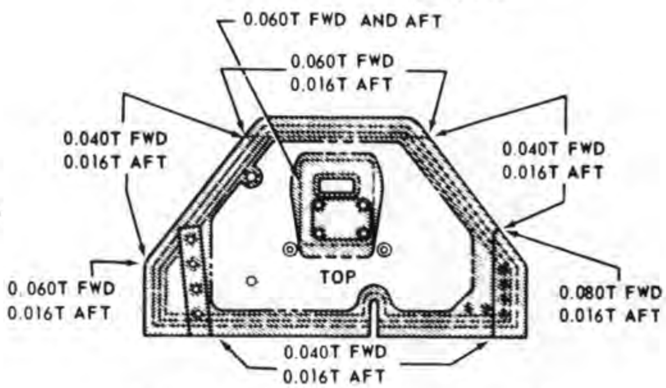
▒ Critical area. Repair in accordance with figure 2-28.

⌐¬ Repairs permissible.

⁞⁞ Mounting surfaces — must be kept level by repairs.

TOP SECTION
REPAIR MATERIAL

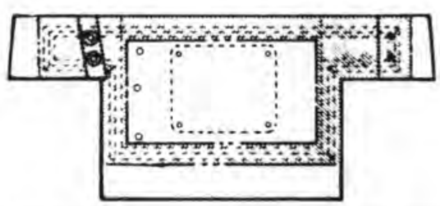
AL. ALY. PATCH 2024T3 BOTH FWD AND AFT, THICKNESS AS INDICATED FIBERGLASS EDGING (C 38)



TOP SECTION
209-033-103

CENTER SECTION REPAIR MATERIAL

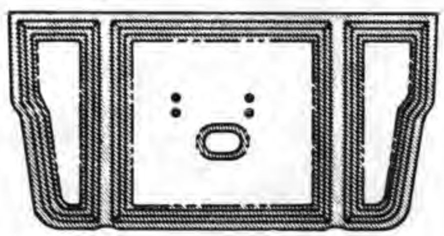
AL. ALY. PATCH 2024T3 0.040T FWD 0.040T AFT. FIBERGLASS EDGING (C 38)



CENTER SECTION
209-033-232

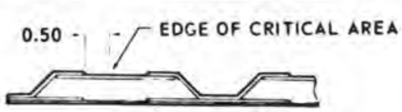
LOWER SECTION REPAIR MATERIAL

AL. ALY. PATCH 2024T3 0.040T FWD 0.040T AFT. FIBERGLASS EDGING (C 38)



LOWER SECTION
209-033-233

AL. ALY. OPPOSITE AL. ALY. WITH FIBERGLASS

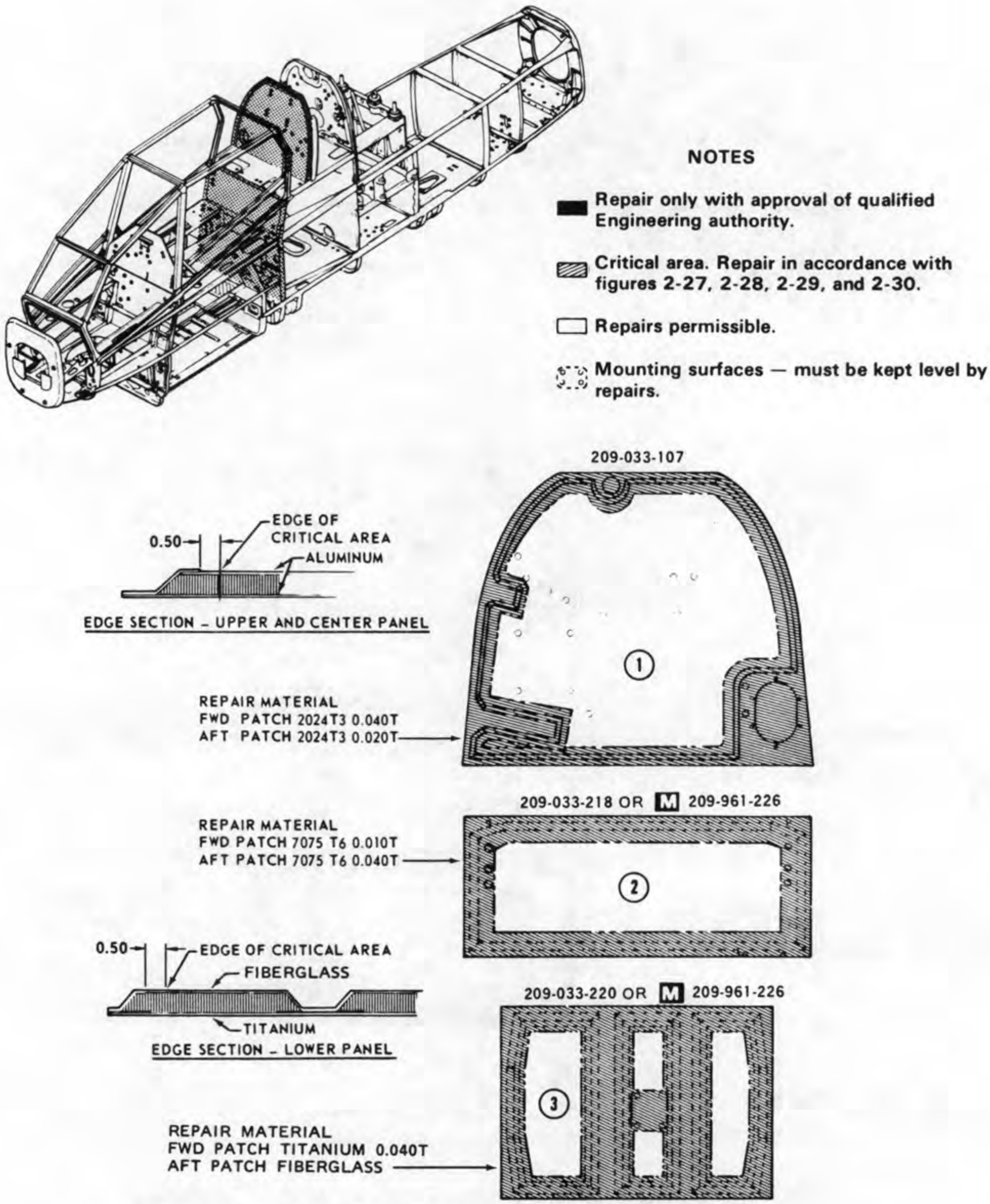


TYPICAL CROSS SECTION

NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-17B

Figure 2-14. Bulkhead at Station 93.0



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-10A

Figure 2-15. Bulkhead at Station 148.5 and 171.61

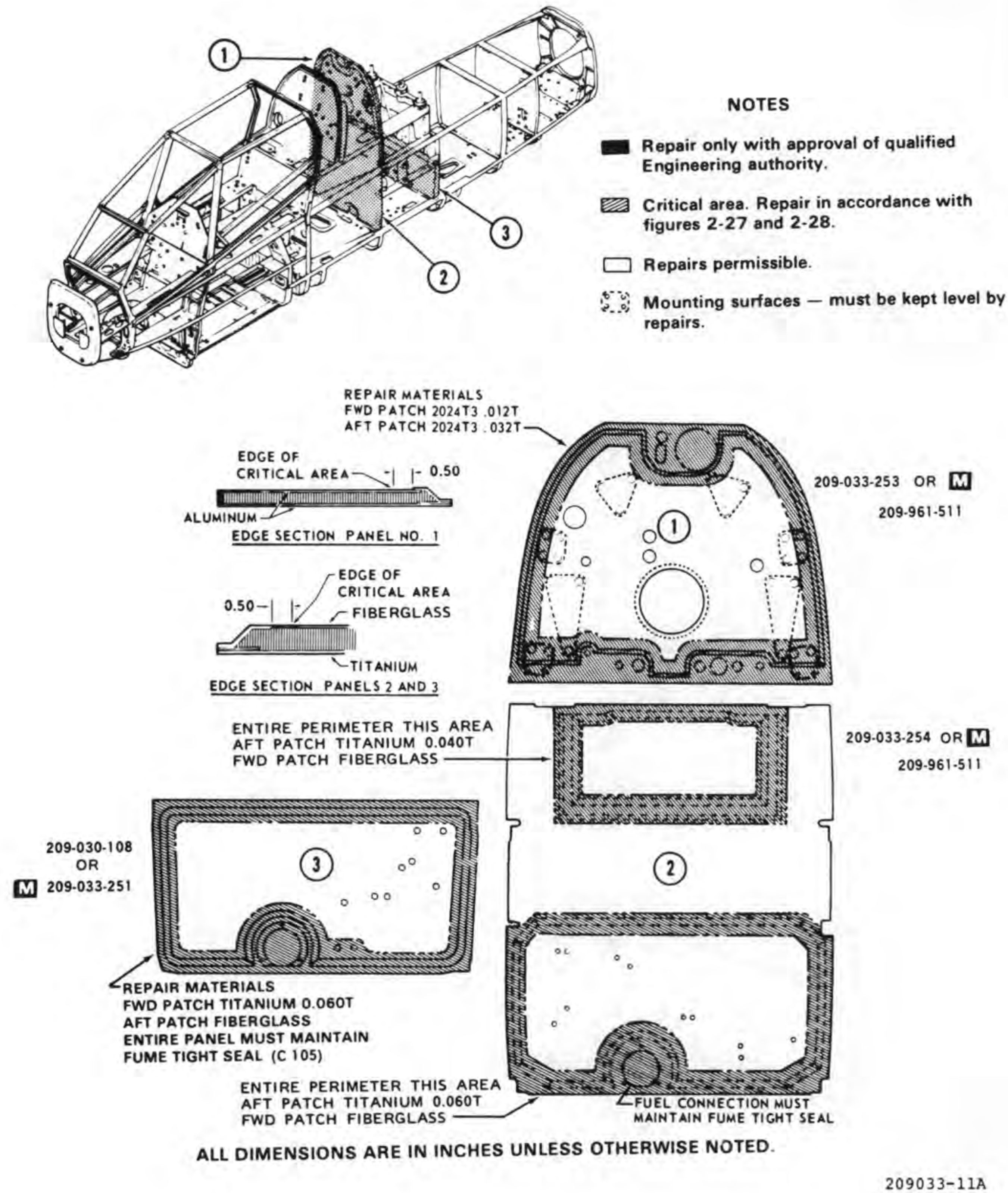
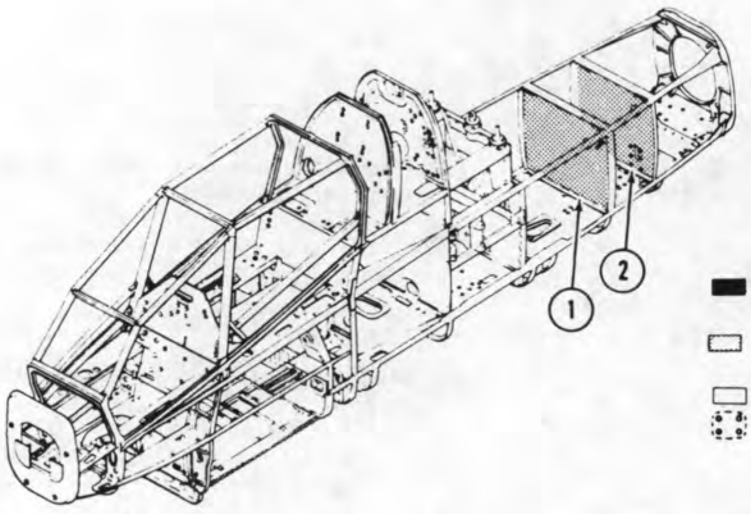
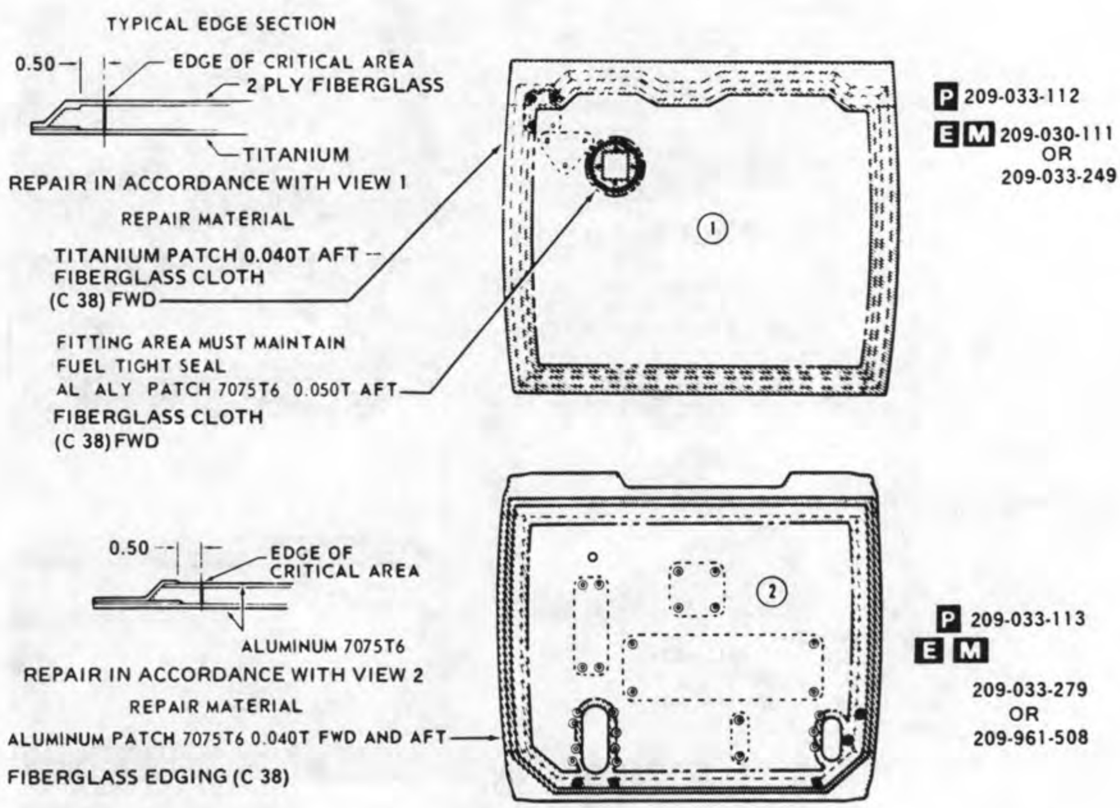


Figure 2-16. Bulkhead at Stations 186.25 and 213.94



NOTES

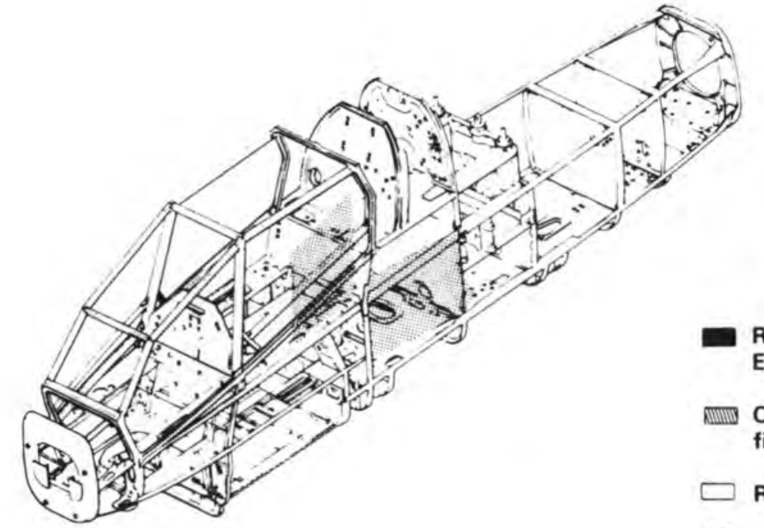
- Repair only with approval of qualified Engineering authority.
- Critical area. Repair in accordance with figures 2-28 and 2-29.
- Repairs permissible.
- Mounting surfaces — must be kept level by repairs.



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

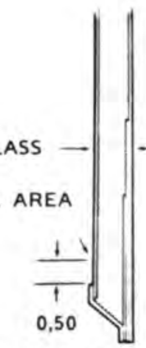
209033-12B

Figure 2-17. Bulkhead at Stations 250.0 and 268.5

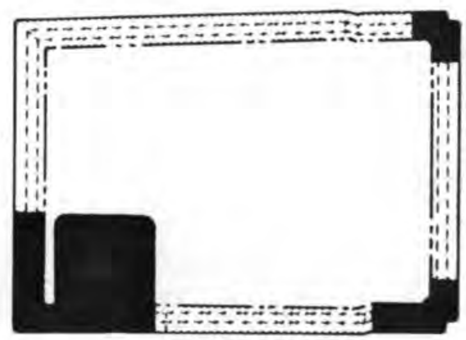


NOTES

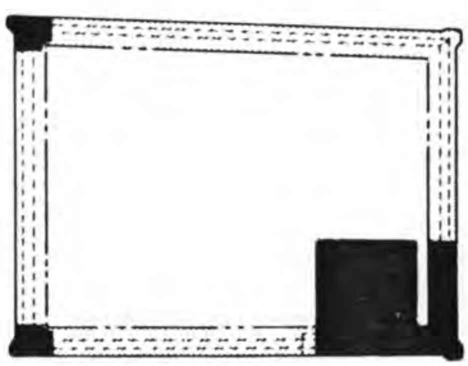
- Repair only with approval of qualified Engineering authority.
- Critical area. Repair in accordance with figure 2-28.
- Repairs permissible.
- Mounting surfaces — must be kept level by repairs.



TYPICAL EDGE SECTION



LEFT SIDE
P 209-033-135
EM 209-961-249



RIGHT SIDE
P 209-033-134
EM 209-961-249

REPAIR MATERIALS

TITANUM PATCH 0.050 THICK FOR ALL METAL SKIN AREA

FIBERGLASS CLOTH TYPE C (C 38) FOR ALL FIBERGLASS SKIN AREA

REPAIRS - MAIN BEAM PANELS RIGHT AND LEFT SIDE- STATIONS 148.5 TO 186.25

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-13B

Figure 2-18. R & L Main Beam Panels at Station 148.5 to 186.25

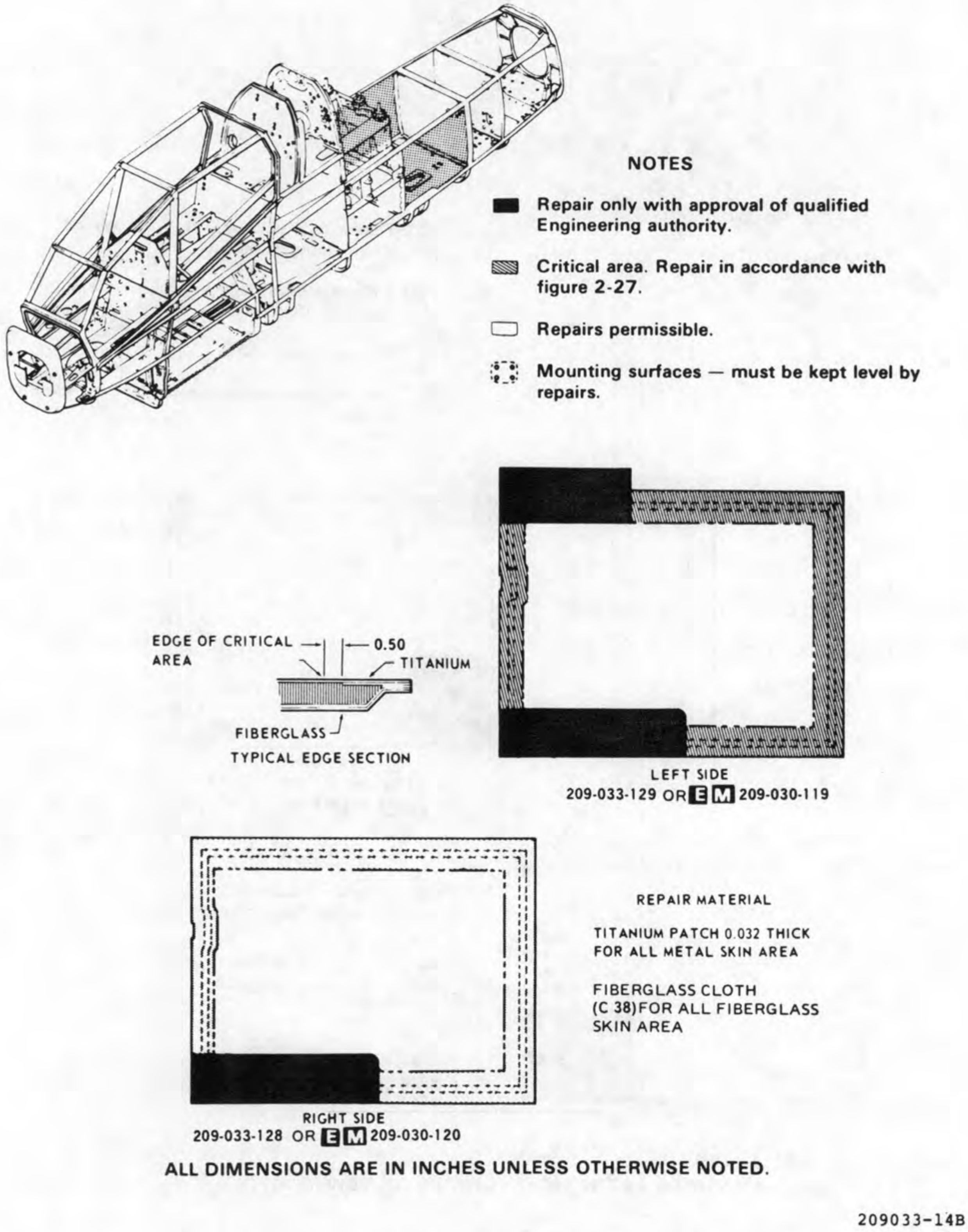
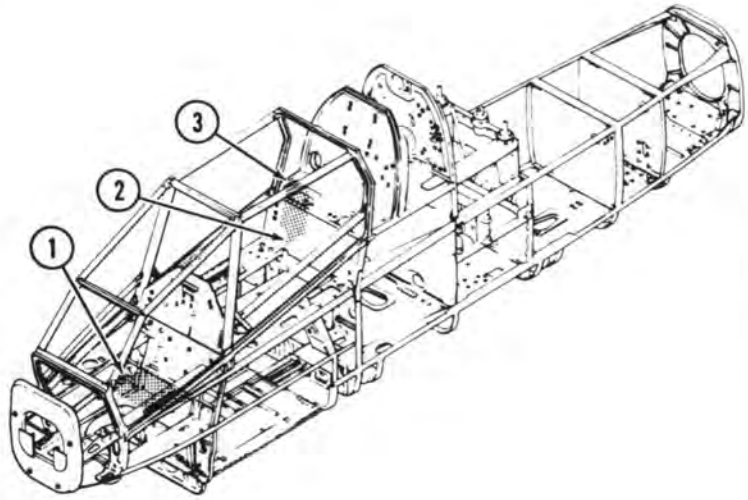


Figure 2-19. R & L Main Beam Panels at Station 213.94 to 250.0



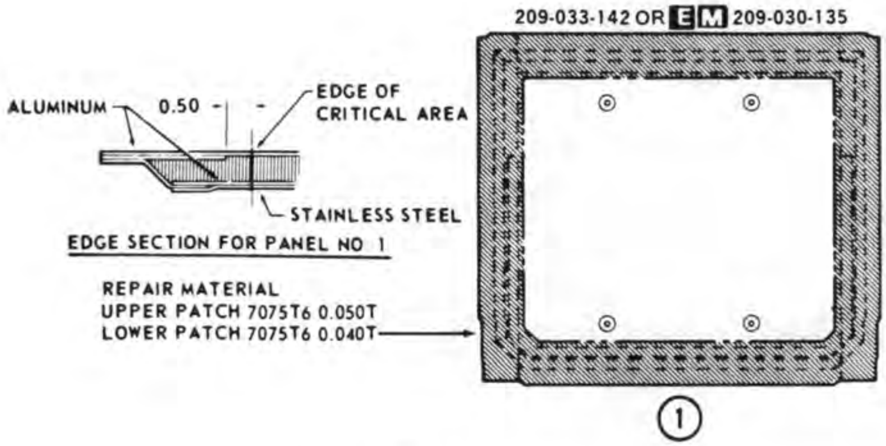
NOTES

■ Repair only with approval of qualified Engineering authority.

▨ Critical area. Repair in accordance with figure 2-28.

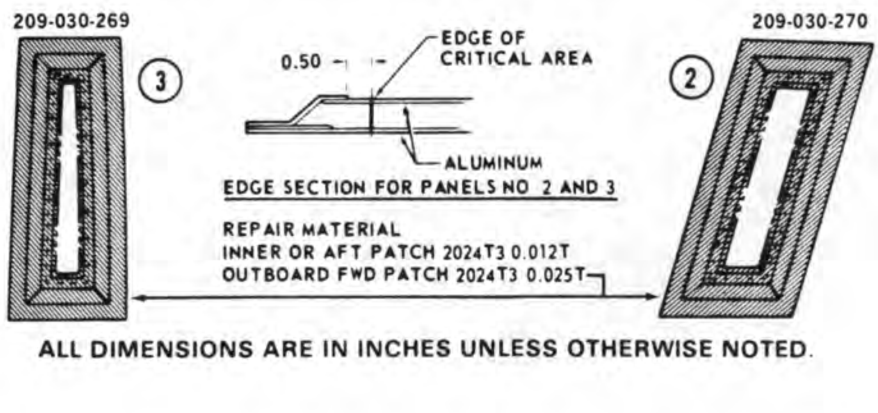
□ Repairs permissible.

⬚ Mounting surfaces — must be kept level by repairs.



NOTE

Stainless steel plate lower is for crew protection, non-structural, hole may be plugged with bonded stainless steel patch.



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-15A

Figure 2-20. Panel at Forward Fuel Cell at R.S. and Gunner Floor

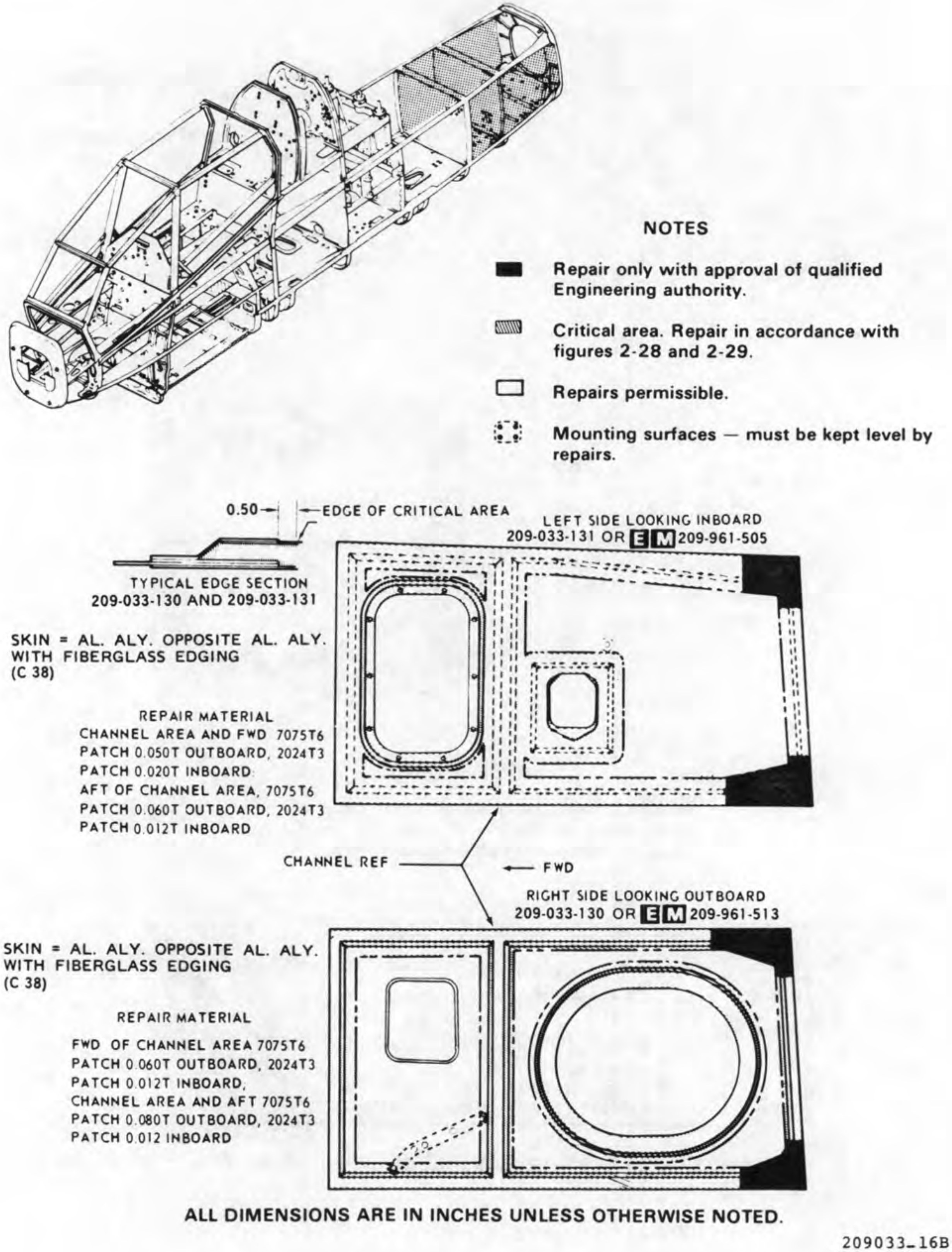


Figure 2-21. R & L Beam Panels at Station 250 to B.S. 41.32

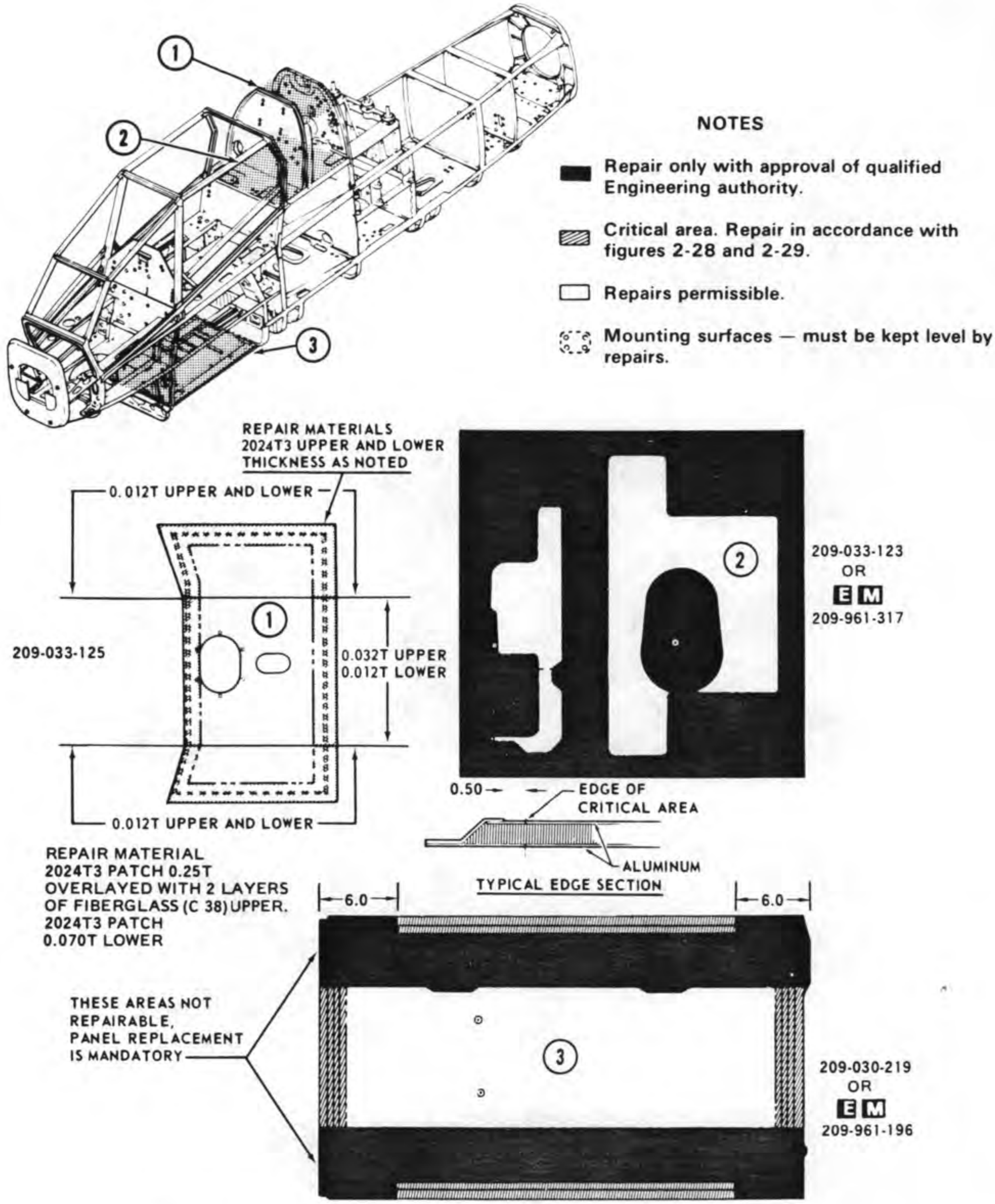
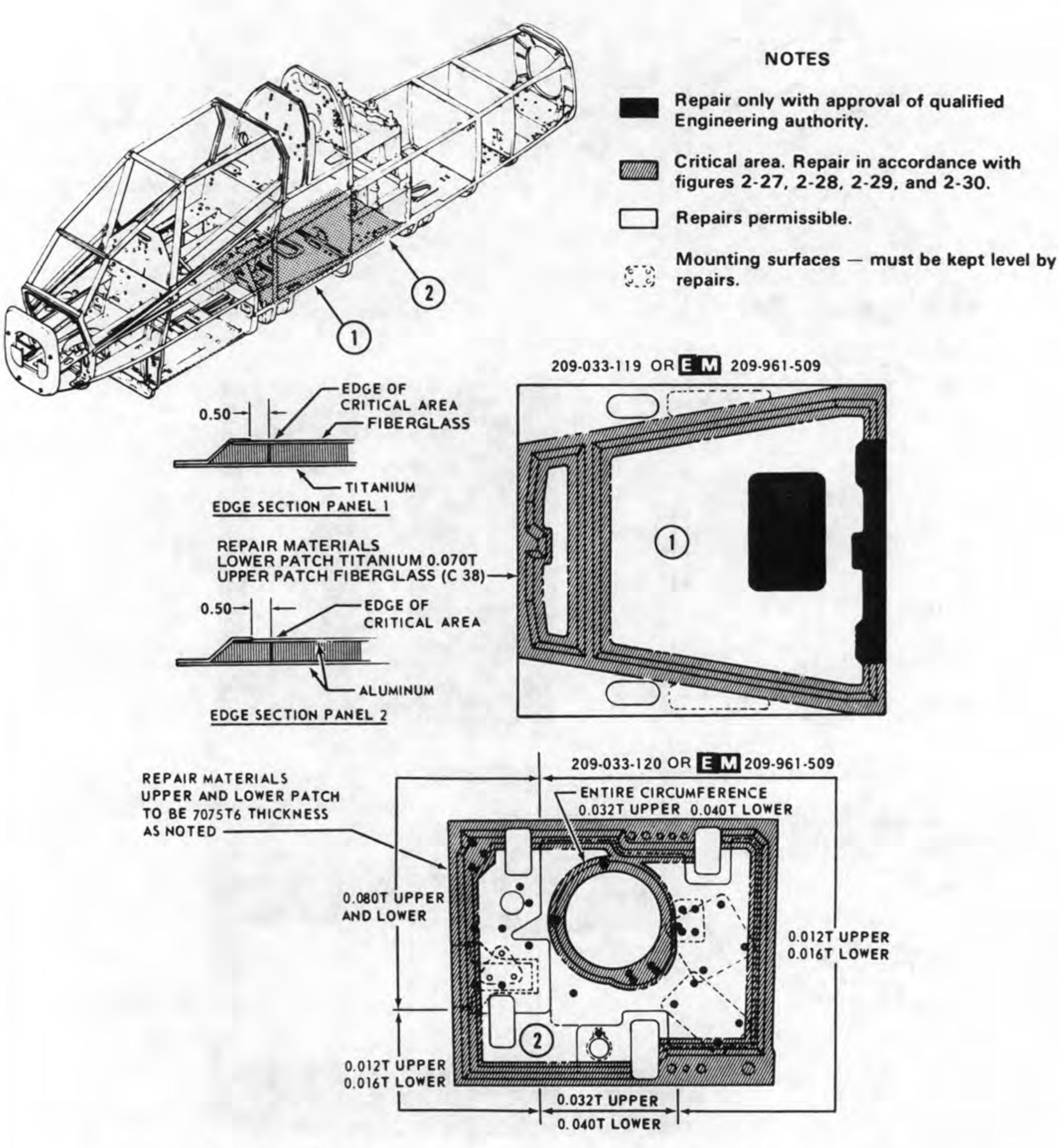


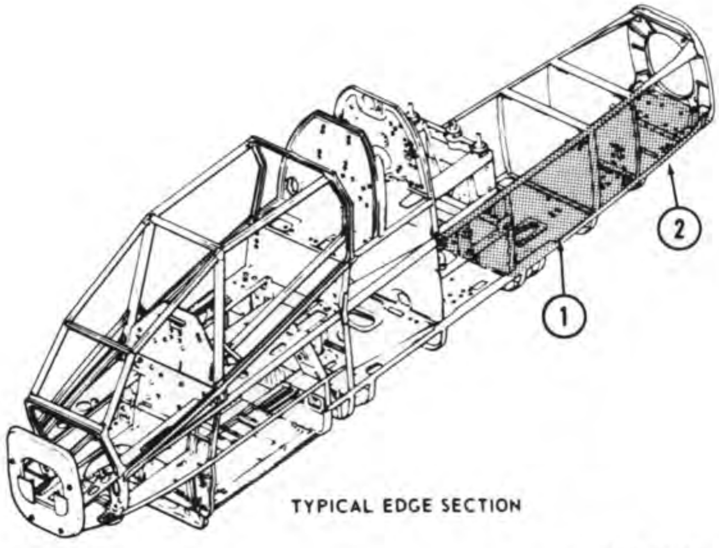
Figure 2-22. Ammo Floor, Support Panel and Forward Fuel Cell Panel at Station 213.9



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-19B

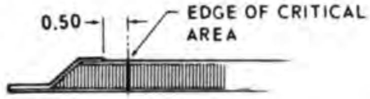
Figure 2-23. Forward Fuel Cell Floor — Lower Panel Station 86 to 213



NOTES

- Repair only with approval of qualified Engineering authority.
- Critical area. Repair in accordance with figures 2-27 and 2-28.
- Repairs permissible.
- Mounting surfaces — must be kept level by repairs.

TYPICAL EDGE SECTION



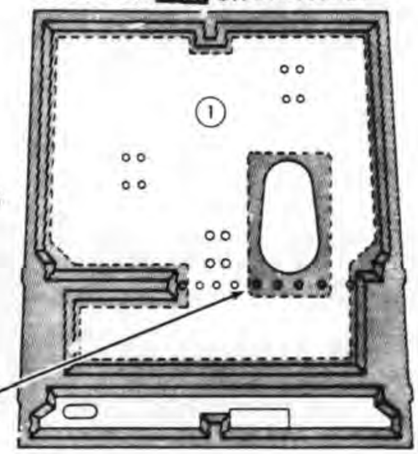
209-033-121

SKIN = TITANIUM OPPOSITE FIBERGLASS

REPAIR MATERIAL

TITANIUM 0.050T LOWER
FIBERGLASS
(C 38)UPPER

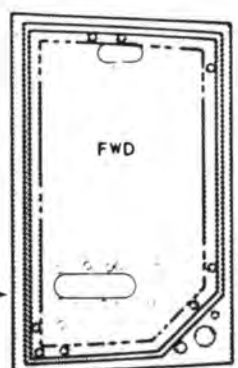
209-961-509 EM OR 209-033-121



FITTING AREA MUST MAINTAIN FUEL TIGHT SEAL

P 209-033-122

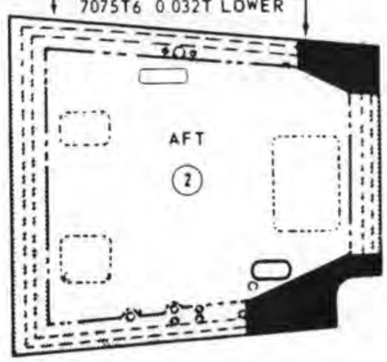
E M 209-033-277
OR 209-961-509



2024T3 0.032
UPPER
2024T3 0.032
LOWER

FWD SECTION - REPAIR MATERIAL
2024T3 PATCH 0.020 UPPER
2024T3 PATCH 0.032T LOWER
EXCEPT AS NOTED

7075T6 0.050T UPPER
7075T6 0.032T LOWER

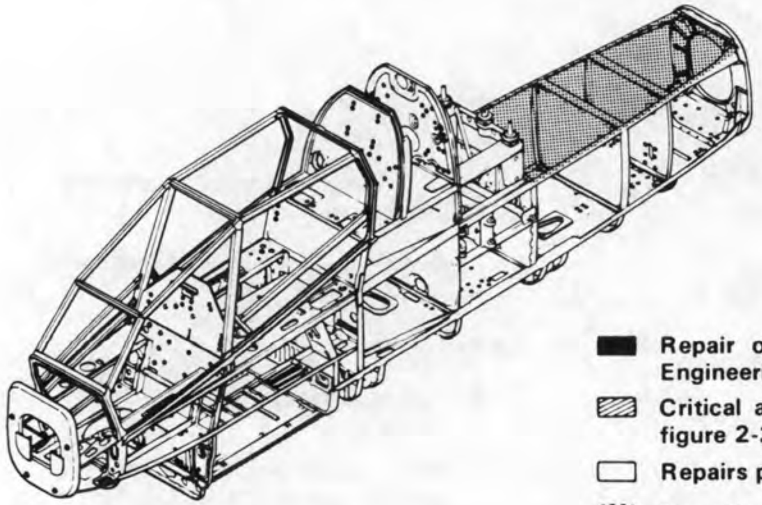


SKIN = AL. ALY. OPPOSITE AL. ALY. WITH FIBERGLASS (C 38)
AFT SECTION - REPAIR MATERIAL:
2024T3 PATCH 0.032T UPPER
2024T3 PATCH 0.012T LOWER
EXCEPT AS NOTED

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

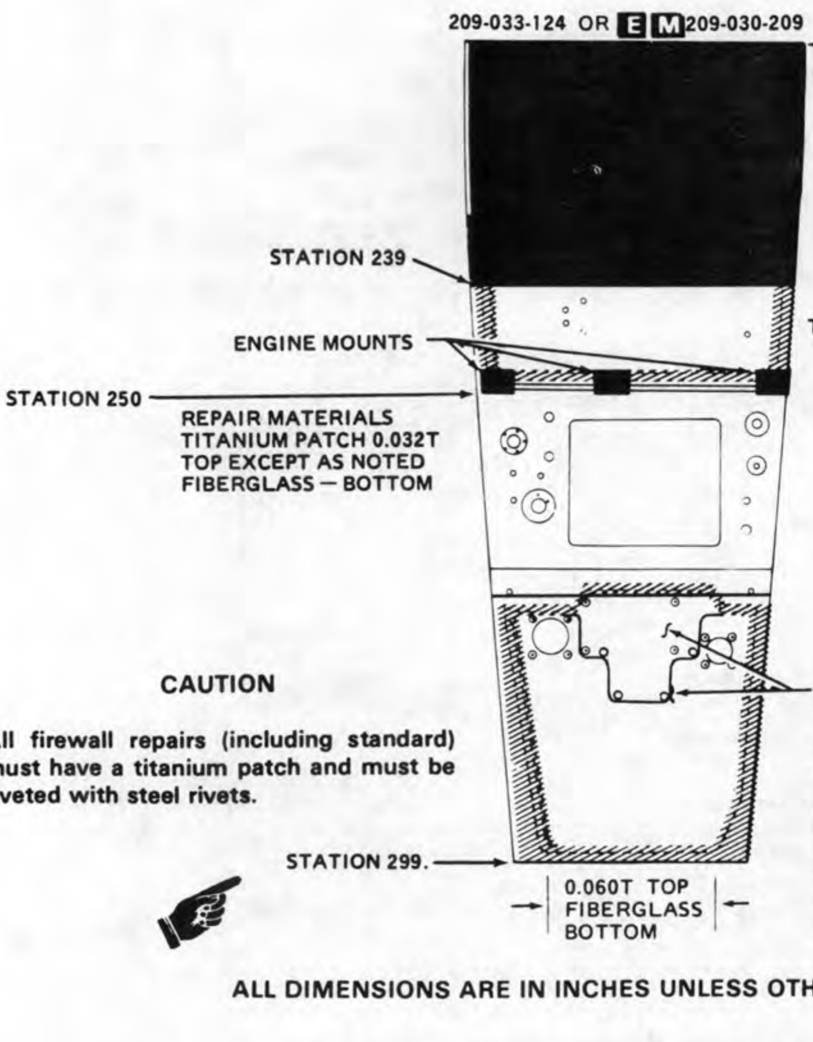
209033-20B

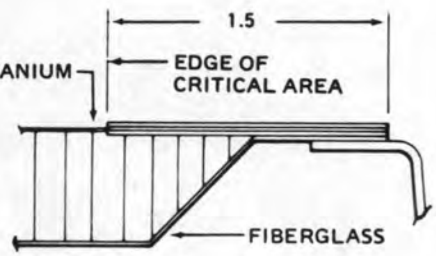
Figure 2-24. Lower Aft Fuel Cell Panel at Station 250 to B.S. 41.32



NOTES

- Repair only with approval of qualified Engineering authority
- Critical area. Repair in accordance with figure 2-27
- Repairs permissible
- Mounting surfaces — must be kept level by repairs





TYPICAL EDGE SECTION

CAUTION

All firewall repairs (including standard) must have a titanium patch and must be riveted with steel rivets.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

209033-21B

Figure 2-25. Engine Deck Installation at Station 213.94 to 298.75

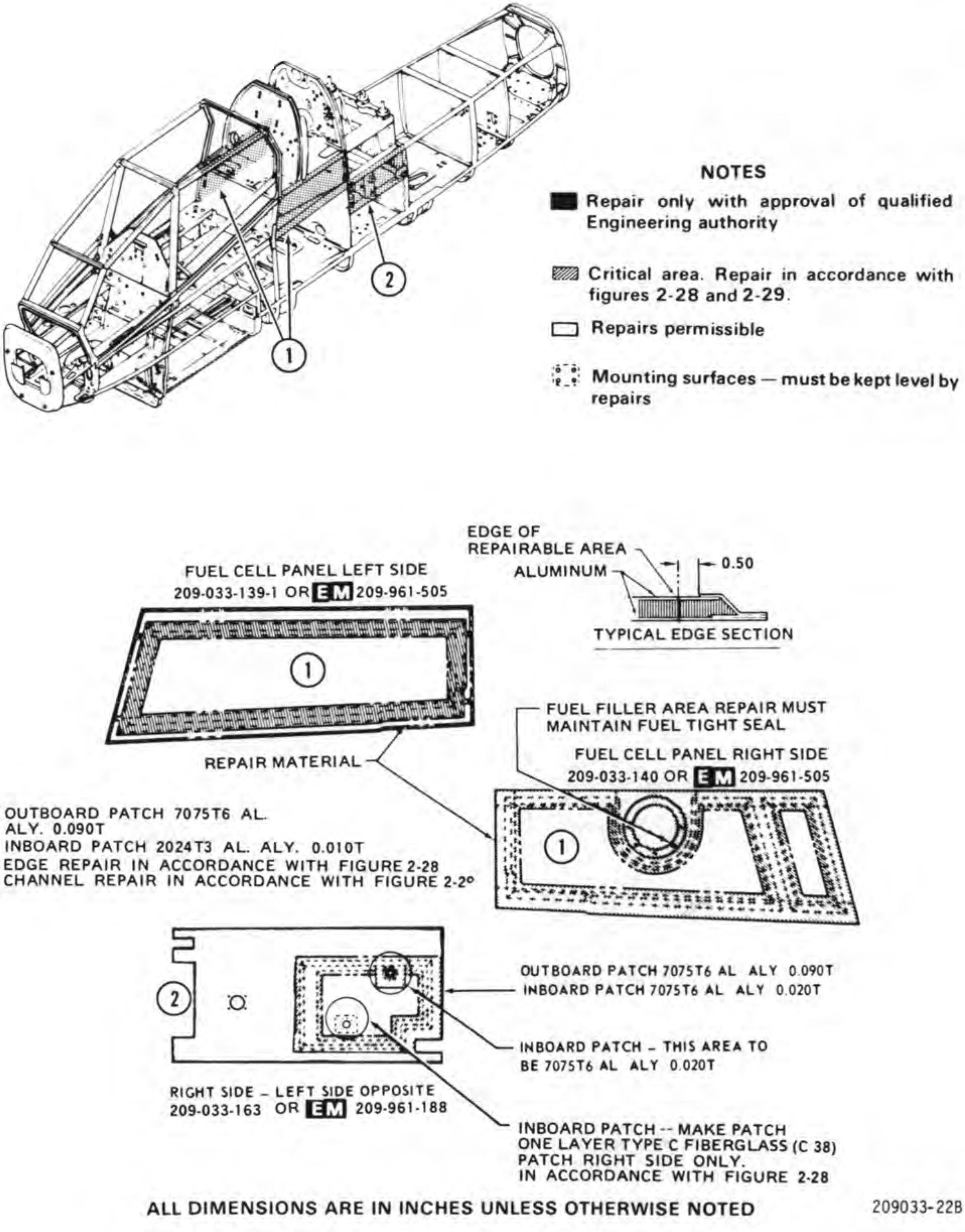
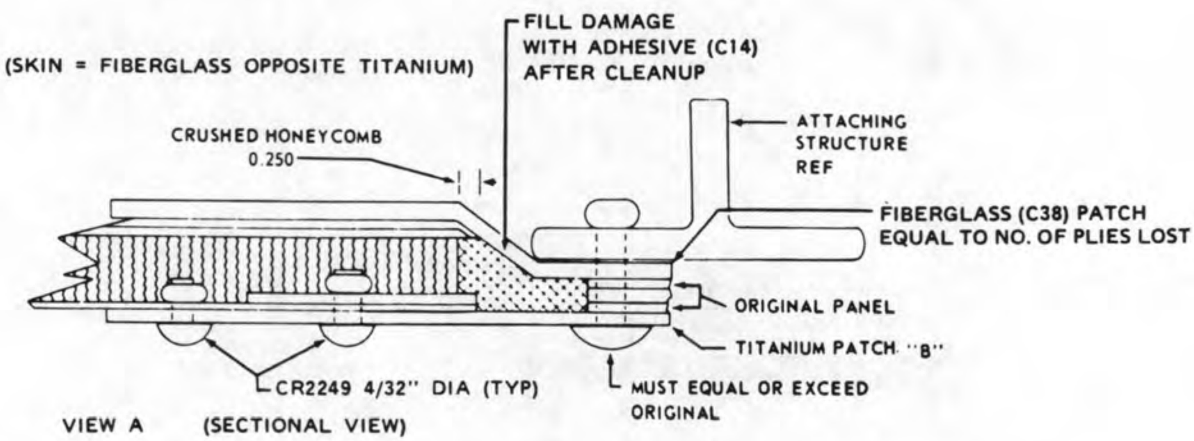
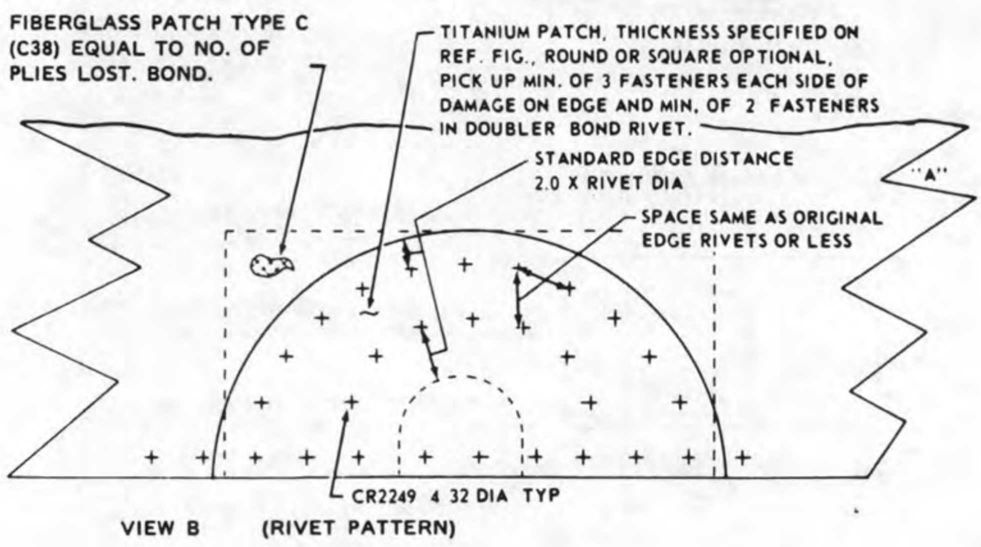


Figure 2-26. Forward Fuel Cell Panels — Main Beam at Station 186 to 214

NOTE

Typical edge repair of applicable panels for cross hatched area as illustrated on referenced figure. Maximum repairable damage is 1.25 inch diameter after cleanup. Repair of damage exceeding 1.25 inch diameter must be approved by qualified Engineering authority.





ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209033-23-1B

Figure 2-27. Edge Repair for Honeycomb Panels with Glass Skin Opposite Titanium (Sheet 1 of 2)

EDGE REPAIR OF HONEYCOMB PANELS

PART NO.	APPLICABLE PANELS	REF. FIG.
M 209-961-226 209-033-218	UPPER BULKHEAD STATION 148.56	2-15 2-15
M 209-961-226 209-033-220	LOWER BULKHEAD STATION 148.50	2-15 2-15
M 209-961-111 209-033-254	LOWER BULKHEAD STATION 186.25	2-16 2-16
209-030-108 M 209-033-251	BULKHEAD STATION 213.94	2-16 2-16
E M 209-030-111 E M 209-033-249 P 209-033-112	BULKHEAD	2-17 2-17 2-17
209-033-129 E M 209-030-119	LEFT FUEL CELL	2-19 2-19
209-033-128 E M 209-030-120	RIGHT FUEL CELL	2-19 2-19
E M 209-961-509 209-033-119	FORWARD FUEL CELL FLOOR	2-23 2-23
E M 209-961-509 209-033-121	BOTTOM OF FUEL TANK	2-24 2-24
E M 209-030-209 209-033-124	ENGINE DECK	2-25
209-031-821 E M 209-031-890	TAIL FIN FIN STA. — 15.00 TO 46.95	2-40

209033-23-2C

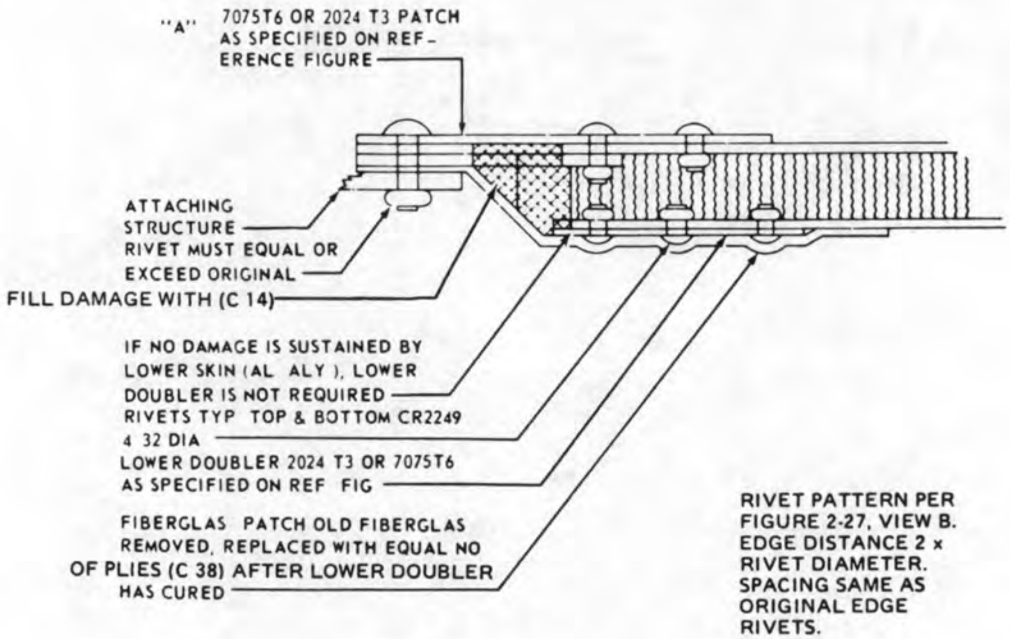
Figure 2-27. Edge Repair for Honeycomb Panels with Glass Skin Opposite Titanium (Sheet 2 of 2)

EDGE REPAIR OF HONEYCOMB PANELS

Typical edge repair of applicable panels for cross hatched area as illustrated on referenced figure. Maximum repairable damage is 1.25 inch diameter. Repair of damage greater than 1.25 inch diameter must be approved by qualified Engineering authority.

PART NUMBER	APPLICABLE PANELS	REF. FIG.
P 209-031-273	Gunner floor	2-13
E M 209-033-275		2-13
E M 209-961-506		2-13
209-033-117	Pilot floor	2-13
209-033-103	Bulkhead station 93.0	2-14
209-033-107	Center Bulkhead Station 164.0 and Station 171.61	2-15
209-033-253	Upper Bulkhead Station 186.25	2-16
M 209-961-511		2-16
P 209-033-113	Bulkhead Station 268.65	2-17
E M 209-033-279		2-17
E M 209-961-508		2-17
P 209-033-135	Right Main Beam	2-18
E M 209-961-249		2-18
P 209-033-134	Left Main Beam	2-18
E M 209-961-249		2-18
209-033-142	Gunner Seat	2-20
E M 209-030-135		2-20
209-030-269	Panel Station 155.97	2-20
209-030-270	Forward Fuel Tank Support	2-20
209-033-131	Left Beam	2-21
E M 209-961-505		2-21
209-033-130	Right Beam	2-21
E M 209-961-513		2-21
209-033-125	Pylon Support	2-22
209-030-219	Ammo Floor	2-22
E M 209-961-196		2-22

(SKIN = AL. ALY. OPPOSITE AL. ALY. WITH FIBERGLASS EDGING)



RIVET PATTERN PER FIGURE 2-27, VIEW B. EDGE DISTANCE 2 x RIVET DIAMETER. SPACING SAME AS ORIGINAL EDGE RIVETS.

209033-24C

Figure 2-28. Edge Repair for Honeycomb Panels with Aluminum Alloy with Glass Edging

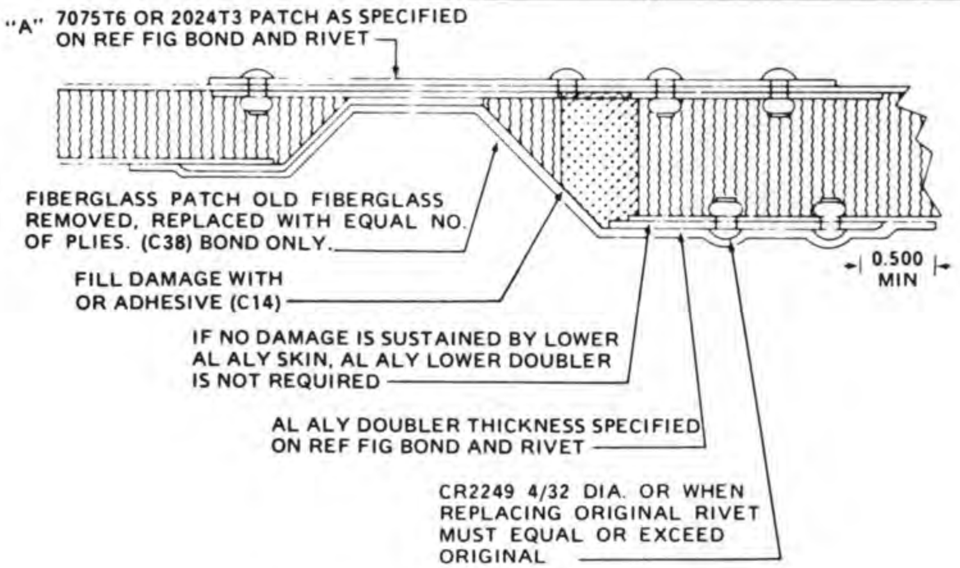
NOTE

Typical repair at channel section of applicable panels, cross hatched on reference figure. Maximum repairable damage 1.25 inch diameter after cleanup. Repair damage greater than 1.25 inch diameter must be approved by qualified Engineering authority.

REPAIR OF CHANNEL SECTION OF HONEYCOMB PANELS

PART NO.	APPLICABLE PANELS	REF. FIG.
P 209-031-273 E M 209-033-275 E M 209-961-506	Gunner Floor	2-13 2-13 2-13
209-033-117	Pilot Floor	2-13
209-033-220 M 209-961-226	Lower Bulkhead Station 148.50	2-15 2-15
P 209-033-113 E M 209-033-279 E M 209-961-508	Bulkhead Station 268.65	2-17 2-17 2-17
209-033-131 E M 209-961-505	Left Beam	2-21 2-21
209-033-130 E M 209-961-513	Right Beam	2-21 2-21
209-033-125	Pylon Support	2-22
209-030-219 E M 209-961-196	Ammo Floor	2-22 2-22
209-033-119 E M 209-961-509	Forward Fuel Cell Floor	2-23 2-23
209-033-139 E M 209-961-505	Fuel Cell Panel Left Side	2-26 2-26
209-033-140 E M 209-961-505	Fuel Cell Panel Right Side	2-26 2-26
209-033-163 E M 209-961-188	Main Beam	2-26 2-26

(SKIN = AL. ALY. OPPOSITE AL. ALY. WITH FIBERGLASS FINISH AT CHANNEL)



SEE REPAIR FIGURE 2-27, VIEW B FOR TOP AND BOTTOM VIEW (RIVET PATTERN)

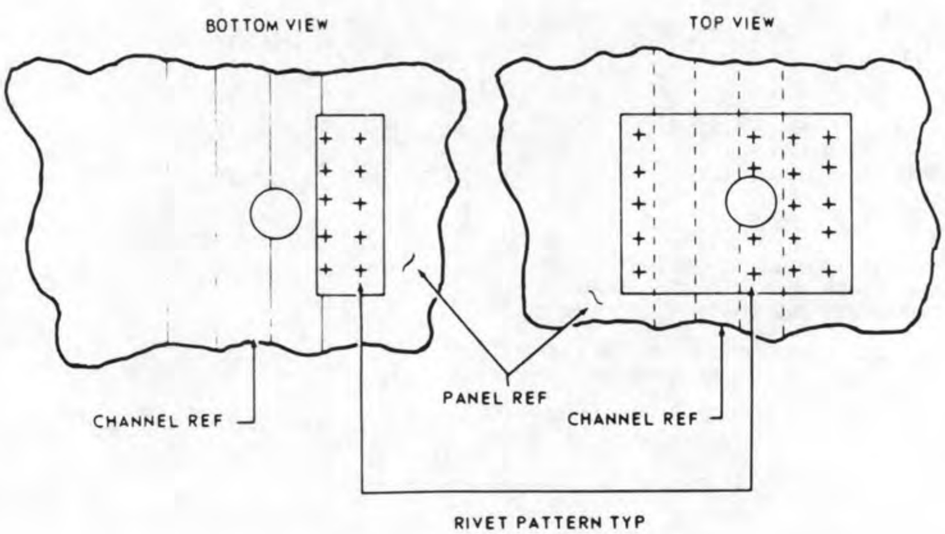
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

209033-25B

Figure 2-29. Edge Repair for Honeycomb Panels with Glass Finish at Channel

REPAIR OF CHANNEL SECTION OF HONEYCOMB PANELS

PART NO.	APPLICABLE PANELS	REF. FIG.
P 209-031-273 E M 209-033-275 E M 209-961-506	Gunner Floor	2-13 2-13 2-13
209-033-117	Pilot Floor	2-13
209-033-220 M 209-961-226	Lower Bulkhead Station 148.50	2-15 2-15
P 209-033-113 E M 209-033-279 E M 209-961-508	Bulkhead Station 268.65	2-17 2-17 2-17
209-033-131 E M 209-961-505	Left Beam	2-21 2-21
209-033-130 E M 209-961-513	Right Beam	2-21 2-21
209-033-125	Pylon Support	2-22
209-030-219 E M 209-961-196	Ammo Floor	2-22 2-22
209-033-119 E M 209-961-509	Forward Fuel Cell Floor	2-23 2-23
209-033-139 E M 209-961-505	Fuel Cell Panel Left Side	2-26 2-26
209-033-140 E M 209-961-505	Fuel Cell Panel Right Side	2-26 2-26
209-033-163 E M 209-961-188	Main Beam	2-26 2-26



EDGE DISTANCE 2.0 x DIA. OF RIVET.
RIVET SPACING SAME AS EDGE RIVETS
OR SAME AS OPPOSITE LIKE PANEL.
MINIMUM OF TWO FASTENERS EACH
SIDE OF DAMAGE.

209033-26B

Figure 2-30. Typical Rivet Pattern for Channel Section Repair

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(c) Clean the area where patch is to be applied with scotchbrite (C103) in lieu of sandpaper to avoid leaving residue. It is permissible to use 320 grit sandpaper (C102) in critical areas. If sandpaper is used, clean the sanded area with MEK (C74).

(d) Bond metal patches with adhesive (C14).

(e) After adhesive (C14) has cured, apply sealant (C105) to entire surface of titanium patch.

(f) Rivet patch with rivets of equal or larger size than original rivets in areas that were riveted prior to application of patch. Use the standard edge distance of two rivet diameters or space the rivets the same as the original panel. If the panel being worked is not riveted, use rivet spacing in opposite panel.

c. Replace damaged fasteners (inserts) in fuselage honeycomb panels.

(1) Determine whether the fastener (insert) is a potted-type, injection-type or grommet-type. See figure 2-31 for view of the fasteners (inserts).

(2) Remove damaged fastener (insert) by machining with a counterbore of the same diameter as the fastener. Note that the grommet-type fastener (insert) flanges overlap the skin of the honeycomb panel.

(3) Install new fastener (insert) as outlined in steps (4) through (6).

(4) Install potted-type fastener (insert).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(a) Immediately prior to installation, clean new fastener (insert) by soaking in MEK (C74). Air dry until moisture free. Handle fastener (insert) with clean white gloves after cleanup.

(b) Place masking tape (C123) over threads of fastener (insert) to prevent entry of adhesive.

CAUTION

An insufficient amount of adhesive will allow moisture or other fluids to enter the honeycomb panel core. This will result in ultimate failure of the panel.

(c) Fill cavity approximately two-thirds full of adhesive as shown on figure 2-31. Use adhesive (C8) in areas where the temperature will not exceed **180** degrees F (**83** degrees C). Use adhesive (C14) in areas where panel will be subjected to higher temperatures but not exceeding **300** degrees F (**149** degrees C). Install fastener (insert) while adhesive is in tacky state. Ensure that there are no pin holes in the adhesive, and that the fastener (insert) is properly aligned and is a snug fit where the fastener (insert) flange mates with the honeycomb panel face.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(d) Remove excess adhesive from honeycomb panel before adhesive sets up. Use cheese cloth (C30) dampened with MEK (C74). Exercise caution to prevent the MEK from diluting the adhesive in the potted areas.

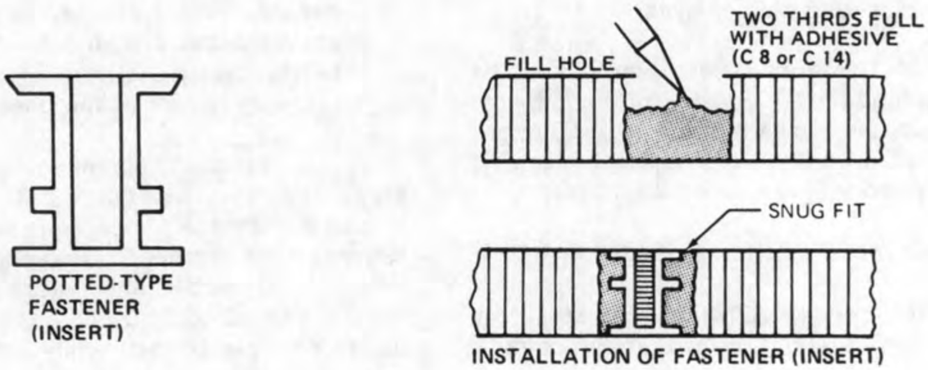
(5) Install injection-type fastener (insert).

WARNING

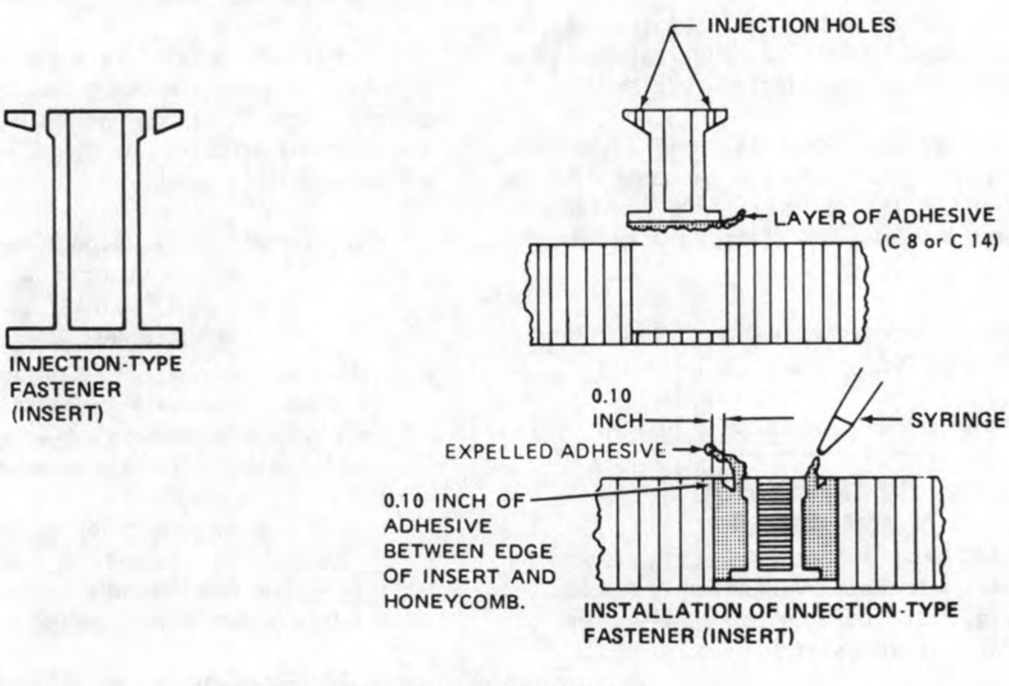
Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(a) Immediately prior to installation, clean new fastener (insert) by soaking in MEK (C74). Air dry until moisture free. Handle fastener (insert) with clean white gloves after cleaning.

(b) Place mystic tape (C124) over threads and injections holes of fastener (insert) to prevent entry of adhesive. Open holes in the tape at the injection holes with a pointed instrument to permit injection of adhesive compound.



POTTED-TYPE FASTENER (INSERT)



INJECTION-TYPE FASTENER (INSERT)

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Figure 2-31. Potted — Injection — Grommet Type Fasteners (Sheet 1 of 2)

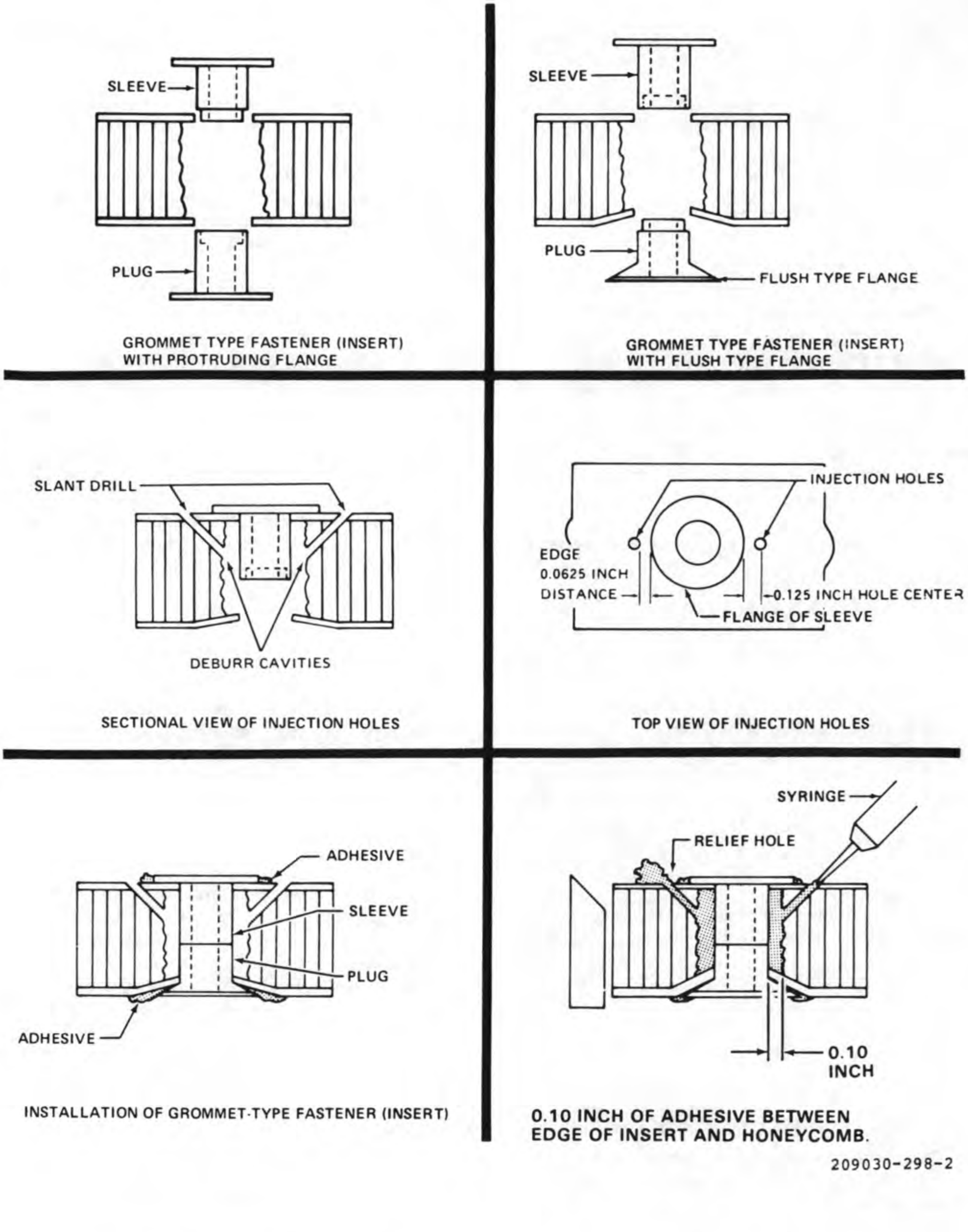


Figure 2-31. Potted — Injection — Grommet Type Fasteners (Sheet 2 of 2)

(c) Apply a layer of adhesive to bottom of fastener as shown in figure 2-31. Use adhesive (C8) in areas where temperature will not exceed **180** degrees F (**82** degrees C). Use adhesive (C14) in areas where panel will be subjected to higher temperatures but not exceeding **300** degrees F (**149** degrees C). Position the fastener (insert in the hole).

CAUTION

An insufficient amount of adhesive will allow moisture or other fluids to enter the honeycomb panel core. This will result in ultimate failure of the panel.

(d) Inject adhesive used in the preceding step into one injection hole until a steady stream of adhesive, without air bubbles, flows out of the opposite injection hole. Use a syringe to inject adhesive (C8 or C14) as shown on figure 2-31.

(e) Ensure that fastener (insert) is properly aligned.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(f) Remove excess adhesive from honeycomb panel before adhesive sets up. Use cheese cloth (C30) dampened with MEK (C74). Exercise caution to prevent the MEK from diluting the adhesive in the potted areas.

(g) Touch up paint to match the surrounding area. Refer to TB 746-93-2 for paint instructions. Use primer (C88 or C91) and lacquer (C89) color to match surrounding area.

(6) Install grommet-type fastener (insert).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(a) Immediately prior to installation, clean new fastener (insert) by soaking in MEK (C74). Air dry until moisture free. Handle fastener (insert) with clean white gloves after cleaning.

(b) Place masking tape (C123) over threads of fastener (insert) to prevent entry of adhesive.

(c) Position the sleeve half of fastener (insert) in honeycomb panel and mark location of two injection holes (figure 2-31). Make hole centers **0.125** inch from edge of flange as illustrated. Remove sleeve and drill two holes with size 42 twist drill. Make hole through honeycomb panel face at ninety degrees, then slant drill as illustrated. Deburr holes and clean all debris from cavity.

(d) Apply a small bead of adhesive under flanges of sleeve and plug (figure 2-31). Use adhesive (C8) in areas where temperature will not exceed **180** degrees F (**82** degrees C). Use adhesive (C14) in areas where panel will be subjected to higher temperatures but not exceeding **300** degrees F (**149** degrees C). Install the sleeve and the plug in their correct relative position in the panel. Lightly tap the two parts together. Ensure that the flanges are seated and properly aligned with the panel.

CAUTION

An insufficient amount of adhesive will allow moisture or other fluids to enter the honeycomb panel core. This will result in ultimate failure of the panel.

NOTE

A screw and washer may be installed in the fastener (insert) to hold it in position and prevent adhesive from getting on threads. Use a parting material, such as celophane, under the washer to prevent it from adhering to the fastener (insert).

(e) Inject the same adhesive used in the preceding step into one injection hole until a steady flow of adhesive, without air bubbles, comes out of the opposite hole.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(f) Remove excess adhesive from honeycomb panel before adhesive sets up. Use cheese cloth (C30) dampened with MEK (C74). Exercise caution to prevent the MEK from diluting the adhesive in the potted areas.

(g) Touch up paint to match the surrounding area. Refer to TB746-93-2 for paint instructions.

2-16. REPAIR — FLOOR PANELS, FORWARD FUSELAGE.

Repair pilot and gunner floor panels shown on figure 2-13 as outlined in paragraph 2-15.

2-17. REPAIR — ENGINE DECK PANELS, FORWARD FUSELAGE.

Repair engine deck panels shown on figure 2-25 as outlined in paragraph 2-15.

2-18. REPAIR — ACCESS COVERS AND DOORS, FORWARD FUSELAGE.

a. Repair access covers and doors, using sheet metal repairs outlined in paragraph 2-14. Refer to TM 55-1500-204-25/1 for standard repair instructions.

b. Replace seals on covers and doors as outlined in paragraph 2-20.

2-19. REPAIR — COWLING AND FAIRING, FORWARD FUSELAGE.

a. Repair metal cowling and fairing, using sheet metal repairs outlined in paragraph 2-14. Refer to TM 55-1500-204-25/1 for standard sheet metal repair instructions.

b. Repair fiberglass cowling and fairing, using fiberglass repair instructions outlined in paragraph 2-15. Refer to TM 55-1500-204-25/1 for standard fiberglass repair instructions.

c. Replace seals on cowling and fairing as outlined in paragraph 2-20.

2-20. SEAL REPLACEMENT — FORWARD FUSELAGE.

Many of the doors, cowlings, and fairings have replaceable seals. The seals may be either of rubber or silicone composition. Seals that are subjected to fuel and/or oil contamination are of the polysulfide or neoprene rubber type.

a. **Inspection.** Inspect seals for failed bonding, tears, breaks, and deterioration that would affect function.

b. **Removal.** Remove damaged or worn seal. Use paint remover (C95) to remove old adhesive, paint, and primer from area where new seal will be installed.

c. **Test to Determine Seal Material.** If the type material from which the seal is made must be determined, cut a small sample of material from the seal and burn the sample. Silicone seals burn readily and leave a gray ash residue. Rubber-type seals are more fire resistant and leave a black ash residue.

d. **Installation.**

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

CAUTION

Do not permit MEK (C74) to contact acrylic windows of canopy or canopy doors.

NOTE

It is necessary to thoroughly clean surfaces prior to sanding to avoid working foreign matter into pores of material.

(1) Clean new seal with the metal where it is to be applied with MEK (C74) and dry with a clean cloth. Sand the mating surfaces of both seal and metal with 180 grit sandpaper (C102). Clean the sanded surface with MEK (C74).

(2) Bond rubber-type seals.

(a) Clean surfaces as outlined in step (1).

(b) Refer to previous step c for instructions to identify rubber-type seals.

(c) Apply an even coat of rubber adhesive (C12) to the mating surfaces of the seal and the metal.

(d) Allow adhesive to air dry 10 to 15 minutes at **75** degrees F (**24** degrees C) or above. Check adhesive by touching with finger. When adhesive will adhere to finger but not transfer, apply a second coat of adhesive and air dry to the same degree.

(e) When second coat of adhesive has air dried until tacky, install seal on metal. Start at one end and roll seal onto metal. Press down on seal to ensure that all air is expelled and that the seal is in full contact with the metal.

(f) Allow bond to air dry for a minimum of fours hours at **75** degrees F (**24** degrees C) or above. Adhesive should be cured at a temperature of **75** degrees F (**24** degrees C) or higher. If temperature is below **75** degrees F (**24** degrees C) double the amount of cure time for each **12** degrees F (**7** degrees C) below **75** degrees F (**24** degrees C). Do not attempt to cure adhesive at temperatures below **50** degrees F (**10** degrees C).

Typical temperatures and cure times:

Temperature		Cure Time
Degrees F	Degrees C	Hours
75	24	5
63	17	8
51	11	16

(3) Bond silicone composition seals.

(a) Clean surface, as outlined in step (1) above.

(b) Refer to step c for instructions to identify silicone composition seals.

WARNING

Do not place a cap on the adhesive used in the following step after it is mixed. This two-part adhesive releases hydrogen gas after mixing which could result in high pressures. The pot life on the mixed adhesive is six hours.

(c) Mix adhesive (C16) in accordance with instructions on the container. Apply an even coat of adhesive to the mating surfaces of the seal and the metal.

(d) Allow the adhesive to air dry at **75** degrees F (**24** degrees C) or above for 15 to 30 minutes. Install seal on metal. Start at one end and roll seal onto metal. Press down on seal to ensure that all air is expelled and that the seal is in full contact with the metal.

(e) Allow bond to cure for a minimum of twelve hours at **75** degrees F (**24** degrees C) or above. Adhesive should be cured at a temperature of **75** degrees F (**24** degrees C) or higher. If temperature is below **75** degrees F (**24** degrees C) double the amount of cure time for each **12** degrees F (**7** degrees C) below **75** degrees F (**24** degrees C). Do not atempt to cure adhesive at temperatures below **50** degrees F (**10** degrees C).

Typical temperature and cure times:

Temperature		Cure
Degrees F	Degrees C	Hours
75	24	12
63	17	24
51	11	48

e. Functional Check. Install door, cowling, or fairing and check to ensure that the new seal fits properly.

2-21. REPAIR — FIREWALLS, FORWARD FUSELAGE.

Repair firewall using titanium repair instructions in TM 55-1500-204-25/1. Stainless steel can be substituted for titanium of the same thickness. Use monel rivets for all repairs.

2-22. REPAIR — BULKHEADS, FORWARD FUSELAGE.

Repair bulkheads shown on figures 2-14 through 2-17 as outlined in paragraph 2-15.

2-23. REPAIR — FUSELAGE FITTINGS, FORWARD FUSELAGE.

a. Negligible damage to forward fuselage tailboom attachment fittings should be polished out using fine India stone (C116). See table 2-3 for limits. Fittings with damage or wear exceeding limits must be replaced by next higher maintenance level.

b. Wing attachment fittings can have bushing wear to limits shown in section IV. Bushings worn beyond limits must be replaced by next higher maintenance level. No damage limits or repairs allowed for wing attachment lugs.

c. Negligible damage to wing attachment fittings should be polished out, using fine India stone (C116). See table 2-3 for limits. Fittings with damage exceeding limits must be replaced by next higher maintenance level.

2-24. REPAIR — BEAM ASSEMBLIES, FORWARD FUSELAGE.

a. Repair main beam structural caps shown on figures 2-11 and 2-12 only with approval of qualified engineering authority.

b. Repair damage to main beam honeycomb panels as outlined in paragraph 2-15. Authorized repairs are shown on figures 2-27 through 2-29. Panels to which repairs are applicable are identified on figures.

2-25. CLASSIFICATION OF DAMAGE — TAILBOOM ASSEMBLY.

Classification of damage and repair limits for the tailboom are given in table 2-4.

2-26. REPAIR — TAILBOOM.

Repair of specific areas of tailboom are covered in the following paragraphs. Refer to table 2-4 for classification of damages and limitations.

2-27. REPAIR — TAILBOOM SKINS.

Refer to paragraph 2-14, same as forward fuselage skin repair.

2-28. REPAIR — TAILBOOM ACCESS COVERS AND DOORS.

Refer to paragraph 2-18, same as forward fuselage cover repair.

2-29. REPAIR — TAILBOOM STRINGERS.

a. Repair damaged stringers by patching. Cracks, tears, and punctures in the stringer may be repaired by patching, provided they do not extend more than one-half the width of the stringer. Repair damaged stringer.

(1) Check to see that no rivets are bent or damaged and that rivet holes are not enlarged or torn.

(2) Remove damaged and insecure rivets.

(3) Stop drill end of crack and, if necessary, cut away damaged part, taking care not to cut away more than necessary.

(4) Re-form damaged stringer and other displaced areas into correct position.

Table 2-4. Tailboom Classification of Damage

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
1. TAIL BOOM SKINS See figure 2-90.	a. Dents	a. Smoth contour free of cracks, nicks, or wrinkles. Depth and diameter not to exceed: Depth / Diameter 0.016 / 1.0 inch 0.047 / 2.0 inch 0.063 / 3.0 inch	a. Cracks or sharp nick in dent. Damage areas after cleanup (including prior repairs) shall not exceed 20 percent of total area for a single skin panel. Damage 6.0 inch minimum from similar repair.	a. Total damage (including prior repairs) exceeds 20 percent of total area of a single skin panel, or damage spans entire distance between two bulkheads. or two stringers.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
1. TAIL BOOM SKINS See figure 2-90 (cont)	a. Dents (cont)	**3.0** inch minimum undamaged material between dents and **1.0** inch minimum from internal structure. Nicks and scratches which can be blended out not to exceed **10** percent of material depth.		
	b. Cracks, holes tears, nicks, scratches, corrosion and wrinkles.	b. Nicks and scratches no deeper than **10** percent of material thickness and not exceeding **1.0** inch length by **0.25** inch width after cleanup. Corrosion damage less than **10** percent of material thickness and not exceeding **4.0** square inch after cleanup. Damage no closer than **1.0** inch to a supporting structure.	b. Damage exceeds negligible limits but does not exceed **20** percent (including prior repairs) of total area for a single skin panel.	b. Same as dents.
	c. Trapped or stretched skin.	c. Inward or outward bulges located in a sectional area, that can be corrected by removing attaching hardware, allowing skin to shift. Mismatch of rivet holes shall not exceed that which can be cleaned up by drilling and installing one size larger rivet and maintain proper rivet edge distance. However, if condition does not disappear after unloading panel,	c. Creased dents not classified as oil can or stretched skin, not exceeding **20** percent of a sectional area and no closer than **1.0** inch to a supporting structure. Oil can condition, free of sharp dents or creases and not extending over or into supporting structure may be repaired by inserting a backup stiffener over the damaged area.	c. Stretched skin, oil cans, or creased dents that cannot be repaired by unloading, insertion repair, or back up stiffeners.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
1. TAIL-BOOM SKINS See figure 2-90 (cont)	c. Trapped or stretched skin. (cont)	area is stretched or oil canned and must be replaced or repaired. Oil canning can be determined by pressing in on a sectional area and that section remains depressed and a bulge appears in that section or adjacent structure.		
2. ACCESS COVERS AND DOORS — TAILBOOM ASSEMBLY (Same defects as fuselage skin and panels table 2-3)				
3. TAILBOOM STRINGERS AND STIFFENERS	Dents, cracks, holes, tears, corrosion and distortion. **NOTE** Dye penetrant inspect bent stringers not requiring section removal (after rework)	Scratches or smooth shallow dents not extending into formed readius and less than **10** percent of material thickness and **0.50** inch length after cleanup. Damage in radius treat as a crack. One treated area per length between bulkheads. Edge damage not to exceed **0.025** inch depth and **0.75** inch length after cleanup. One repair per length between bulkheads.	a. Damage Repairable by Patching: Lateral cracks and smooth contour dents less than **1.0** inch depth that are less than **0.50** stringer width and do not extend into radius, stringer splice or bulkhead. Longitudinal cracks maximum **0.10** inch width and **1.0** inch length. b. Damage Repairable by Insertion: Damage exceeds limits for patching, but does not exceed **3.0** inch length after cleanup. One repair per length between bulkheads.	Damage requires more than one insertion type repair between bulkheads. Damage exceeds repairable limits or repair does not warrant time expended.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
3. TAIL-BOOM STRINGERS AND STIFFENERS (cont)			Damage not to extend into splice or bulk-heads. If combined stringer and skin damage is present, above limits and limits for skin damage shall not be exceeded.	
4. TAILBOOM DOUBLERS.	a. Cracks		Cracks that are no deeper than **20** percent of doubler thickness, and not exceeding **1.0** inch in length can be stop drilled at each end provided the crack is not closer than **1.0** inch to any adjacent structure.	
	b. Nicks, scratches, and dents.		Nicks, scratches and dents that are no deeper than **20** per-cent of the doubler thickness and not exceeding **1.0** inch in length, or **0.025** inch in width may be polished out and require no patching.	
	c. Holes, tears, and other damage exceeding the limits in a. and b. above		Holes, tears, and other damage exceeding the limits in steps a. and b. above and no longer than **4.0** inches or greater than **6.0** square inches may be repaired by patching.	

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
5. LONGERONS (EXCLUDING TAIL-BOOM ATTACH FITTINGS) See figure 2-32 SEE NOTE IN DAMAGE REQUIRING REPLACEMENT COLUMN	a. Cracks, corrosion, dents, holes, tears, nicks, scratches, buckle, or wrinkled.	a. Nicks and Scratches: Not to exceed **10** percent of material thickness, **0.010** inch width and **0.75** inch length after cleanup. Scratches in web area that extend into radius or at angle greater than 45 degrees into critical area, treat as a crack, (figure 2-32, detail B). Nicks or notches in flange area not to exceed **0.80** inch length, **0.04** inch width and no deeper than **10** percent of material thickness after cleanup (figure 2-32 details B and C). No repair closer than **1.0** inch to a bulkhead, splice or doubler. Refer to attach fitting illustration for damage limits to fittings.	a. Damage Repairable by Patching: 1. Smooth contoured dents, length not exceeding **1.0** inch longitudinal **0.5** inch lateral and **0.050** inch depth. If dent limits are exceeded, treat as a crack. (See figure 2-32, detail A.) 2. Nick and scratch damage exceeds negligible limits but does not exceed **1.0** inch width by **0.38** inch height and does not extend into critical after after cleanup (figure 2-32, detail F, section F-F). Damage in critical area does not exceed **2.0** inch length and **0.40** inch depth after cleanup. See detail F, section G-G.) 3. Crack, hole or tear damage not exceeding limits of figure 2-32, details D and E, and extending no closer than **1.0** inch to a splice, doubler or bulkhead after repair.	a. Damage exceeds repairable limts or two or more repairs required in a single bay. b. Damage other than negligible occurs in a bay containing either a splice joint or a previous repair. c. Damage other than negligible in forward bay. d. Splice required in second bay. e. Damage other than negligible comes closer than **1.0** inch to a doubler, splice or bulkhead. f. Any longeron damaged a sufficient amount to cause permanent buckles in tail boom, sharp wrinkles in skin or excessive misalignment. **NOTE** Damage to any longeron in forward bay area (other than negligible) requires replacement.
		b. Corrosion: Less than **10** percent of material thickness and not exceeding an area **0.10** inch	b. Damage Repairable by Insertion: 1. Repairable by patching limits exceeded but less than	requires replacement of both the longeron and fitting. Longerons are replaced at next

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
5. LONGERONS (EXCLUDING TAILBOOM ATTACH FITTINGS) See figure 2-32 (cont)		width by **0.75** inch length after cleanup. Damage confined to web area only and no closer than **1.0** inch to a splice, doubler or bulkhead. One repair for each longeron in a bay area. No damage in forward bay (figure 2-32, detail B).	**2.50** inch length after cleanup, (figure 2-32, details F and G). 2. Cracks or sharp nicks in dent or damage exceeds repair by patching, but less than **2.50** inch after cleanup.	higher maintenance level
6. TAILBOOM BULKHEADS (Does not include canted bulkhead) See figure 2-33	Corrosion, dents, cracks, holes nicks, and wrinkles.	Corrosion less than **10** percent of web maerial thickness and not exceeding **4.0** square inch after cleanup. Damage no closer than **0.250** inch to a former, stiffener or radius. Dents, nicks, scratches in bulkhead web, refer to skin damage limits, item 1. Damage in a radius Damage in a radius treat as a crack.	a. Damage Repairable by Patching. 1. Corrosion damage greater than negligible but does not exceed **0.70** inch width or 33 percent of a cross section after cleanup. (See figure 2-33, detail B.) Damage no closer than **0.50** inch to a stiffener or attaching parts after cleanup. 2. Dent, cracks, holes and scratches greater than negligible but does not exceed limits of figure 2-33, details A and B. Maximum three damages not to exceed limits of detail A allowed for each bulkhead quadrant. Cracks or damage in radius of former on forward bulkhead except in area of attach fittings. b. Damage Repairable by Insertion:	Replace stiffeners or any attaching parts for damage other than negligible. Replace bulkhead if repairable limits are exceeded or if more than one repair to the limits of figure 2-33, detail D, is required **NOTE** Bulkheads are replaced by higher maintenance level.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
6. TAILBOOM BULKHEADS (Does not include canted bulkhead) See figure 2-33 (cont)			1. Corrosion damage exceeds repairable by patching but does not exceed limits of figure 2-33, detail C. 2. Dent, cracks or hole damage exceeds limits of figure 2-33, details A and B, but less than limits.	
7. TAILBOOM CANTED BULKHEAD	Cracks, holes, nicks, corrosion, and wrinkles.	Corrosion not to exceed **1.0** square inch for single area, **4.0** square inch total area and **10** percent material thickness after cleanup. Nicks and scratches not to exceed **1.0** inch length, **0.025** inch width and **10** percent material thickness after cleanup. Treat damage in radius as a crack.	Three holes maximum not exceeding **1.0** inch diameter in web area and **3.0** inch minimum distance between damage. Cracks in nutplate hole but not extending into radius. Cracks in web area not exceeding **1.0** inch length after cleanup. No damage to come closer than **0.50** inch to stringer, longeron or structure attaching point and no closer than **1.0** inch to a fin spar cap attachment.	Cracks or holes in area of longeron, stringer, or fin spar cap attachment points. Damage exceeds repairable damage limits.
8. COVERS, TAIL ROTOR DRIVESHAFT INTERMEDIATE GEARBOX See figure 2-34	Dents, nicks scratches, cracks, holes, corrosion, and worn rub strips.	Same as tailboom skins.	Same as tailboom skins except repair shall not interfere with fit or function of the cover. Replace worn rub strips.	Replace covers if damage is impractical to repair.

Table 2-4. Tailboom Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
9. HINGES AND SUPPORT ANGLES, DRIVE-SHAFT COVER	Inspect hinges for cracked, worn, or missing loops. Check angles for cracks, holes, distortion and damaged or missing fasteners. Check covers for loose anti-chafing tape.	See figure 2-35	See figure 2-35	Damage exceeding limits of figure 2-35. Refer to TM 55-1500-204-25/1.
10. TAIL-BOOM ATTACH FITTINGS See figure 2-36	a. Nicks, scratches, and gouges.	a. Nicks, scratches, and gouges in tail-boom attach fitting may be polished out if they do not exceed these limits: (1) Axial damage (parallel to bolt holes) must not exceed **0.020** inch in depth and **0.300** inch in length. (2) Radial damage (normal to bolt axis) must not exceed **0.010** inch in depth or **0.300** inch in length. (3) Nicks, scratches, or gouges are not permitted within one diameter of bolt hole, longeron splice rivets or within **0.250** inch of end of sheet metal longeron located at splice.		Any cracks to the longeron attach fittings forward of boom station 70.00, or damage exceeding the above limitations, require the part to be replaced by next higher maintenance level.
	b. Corrosion			No corrosion allowed in first **5.50** inches of attach fitting.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
10. TAIL-BOOM ATTACH FITTINGS See figure 2-36 (cont)	c. Bolt hole elongation.			Inspect attachment bolt holes in tail-boom fuselage fittings for wear. Maximum diameter permitted for holes is 0.516 inch.
11. BEARING HANGER SUPPORT FITTING. See figure 2-37	a. Cracks b. Corrosion c. Hole elongation. Bearing support attach holes.		See figure 2-37.	Cracks in fitting or damage exceeding limits shown in figure 2-37. No corrosion damage allowed inside diameter of attachment hole surfaces. Refer to paragraph 2-35b.
12. INTERMEDIATE GEARBOX SUPPORT INSTALLATION. See figure 2-38.	a. Cracks.			Any cracks are cause for replacement.
	b. Distortion of support installation components.			Replace distorted components. Replacement of support fittings must be done by next higher maintenance level.
	c. Gearbox attachment hole damage.		See figure 2-38.	
	d. Scratches, nicks, dents.		See figure 2-38.	Treat deep scratches, nicks, and dents as cracks for inspection.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
12. INTER-MEDIATE GEARBOX SUPPORT INSTAL-LATION. See figure 2-38 (cont)	e. Corrosion.		See figure 2-38.	Treat deep corrosion same as cracking for inspection.
	f. Stud pin damaged.		Replace damaged stud pin.	
	g. Nutplates damaged.		Replace damaged nutplates.	
13.TAIL-ROTOR GEARBOX SUPPORT FITTING See fig-ure 2-39	a. Cracks			a. Any cracks are cause for replacement.
	b. Scratches, nicks, dents and corrosion.		b. Repairable scratches, nicks, dents, and corrosion on top surface and on stud holes may be polished out with Scotchbrite (C103) or No. 400 grit sandpaper (C102). When removing corrosion be sure to check pockets and hidden areas for in-dications. Determine the proper cleaning procedures and treat-ment of corroded parts.	
	c. Chafing		c. Total depth of chafing allowed in area A is **0.075** inch. For total depth of chafing allowed in area B refer to fig-ure 2-39.	
	d. Gearbox mounting hole elongation. Stud holes diameter cannot exceed **0.400** inch			d. If limits are ex-ceeded the tail rotor gearbox fitting must be re-paired or replaced by next higher maintenance level.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
13. TAIL-ROTOR GEARBOX SUPPORT FITTING See figure 2-39 (cont)	e. Bellcrank support bushings may be elongated to a maximum diameter of **0.445** inch for bushing in forward lug and to **0.317** inch for bushing in aft lug.			e. Bellcrank support bushings elongated in excess of limits must be replaced.
14. VERTICAL FIN HONEY-COMB PANELS. See figure 2-40.	a. Dents	Smooth scratch free dents which do not crush the core may be classed as negligible.	See figure 2-40.	See figure 2-40.
	b. Holes	See figure 2-40	See figure 2-40	See figure 2-40
	c. Voids	See figure 2-40	See figure 2-40	See figure 2-40
	d. Nicks and scratches.	Minor surface scratches which do not penetrate the core may be classed as negligible. Surface scratches no deeper than **10** percent of material are acceptable after blending.	See figure 2-40	See figure 2-40
	e. Corrosion	See figure 2-40	See figure 2-40	Remove panel if water or corrosion is found in core, or repair limits exceeded, or if four or more patch type repairs are required to a panel.
	f. Loose or damaged inserts.	None	Replace as required. See figure 2-40	

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
15. VERTICAL FIN TRAILING EDGE See figure 2-41	a. Nicks and scratches	Scratches and nicks which do not deform the airfoil shape of fin.		Any damage which causes deformation of airfoil or repairable limits exceeded.
	b. Dents, cracks, and holes.	Smooth dents which do not deform airfoil shape of fin.	Dents, cracks, holes which are less than 1.0 inch length and 0.50 inch width through one or both sides. 8.0 inch minimum distance between damaged areas after cleanup. See figure 2-41.	Any damage which causes deformation of airfoil or if repairable limits are exceeded.
16. VERTICAL FIN FORWARD SPAR See figure 2-34	a. Dents.	Smooth dents in spar web free of cracks and gouges not exceeding 0.016 inch depth and 10 inch diameter. No dents in spar caps		Dents in area of fittings, or damage exceeding negligible limits, or damage to spar caps not authorized for repair at AVIM level
	b. Cracks		Cracks in lateral stiffeners that do not extend inside rivet line. Web damage not to exceed 3.0 square inches after cleanup, may be repaired in areas of fitting attach points. Any repair to spar cap angles requires qualified engineering approval.	Cracks in area of fittings, or damage exceeding repairable limits, or damage to spar caps not authorized for repair at AVIM level
	c. Scratches	Surface scratches no deepter than 10 percent of material thickness after blending.		Scratches in areas of fittings, or damage exceeding negligible limits, or damage to caps not authorized for repair at AVIM level.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
16. VERTICAL FIN FORWARD SPAR See figure 2-41 (cont)	d. Holes		Holes in lateral stiffiners that do not extend inside rivet line. Web damage not to exceed 3.0 square inches after cleanup may be repaired in areas clear of fitting attach point. Any repair to spar cap angle requires qualified engineering approval.	Holes in area of fittings or damage exceeding negligible limits, or damage to spar caps not authorized for repair at AVIM.
17. ELECTRONIC EQUIPMENT SHELF	a. Dents.	a. Smooth contoured dents up to 5 percent of panel thickness provided: 1. Total damage does not exceed 5 percent of panel area. 2. No voids exist under dents.	a. Damage exceeds negligible damage limits. If no cracks, holes, or voids exist, see figure 2-7 for limits. Void limits are shown on figure 2-8. Limits for sharp dent or dents which penetrate panel surfaces are shown on figures 2-9 and 2-10.	a. Damage exceeds repairable limits. Corrosion in honeycomb core.
	b. Voids.	b. Voids up to 0.25 square inch (0.50 x 0.50) provided: 1. No more than two such areas can be encompassed by a 4.0 inch circle. 2. The edge of any void is a minimum of 3.0 inches from supporting structure, panel edge bevel or insert or fitting. NOTE: Voids closer than 1.0 inch are	b. Damage exceeds negligible limits. See figure 2-8.	b. Damage exceeds repairable limits.

Table 2-4. Tailboom Classification of Damage (cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
17. ELECTRONIC EQUIPMENT SHELF (CONT)	b. Voids (cont).	classed as one void. Edge separation is never classed as negligible damage.		
	c. Nicks and scratches.	c. Nicks and scratches not exceeding 10 percent of metal facing thickness and 4.0 inches square after cleanup. Damage 1.0 inch minimum from supporting structure after cleanup.	c. Damage exceeds negligible limits. See figure 2-7 for damage not penetrating surface. See figure 2-9 for damage penetrating surface.	c. Damage exceeds repairable limits. Replace any panel having evidence of water or corrosion in the core.
	d. Corrosion.	d. Corrosion not to exceed 10 percent of metal facing thickness and 4.0 square inches after cleanup. Damage minimum 1.0 inch from supporting structure.	d. Damage not to exceed 20 percent of panel area. Maximum diameter of any area after cleanup is 1.0 inch. One repair per bay allowed. Minimum distance between repairs is 3.0 inches. No repair within 1.0 inch of supporting structure, inserts, or beveled edge.	d. Same as preceding step c.
	e. Cracks, holes, punctures.	e. None.	e. Cracks, holes or punctures. 1. Damages affect only one skin and core. (See figure 2-9 for limits.) 2. Damages affect both skins and core. (See figure 2-10 for limits.)	e. Same as preceding step c.

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
17. ELECTRONIC EQUIPMENT SHELF (CONT)	f. Loose or damaged inserts.	f. None.	f. Replace as required.	

(5) Form a reinforcing patch of same material and one gage heavier than damaged stringer. The patch should extend at least four inches beyond each end of cutout section. Maximum length of patch is **12** inches. Refer to figure 2-89.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(6) Clean dirt from around damaged area and from both sides of reinforcing patch using a clean cloth saturated with naphtha (C75).

(7) Secure reinforcing patch firmly in place and drill rivet holes through patch and damaged stringer the same size and pitch as existing rivet holes. Deburr all holes.

(8) Apply a coat of primer (C88 or C91) to both sides of patch and damaged stringer.

(9) Secure reinforcing patch in position and rivet into place.

(10) Apply a coat of primer (C88 or C91) over repaired area.

b. Repair damaged stringer by insertion. Complete stringer breaks and cracks extending more than **one-half** the width of the stringer, which make patching inadequate, necessitates repair by insertion (splicing).

(1) Check to see that no rivets are bent or damaged and that the rivet holes are not elongated or torn.

(2) Remove damaged or loose rivets.

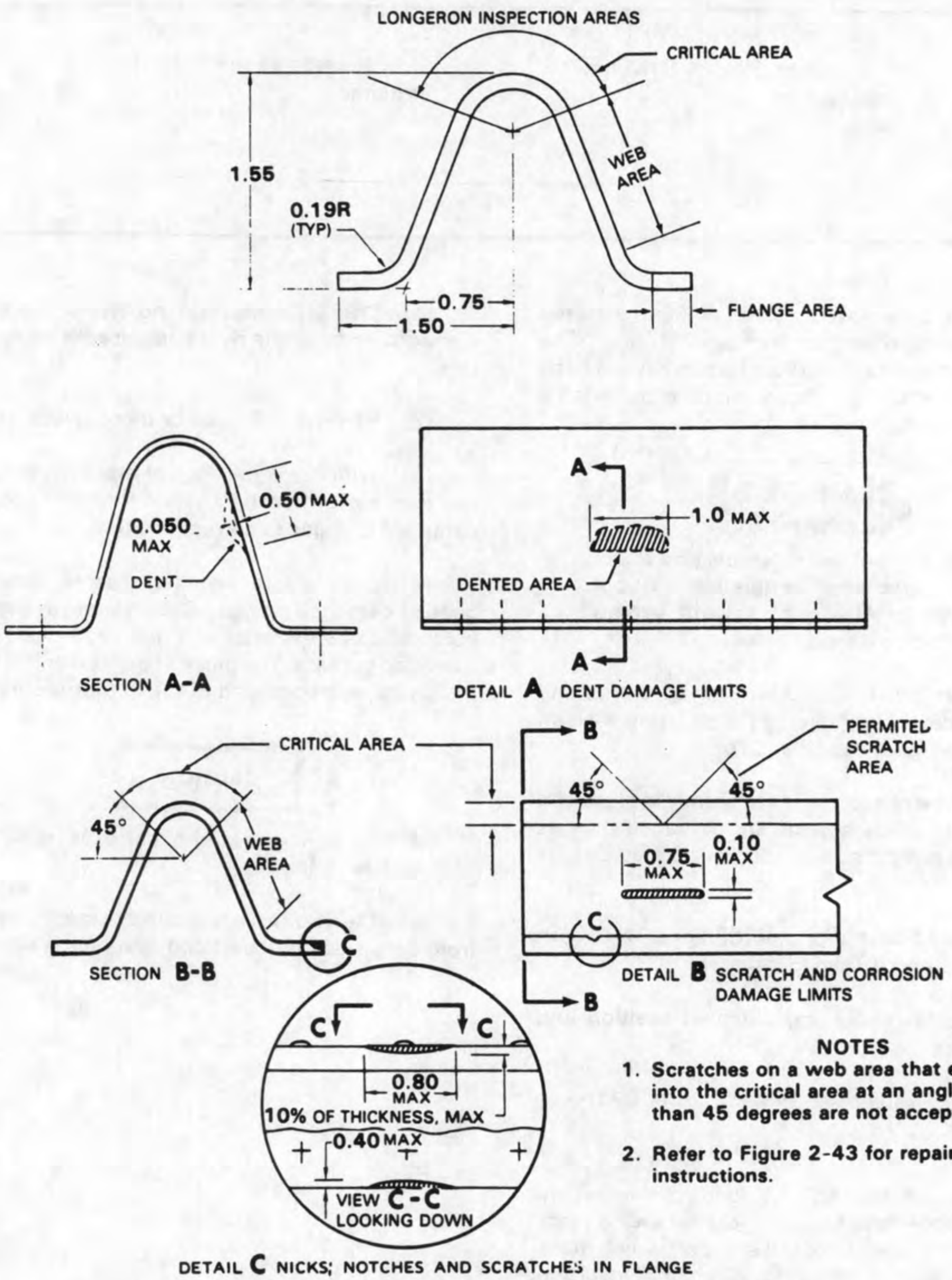
(3) Trim damaged edge of break in stringer. Do not trim more than necessary. Re-form and return damaged stringer to correct position.

(4) Cut and form an insert of same material and gage as damaged stringer. Cut and form a reinforcing patch of same material and one gage heavier than damaged stringer. The patch should extend at least **4** inches beyond each end of the cutout section.

CAUTION

A filler splice should never exceed 12.0 inches in length.

(5) Clean dirt from around damaged area and from both sides of insert and reinforcing patch.



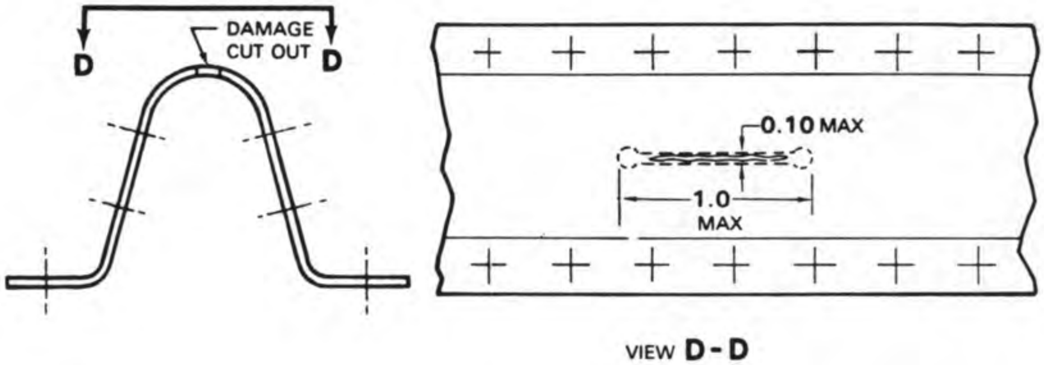
NOTES

1. Scratches on a web area that extend into the critical area at an angle greater than 45 degrees are not acceptable.
2. Refer to Figure 2-43 for repair instructions.

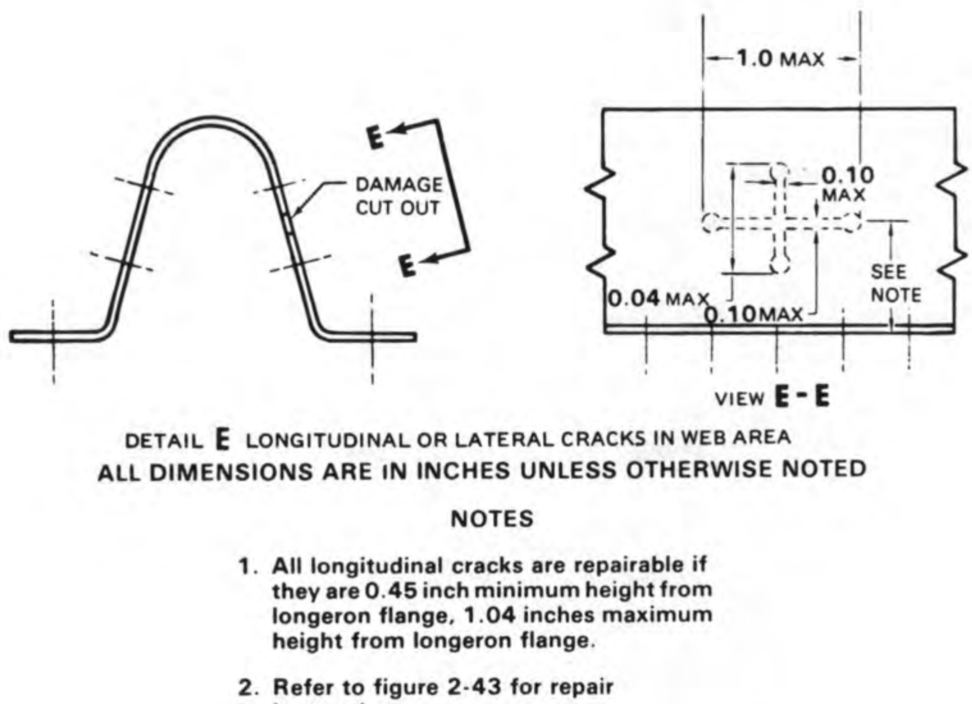
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204030-183-1C

Figure 2-32. Longeron Damage Limits (Sheet 1 of 3)



DETAIL D LONGITUDINAL CRACKS IN CRITICAL AREA



DETAIL E LONGITUDINAL OR LATERAL CRACKS IN WEB AREA

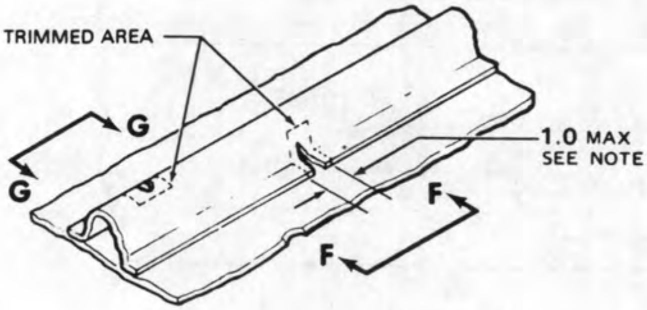
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

NOTES

1. All longitudinal cracks are repairable if they are 0.45 inch minimum height from longeron flange, 1.04 inches maximum height from longeron flange.
2. Refer to figure 2-43 for repair instructions.

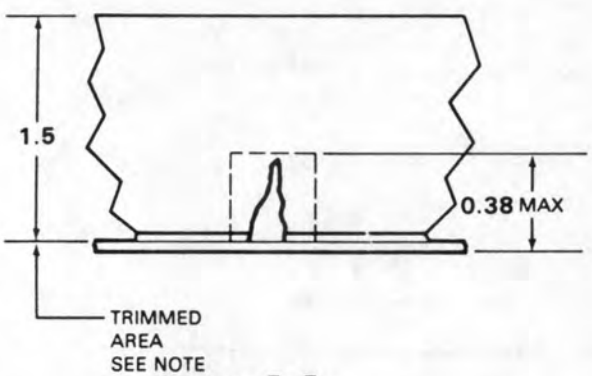
204030-183-2B

Figure 2-32. Longeron Damage Limits (Sheet 2 of 3)

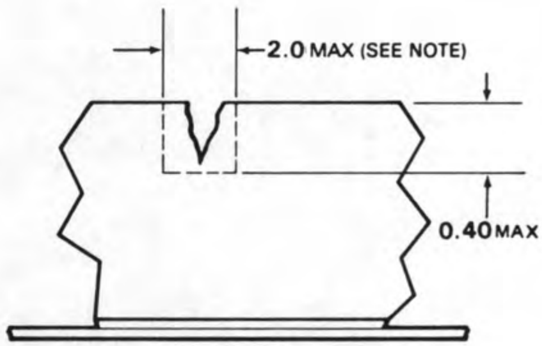


NOTES.

1. When trimmed area exceeds limits shown for either critical area or flange and web, or if combined damage extends from the flange and web into critical area, inspect to limits of detail G.
2. Refer to figure 2-43 for repair instructions.

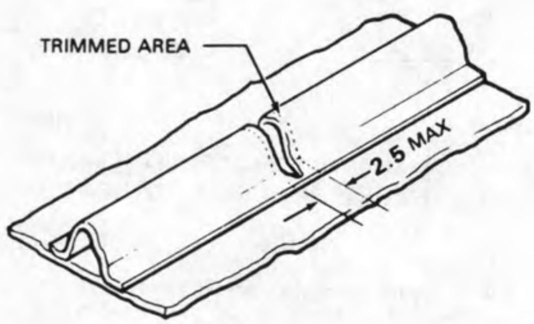


SECTION **F-F**
FLANGE AND WEB



SECTION **G-G**
CRITICAL AREA

DETAIL **F** DAMAGE LIMIT TO CRITICAL AREA, FLANGE OR WEB

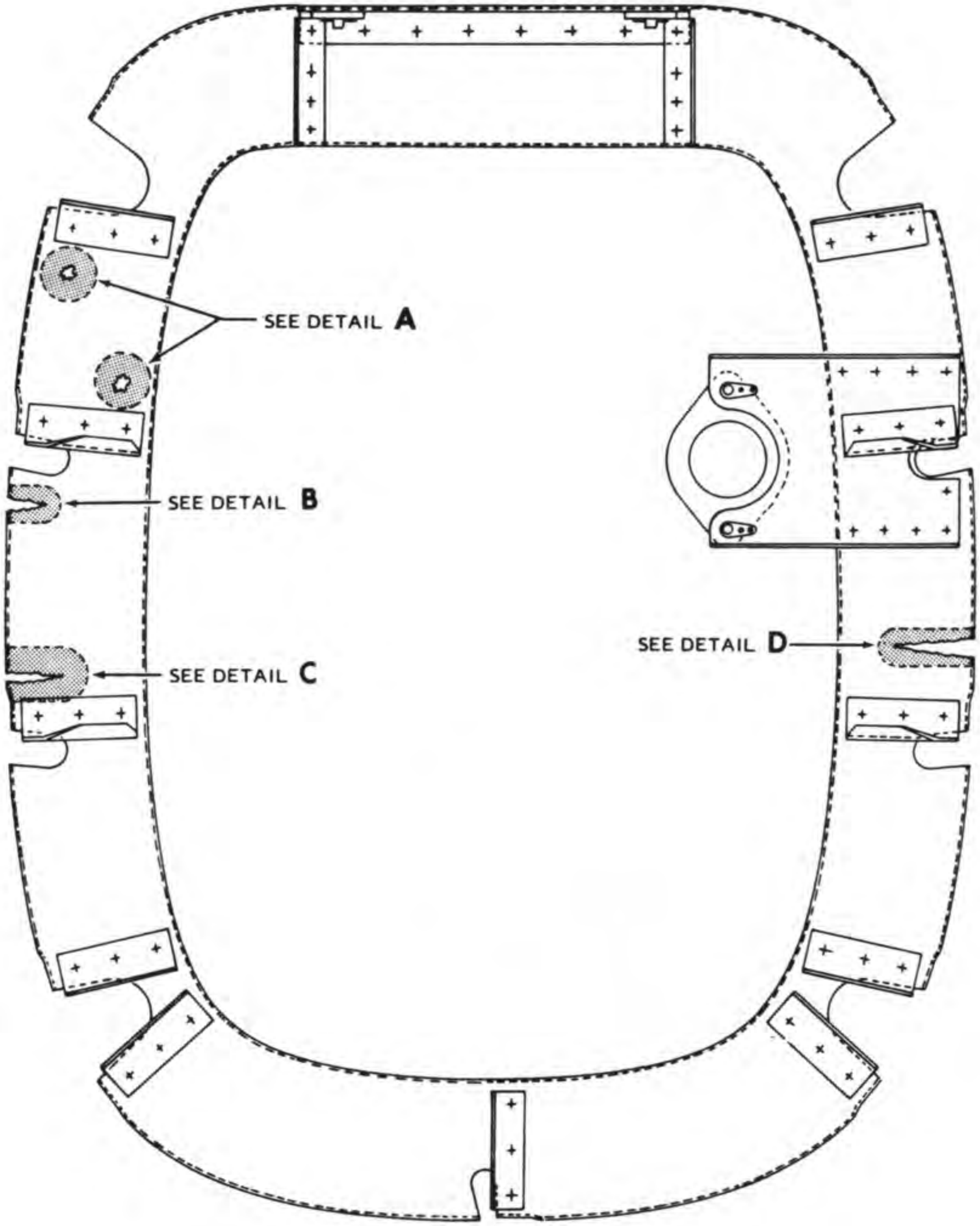


DETAIL **G** DAMAGE LIMIT TO CRITICAL AREA, FLANGE AND WEB

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204030-183-3B

Figure 2-32. Longeron Damage Limits (Sheet 3 of 3)

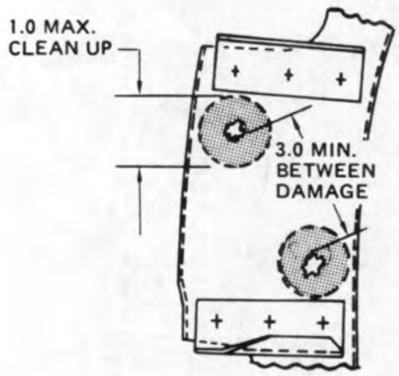


NOTE

Three repairs not exceeding the limits of detail "A" or "B" and minimum 3.0 inches between damage areas are allowed for each quadrant of a bulkhead. One repair not exceeding the limits of detail "C" is allowed in each quadrant of a bulkhead. One repair not exceeding the limits of detail "D" is allowed for each bulkhead. Damage affecting more than one-half of a cross sectional area requires a full splice.

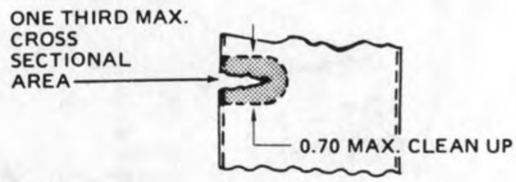
209033-79-1

Figure 2-33. Typical Tailboom Bulkhead Damage Limits (Sheet 1 of 2)



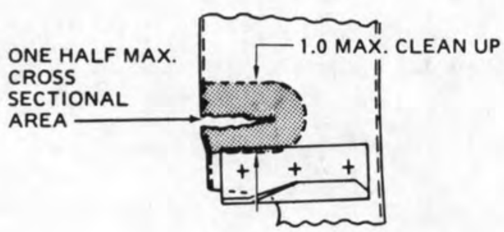
DETAIL **A** (SEE NOTE ON SHEET 1)

HOLE DAMAGE LIMITS



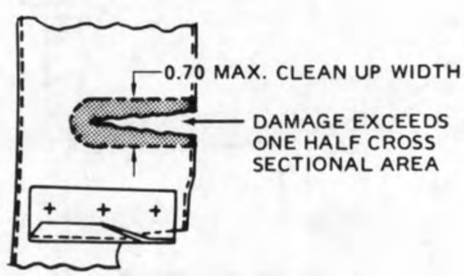
DETAIL **B** (SEE NOTE ON SHEET 1)

DAMAGE LIMITS AFFECTING ONE THIRD
OR LESS OF CROSS SECTION



DETAIL **C** (SEE NOTE ON SHEET 1)

DAMAGE LIMITS AFFECTING ONE HALF
OR LESS OF CROSS SECTION



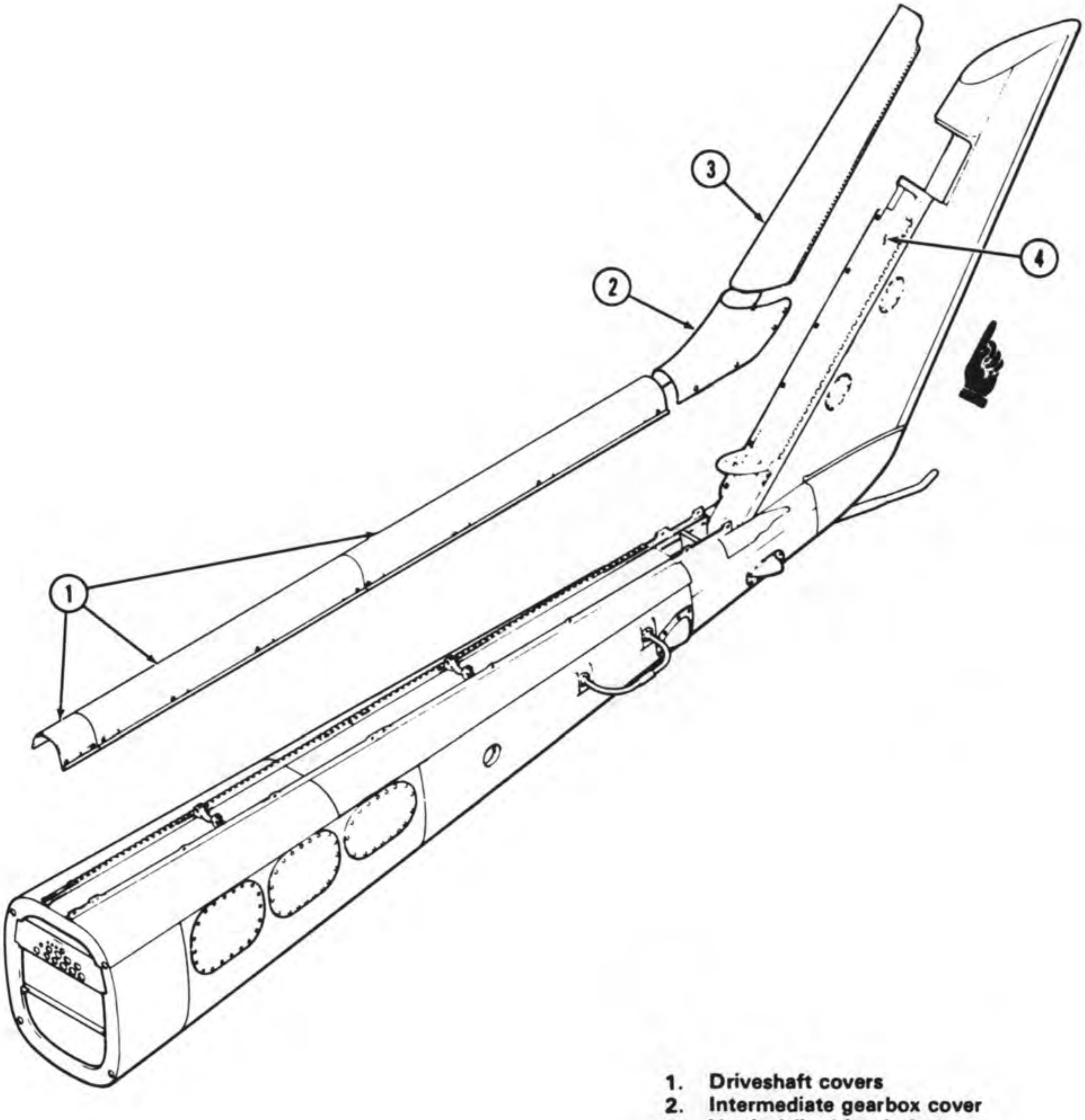
DETAIL **D** (SEE NOTE ON SHEET 1)

DAMAGE AFFECTS MORE THAN
ONE HALF CROSS SECTIONAL AREA

NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

209033-79-2

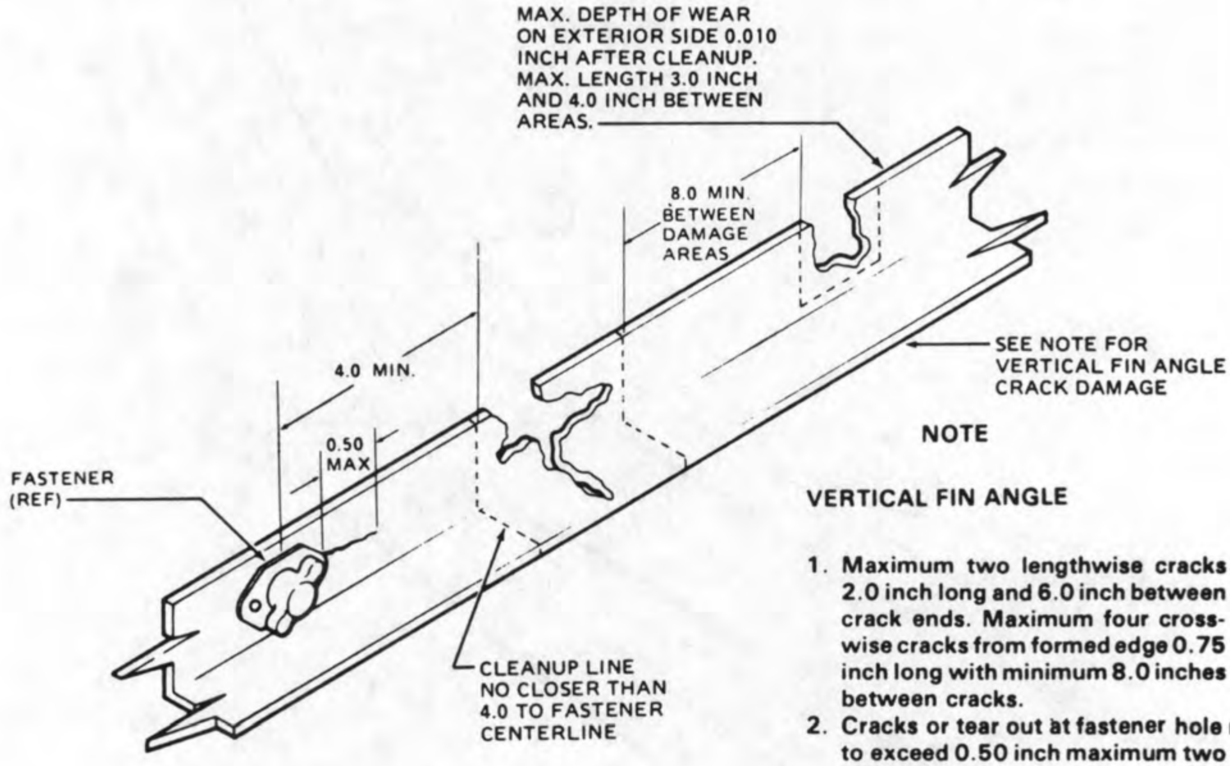
Figure 2-33. Typical Tailboom Bulkhead Damage Limits (Sheet 2 of 2)



1. Driveshaft covers
2. Intermediate gearbox cover
3. Vertical fin driveshaft door
4. Vertical fin forward spar

209200-45B

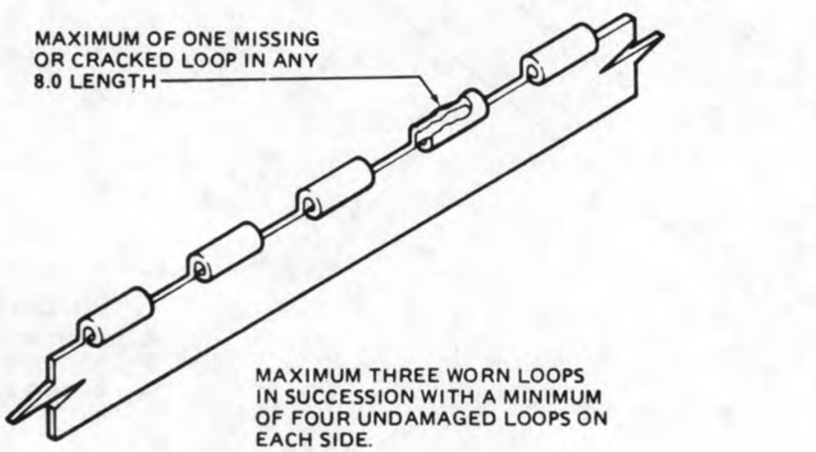
Figure 2-34. Tail Rotor Driveshaft Covers



NOTE

VERTICAL FIN ANGLE

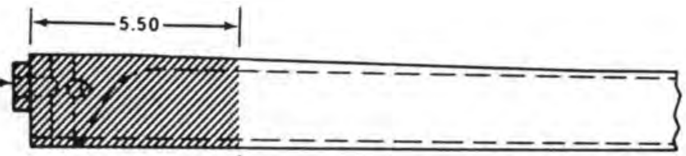
1. **Maximum two lengthwise cracks 2.0 inch long and 6.0 inch between crack ends. Maximum four cross-wise cracks from formed edge 0.75 inch long with minimum 8.0 inches between cracks.**
2. **Cracks or tear out at fastener hole not to exceed 0.50 inch maximum two damaged holes.**



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

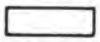
204030-179D

Figure 2-35. Driveshaft Cover Hinges and Angles Damage



LOWER LEFT FITTING	209-033-813-1
LOWER RIGHT FITTING	209-033-814-1
UPPER LEFT FITTING	209-033-815-1
UPPER RIGHT FITTING	209-033-816-1

DAMAGE LOCATION SYMBOLS



TYPE OF DAMAGE	MAXIMUM DEPTHS AND REPAIR AREAS ALLOWED	
CRACKS ALLOWED	NONE	NONE
MECHANICAL DAMAGE	0.020	0.040
CORROSION DAMAGE		
BEFORE REPAIR	0.010	0.010
AFTER REPAIR	0.020	0.020
MAXIMUM AREA PER FULL DEPTH REPAIR	20 Percent of surface area after cleanup.	20 Percent of surface area after cleanup.
MAXIMUM WIDTH	0.100	0.200
EDGE CHAMFER	0.020	0.040

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

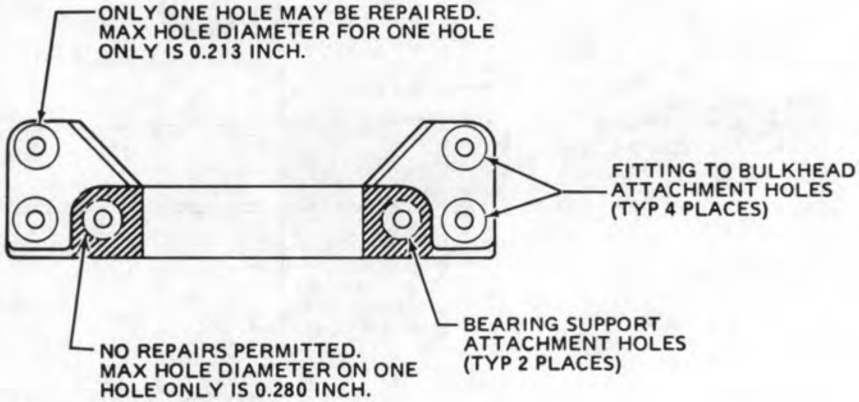
NOTES:

1. Negligible damage consists of small, smooth contoured dents with a maximum depth of 0.010. No material may be removed. No rivet damage.

2. Blend nicks, dents, or scratches to 0.200 maximum width.

209033-45A

Figure 2-36. Damage Limits — Tailboom Attach Fitting

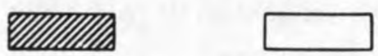


WARNING

NO REPAIRS PERMITTED ON BEARING MOUNTING SURFACE.

209-033-818-1 FITTING

DAMAGE LOCATION SYMBOLS



TYPE OF DAMAGE	MAXIMUM DEPTHS AND REPAIR AREAS ALLOWED	
CRACKS ALLOWED	None	None
MECHANICAL DAMAGE	None	0.005
CORROSION DAMAGE AFTER REPAIR	None	10 percent of thickness or 0.020 whichever is greater.
MAXIMUM AREA PER FULL DEPTH REPAIR	None	Mechanical: 40 percent of surface area after cleanup including prior repairs. Corrosion: 20 percent of surface area after cleanup including prior repairs.

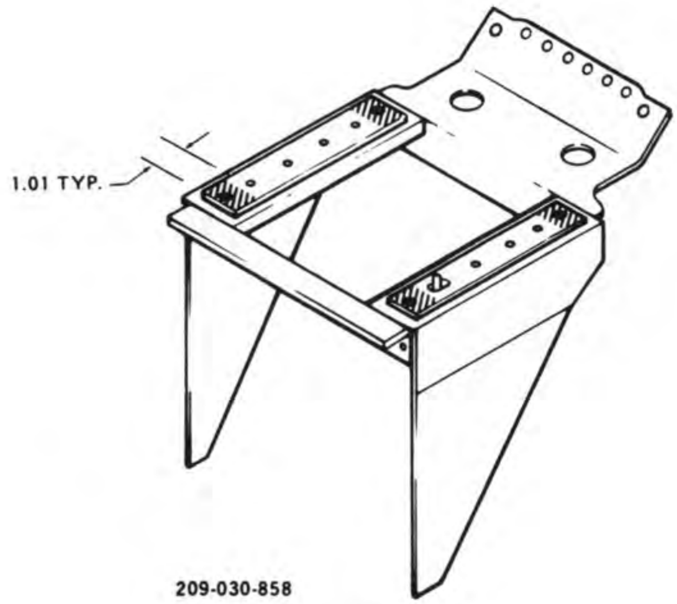
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

NOTES:

1. No corrosion allowed in hole area.
2. Corrosion damage must be clear of counterbores, fillets, and fastener holes by 0.05 minimum.

209030-344A

Figure 2-37. Damage Limits — Bearing Hanger Support Fitting



WARNING

NO REPAIRS PERMITTED ON
GEARBOX MOUNTING SURFACE.

DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DEPTHS AND REPAIR AREAS ALLOWED	
CRACKS ALLOWED	None	None
MECHANICAL DAMAGE	None	0.020
CORROSION DAMAGE AFTER REPAIR	None	10 percent of thickness or 0.020, whichever is less.
MAXIMUM AREA PER FULL DEPTH REPAIR	None	20 percent of surface area after cleanup including prior repairs.

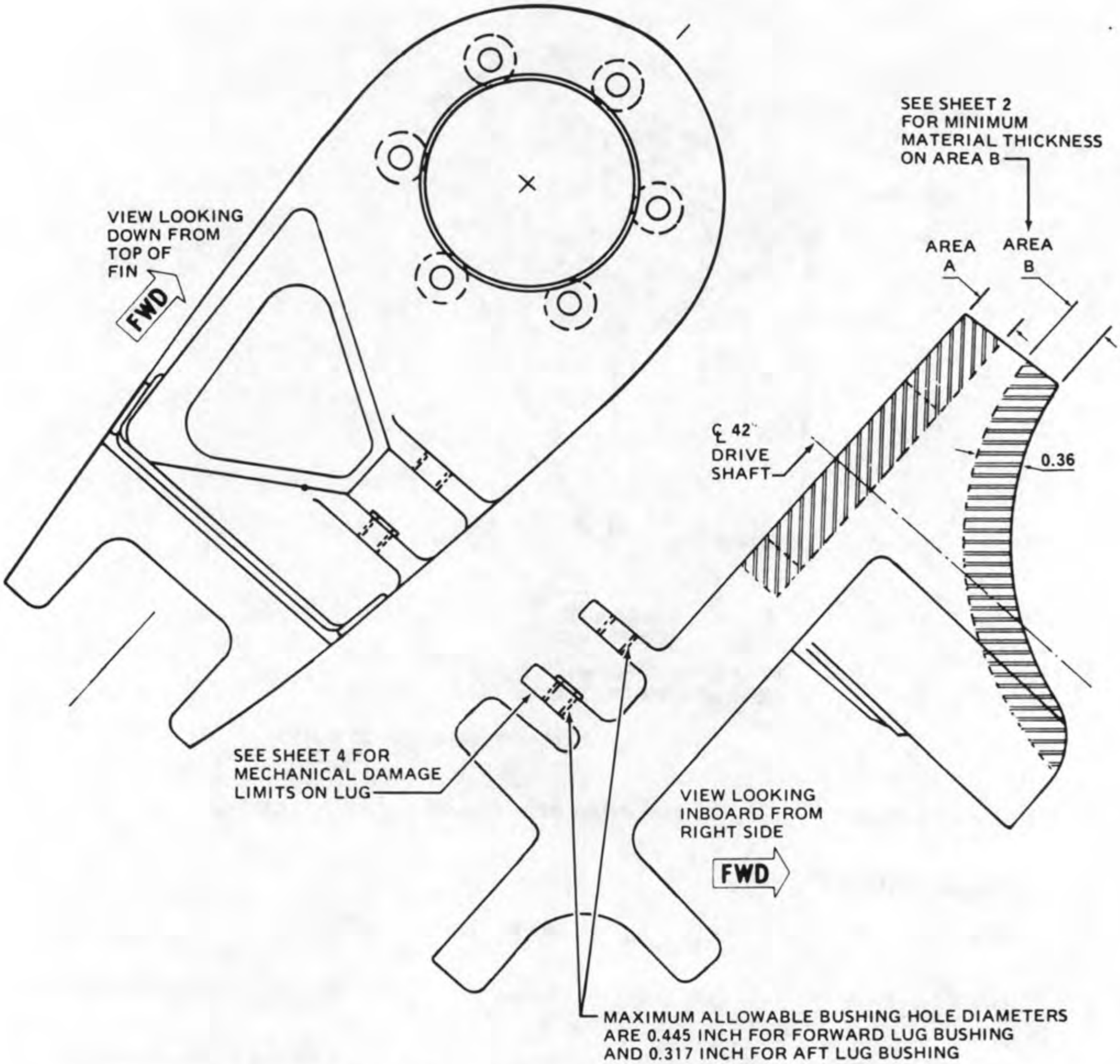
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

NOTES:

1. Only one gearbox attachment hole can be repaired, maximum diameter 0.275.
2. No corrosion in attachment holes or within 0.05 of fastener holes or fillets.

209030-343B

Figure 2-38. Damage Limits — Intermediate Gearbox Support Installation



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

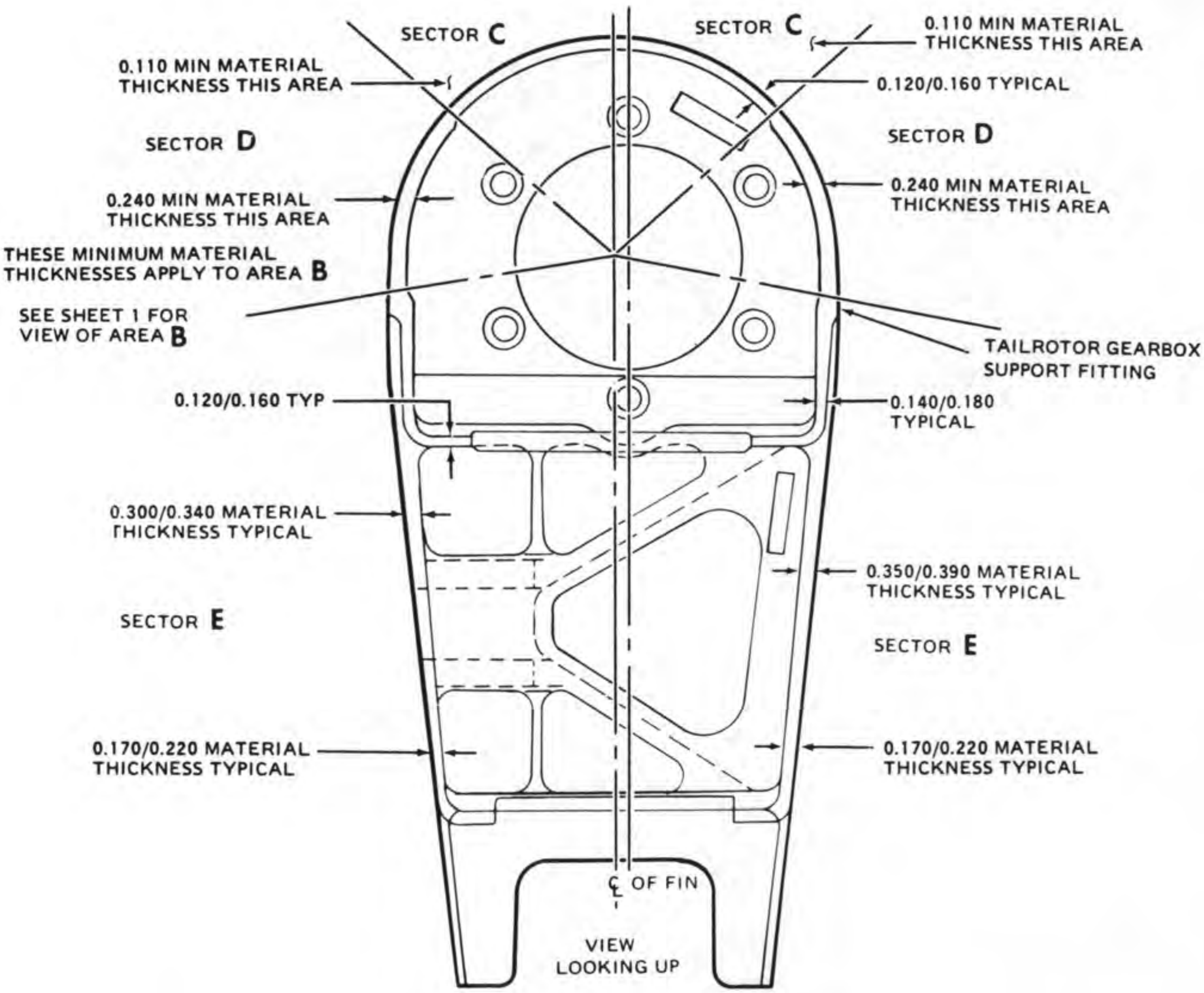
NOTES:

1. Total depth of nicks, scratches, and dents permitted to the top surface of the fitting is 0.080 inch with an allowable width of 0.200 inch. The total reworked area must not exceed 30 percent of the total surface area.

2. The total depth of chafing allowed in area A is 0.075 inch. The total depth of chafing allowed in area B is 0.010 inch. Minimum material thicknesses for area B are shown on sheet 2.

209031-85-1B

Figure 2-39. Damage Limits — Tail Rotor Drive Support Fitting (Sheet 1 of 4)



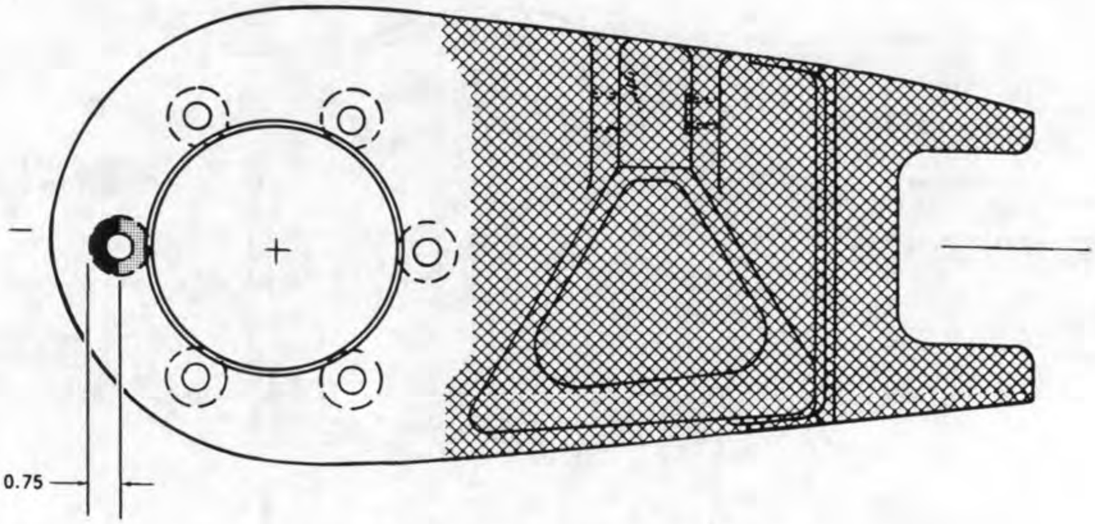
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

DAMAGE LIMITS FOR AREAS BEYOND AREA B.
SEE SHEET 1 FOR VIEW OF AREA B

DAMAGE SECTOR	DAMAGE QUANTITY	MAX. LENGTH	MAX. DEPTH	MAX. BLEND DEPTH	MIN DAMAGE SPACING
C-LEFT C-RIGHT	3 2	0.75 0.75	0.005 0.005	0.006 0.006	2X LENGTH OF LONGEST DAMAGE
D-LEFT D-RIGHT	2 3	1.00 1.00	0.01 0.01	0.012 0.012	2X LENGTH OF LONGEST DAMAGE
E	3	0.75	0.01	0.012	2X LENGTH OF LONGEST DAMAGE

209031-85-2B

Figure 2-39. Damage Limits — Tail Rotor Drive Support Fitting (Sheet 2 of 4)



VIEW LOOKING DOWN ON TOP OF SUPPORT FITTING

DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DEPTH AND REPAIR AREAS ALLOWED ON EXPOSED UPPER SURFACE			
CRACKS	None	None	None	None
NICKS, SCRATCHES, SHARP DENTS AND CORROSION	0.010 maximum depth after blending	0.025 maximum depth after blending	0.060 maximum depth after blending	0.080 maximum depth after blending 0.200 maximum width

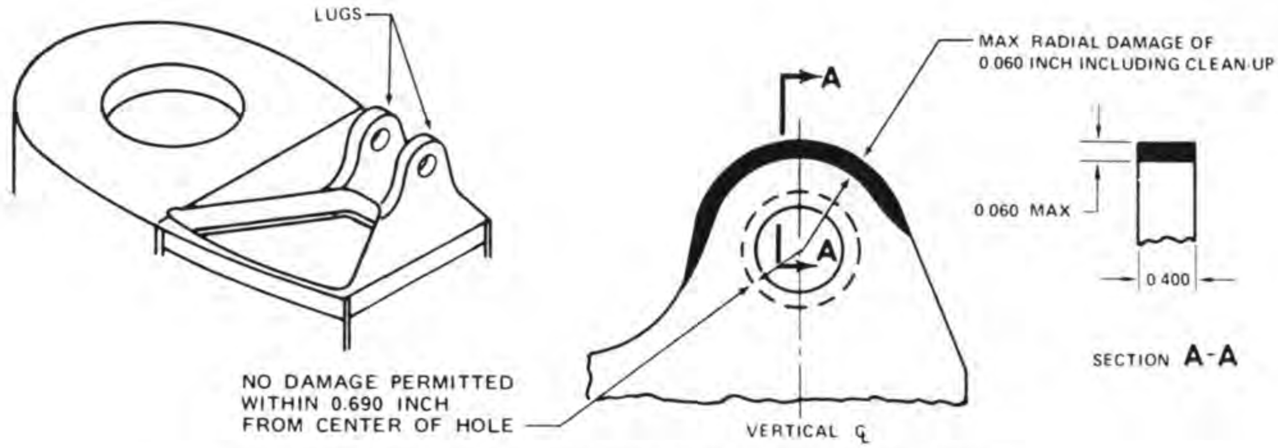
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

NOTES

1. Damage limits adjacent to holes are applicable to each of six gearbox stud holes; however, if area around two or more holes is damaged to limits shown, part must be replaced.
2. Total reworked area on top surface of fitting must not exceed 30 percent of total area.
3. Wear Limit: Maximum diameter of holes for gearbox studs is 0.400.
4. See sheet 4 for additional limits in area of lugs.

209031-85-3B

Figure 2-39. Damage Limits — Tail Rotor Drive Support Fitting (Sheet 3 of 4)



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

NOTES:

1. Nicks and scratches on fitting lug faces to a maximum depth of 0.010 inch and a maximum length of 0.50 inch are reparable.
2. Only two repairs allowed on each lug face.
3. Both damages should not occur on same side of vertical lug face.
4. No cracks in lug area acceptable.

209031-85-4C

Figure 2-39. Damage Limits — Tail Rotor Drive Support Fitting (Sheet 4 of 4)

(6) Secure the insert and reinforcing patch firmly in place and drill rivet holes through reinforcing patch, insert, and damaged stringer, the same size, and pitch, as existing rivet holes. Remove burrs from all holes.

(7) Apply primer (C88 or C91) to damaged area on both sides of insert and patch.

(8) Secure insert and patch and rivet in place.

2-30. REPAIR — TAILBOOM DOUBLERS.

Repair using standard aluminum repair procedures in TM 55-1500-204-25/1.

2-31. REPAIR — TAILBOOM LONGERONS.

See figure 2-42. Repair damaged longeron aft of Boom Station 70.00.

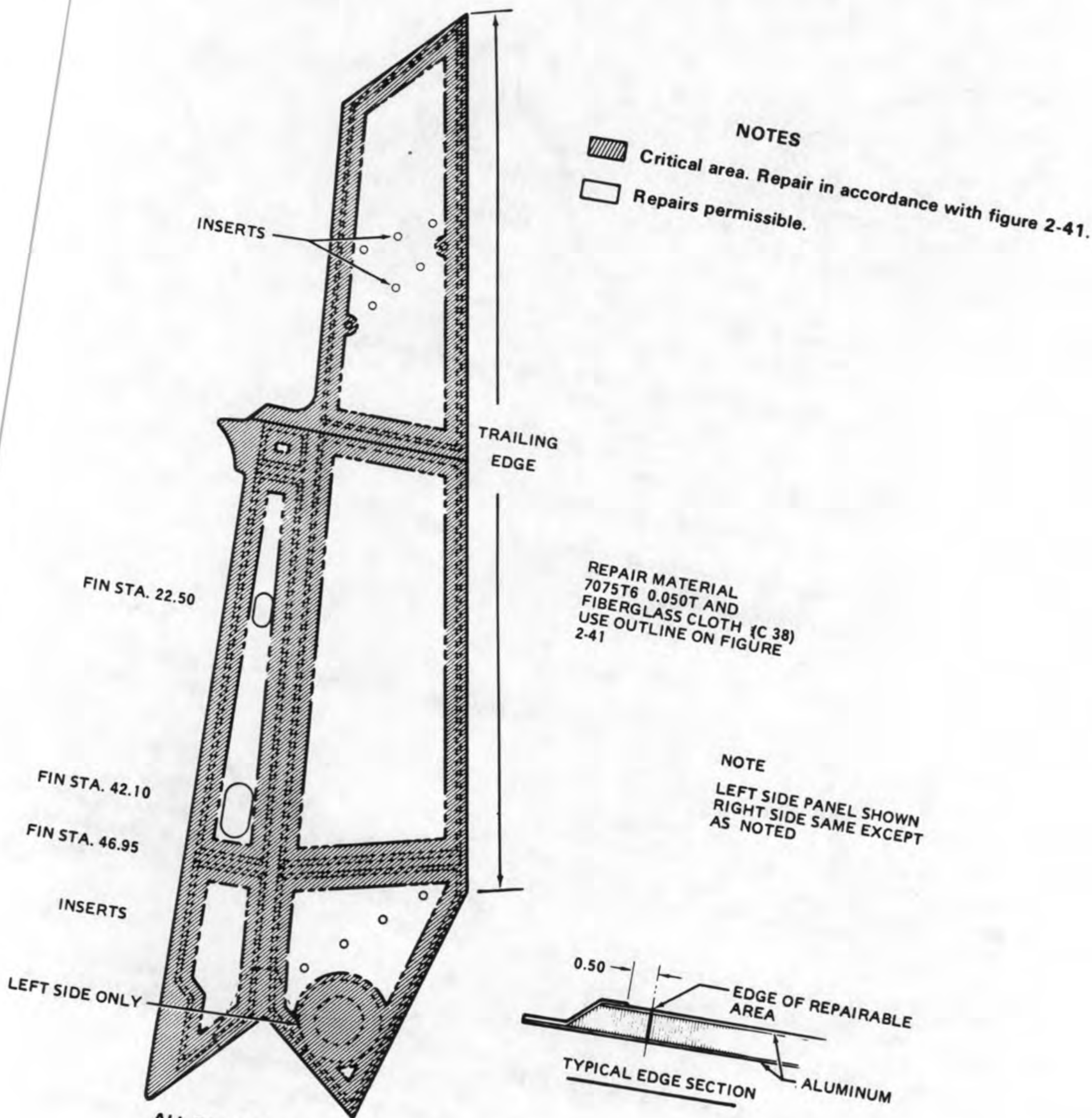
WARNING

No repairs allowed forward of boom station 70.00 other than limits specified in Table 2-4, Tailboom Classification of Damage, item 10.

a. Check to see if there is any damage to skin such as bent or damaged rivets or torn rivet holes.

b. Cut out damaged area, centering the cut edges between holes to permit retention of existing rivet pattern (figure 2-42). Do not cut more than necessary. Use generous radii at corners (**0.250** inch minimum).

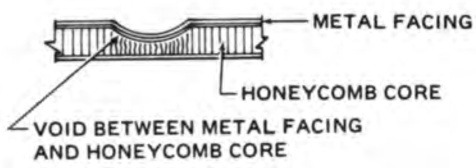
c. Cut and form a reinforcing patch of the same material and one gage heavier than the longeron and long enough to extend at least **4.50** inches on each side of the damage (after cleanup).



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

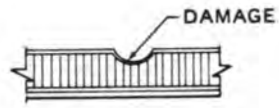
209030-370-1

Figure 2-40. Vertical Fin Honeycomb Panels Damage (Sheet 1 of 4)



DETAIL **A**

SURFACE DENT WITH CRUSHED CORE AND VOID BETWEEN SKIN AND CORE



DETAIL **B**

SURFACE DENT WITH CRUSHED CORE. NO VOIDS UNDER DENT

LIMITS

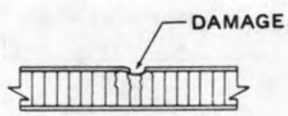
1. No sharp dents, holes, or damages that penetrate metal facing.
2. Maximum diameter of damage 2.0 inches, or maximum length of damage 1.50 inches.
3. Maximum depth of damage 20 percent of panel thickness.
4. Total damage not to exceed 10 percent of a bay area.
5. Minimum distance of 0.5 inch from adjacent structure, inserts or beveled edge.

LIMITS

1. Smooth, crack free dent.
2. Maximum diameter of single dent 1.0 inch. Two or more dents in any 6.0 inch diameter area, consider as one dent.
3. Maximum depth: 20 percent of panel thickness.
4. Maximum area of all dents combined: 10 percent of a bay area.
5. Maximum of five dents in a 9.0 square inch area.
6. No voids may be present under the damage.
7. Minimum distance of 0.5 inch from inserts or beveled edge.

209030-370-2

Figure 2-40. Vertical Fin Honeycomb Panels Damage (Sheet 2 of 4)

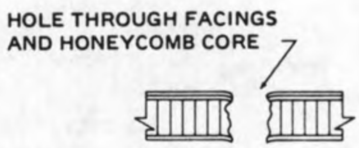


DETAIL C

OUTER SKIN AND CORE DAMAGED. DAMAGE PENETRATES OUTER SKIN AND CORE ONLY.

LIMITS

1. Maximum diameter of 3.0 inches after clean-up.
2. Maximum of three patch repairs in a panel. Damage after clean-up comes no closer than 1.5 inch to a similar repair or insert and no closer than 1.5 inch to a beveled edge.
3. Replace panel if water or corrosion found in core.
4. Total damage not to exceed 10 percent of total panel area or 25 percent of a single bay area after clean-up.



DETAIL D

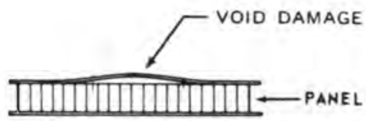
DAMAGE PENETRATES THROUGH BOTH SKIN AND CORE.

LIMITS

1. Maximum diameter of hole 3.0 inches, after clean-up.
2. Minimum distance from structural members or other repair: 2.0 inches.
3. Minimum distance of completed repair from an edge bevel: 0.50 inches.
4. Total damage not to exceed 10 percent of a bay area.
5. Maximum of three patch repairs in a panel.
6. Replace panel if water or corrosion found in core.

209030-370-3

Figure 2-40. Vertical Fin Honeycomb Panels Damage (Sheet 3 of 4)

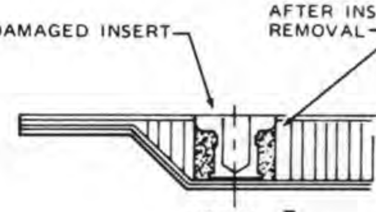


DETAIL E

VOID AREA BETWEEN METAL FACING AND CORE

LIMITS

1. **Maximum total void area not to exceed 5 percent of panel surface area.**
2. **Maximum area of a single void: 1.5 square inch and a minimum of 2.0 inches between voids. Maximum length of a void: 3.0 inches in any direction.**
3. **Damage not closer than 1.0 inch of a beveled edge, hole or adjacent structure, or within 3.0 inches of an insert. Void in area of insert limited to 0.62 square inch with no damage to insert.**



DETAIL F

DAMAGED OR LOOSE INSERTS

LIMITS

1. **Remove insert by counterboring without enlarging hole size in panel facing.**
2. **Original hole diameter in panel facing must be maintained in the replacement process.**
3. **No damage in area adjacent to insert.**

209030-370-4

Figure 2-40. Vertical Fin Honeycomb Panels Damage (Sheet 4 of 4)

d. Secure the reinforcing patch in position and drill out rivet holes of the same size and pitch as shown in figure 2-42.

e. Mark a line around outer edge of patch using a soft pencil. Remove patch and deburr holes.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

f. Remove paint from between previously marked lines of damaged area using a clean cloth saturated with MEK (C74).

g. Buff both sides of patch with Scotchbrite (C103) and wipe with a clean cloth.

CAUTION

Do not touch patch with bare hands after cleaning.

h. Apply adhesive (C8) to mating surface of patch.

i. Secure reinforcing patch in position and rivet in place while adhesive is still wet.

j. Apply a coat of primer (C88 or C91) over the repaired area.

2-32. REPAIR — TAILBOOM BULKHEADS.

Repair damaged bulkheads by patching and insertion.

a. Cracks, tears, and punctures in the bulkhead, web, and flanges may be repaired by patching, provided the damage does not extend more than **one-half** the width of the bulkhead. Refer to figures 2-44 through 2-47. Repair damage.

REPAIR — TRAILING EDGE

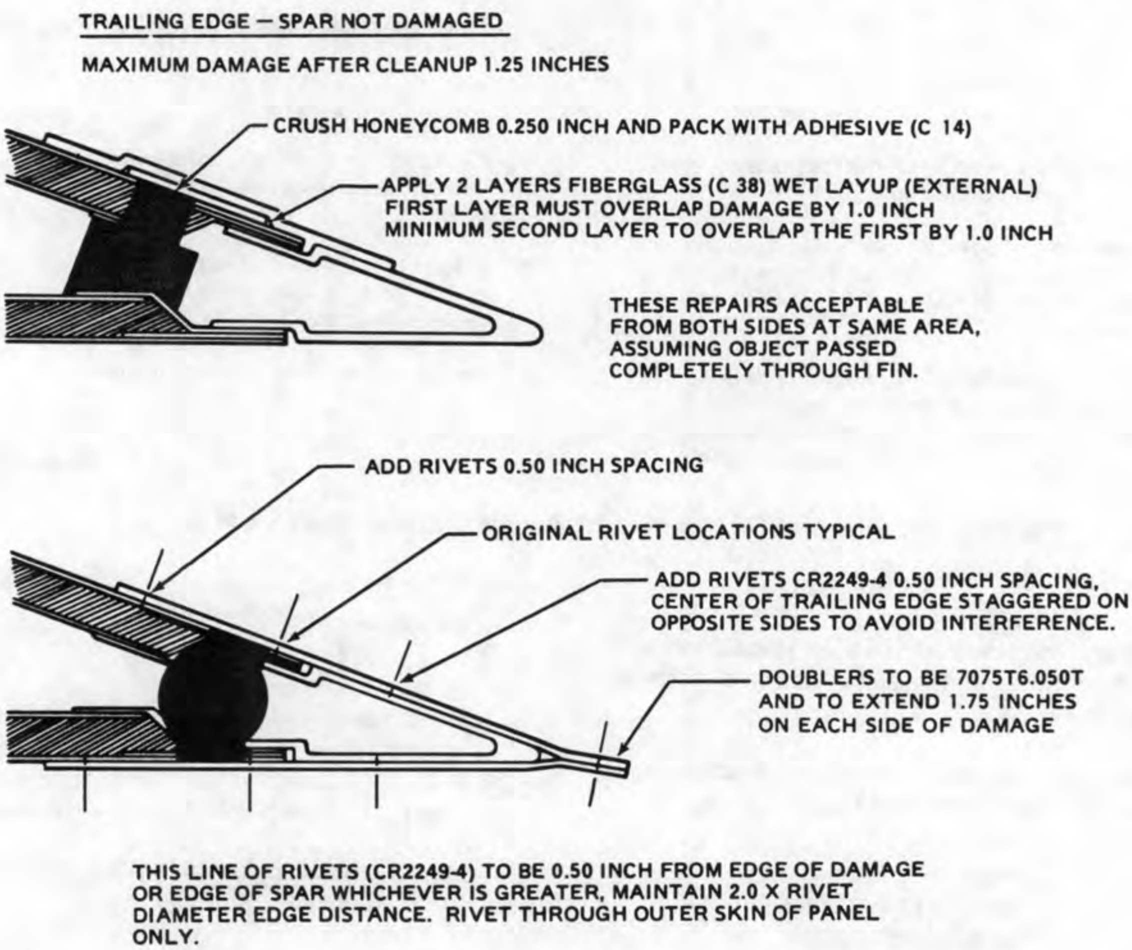
DESCRIPTION

Tears, cracks, gouges, dents, and holes, penetrating through one or both sides of the trailing edge.

LIMITS — REPAIRABLE DAMAGE

Tears, cracks, gouges, dents, and holes that are less than 1.25 inch in length and 0.50 inch in width through one or both sides of fin, can be repaired by patching.

Maximum distance between damaged areas, 8.0 inches.



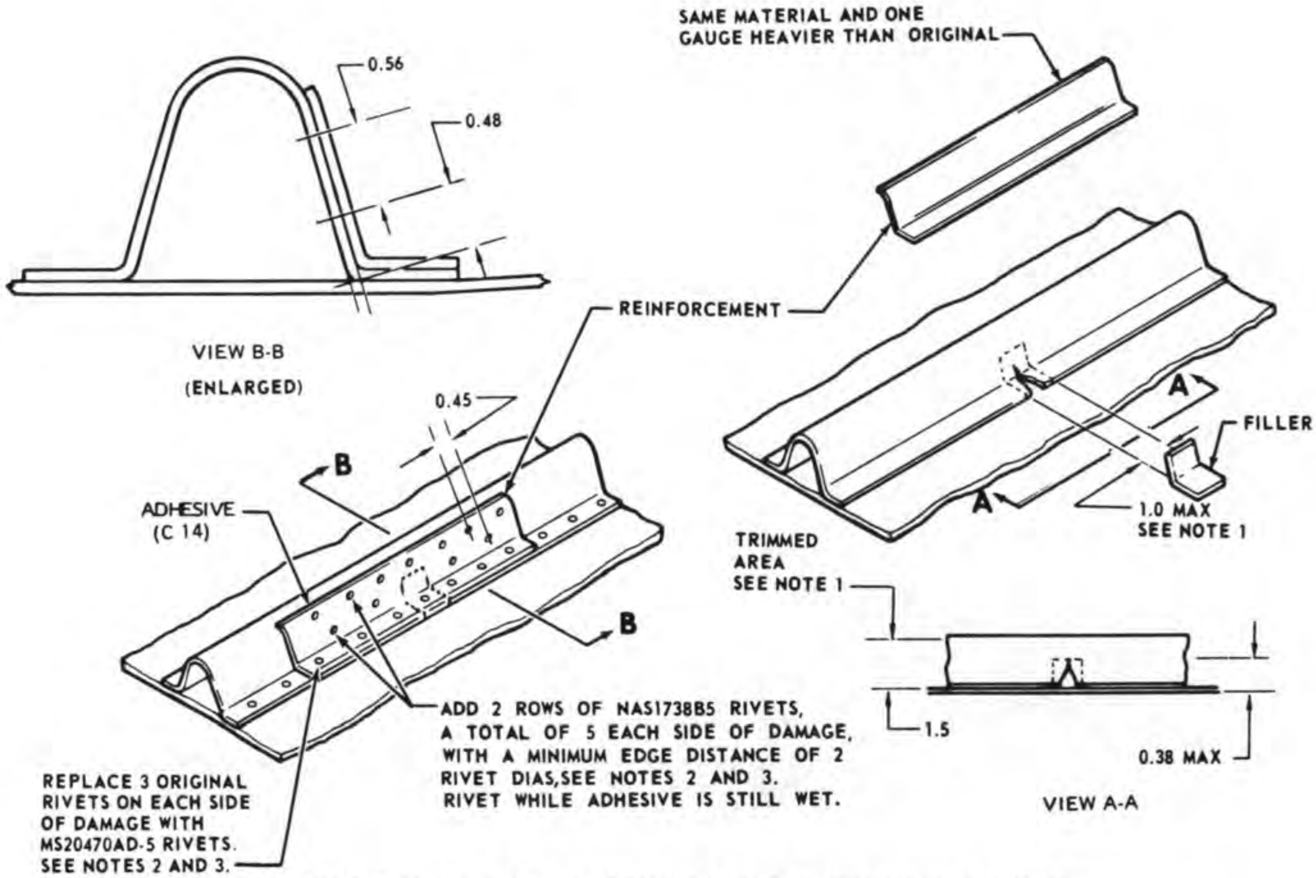
Bond doublers with adhesive (C14). Fill and file all edges of doubles after riveting. Touch up refinish.

Polish and inspect dents for cracks. If crack does exist stop drill cracks at both ends and patch as shown above. Dents with or without cracks fill and fair with adhesive (C14).

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

209030-331B

Figure 2-41. Edge Repair on Vertical Fin



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

Note 1

When trimmed area exceeds 1.0 inch, or more than two rivets (in flanges) are lost or damaged, repair as directed on figure 2-43.

Note 2

Under no circumstances may an MS20600 or similar nonlocking stem blind rivet be used in a structural application.

CAUTION

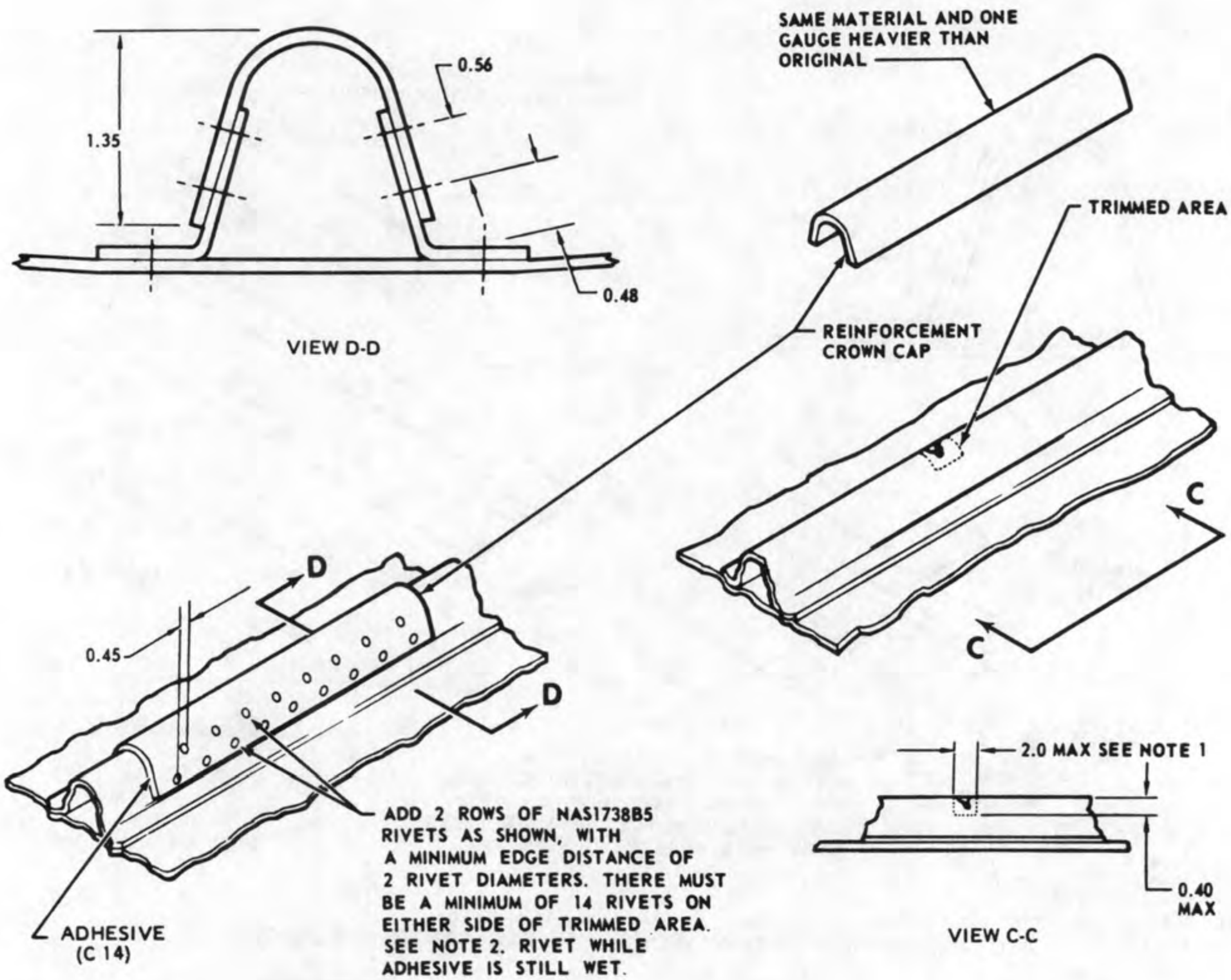
Before making repairs refer to "Limitation of Repairs at Specific Locations" in accompanying text.

Note 3

NAS1738B5 blind rivets or MS20470AD-5 rivets, where installation is not blind.

204030-1036

Figure 2-42. Tailboom Longerons



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

CAUTION

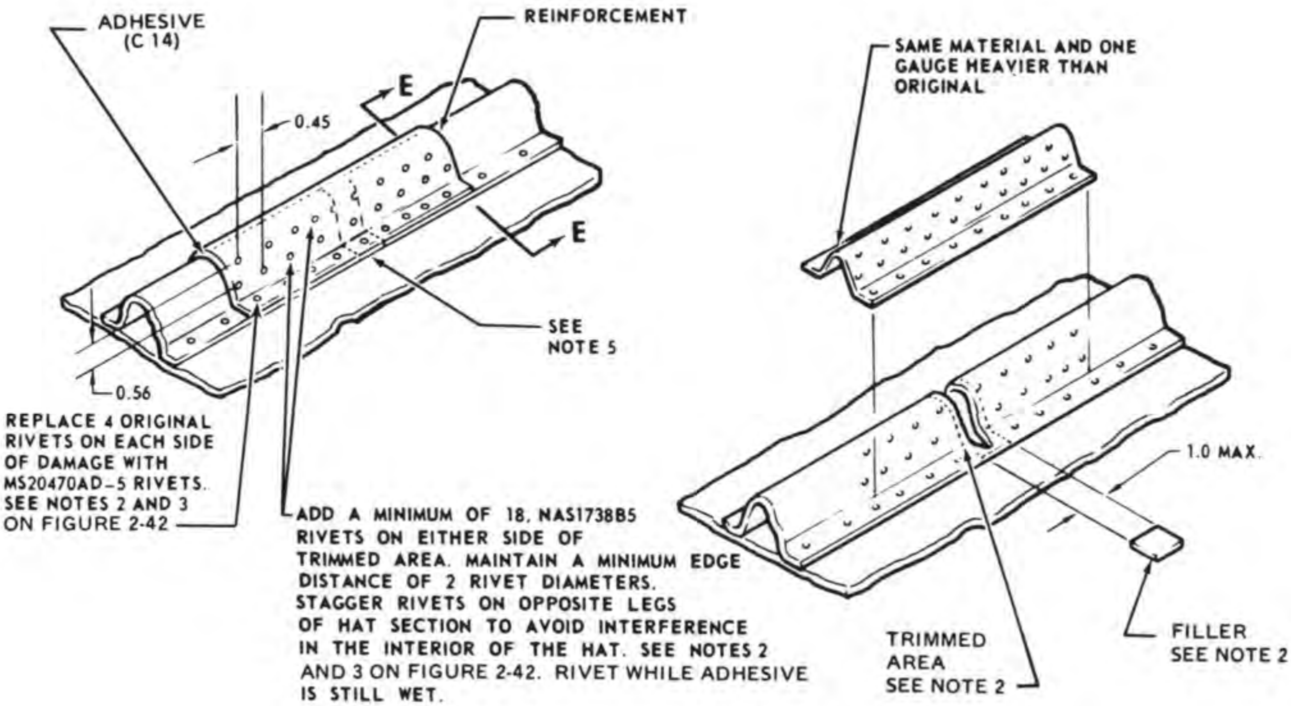
Before making repairs refer to "Limitations of Repairs at Specific Locations" in accompanying text.

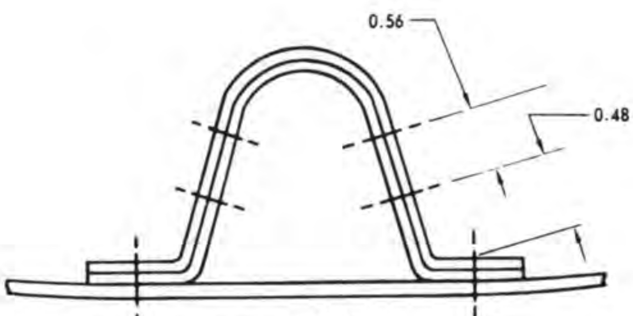
Note 1

When trimmed area exceeds 0.40 inch depth, repair as directed on sheet 2.

204030-1035-1

Figure 2-43. Longeron Repair (Sheet 1 of 2)





VIEW **E-E**

NOTE 2

When trimmed area exceeds 1.0 inch, use an insert that is an identical section to the longeron, in addition to the reinforcement section.

CAUTION

Before making repairs refer to "Limitations of Repairs at Specific Locations" in accompanying text.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204030-1035-2

Figure 2-43. Longeron Repair (Sheet 2 of 2)

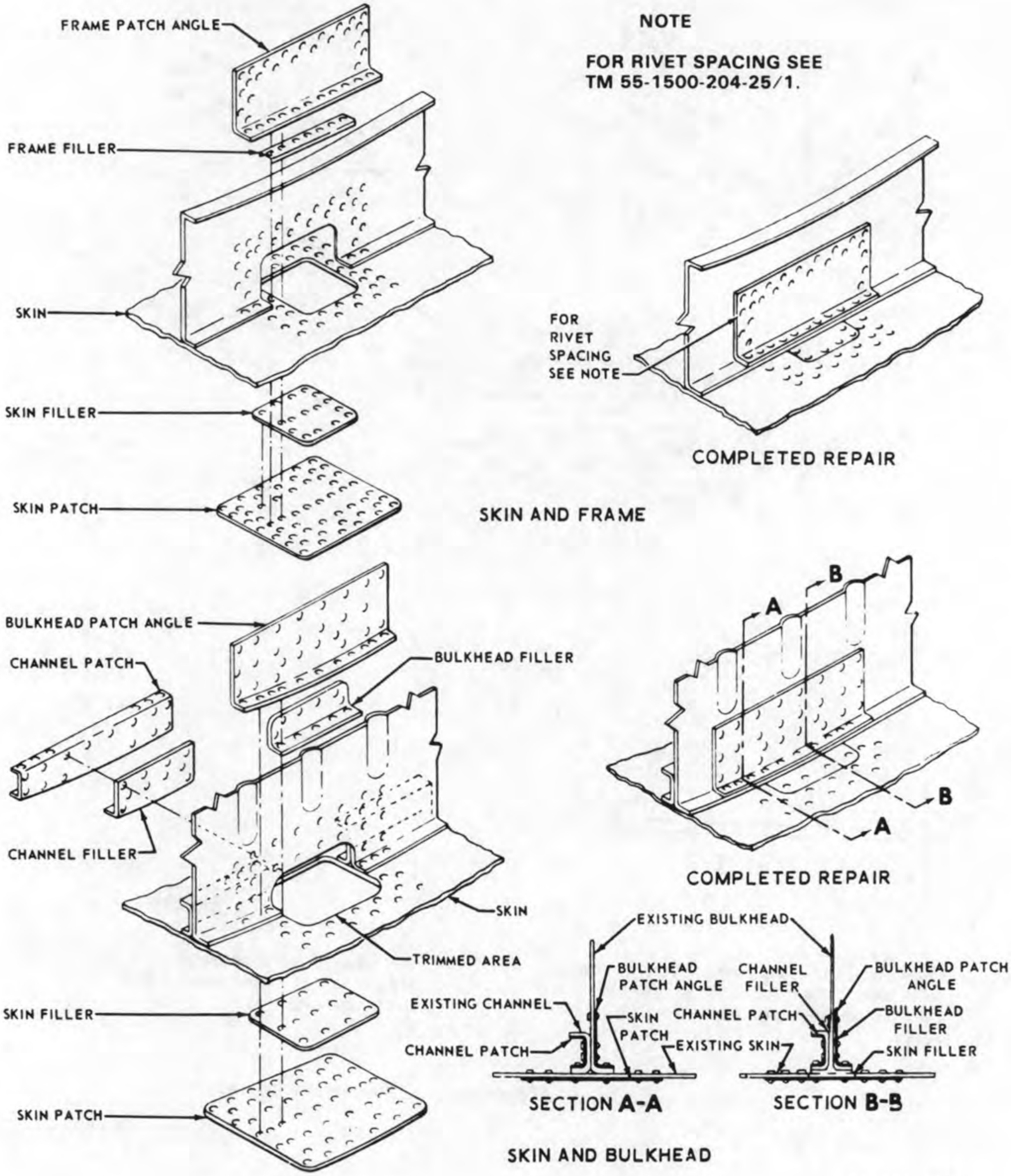
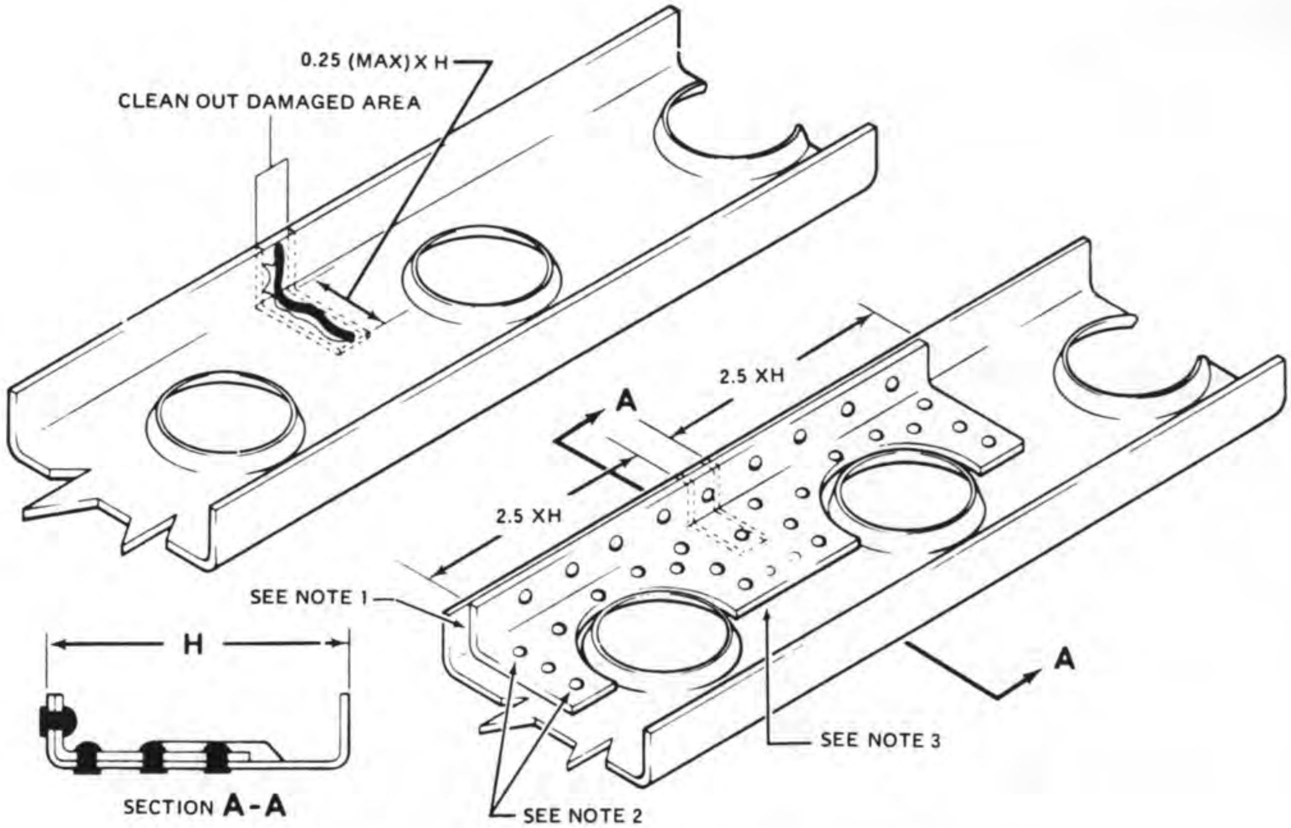


Figure 2-44. Damaged Skin, Frame, and Bulkhead Repair



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

NOTE 1

REINFORCING ANGLE TO BE ONE GAGE HEAVIER THAN ORIGINAL METAL.

NOTE 2

USE MS20470AD4 FOR THICKNESS 0.040 INCH AND UNDER.
USE MS20470AD5 FOR THICKNESS OVER 0.040 INCH.
SPACE RIVETS SIMILAR TO THAT FOR ADJACENT AREAS. USE AS A GUIDE 4D (FOUR RIVET DIAMETERS) SPACING AND 2D (TWO RIVET DIAMETERS) EDGE DISTANCE.

NOTE 3

A MINIMUM OF FOUR RIVETS ON EACH SIDE OF DAMAGE IN FLANGE.

NOTE 4

REMOVE PAINT IN AREA TO BE COVERED BY REINFORCING ANGLE, AND CLEAN BOTH SIDES OF ANGLE. COAT CLEANED SURFACES WITH PRIMER (C88 OR C91). INSTALL RIVETS. APPLY A COAT OF PRIMER OVER REPAIRED AREA.

204030-126C

Figure 2-45. Repair — Damaged Ribs — Bulkhead

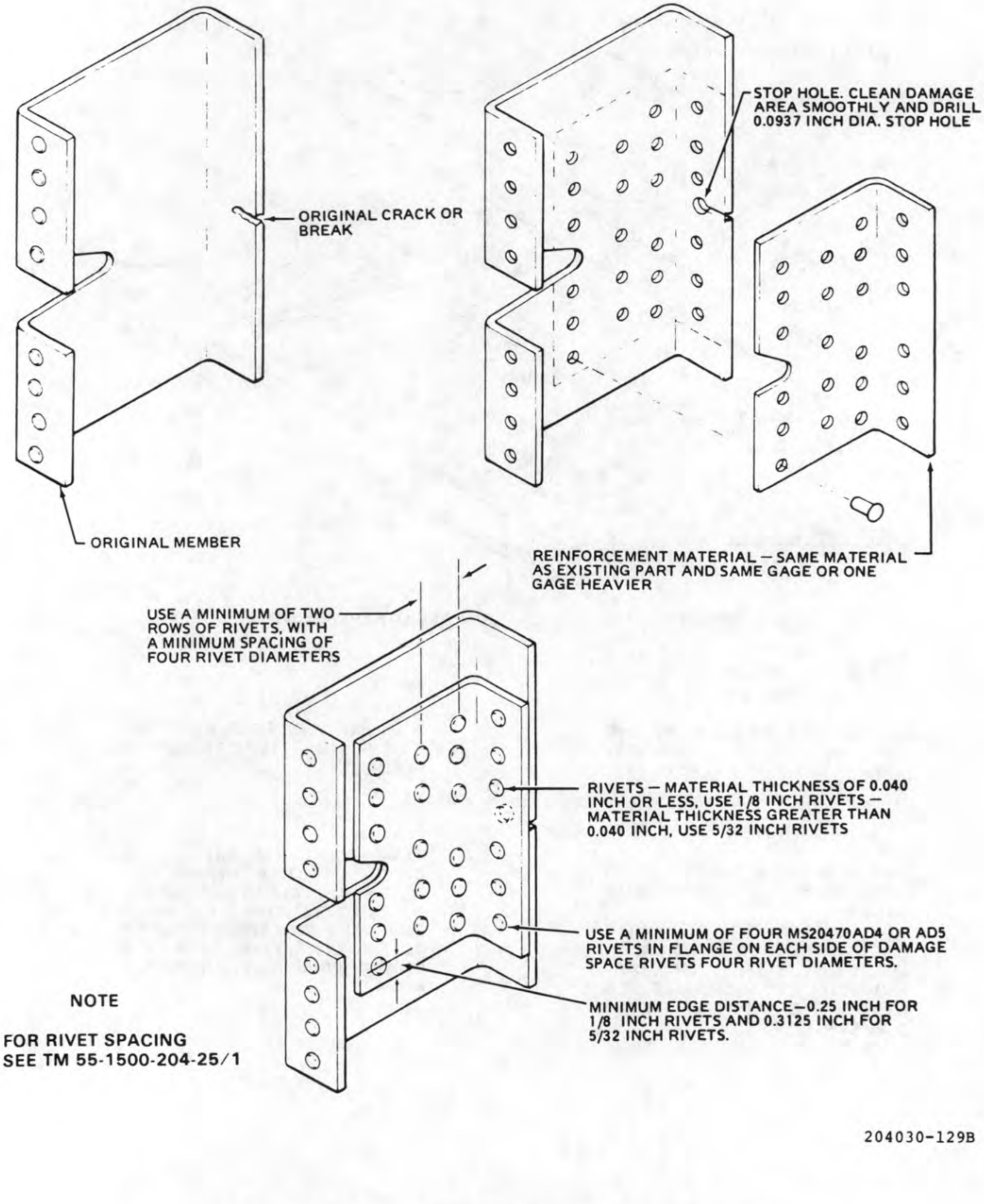
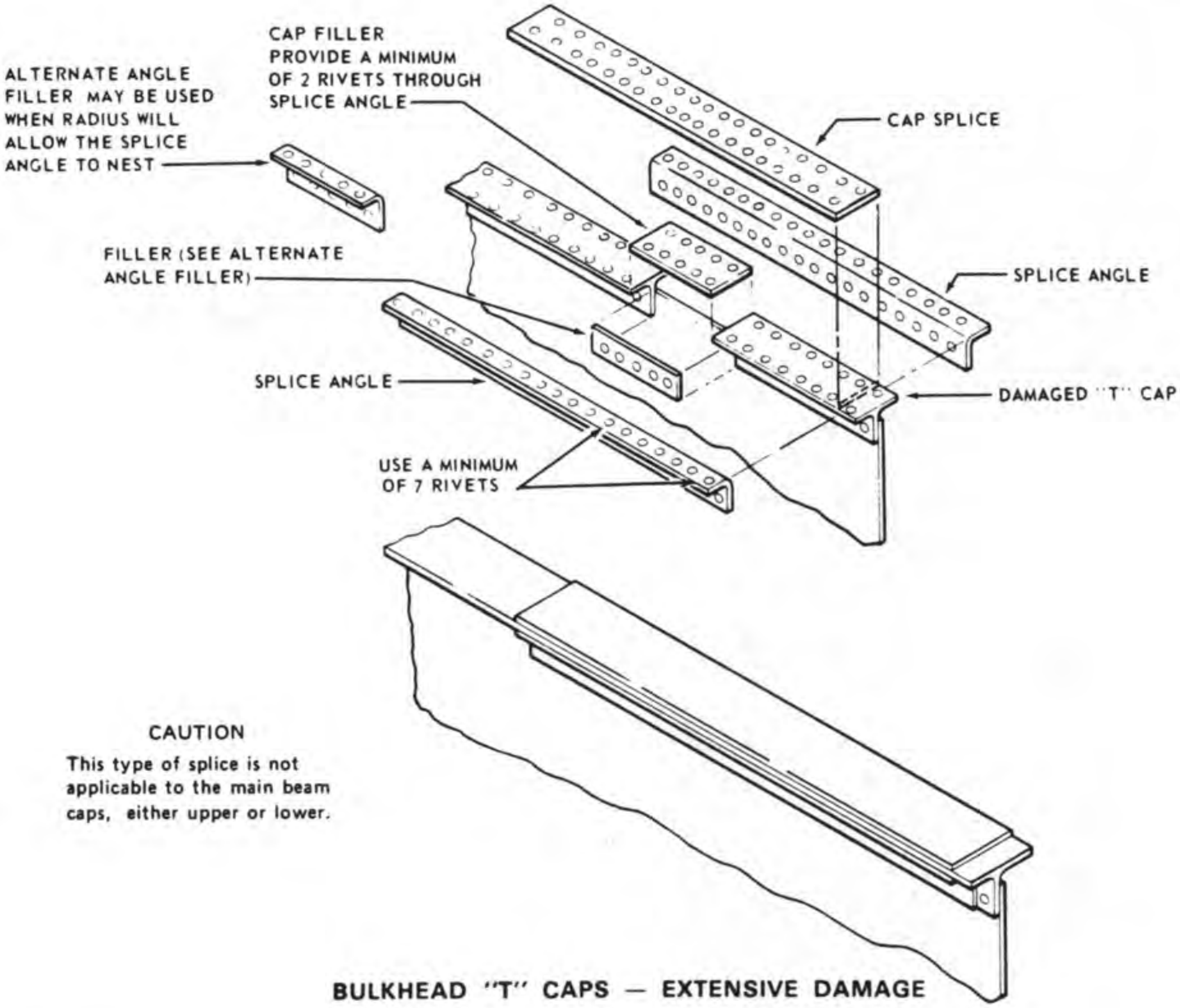


Figure 2-46. Repair — Bulkhead Flanged Member



REPAIR PROCEDURE

1. Clean up damage.
2. Use generous routing radius when damage is to one flange only (0.160 inch minimum).
3. Add fillers, same thickness as "T" cap.

d. Provide splice angles — same material and thickness as original cap extrusion. Splice angles may be made from equivalent extrusions. Chamfer corner to nest into original part.

e. Add a minimum of fourteen MS20470AD5 rivets, each side of damage, seven through each end of splice angle, as shown.

f. Cap splice, make from 0.25 inch 7075-T6 material in areas where floor must cover splice cap, and bond to upper surface of cap and filler with adhesive (C14) prior to riveting.

204030-139B

Figure 2-47. Repair — Bulkhead "T" Cap — Extensive Damage

(1) Check to see that no rivets are bent or damaged and that rivet holes are not elongated or torn.

(2) Remove damaged and loose rivets.

(3) Stop drill end of crack, or if a tear or puncture exists, cut away damaged part, taking care not to cut away more than necessary.

(4) Reform damaged member and other displaced areas into correct position.

(5) Form a reinforcing patch of same material and one gage heavier than damaged member, and sufficiently long to give sturdy support.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(6) Clean dirt from around damaged area and from both sides of reinforcing patch using, a clean cloth saturated with naphtha (C75).

(7) Secure reinforcing patch firmly in place and drill rivet holes through patch and damaged member, and same size, and pitch as existing rivet holes. Deburr all holes.

(8) Apply primer (C88 or C91) to both sides of patch, and damaged member.

(9) Secure reinforcing patch in position and rivet into place.

(10) Apply (C88 or C91) primer over repaired area.

b. Complete bulkhead breaks, and cracks, extending more than **one-half** the width of the member, make patching inadequate, repair by insertion (splicing).

(1) Check to see that no rivets are bent or damaged and that rivet holes are not enlarged or torn.

(2) Remove damaged or loose rivets.

(3) Trim damaged edge of the break in bulkhead. Do not trim more than necessary.

(4) Re-form and return damaged bulkhead to correct position and contour.

(5) Cut and form an insert of same material and gage as damaged bulkhead.

(6) Cut and form a reinforcing patch of same material and one gage heavier than damaged bulkhead, and sufficiently long to give sturdy support.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(7) Clean dirt from around damaged area and from both sides of insert and reinforcing patch, using a clean cloth saturated with naphtha (C75).

(8) Secure insert and reinforcing patch firmly in place. Drill rivet holes through reinforcing patch, insert, and damaged bulkhead, the same size and pitch as existing rivet holes. Remove burrs from all holes.

(9) Apply primer (C88 or C91) to both sides of insert, reinforcing patch, and damaged bulkhead.

(10) Secure insert and reinforcing patch in position and rivet into place.

(11) Apply primer (C88 or C91) over repaired area.

c. Repair damaged bulkhead, web, cracks, tears and punctures.

(1) Stop drill extreme ends of crack or cut a round or elongated hole according to the length or shape of crack, puncture, or tear in order to clean up ragged edges and stretched metal. Allow generous radii at all corners.

(2) Cut and form a patch of same material and thickness as damaged web.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(3) Remove dirt from around damaged area using clean cloth saturated with naphtha (C75).

(4) Secure patch in position and drill out a double row of holes of same size and pitch as surrounding areas. Remove patch and deburr holes.

(5) Apply primer (C88 or C91) to damaged area and both sides of patch.

(6) Secure patch and rivet in place.

(7) Apply primer (C88 or C91) over repaired area.

2-33. REPAIR TAILBOOM DRIVESHAFT COVERS AND SUPPORT HINGES.

Repair using standard aluminum repair procedures in TM 55-1500-204-25/1.

2-34. REPAIR — TAILBOOM ATTACH FITTINGS.

WARNING

Any cracks in tailboom attach fitting forward of boom station 70.00, or attachment bolt hole elongation wear exceeding the maximum diameter of 0.516 inch, is cause for replacement by next higher maintenance level.

Repair of tailboom attach fittings consisting of minor nicks, scratches,. and gouges may be polished out using fine india stone (C116), provided they do not exceed damage limits in table 2-4, Tailboom Classification of Damage.

2-35. REPAIR — BEARING HANGER SUPPORT FITTING.

a. Repair corrosion and damage areas on the bearing hanger support fitting per figure 2-37.

b. Damage to bearing hanger support fitting severe enough to require replacement:

(1) Two or more bulkhead attach holes exceeding the new part dimension of **0.203 to 0.208** inch diameter.

(2) Two bearing hanger attach holes exceeding **0.270** inch diameter.

2-36. REPAIR — INTERMEDIATE GEARBOX SUPPORT FITTING.

WARNING

No repairs are permitted on mounting surface of intermediate gearbox support fitting.

NOTE

Refer to table 2-4 for repairable damage limits of the intermediate gearbox support fitting.

a. Because of critical alignment requirements, replacement of distorted, damaged or cracked intermediate gearbox support fitting parts must be done by depot maintenance. An intermediate gearbox alignment check must be made by depot maintenance after repair or replacement of supporting structure.

b. Repair gearbox attachment holes within limits shown in figure 2-38.

c. Check laminated shims at gearbox attachment holes for security.

d. Inspect all scratches, dents and corroded areas for cracks. Inspect affected area using fluorescent penetrant method. Refer to TM 43-0103.

2-37. REPAIR — TAIL ROTOR DRIVE SUPPORT FITTING.

a. Repairable chafing damage to the tail rotor drive support fitting may be repaired as follows:

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(1) Clean the chafed area with MEK (C74).

(2) Polish chafed area to not less than minimum allowable thickness as shown on figures 2-39 with Scotchbrite (C103) or No. 400 grit abrasive paper (C36).

(3) If minimum thickness have not been exceeded, area B, figure 2-39, sheet 1 may be built up with adhesive (C8 or C14) to provide a new seat for the driveshaft cover. Buildup portions of sector C, figure 2-39, sheet 2, to a thickness of **0.12 to 0.15** and buildup portions of section D to a thickness of **0.25 to 0.29**. Area A, figure 2-39, sheet 1 may be built up with adhesive (C8 or C14) to provide a new seat for the gearbox cover. Buildup area to a thickness of **0.800 to 0.820**.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(4) After adhesive is thoroughly dry, clean the repaired area with MEK (C74) and wipe dry with a clean cloth.

(5) Apply two coats of primer (C88 or C91) to the repaired area. When dry, apply two coats of lacquer of color to match finish.

(6) Install teflon tape, (C118) on forward upper edge of fitting where tail rotor driveshaft door contacts fitting.

b. Tail rotor support drive fitting mounting stud holes exceed **0.400** inch diameter must be repaired or replaced by next higher maintenance level.

c. Blend out repairable damage to fitting lug faces to a maximum blend depth of **0.010** inch, using (C102) or No. 400 grit abrasive paper (C36). Radial damage to top of lugs may be blended out to a maximum depth of **0.060** inch. Refer to figure 2-39 sheet 4, section A-A.

d. Bellcrank support bushing I.D.s may be elongated to a maximum diameter of **0.445** inch for bushing in forward lug and to **0.317** inch for bushing in aft lug. Bushings elongated in excess of these dimensions must be replaced.

(1) Forward lug bushing:

(a) Press out bushing.

(b) Press in new bushing.

(c) Ream bushing hole to **0.4425 TO 0.4430** inch diameter.

(2) Aft lug bushing:

(a) Press out bushing.

(b) Press in new bushing.

(c) Ream bushing hole to **0.3130 to 0.3145** inch diameter.

2-38. REPAIR — VERTICAL FIN HONEYCOMB PANELS.

a. Repair honeycomb panels on the vertical fin. Refer to paragraph 2-15. (Repair same as forward fuselage.)

b. Replace damaged fastener (insert) in vertical fin honeycomb panels. Refer to figure 2-48.

(1) Remove damaged fastener (insert) by drilling with counter bore of the same diameter. If the fastener (insert) is loose and turns, drill out two holes shown for injecting adhesive on figure 2-48. Use a spacer on twist drill while drilling out holes to avoid drilling too deep and damaging panel. Attach a puller to fastener (insert) with self-tapping screws and remove the fastener (insert) from the panel.

(2) Remove honeycomb core a minimum of **0.0625** inch and maximum of **0.250** inch on figure 2-48. Clean all metal particles out of hole.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(3) Immediately prior to installation, clean new fastener (insert) with MEK (C74) and air dry until moisture free. Handle fastener (insert) with white cotton gloves (C54) after cleaning.

(4) Cover threaded hole and injection holes with masking tape then open the injection holes with a pointed instrument. Apply adhesive (C8) to bottom of fastener (insert) as shown on figure 2-48 and position in hole in panel. Inject adhesive (C8) in one injection hole with a syringe until it comes out of the opposite injection hole as shown of figure 2-48.

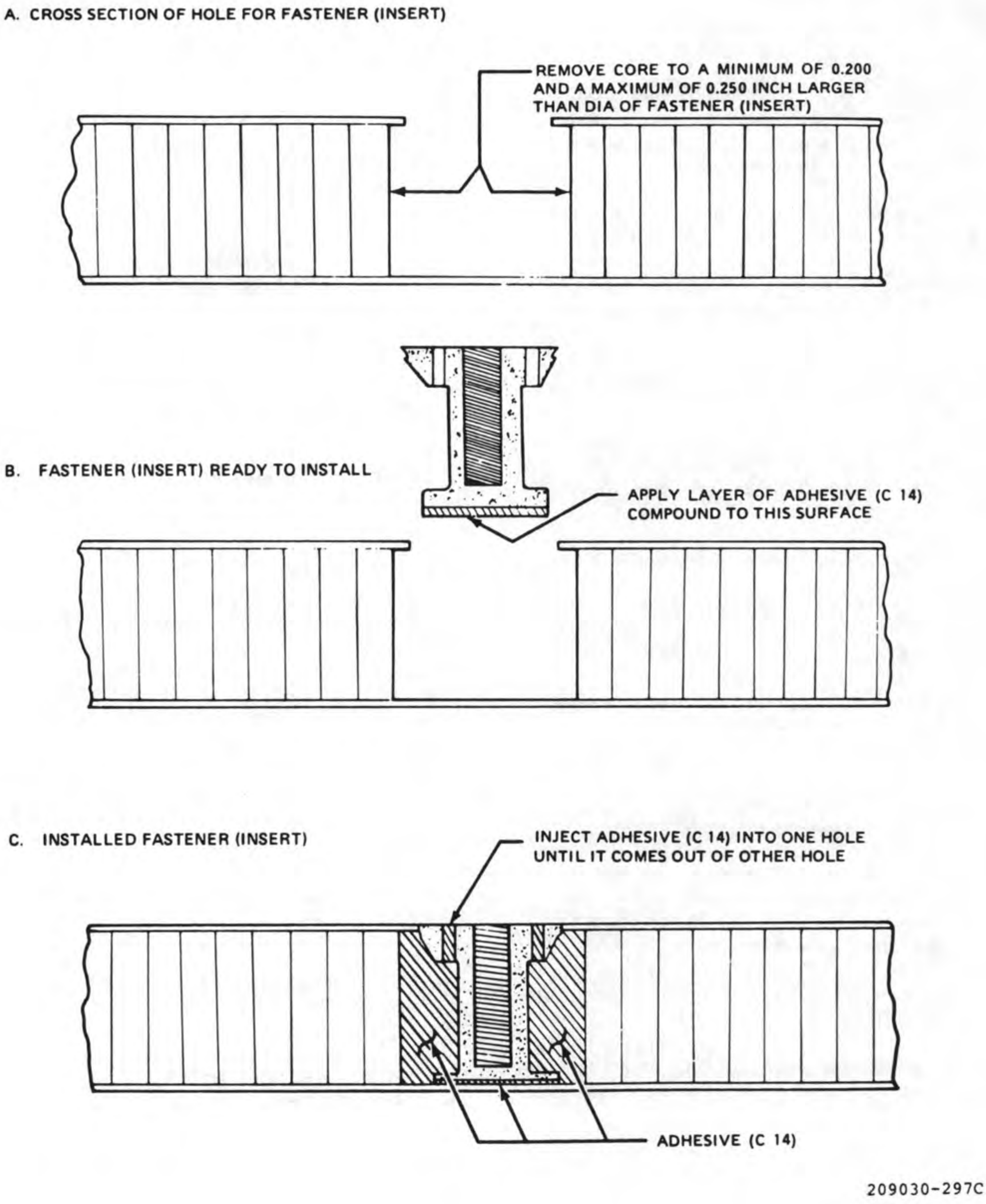


Figure 2-48. Injection Tape Fastener (Insert) in Vertical Fin Panel

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(5) Remove excess adhesive with cloth dampened with MEK (C74) or naphtha (C75).

(6) Touch up paint to match surrounding area. Refer to TB746-93-2 for paint instructions.

2-39. REPAIR — VERTICAL FIN TRAILING EDGES.

Comply with the following instructions for fiberglass or metal for repairing trailing edge. Refer to figure 2-41.

a. Fiberglass.

(1) Use only fiberglass cloth **0.010** inch thick (C38) when making edge repairs. The repair must equal or exceed the numer of plies lost.

(2) Remove all old finish from repair area with verying grades of sandpaper (C102).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(3) Clean sanded area with clean cloth moistened with MEK (C74).

(4) Cut fiberglass cloth (C38) to correct size and saturate with epoxy resin (C98) and apply as a patch.

(5) If multiple layers of fiberglass are requred, overlap each successive patch for a minimum distance of one inch.

b. Aluminum alloy patching material.

(1) Use aluminum patching material as specified on figure 2-41.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(2) Clean the area where the patch is to be applied with MEK (C74).

(3) Bond the metal doubler patch to vertical fin trailing edge, using adhesive (C8 or C14).

(4) Rivet patch with rivets of equal or larger size than original rivets in areas that were riveted prior to application of patch. Use the standard edge distance of two rivet diameters or space the rivets the same as the original panel. If the panel being worked is not riveted, use rivet spacing in opposite panel.

(5) Fill and fair all edges of doubler patches after riveting. Touch up the area. Refer to TB746-93-2 for paint instructions.

2-40. REPAIR — VERTICAL FIN FORWARD SPAR.

a. Repair smooth dents, lateral stiffeners, surface scratches, and holes according to TM 55-1500-204-25/1.

b. All other repairs must be approved by qualified engineering authority.

2-40.1. REPAIR — ELECTRONIC EQUIPMENT SHELF.

a. The electronic equipment shelf is constructed of aluminum alloy honeycomb core and 2024T3 aluminum alloy skins. Edging material is two ply glass fabric. The lower skins are **0.008** inch thick.

The upper skins are **0.012** inch thick except for the right side between BS 80.44 and BS 122.33, these skins are **0.016** inch.

b. Repair acceptable damage in accordance with paragraph 2-15. Repairs shall not interfere with mounting surfaces or affect the serviceability of the panel.

c. Replace damaged or loose inserts in accordance with paragraph 2-38, step b., with the following exceptions:

(1) Adhesive (C15.1) shall be used for bonding inserts. Cure adhesive for 16 hours at 75 °F.

(2) Perform proof load test of 100 pounds on threaded inserts after adhesive cure, using pound reading spring scale.

2-40.2. REPAIR — VERTICAL FIN BALLAST WEIGHT PANELS.

a. Repair of outer skin surface cracks around Ballast Weight inserts.

b. Remove existing inserts and potting compound (7 places).

c. Remove cracks in panel by routing out a 1/4 inch of material around and below the damaged area. Fill void with adhesive (C-14) and prepare surface for doubler. Other damage, such as tears, gouges, etc., should have 1/4 inch of material routed around and below damage, filled with adhesive (C-14) and smoothed to surrounding surface level (see figure 2-48.1).

d. Install doubler on outboard surface of panel, covering all seven insert panel holes. Edges of doubler must extend a minimum of 0.75 inches beyond the cracked and insert hole area. Bond doubler to panel with adhesive (C-15) and install rivets NAS1738B4-2. When rivets are to be installed, remove 1/4 inch of internal material around and below rivet hole. Fill rivet hole with adhesive (C-14) and install rivets immediately (see figure 2-48.1). Rivets should be spaced 1 1/2 inches apart around doubler; rivets should be at least two rivet diameters from edge of doubler (see figure 2-48.1). If a rivet is to be installed within 0.372 inches from an area of damage, do not install that rivet. Doubler material is made from 0.032 inches thick 2024 aluminum alloy QQ-A-250/0 temp T3.

e. Insert areas should have 1 1/2 inches of internal material removed through the inboard surface panel. Void area is then filled with adhesive (C-14) and prepared for doubler (see figure 2-48.1).

f. Install individual doublers on each insert hole on the inboard side of panel. Doublers should be minimum of 2 inches in diameter and corners rounded to a minimum of 0.25 inches in radius (see figure 2-48.1).

g. Drill a 0.427 inch hole for each insert. Install sleeve 80-013-S4D2-9 through outboard surface and plug 80-013P4F06-0 through inboard surface. Use adhesive (C-15) on both sleeve and plug when installing (see figure 2-48.1).

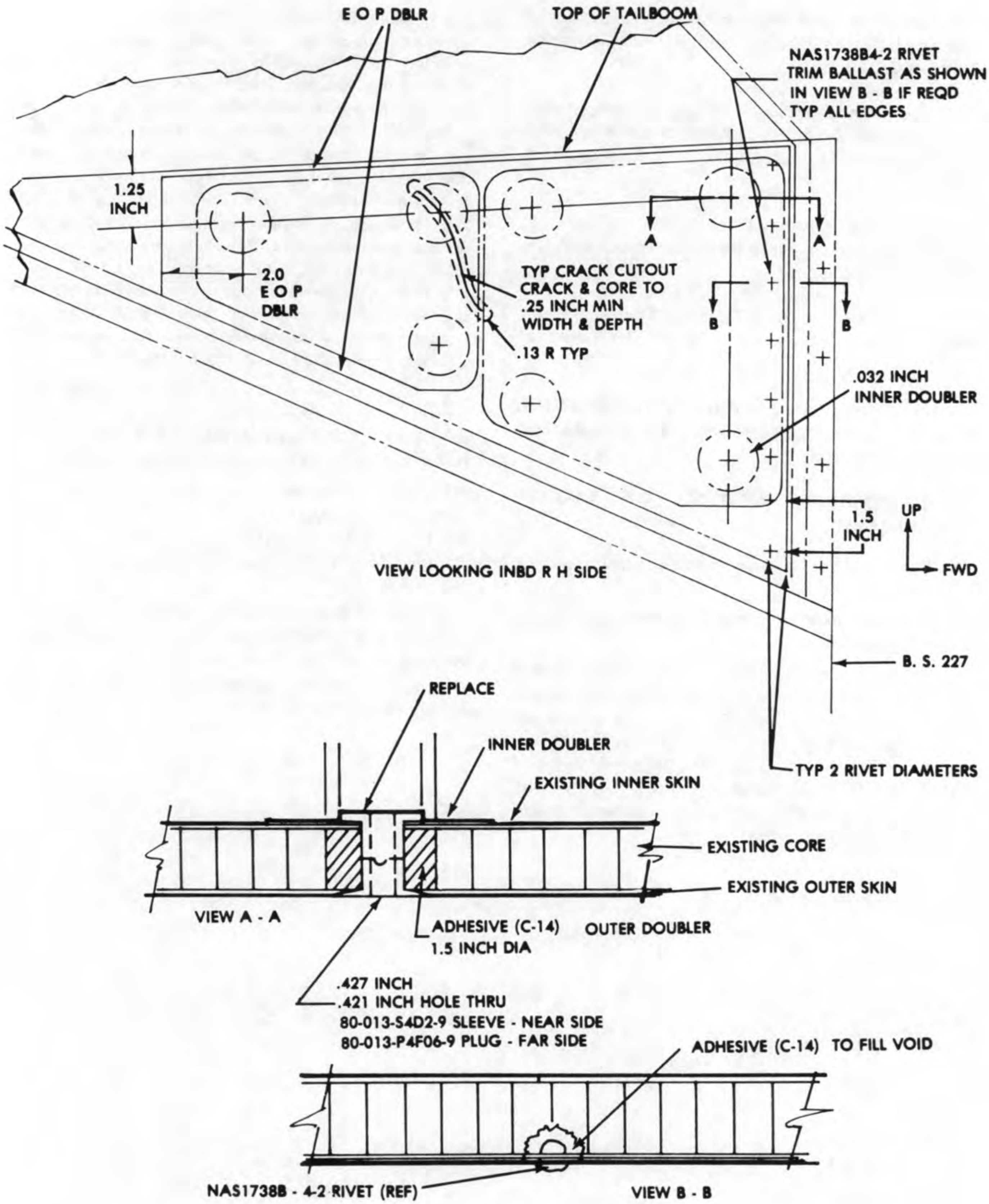


Figure 2-48.1 Vertical Fin Ballast Weight Panel

SECTION II. FUSELAGE

2-41. FUSELAGE ASSEMBLY.

2-42. DESCRIPTION — FUSELAGE ASSEMBLY.

The fuselage constitutes the primary structural assembly of the helicopter. It encloses and/or supports such major provisions and systems as the tandem crew compartment, engine, fuel and oil systems, armament system, transmission and main rotor pylon, alighting gear, wings and tailboom. See figure 2-1.

2-43. HONEYCOMB PANELS.

2-44. DESCRIPTION — HONEYCOMB PANELS.

The principal part of the fuselage structure is honeycomb panels. The panels have an aluminum core that resembles honeycomb. Facings are bonded to the honeycomb to form the panel. The facings may be fiberglass or metal. The panels are joined together and supported by the primary structural caps which are shown on figure 2-11 and 2-12 by solid black shading. Panels on the unshaded portion of figure 2-2 are either of honeycomb panel construction or of conventional sheet metal construction. Refer to TM 55-1500-204-25/1 for repair instructions for the sheet metal construction panels.

2-45. REMOVAL — HONEYCOMB PANELS.

a. Replace honeycomb panels that have damage in excess of limits specified in table 2-3. Refer to paragraph 2-5 for support of structure during airframe repair. Refer to figure 2-2 for exterior panels secured with screws.

b. Remove screws or twist-type fasteners and remove panel. Do not remove riveted panels unless the entire panel is to be replaced.

2-46. INSPECTION — HONEYCOMB PANELS.

Refer to paragraph 2-12 and table 2-3 for inspection and classification of damage.

2-47. CLEANING — HONEYCOMB PANELS.

Refer to paragraph 2-10, figure 2-7, and TM 55-1500-204-25/1 for cleaning instructions.

2-48. REPAIR — HONEYCOMB PANELS.

Refer to paragraph 2-15 for repair instructions.

2-49. INSTALLATION — HONEYCOMB PANELS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

a. Clean mating surfaces of the forward fuselage panels with MEK (C74) and wipe dry with clean dry cloth.

b. Install panels on forward fuselage with screws.

2-50. PAINTING — HONEYCOMB PANELS — TOUCH-UP.

a. Clean area where paint requires touch-up with cleaning compound (C32) and rinse with water. Allow to dry thoroughly.

b. Apply primer (C88 or C91) to area that requires touch-up.

c. Apply lacquer (C71) finish coat color to match existing finish in accordance with TB746-93-2.

2-51. SHEET METAL PANELS AND SKIN.

2-52. DESCRIPTION — SHEET METAL PANELS AND SKIN.

A limited amount of sheet metal skin and panels are used on the fuselage. The major portions of the fuselage are covered with structural honeycomb panels. See figure 2-49 for description of sheet metal panels (doors) and skins used on the fuselage.

2-53. REMOVAL — SHEET METAL PANELS AND SKIN.

a. Removal of riveted skins illustrated on figure 2-49 must be accomplished at next higher maintenance level.

b. Remove panels (doors) illustrated on figure 2-49 by removing attaching screws.

2-54. INSPECTION — SHEET METAL PANELS AND SKIN.

Refer to table 2-3 for instructions to inspect sheet metal panels and skin.

2-55. CLEANING — SHEET METAL PANELS AND SKIN.

a. Clean sheet metal panels and skin with cleaning compound (C33) and water.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Remove stubborn deposits with solvent (C112) and clean cloths.

2-56. REPAIR — SHEET METAL PANELS AND SKIN.

a. Refer to paragraph 2-14 for instructions to repair damage to skin and sheet metal panels and doors that is within repairable limits. See figure 2-49 for description of skin and panel (door) fabrication material.

b. Do not remove riveted skin panels from fuselage to accomplish repair (paragraph 2-53).

2-57. INSTALLATION — SHEET METAL PANELS AND SKIN.

a. Installation of riveted sheet metal skins illustrated on figure 2-49 must be accomplished at next higher maintenance level.

b. Install panels (doors) illustrated on figure 2-49. Position panel on fuselage and install attaching screws.

2-58. PAINTING — SHEET METAL PANELS AND SKIN — TOUCH-UP.

a. Clean area where paint requires touch-up with cleaning compound (C32) and rinse with water. Allow to dry thoroughly.

b. Apply primer (C88 or C91) to area that requires touch-up.

c. Apply finish coat to match existing finish.

2-59. ACCESS COVERS AND DOORS.

2-60. DESCRIPTION — ACCESS COVERS AND DOORS.

The access covers and doors are shown on figure 2-3. The components which are accessible through each cover and door are listed on the illustration legend.

The small covers and doors are constructed from aluminum sheet metal. The hydraulic compartment doors (8) are constructed from laminated fiberglass, honeycomb core and aluminum skin. The ammunition compartment doors (21) are constructed from aluminum frame and skin.

2-61. REMOVAL — ACCESS COVERS AND DOORS.

a. Remove hydraulic compartment doors (8, figure 2-3).

(1) Release latches and open doors.

(2) Remove air duct hose from inside of left door if installed.

(3) Remove bolt to separate door holding spring (restrainer) at the lower hinge. Remove bolts to disconnect hinges from hinge supports and remove door.

b. Remove ammunition compartment doors (21).

(1) Release latches and open door.

(2) Support door in horizontal position and disconnect the support cables.

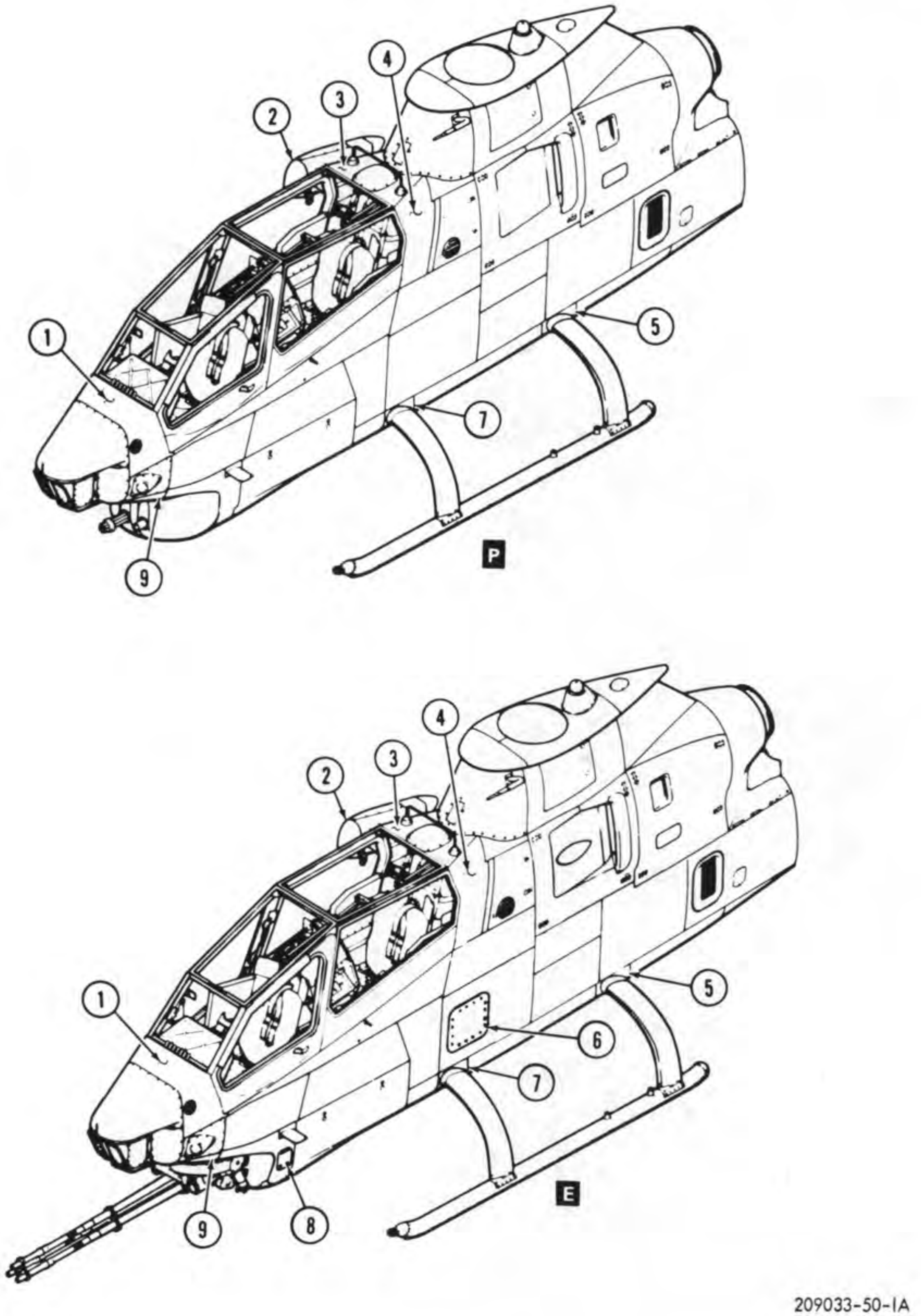
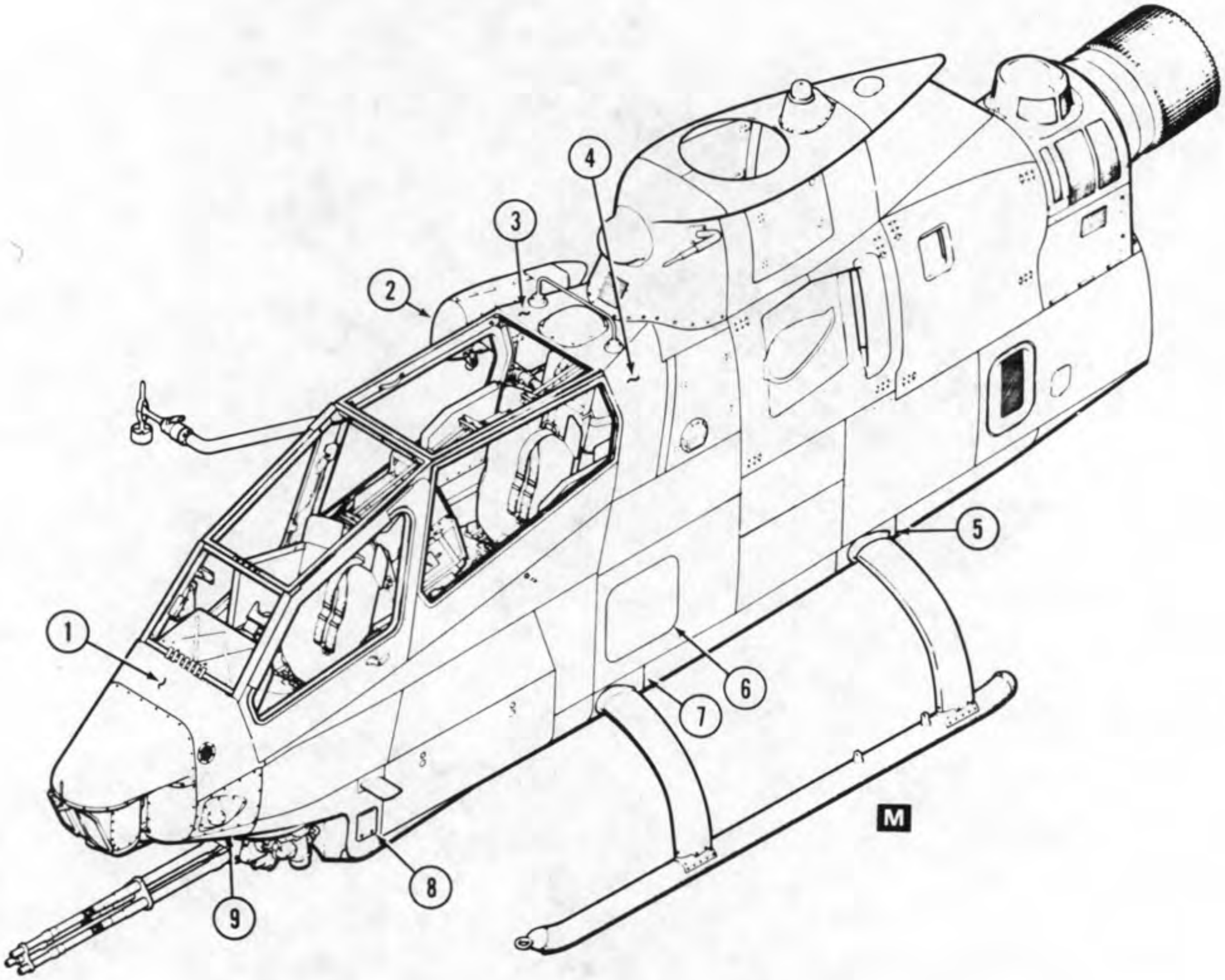


Figure 2-49. Sheet Metal Panels and Skin (Sheet 1 of 4)



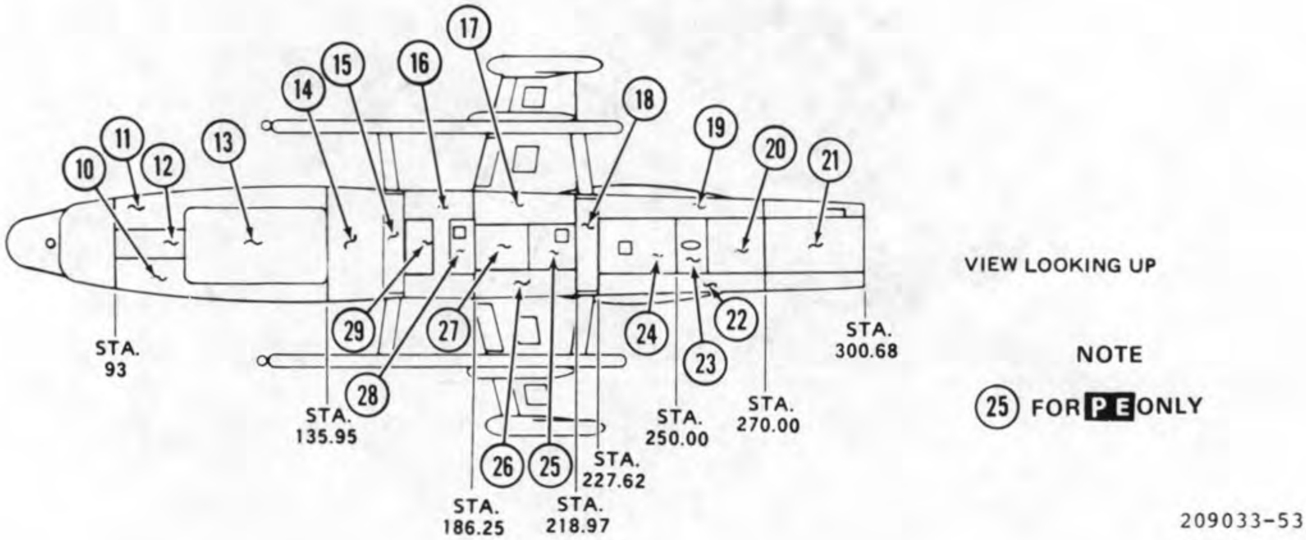


Figure 2-49. Sheet Metal Panels and Skin (Sheet 2 of 4)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
1	Nose Upper Skin	209-033-005-15	2024 Al Aly	QQ-A-250/5 Temp 0	T42	0.063	17 0 x 6.5
2	Right Wing. Left Wing Removed for Clarity	NA	NA	NA	NA	NA	NA
3	Upper Skin	209-033-525-15	7075 Al Aly	QQ-A-250/13 Temp T6	T6	0.032	29.3 x 19 3
4	Side Skin	209-033-525-17	7075 Al Aly	QQ-A-250/13 Temp T6	T6	0.032	31 7 x 20 8
	Side Skin	209-033-525-18	7075 Al Aly	QQ-A-250 13 Temp T6	T6	0.032	31 7 x 20 8
5	Lower Skin, Right	209-033-150-49	2024 Al Aly	QQ-A-250 5 Temp T3	T3	0.025	5 7 x 9 0
	Lower Skin, Left	209-033-150-50		QQ-A-250 5 Temp T3	T3	0.025	5 7 x 9 0
6	Door	209-033-127-9	2024 Al Aly	QQ-A-250/5 Temp T3	T3	0.063	17.5 x 18.9
7	Lower Skin, Right	209-033-150-65	2024 Al Aly	QQ-A-250 5 Temp T3	T3	0.025	6.0 x 8 5
	Lower Skin, Left	209-033-150-66	2024 Al Aly	QQ-A-250 5 Temp T3	T3	0.025	6 0 x 8 5
8	Turret Door, Left	209-033-276-11	2024 Al Aly	QQ-A-250/5 Temp T3	T3	0.020	4.8 x 5.0
	Turret Door, Right	209-033-276-11	2024 Al Aly	QQ-A-250/5 Temp T3	T3	0.020	4.8 x 5.0
9	Nose Lower Skin	209-033-005-17	2024 Al Aly	QQ-A-250 5 Temp 0	T42	0.063	18 0 x 40 0
10	Ammo Floor Fairing Installation Right Skin	209-031-203-19	2024 Al Aly	QQ-A-250 5 Temp T3	T3	0.025	13 6 x 43 5
11	Ammo Floor Fairing Installation Left Skin	209-031-203-103	2024 Al Aly	QQ-A-250 5 Temp T3	T3	0.025	13 6 x 43 5
12	Plate	209-031-203-73	2024 Al Aly	QQ-A-250 5 Temp T3	T3	0.050	8 7 x 15 5
13	Door	209-031-203-75	N A	NA	NA	NA	NA
14	Fairing	209-031-203-57	6061 Al Aly	QQ-A-250 11 Temp 0	T6	0.040	14 0 x 30 7
15	Forward Cross Tube Cover	209-033-190-15	2024 Al Aly	QQ-A-250 5 Temp 3	T3	0.025	9 0 x 35 3

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Figure 2-49. Sheet Metal Panels and Skin (Sheet 3 of 4)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
16	Lower Skin Sta 156.41 To Sta. 186.25	209-033-150-87	2024 Al Aly	QQ-A-250/5 Temp 3	T3	0.025	32.0 x 52.0
17	Lower Left Skin Sta 186.25 To Sta 218.97	209-033-150-89	2024 Al Aly	QQ-A-250/5 Temp 0	T42	0.025	24.0 x 34.0
18	Aft Cross Tube Cover	209-033-190-17	2024 Al Aly	QQ-A-250/5 Temp 3	T3	0.025	9.0 x 35.3
19	Lower Left Skin Sta 227.62 To Sta 270.00	209-033-150-63	2024 Al Aly	QQ-A-250)5 Temp 0	T42	0.025	20.0 x 44.0
20	Door	209-033-150-83	2024 Al Aly	QQ-A-250/5 Temp T3	T3	0.032	16.0 x 17.0
21	Sense Antenna Panel	209-030-133-7	NA	NA	NA	NA	NA
22	Lower Right Skin Sta 227.62 To Sta 270.00	209-033-150-67	2024 Al Aly	QQ-A-250/5 Temp 0	T42	0.025	20.0 x 44.0
23	Skin	209-033-150-79	2024 Al Aly	QQ-A-250/5 Temp T3	T3	0.025	6.0 x 17.0
24	Door	209-033-194-1	NA	NA	NA	NA	NA
25	P E Door	209-033-193-1	NA	NA	NA	NA	NA
26	Lower Right Skin Sta 186.25 To Sta 218.97	209-033-150-90	2024 Al Aly	QQ-A-250/5 Temp 0	T42	0.025	24.0 x 34.0
27	Door	209-033-192-1	NA	NA	NA	NA	NA
28	Door	209-033-191-1	NA	NA	NA	NA	NA
29	Door	209-033-150-121 or 209-033-150-123	2024 Al Aly	QQ-A-250/5 Temp T3	T3	0.032	10.5 x 21

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Figure 2-49. Sheet Metal Panels and Skin (Sheet 4 of 4)

(3) Remove hinge pin from hinge and remove door.

c. Remove other access covers and doors shown on figure 2-3 by removing screws or releasing turnlock fasteners as applicable.

2-62. INSPECTION — ACCESS COVERS AND DOORS.

a. Inspect hydraulic compartment doors (8, figure 2-3).

(1) Latches for correct operation.

(2) Seals for cuts, chafing, and secure adhesion surface.

(3) Hinges for cracks. If cracks are suspected, remove hinges and inspect by fluorescent penetrant method in accordance with TM 43-0103.

(4) Doors for cracks, dents, holes, deformation, and corrosion.

b. Inspect ammunition compartment doors (21).

(1) Catch assemblies for correct operation and damage. Catch assembly covers and strips for damage.

(2) Door support cables and cable fasteners for proper safetying and condition.

(3) Doors for cracks, dents, holes, deformation and corrosion.

(4) Door hinges for damage.

(5) Door rubber strips (seals) for cuts, chafing, and secure adhesion to door surface.

c. Refer to table 2-3 for instructions to inspect other access covers and doors shown on figure 2-3.

2-63. CLEANING — ACCESS COVERS AND DOORS.

a. Clean access covers and doors with cleaner (C33) and water.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Remove stubborn deposits with solvent (C112) and clean cloths.

2-64. REPAIR — ACCESS COVERS AND DOORS.

a. Repair hydraulic compartment doors (8, figure 2-3).

(1) Replace faulty latches.

(2) Replace damaged seals or rebond seals with adhesive. Refer to paragraph 2-20 for procedure.

(3) Replace faulty hinges.

(4) Repair cracks, dents, and holes that are within limits shown on figures 2-7 through 2-10. Use repair procedures shown on the illustrations.

(5) Repair corrosion damage. Refer to paragraph 2-10.

(6) Replace door if it is distorted to the degree that it will not close properly and fit smoothly with the fuselage.

b. Repair ammunition compartment doors (21, figure 2-3).

(1) Replace faulty catch assemblies, damaged catch assembly covers, and strips.

(2) Replace damaged door support cables and cable fasteners (attachment brackets).

(3) Repair cracks, dents, holes, deformation, and corrosion. Refer to TM 55-1500-204-25/1 for general repair instructions. Refer to paragraph 2-10 for corrosion damage repair instructions. Repair fatigue-type vertical cracks along aft spotweld seam on outer skin of ammunition compartment doors.

(a) Stop drill ends of cracks.

(b) Remove rubber strip (seal) from inside aft edge of door.

(c) Fabricate doubler of 2024T3 aluminum alloy **0.040** inch thick. Make doubler to fit the width and length of the inside edge of door.

(d) Fabricate overlay patch for outside skin of door 2024T3 aluminum alloy **0.025** inch thick. Make overlay patch to overlap cracks in skin by **1.50** inches.

(e) Clamp inside doubler and overlay patch to door. Drill holes for rivets (51, table 2-2) through overlay patch, aft edge of door and doubler. Use one inch spacing between rivets and **0.25** inch edge distance. Countersink the doubler for installation of these rivets. Drill holes for bulb-type cherry rivets (32, table 2-2) on remaining three edges of patch. Use the same spacing.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(f) Remove overlay patch and doubler from door. Clean and deburr parts and coat outside surface with primer (C88 or C91). Clean inside surface of doubler, patch, and mating surfaces on door with MEK (C74).

(g) Apply a thin smooth layer of adhesive (C14) on mating surfaces of door, patch, and doubler. Position the patch and doubler in the door. Install rivets (51, table 2-2) in holes prepared in step (e). Install cherry rivets (32, table 2-2) in remaining three sides of patch.

(h) Install rubber strip (seal) that was removed in step (b). Refer to paragraph 2-20 for procedure.

(i) Touch-up paint to match surrounding area.

(4) Replace damaged rubber strips (seals) or rebond with adhesive. Refer to paragraph 2-20 for procedure.

(5) Replace faulty hinges.

c. Refer to paragraph 2-18 for instructions to repair other access covers and doors shown on figure 2-3.

2-65. INSTALLATION — ACCESS COVERS AND DOORS.

a. Install hydraulic compartment doors (8, figure 2-3).

(1) Position door on fuselage and install bolts to attach hinges to supports. Attach door-holding spring to the lower hinge.

(2) Open and close door several times to ensure that latches operate properly.

(3) Attach air duct hose to vent on left door.

b. Install ammunition compartment doors (21).

(1) Align door hinge half with the mating hinge half on the fuselage and install pin.

(2) Install two door support cables.

(3) Check operation of door catches to ensure that they function properly. Check that door fits smoothly with fuselage and that rubber strips (seals) are in position on the door.

c. Install other access covers and doors shown on figure 2-3 by securing with turnlock fasteners or screws as applicable.

2-66. PAINTING — ACCESS COVERS AND DOORS — TOUCH-UP.

Touch-up damaged paint by same procedure outlined for cowling and fairing. Refer to paragraph 2-93 and TB746-93-2 for paint instructions.

2-67. FLOORS AND DECKS.

2-68. DESCRIPTION — FLOORS AND DECKS.

The floors and decks described in this paragraph are the ammunition compartment floor, gunner compartment floor, pilot compartment floor, engine deck, rear panel, and the floor (bottom panels) of the compartments below the engine compartment. These floors and decks are constructed of bonded honeycomb.

2-69. REMOVAL — FLOORS AND DECKS. (AVIM)

a. Except for engine deck, removal of floors and decks listed in paragraph 2-68 must be accomplished by depot maintenance.

b. **Removal of Engine Deck.**

CAUTION

Do not remove front engine deck panel (209-033-152) and center deck skin (209-033-154) at the same time. Structural misalignment can result when both sections of the deck are removed together.

All structural stress must be relieved prior to removing engine deck front panel or center skin. The primary method for relieving the stress is to remove all wing stores, engine assembly, all rotating controls, transmission assembly, and tailboom assembly.

Fuel system must be defueled and the rear fuel cell removed to prevent inadvertant puncture and FOD during the drilling process in removing the front deck panel.

Do not use helicopter structure as work platform when engine deck is removed. All maintenance personnel must work from maintenance stands rather than the helicopter structure, to preclude structural misalignment.

(1) Remove engine assembly, including all mounts and linkage (paragraph 4-12).

(2) Remove transmission assembly, including all rotating controls (paragraphs 5-12 and 6-24).

(3) Remove tail boom assembly, including tail rotor driveshaft and number one hanger support (paragraphs 2-283 and 6-84).

(4) Install rear jack fitting and support helicopter with a suitable jack.

(5) Remove rear fuel cell side panel and cell (paragraphs 2-61 and 10-77).

NOTE

Cap all lines and cover all component opening to prevent entry of foreign matter.

(6) Remove lines and wiring in work area.

(7) Identify all removed components and store in a secure location to prevent loss or damage.

(8) Preserve fuel cell to preclude deterioration.

(9) Cover oil cooler air inlet to prevent entry of foreign matter.

(10) Drill out rivets holding deck section in place, being careful not to drill into existing helicopter structure.

(11) Remove old sealant from edges of deck mating surface.

(12) Remove all foreign matter from work area including drill shavings and rivet fragments in fuel cell cavity.

2-70. INSPECTION — FLOORS AND DECKS.

Refer to table 2-2 for inspection requirements for the floors and decks listed in paragraph 2-68.

2-71. CLEANING — FLOORS AND DECKS.

a. Clean the floors and decks listed in paragraph 2-68 with cleaner (C32) and water.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Remove stubborn deposits with solvent (C112) and clean cloths.

2-72. REPAIR — FLOORS AND DECKS.

Refer to paragraphs 2-16 and 2-17 for procedure to repair floors and decks listed in paragraph 2-68.

2-73. INSTALLATION — FLOORS AND DECKS (AVIM)

a. Except for engine deck, installation of floors and decks listed in paragraph 2-68 must be accomplished by higher maintenance level.

b. **Installation of Engine Decks:**

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(1) Clean deck mating surfaces with MEK (C74).

(2) Apply a bead of sealant (C105) to mating surface and install deck section, being careful not to bend corners or damage bonding.

(3) Rivet in place and seal edges to ascertain water-tight condition, using sealant (C105).

(4) Reinstall all removed components, lines, wiring, mounts, and fittings in reverse order. Insure that rear fuel cell cavity is completely free of foreign matter prior to installing fuel cell.

(5) Perform engine to transmission alignment check (paragraph 6-7).

(6) Rig all affected systems, perform maintenance operational checks, and maintenance test flight to ascertain airworthiness.

2-74. PAINTING — FLOORS AND DECKS — TOUCH-UP.

a. Clean area where paint requires touch-up with cleaning compound (C32) and rinse with water. Allow to dry thoroughly.

b. Apply primer (C88 or C91) to area that requires touch-up.

c. Apply finish coat to match existing finish.

2-75. COWLING AND FAIRING.

2-76. DESCRIPTION — COWLING AND FAIRING.

a. P E The pylon fairings (1, 3, and 4, figure 2-50) are primarily honeycomb construction with the exception of the horizontal firewalls (5 and 8) which are titanium.

b. M The pylon fairings (1, 3, and 4, figure 2-51) are primarily honeycomb construction with the exception of the horizontal firewalls (5 and 17) which are titanium.

c. The honeycomb construction parts have fiberglass facings with aluminum or fiberglass cores. The fairings are not structural members and do not carry primary loads; therefore, larger size damage may be repaired on these fairings than can be repaired on the fuselage honeycomb panels. It is necessary to maintain contours and restore the fairings to original strength when repair is accomplished.

d. P E The transmission cowling (14, figure 2-50) consists of the right and left doors.

e. M The transmission cowling (8, figure 2-51) consists of the right and left doors.

f. Openings in the doors form the engine air inlet ducts. A small window in the right door permits viewing the transmission oil level. A latch safety indicator, which is a red-painted knob, protrudes slightly past the surface of the door when the door is properly latched in the closed position. The doors are equipped with articulated hinges.

g. P E The engine cowling (11, figure 2-50) consists of the right and left doors. Ram air inlets (12) form inlets for outside air into the engine compartment.

h. M The engine cowling (6, figure 2-51) consists of the right and left doors. Ram air inlets (7) form inlets for outside air into the engine compartment.

i. The engine cowl doors are equipped with hinges and latch safety indicators similar to those described in the preceding paragraph for the transmission doors.

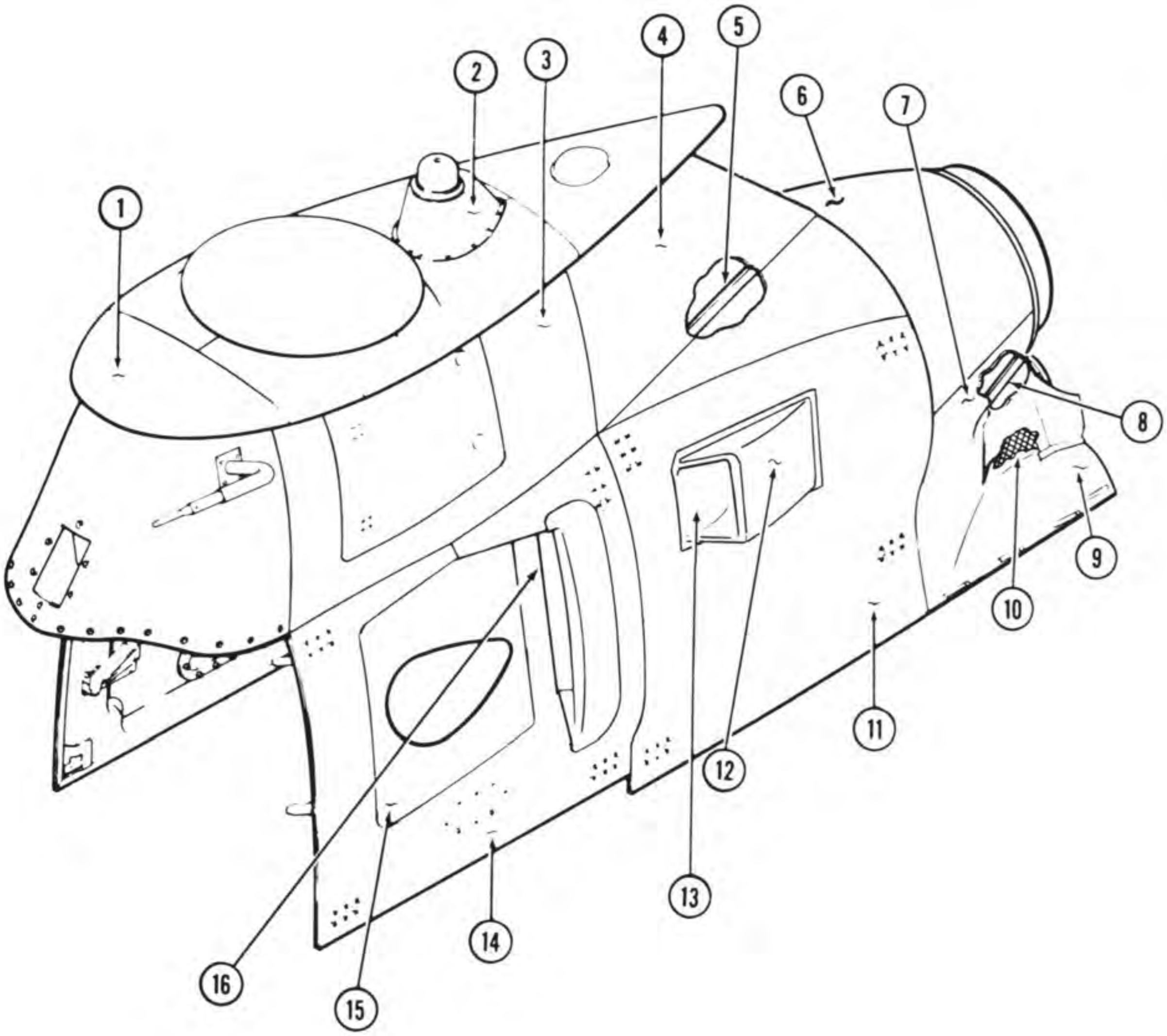

Figure 2-50. P E Fairing — Cowling for Pylon, Transmission, Engine, and Tailpipe (Sheet 1 of 3)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
1	Forward Pylon Fairing Assembly	209-061-801-1					
	Outer Skin, Two Ply Glass Fabric	N/A	Fiberglass Fabric	Bell Helicopter Specification 299-947-076 One Ply Type A on Outside One Ply Type C Next to Core	N/A	N/A	N/A
	Inner Skin, One Ply Glass Fabric	N/A	Fiberglass Fabric	Same As Above Except Use One Ply Type A Only	N/A	N/A	N/A
	Core Between Outer and Inner Skins	N/A	Nonmetallic Honeycomb	Bell Helicopter Specification 299-947-103 Grade II, Type I, Class I Density 4.0 1/8 Hexagonal Cell	N/A	N/A	N/A
	Core At Pitot Tube Mounting Boss	N/A	Al Aly Honeycomb	Bell Helicopter Specification 299-947-059 Type IV	N/A	N/A	N/A
2	Support Assembly	209-060-812-17					
	Outer Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	23.0 x 4.7
		N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	23.0 x 4.70
	Inner Skin, 1 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	23.0 x 23.5
3	Fairing Assembly, Left	209-060-811-95					
	Outer Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	42.0 x 46.0
		N/A	Fiberglass Cloth	MIL-C-9084, Type VIII	N/A	Variable	42.0 x 46.0
	Inner Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	42.0 x 46.0
		N/A	Fiberglass Cloth	MIL-C-9084, Type VIII			
	Core, Nonmetallic	N/A	Honeycomb, Nonmetallic	Same as Specification for core, nonmetallic in item 1.			
	Fairing Assembly, Right, (Same as listed above for 209-969-811-95)	209-060-811-96					
4	Aft Pylon Fairing Assembly	209-060-807-13					
	Outer Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	54.0 x 154.0
		N/A	Fiberglass Cloth	MIL-C-9084, Type VIII	N/A	Variable	54.0 x 154.0
	Inner Skin, 1 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	54.0 x 154.0
	Core, Nonmetallic	N/A	Honeycomb, Nonmetallic	Same as Specification for core, nonmetallic in item 1.			
5	Upper Horizontal Firewall	209-060-902-3	Titanium	MIL-T-9046 Type I, Comp B	80 Min.	0.020	25.0 x 41.0
6	Tail Pipe Fairing, Assembly of	209-060-810-7					
	Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	22.0 x 45.0
7	Tail Pipe Fairing, Assembly of	209-060-810-7					
	Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	26.0 x 35.0
8	Firewall	209-060-810-17	Titanium	MIL-T-9046, Type I, Comp C	65 Min.	0.020	24.0 x 28.0

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Figure 2-50. P E Fairing — Cowling for Pylon, Transmission, Engine, and Tailpipe (Sheet 2 of 3)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
9	Tail Pipe Fairing, Assembly of	209-060-810-7					
	. Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	14.0 x 32.0
10	Screen (Nonreparable — replace screen)	209-060-810-75	N/A	N/A	N/A	N/A	N/A
11	Engine Cowl Assembly, Left	209-060-809-11					
	Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	43.0 x 45.0
	Inner Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	43.0 x 45.0
	Engine Cowl Assembly, Right (Same as listed above for 209-060-809-11)	209-060-809-12					
12	Ram Air Inlet Assembly, Left	·209-060-815-1					
	Reinforcement	N/A	Al Aly 2024	QQA250/5, Temp T3	T3	0.025	1.0 x 19.0
	Reinforcement	N/A	Al Aly 2024	QQA250/5, Temp T3	T3	0.025	1.0 x 20.0
	Reinforcement	N/A	Al Aly 2024	QQA250/5, Temp T3	T3	0.025	1.2 x 10.0
	Reinforcement	N/A	Al Aly 2024	QQA250/5, Temp T3	T3	0.025	2.6 x 10.0
	Skin Outer	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	36.0 x 36.0
	Skin Inner	N/A	Fiberglass Cloth	MIL-C-9084, Type VIII	N/A	Variable	72.0 x 72.0
	Honeycomb Core, Aluminum			Bell Helicopter Specification 299-947-059, Type II		0.250	10.0 x 14.0 and 7.0 x 8.0
	Ram Air Inlet Assembly, Right (Same as listed above for 209-060-015-1)	209-060-815-2					
13	Air Scoop, Right	209-060-809-10					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	14.0 x 6.0
	Air Scoop, Left	209-060-809-9					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	14.0 x 6.0
14	Transmission Cowl Assembly, Left	209-060-808-215					
	Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	40.0 x 43.0
	Inner Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	40.0 x 43.0
	Transmission Cowl Assembly Right (Same as listed above for 209-060-808-215)	209-060-808-216					
15	Intake Ramp, Left	N/A					
	Outer Skin		Al Aly 2024	QQA250/5, Temp 0	T42	0.025	22.8 x 23.5
	Intake Ramp, Right	N/A					
	Outer Skin		Al Aly 2024	QQA250/5, Temp 0	T42	0.025	22.8 x 23.5
16	Intake Lip, Left	N/A					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	25.0 x 25.0
	Intake Lip, Right	N/A					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	25.0 x 25.0

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Figure 2-50. P E Fairing — Cowling for Pylon, Transmission, Engine, and Tailpipe (Sheet 3 of 3)

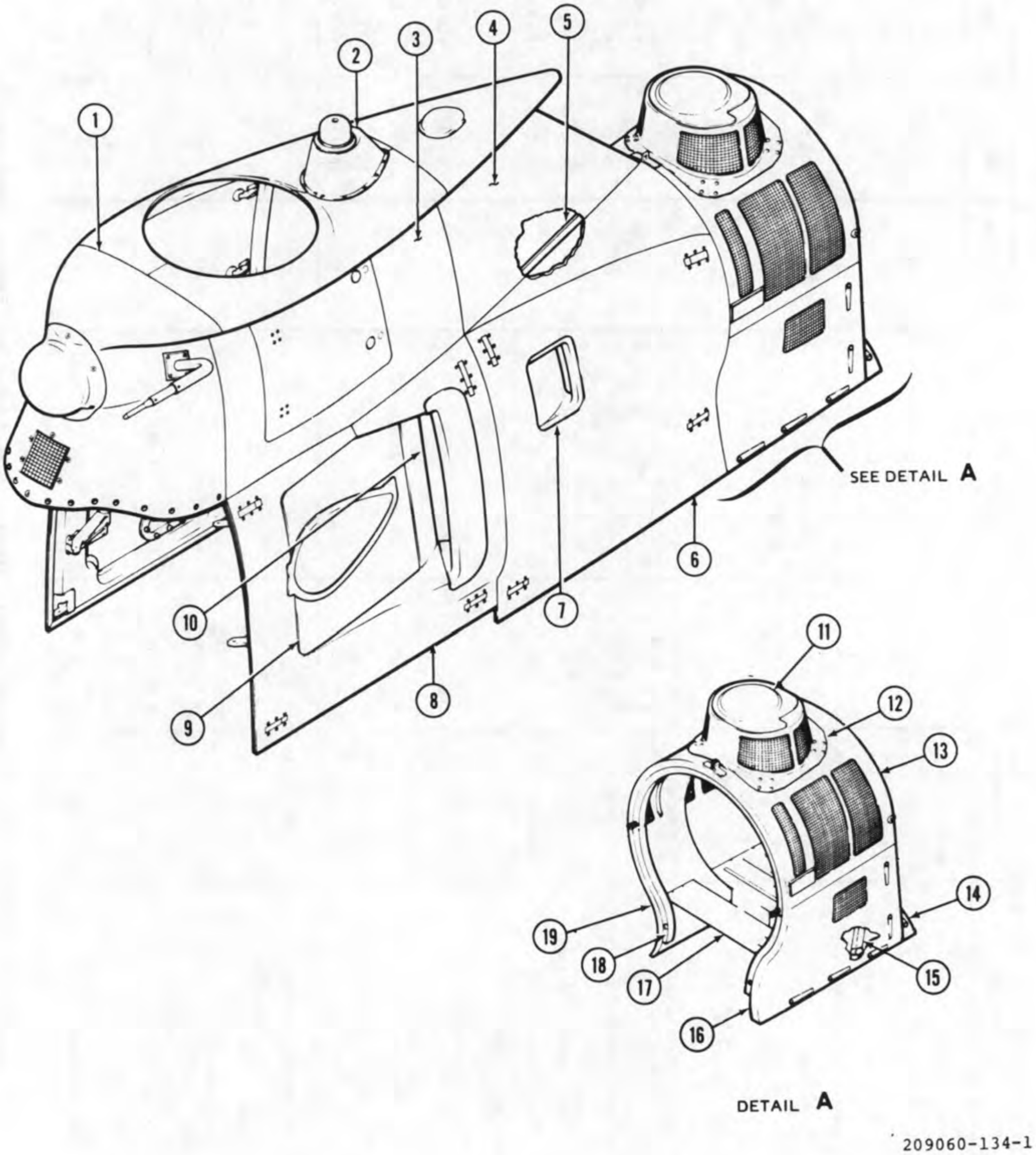

Figure 2-51. M Fairing and Cowling — Pylon, Transmission, Engine and IR Suppressor (Sheet 1 of 5)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
1	Forward Pylon Fairing Assembly	209-061-801-1					
	Outer Skin, Two Ply Glass Fabric	N/A	Fiberglass Fabric	Bell Helicopter Specification 299-947-076 One Ply Type A on Outside One Ply Type C Next to Core	N/A	N/A	N/A
	Inner Skin, One Ply Glass Fabric	N/A	Fiberglass Fabric	Same As Above Except Use One Ply Type A Only	N/A	N/A	N/A
	Core Between Outer and Inner Skins	N/A	Nonmetallic Honeycomb	Bell Helicopter Specification 299-947-103 Grade II, Type I, Class I Density 4.0 1/8 Hexagonal Cell	N/A	N/A	N/A
	Core At Pitot Tube Mounting Boss	N/A	Al Aly Honeycomb	Bell Helicopter Specification 299-947-059 Type IV	N/A	N/A	N/A
2	Support Assembly	209-060-812-17					
	Outer Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	23.0 x 4.7
		N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	23.0 x 4.70
	Inner Skin, 1 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	23.0 x 23.5
3	Fairing Assembly, Left	209-060-811-95					
	Outer Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	42.0 x 46.0
		N/A	Fiberglass Cloth	MIL-C-9084, Type VIII	N/A	Variable	42.0 x 46.0
	Inner Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	42.0 x 46.0
		N/A	Fiberglass Cloth	MIL-C-9084, Type VIII			
	Core, Nonmetallic	N/A	Honeycomb, Nonmetallic	Same as Specification for core, nonmetallic in item 1			
	Fairing Assembly, Right, (Same as listed above for 209-969-811-95)	209-060-811-96					
4	Aft Pylon Fairing Assembly	209-060-807-13					
	Outer Skin, 2 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	54.0 x 154.0
		N/A	Fiberglass Cloth	MIL-C-9084, Type VIII	N/A	Variable	54.0 x 154.0
	Inner Skin, 1 Ply	N/A	Fiberglass Cloth	MIL-C-9084, Type III (120)	N/A	Variable	54.0 x 154.0
	Core, Nonmetallic	N/A	Honeycomb, Nonmetallic	Same as Specification for core, nonmetallic in item 1			
5	Upper Horizontal Firewall	209-060-902-3	Titanium	MIL-T-9046 Type I, Comp B	80 Min	0.020	25.0 x 41.0
6	Engine Cowl Assembly, Left	209-060-809-11					
	Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	43.0 x 45.0
	Inner Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	43.0 x 45.0
	Engine Cowl Assembly, Right (Same as listed above for 209-060-809-11)	209-060-807-12					

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Figure 2-51. M Fairing and Cowling — Pylon, Transmission, Engine and IR Suppressor (Sheet 2 of 5)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
7	Air Scoop, Right	209-060-809-10					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	14.0 x 6.0
	Air Scoop, Left	209-060-809-9					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	14.0 x 6.0
8	Transmission Cowl Assembly, Left	209-060-808-215					
	Outer Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	40.0 x 43.0
	Inner Skin	N/A	Al Aly 2024	QQA250/5, Temp 0	T42	0.025	40.0 x 43.0
	Transmission Cowl Assembly Right (Same as listed above for 209-060-808-215)	209-060-808-216					
9	Intake Ramp, Left	N/A					
	Outer Skin		Al Aly 2024	QQA250/5, Temp 0	T42	0.025	22.8 x 23.5
	Intake Ramp, Right	N/A					
	Outer Skin		Al Aly 2024	QQA250/5, Temp 0	T42	0.025	22.8 x 23.5
10	Intake Lip, Left	N/A					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	25.0 x 25.0
	Intake Lip, Right	N/A					
	Outer Skin		Al Aly 6061	QQA250/11, Temp 0	T6	0.032	25.0 x 25.0
11	Cover Assembly, Auxiliary Jammer	191722-2					
	Cover	191722-3	Al Aly 2024	QQA250/5	T3	0.040	
	Bracket	191722-7	Al Aly 2024	QQA250/5	T3	0.063	
12	Fairing Assembly, Jammer	191657-1					
	Fairing	191657-3	Polyester Glass Cloth	MIL-R-7575, Form B	N/A		
	Screen	191657-5	N/A	N/A	N/A	N/A	N/A
	Screen (Nonreparable — replace screens)	191657-7	N/A	N/A	N/A	N/A	N/A
13	Panel Assembly, , Cowling Top	191653-2					
	Outer Skin	191653-15	Al Aly 2024	QQA250/3	T4	0.015	
	Screen (Nonreparable — replace screen)	191653-13	N/A	N/A	N/A	N/A	N/A
14	Panel Assembly, Aft	191652-1					
	Upper Panel	191652-9	Al Aly 2024	QQA250/5	T3	0.032	
	Lower Panel	191652-11	Polyester Glass Cloth	MIL-R07575, Form B	N/A		
	Screen (Nonreparable — replace screen)	191652-17	N/A	N/A	N/A	N/A	N/A

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M Fairing and Cowling — Pylon, Transmission, Engine and IR Suppressor (Sheet 3 of 5)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
15	Frame Assembly, Aft	191650-2					
	Channel, LH Strut Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Channel, RH Strut Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Channel, Fwd LH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Foot, Fwd LH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.75	
	Channel, Fwd RH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Foot, Fwd RH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.75	
	Channel, Aft LH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Foot, Aft LH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.75	
	Channel, Aft RH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Foot, Aft RH Leg Assembly		Al Aly 6061	QQA250/11	T6	0.75	
	Ring Assembly		Al Aly 6061	QQA250/11	T6	0.040	
	Doubler		Al Aly 6061	QQA250/11	T6	0.032	
	Flange		Al Aly 6061	QQA250/11	T6	0.032	
16	Panel Assembly, Cowling Side LH	191654-3					
	Outer Skin		Al Aly 2024	QQA250/5	T3	0.025	
	Doubler		Al Aly 2024	QQA250/5	T3	0.032	
	Screen (Nonreparable — replace screen)	191654-35	N/A	N/A	N/A	N/A	N/A
17	Firewall Assembly	191651-1					
	Wall	191651-3	CRES	WWS766, Class 347	A	0.025	
	Flange, LH	191651-5	CRES.	QQS766, Class 347	A	0.032	
	Flange, RH	191651-6	CRES	QQS766, Class 347	A	0.032	
	Flange	191651-7	CRES	QQS677, Class 347	A	0.032	
	Flange	191651-9	CRES	QQS766, Class 347	A	0.025	

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Figure 2-51. M Fairing and Cowling — Pylon, Transmission, Engine and IR Suppressor (Sheet 4 of 5)

ITEM	DESCRIPTION	PART NUMBER	MATERIAL	SPECIFICATION	CONDITION	THICKNESS	SIZE
18	Frame assembly, Fwd	191649-2					
	Frame		Al Aly 2024	QQA250/5	T3	0.032	
	Pad		CRES	QQS766, Class 321		0.063	
19	Panel Assembly, Cowling Side RH	191654-4					
	Outer Skin		Al Aly 2024	QQA250/5	T3	0.025	
	Doubler		Al Aly 2024	QQA250/5	T3	0.032	
	Screen (Nonreparable — replace screen)	191654-35	N/A	N/A	N/A	N/A	N/A
	Cover, Inspection Door		Al Aly 2024	QQA250/5	T3	0.025	

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Figure 2-51. M Fairing and Cowling — Pylon, Transmission, Engine and IR Suppressor (Sheet 5 of 5)

j. **P** **E** The tailpipe assembly fairing (6, figure 2-50) encloses the engine tailpipe and supports the exhaust duct.

k. **M** The IR suppressor cowling (detail A, figure 2-51) encloses the engine exhaust duct and supports the IR suppressor.

2-77. REMOVAL — COWLING AND FAIRING.

Refer to paragraph 2-78 through 2-82.

2-78. REMOVAL — TRANSMISSION COWL ASSEMBLY.

a. Remove shields, if installed, from engine air inlet ducts.

b. **P** **E** Open transmission cowl assembly (door) (14, figure 2-50) that is to be removed.

c. **M** Open transmission cowl assembly (door) (8, figure 2-51) that is to be removed.

d. Remove bolts that attach hinges to fittings on cowl frame. Identify washers and shims for reinstallation in the same relative location to avoid requirement to align cowling assembly when it is reinstalled.

e. Remove cowling assembly from helicopter.

2-79. REMOVAL — ENGINE COWL ASSEMBLY.

a. **P** **E** Remove engine cowl assembly doors (11, figure 2-50) in same manner as transmission cowl doors (paragraph 2-78).

b. **M** Remove engine cowl assembly door (6, figure 2-51) in same manner as transmission cowl doors (paragraph 2-78).

2-80. P E REMOVAL — TAILPIPE FAIRING.

Disconnect fasteners and remove machine screws to release tailpipe assembly fairing (6, figure 2-50) from fuselage and from pylon fairings. Remove tailpipe assembly fairing.

2-81. M REMOVAL — IR SUPPRESSOR COWLING.

a. Release fasteners (9, figure 2-52), and remove side panels (10) from cowling.

b. Remove IR suppressor (paragraph 4-54).

c. Disconnect auxiliary jammer connectors (3) at aft engine firewall.

d. Disconnect fuel drain lines.

(1) Overboard drain line (4) at aft engine firewall.

(2) Engine exhaust duct drain line (6) at tee fitting. Cap open drain lines.

e. Release fasteners (13) on aft panel assembly (11).

f. Remove screws (15) and washers (14).

g. Remove bolts and washers (5).

h. Remove safety clips (1) from dowel pins (2).

i. Open cowl support latch.

j .Remove cotter pins (18), washers (19) and pins (22).

k. Remove suppressor cowling.

(1) Pull up on aft end of cowling to disengage eyebolts (7) from lugs on mount brackets (26 and 29).

(2) Pull cowling aft to disengage dowel pins (2) from aft engine firewall.

(3) Remove cowling from helicopter.

2-82. REMOVAL — PYLON FAIRING.

a. **P** **E** Disconnect electrical wiring inside forward and aft pylon fairings (1, 3, and 4, figure 2-50).

b. **M** Disconnect electrical wiring inside forward and aft pylon fairings (1, 3, and 4, figure 2-51).

c. Disconnect tubing at pitot tube.

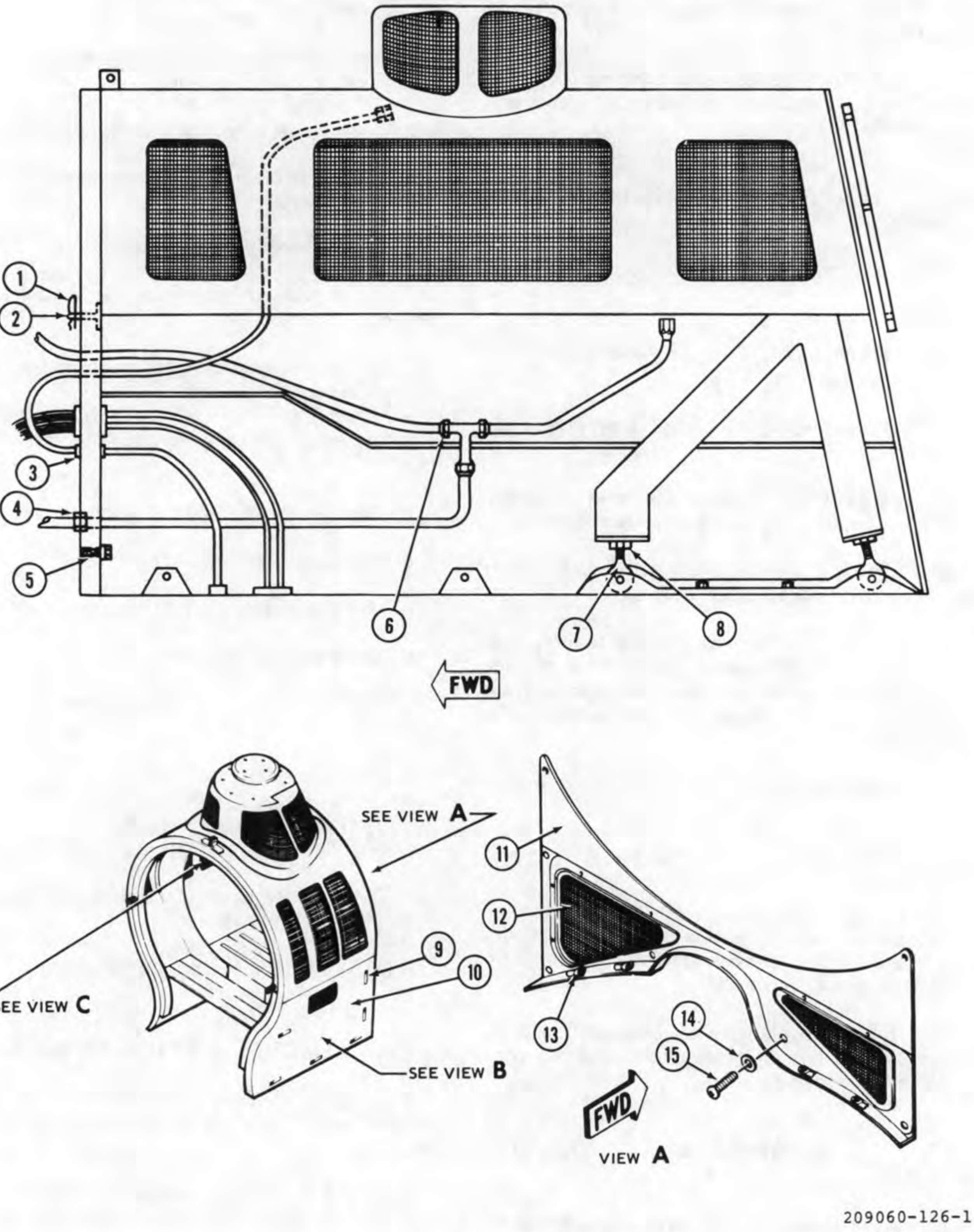
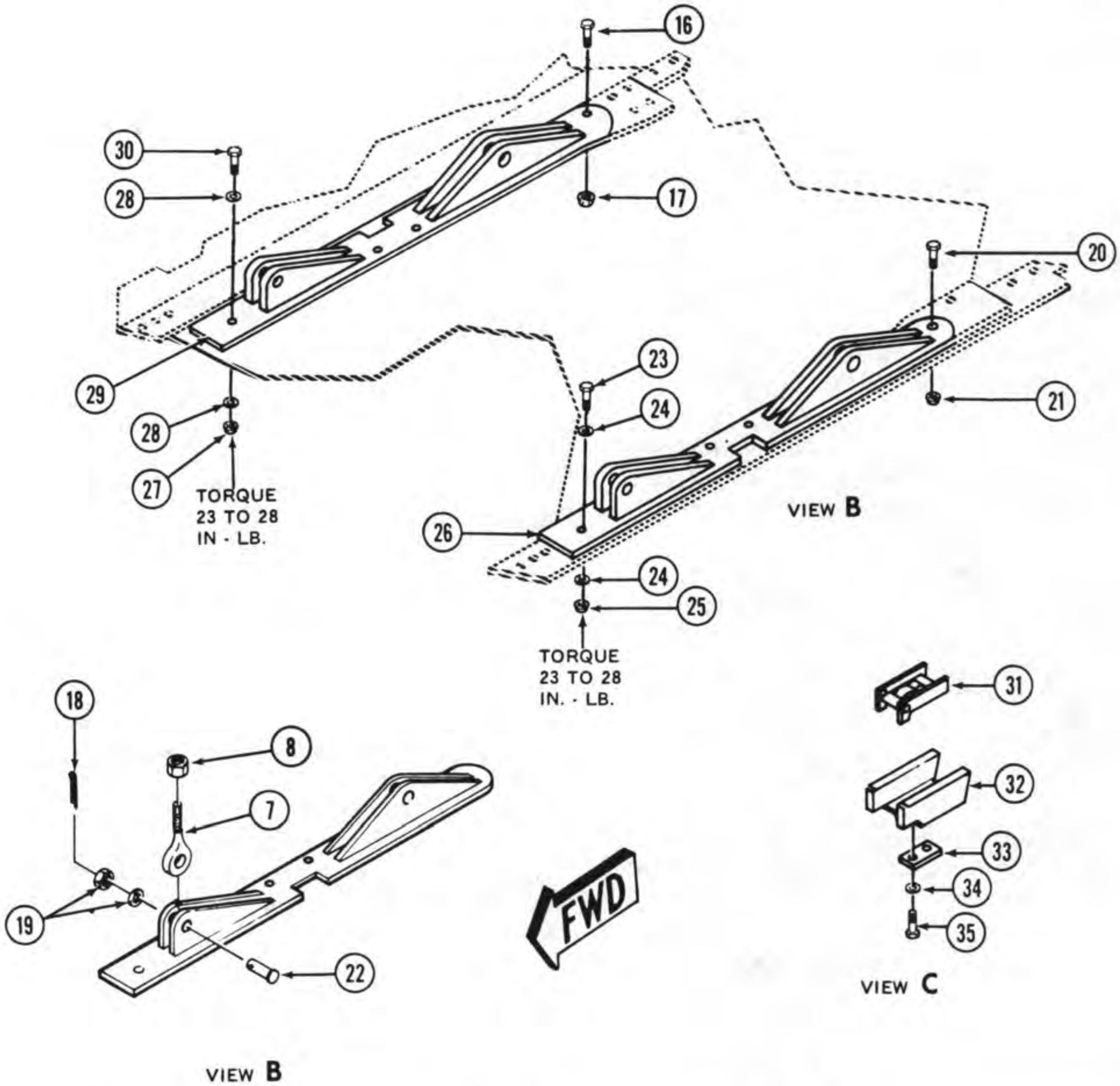


Figure 2-52. IR Suppressor Cowling Installation (Sheet 1 of 2)



1. Safety clip	13. Fastener	25. Nut MS21045C3
2. Dowel pin	14. Washer	26. Bracket 191658-2
3. Auxiliary jammer connectors	15. Screw	27. Nut MS21045C3
4. Fuel drain connector	16. Bolt 145-173-9029	28. Washer
5. Bolt and washer	17. Nut 525-272-9502	29. Bracket 191729-2
6. Fuel drain connector	18. Cotter pin	30. Bolt AN3C10A
7. Rod end bearing	19. Washer	31. Cowling latch
8. Locknut	20. Bolt 145-173-9011	32. Bracket
9. Fastener	21. Nut 525-272-9501	33. Lower serrated plate
10. Side panel	22. Pin	34. Washer
11. Aft panel assembly	23. Bolt AN3C6A	35. Screw
12. Screen	24. Washer	

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Figure 2-52. IR Suppressor Cowling Installation (Sheet 2 of 2)

d. Disconnect fasteners and remove pylon fairings.

2-83. INSPECTION — COWLING AND FAIRING.

a. Refer to table 2-3 to classify damage to structure and fasteners of cowling and fairing.

b. Inspect rubber seals and bumpers for deterioration, damage, and secure installation.

c. **P** **E** Inspect latch assemblies on transmission and engine cowling (14 and 11, figure 2-50) for wear and damage that could affect function.

d. **M** Inspect latch assemblies on transmission and engine cowling (8 and 6, figure 2-51) for wear and damage that could affect function.

e. **P** **E** Inspect hinge assemblies on transmission and engine cowling (14 and 11, figure 2-50) for wear and damage that could affect function.

f. **M** Inspect hinge assemblies on transmission and engine cowling (8 and 6, figure 2-51) that could affect function.

2-84. CLEANING — COWLING AND FAIRING.

a. Clean cowling and fairing with cleaning compound (C32) and water.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Remove stubborn deposits with solvent (C112) and clean cloths.

2-85. REPAIR — COWLING AND FAIRING.

a. Repair structural damage and replace damaged fasteners (paragraph 2-19).

b. **P** **E** Refer to figure 2-50 for cowling and fairing construction material.

c. **M** Refer to figure 2-51 for cowling and fairing construction material.

d. Replace damaged latches and hinges.

e. Replace damaged rubber seals and bumpers. Refer to paragraph 2-20.

f. **P** **E** Replace damaged screen (10, figure 2-50). Carefully drill out rivets and remove the aluminum alloy spoiler to gain access to the rivets that retain the screen. Carefully drill out the rivets that retain the screen. Remove the damaged screen and retainer strips. Deburr holes and touch-up bare metal with chemical film (C31) and primer (C88 or C91). Trim new screen to fit. Install new screen, retainer strips and spoiler with blind rivets (37, table 2-2).

2-86. M REPAIR — I R SUPPRESSOR COWLING.

a. Refer to paragraph 2-19 for procedure to repair structural damage and to replace damaged fasteners. See figure 2-51 for partial list of materials used in construction of cowling.

b. Replace damaged latches.

c. Replace damaged rubber seals (paragraph 2-20).

d. Replace damaged screen (12, figure 2-52).

(1) Carefully drill out rivets and remove doublers around screen.

(2) Deburr holes, touch up bare metal with chemical film (C31) and primer (C88 or C91).

(3) Trim new screen to fit.

(4) Install screen, doublers, and rivets.

e. Replace damaged cowling mount brackets (26 and 29). (Refer to table 2-3, item 11.)

(1) Remove IR suppressor cowling (paragraph 2-81).

CAUTION

Use proper removal tool when removing Hi-Lok bolts to prevent damage to or enlargement of bolt holes. Use vise-grips or equivalent to remove locking collars from Hi-Lok bolts. Apply penetrating oil (C81) around heads of Hi-Lok bolts to facilitate removal.

(2) Use a **0.156** inch (maximum) diameter drive bar of aluminum or equally soft material to remove Hi-Lok bolts (16 and 20). Remove remaining nuts, bolts, and washers. Remove defective mount bracket. Clean engine deck, with sharp plastic scraper.

(3) Position replacement mount bracket (26 or 29) on engine deck at approximate installed position.

(4) Temporarily install cowling assembly on helicopter. Ensure that dowel pins (2) are engaged, and that rod end bearing (7) of cowling assembly are positioned within the lugs of mount brackets (26 and 29) on the engine deck.

(5) Temporarily install two bolts and washers (5) to secure lower section of cowling forward frame to aft engine firewall.

CAUTION

Adjustment of cowling latch may be necessary to ensure proper closing of latch. Do not force latch closed. Slight tension shall remain on latch in the closed position.

(6) Fasten cowl latch. If adjustment is required, perform steps (a) through (c).

(a) Loosen two attachment screws (35) securing serrated latch plate (33) to IR suppressor cowling bracket. Latch shall remain fastened during adjustment.

(b) Adjust as necessary to provide slight tension on latch when closed.

(c) Tighten two attachment screws (35).

(7) Adjust eyebolts (7) as necessary for alignment with mount bracket (26 and 29) lugs when brackets are resting on engine deck. Insert pins (22) through mount brackets (26 and 29) and rod end bearing (7).

(8) Transfer location of five holes from engine deck to underside of mount bracket.

(9) Remove pins (22) from mount brackets (26 and 29). Remove bolts (5) securing lower section of cowling forward support to aft engine firewall and cowl support. Unlatch upper cowl latch and remove cowling assembly from helicopter.

(10) Remove mount bracket from engine deck, and drill brackets.

(a) If left bracket (29) is being replaced, drill five **0.220 TO 0.227** inch diameter holes through mount bracket.

(b) If right bracket (26) is being replaced, drill three **0.220 TO 0.227** inch diameter holes at forward three locations. Drill two **0.193 TO 0.198** inch diameter holes (No. 9 drill) through aft end of mount bracket for Hi-Lok bolts.

CAUTION

After rework, mount bracket must be at least 0.290 inch thick and must not have any sharp edges or scratches.

(c) Remove sharp edges. Touch-up all drilled areas with primer (C88 or C91) and allow to dry.

(d) Position mount brackets on engine deck and ensure that no more than **0.010** inch gap exists in any mating area prior to securing attaching bolts.

(11) Place mystic tape (C124) over bottom surface of mount bracket (26 or 29). Tape will prevent adhesive (C14) from adhering to mount bracket during initial installation and curing.

(12) Apply adhesive (C14) to mount bracket contact area on engine deck. Apply enough adhesive to fill in any low areas on the engine deck and to make a smooth area for installation of mount bracket.

(13) Install mount bracket on prepared area of engine deck, using temporarly bolts and nuts. Install and torque nuts **10** inch-pounds.

(14) Allow filler material to cure for one hour at a temperature of **180 to 200** degrees F (**82 to 93** degrees C) or 24 hours at room temperature. Use a heat lamp for the **180 to 200** degrees F curing temperature.

(15) Remove mount bracket. Remove tape and clean mount bracket of any adhesive.

(16) Install mount brackets (26 and 29) as follows:

(a) Position mount bracket (29) on engine deck. Install three bolts (30), six washers (28) and three nuts (27) at front of bracket. Do not torque nuts (27) at this time.

(b) Install two hi-lok bolts (16) and two nuts (17) at rear of bracket (29) in accordance with TM 55-1500-204-25/1.

(c) Torque nuts (27), that were installed in step a., **23 TO 28** inch-pounds.

(d) Position mount bracket (26) on engine deck. Install three bolts (23), six washers (24) and three nuts (25) at front of bracket. Do not torque nuts (25) at this time.

(e) Install two hi-lok bolts (20) and two nuts (21) at rear of bracket (26) in accordance with TM 55-1500-204-25/1.

(f) Torque nuts (25), that were installed in step d., **23 TO 28** inch-pounds.

f. Replace damaged or worn rod end bearings (7), lock nuts (8), and pins (22).

2-87. INSTALLATION — COWLING AND FAIRING.

Refer to paragraphs 2-88 through 2-92.

2-88. P E INSTALLATION — TAILPIPE FAIRING.

a. Position tailpipe fairing (6, figure 2-50) on helicopter and secure.

b. Ensure that engine tailpipe overboard fuel drain is properly positioned to prevent chafing.

2-89. M INSTALLATION — IR SUPPRESSOR COWLING.

a. Position aft panel assembly (11, figure 2-52) on helicopter, but do not secure at this time.

b. Position IR suppressor cowling on helicopter (figure 2-52). Ensure that dowel pins (2) are engaged in holes in aft engine firewall and rod end bearings (7) are within lugs of mount brackets (26 and 29). Secure cowling.

(1) Maintain **0.040 TO 0.190** inch (minimum) clearance at IR suppressor cowling and aft pylon fairing interface.

(2) Check alignment of rod end bearings (7) to holes in lugs on mount brackets (26 and 29).

(3) If necessary, move cowling rearward and adjust rod end bearings (7) to obtain alignment.

(4) Tighten locknuts (8) on rod end bearings after adjustment. Secure locknuts to cowling support legs with lockwire (C137).

c. Install pins (22), washers (19), and cotter pins (18).

d. Install bolts and washers (5).

e. Install safety clips (1).

f. Remove caps and connect fuel drain lines:

(1) Engine exhaust drain line (6) at tee fitting.

(2) Overboard drain line (4) at aft engine firewall.

g. Connect IR jammer cannon plugs (3).

h. Install IR suppressor (paragraph 4-57).

i. Install panels (10) with fasteners (9).

j. Secure aft panel assembly (11). Install screws (15) and washers (14). Secure fasteners (13).

2-90. INSTALLATION — PYLON FAIRING.

a. P E Position aft pylon fairing (4, figure 2-50) on helicotper and secure.

b. M Position aft pylon fairing (4, figure 2-51) on helicopter and secure.

c. P E Position forward pylon fairing (1, figure 2-50) on helicopter and secure.

d. M Position forward pylon fairing (1, figure 2-51) on helicopter and secure.

e. Connect electrical wiring inside pylon fairing. Connect tubing at pitot tube.

2-91. INSTALLATION — TRANSMISSION COWL.

a. P E Position transmission cowl (14, figure 2-50) on helicopter.

b. M Position transmission cowl (8, figure 2-51) on helicopter.

c. Install bolts, washers, shims, and nuts to attach hinges to fittings on cowl frame. Install the shims in same location from which removed.

d. Close cowling and check alignment of cowling and operation of latches. Adjust shims on hinges and/or latch bolt assemblies if required.

(1) P E See figure 2-50 for view of latch and hinge.

(2) M See figure 2-51 for view of latch and hinge.

e. Open cowling and check standoff to ensure that it operates properly. Close cowling.

f. Install protective shields in air inlet ducts.

2-92. INSTALLATION — ENGINE COWL.

a. P E Install engine cowling (11, figure 2-50) in same manner outlined for transmission cowling (paragraph 2-91).

b. Install engine cowling (6, figure 2-51) in same manner outlined for transmission cowling (paragraph 2-91).

2-93. PAINTING — COWLING AND FAIRING — TOUCH-UP.

a. Clean area where paint requires touch-up with cleaning compound (C32) and rinse with water. Allow to dry.

b. Apply primer (C88 or C91) to area that requires touch-up.

c. Apply finish coat to match existing finish.

d. Refer to TB746-93-2 for paint instructions.

2-94. BEAM INSTALLATION — FUSELAGE RIGHT SIDE AND LEFT SIDE.

2-95. DESCRIPTION — BEAM INSTALLATION FUSELAGE RIGHT SIDE AND LEFT SIDE.

The right and left side beam installations in conjunction with floor installations, bulkhead installations, pylon installation, and the engine deck vent and drain installation form a primary box beam structure fuselage. The major components of the two beam installations are panel installations and the main beam caps.

2-96. REMOVAL — FUSELAGE RIGHT SIDE AND LEFT SIDE BEAM INSTALLATIONS.

Removal of beams must be accomplished at higher maintenance level.

2-97. INSPECTION — FUSELAGE RIGHT SIDE AND LEFT SIDE BEAM ISNTALLATIONS.

Refer to table 2-3 to classify damage to beam panels. See figure 2-11 and 2-12 for damage repair limits on beam caps.

2-98. REPAIR — FUSELAGE RIGHT SIDE AND LEFT SIDE BEAM INSTALLATIONS.

Refer to paragraph 2-24 for procedure to repair right side and left side beam installations.

2-99. FITTINGS — FORWARD FUSELAGE TAILBOOM ATTACHMENT.

2-100. DESCRIPTION — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

Four tailboom attachment fittings are installed at the aft bulkhead of the forward fuselage to provide strong points for the four tailboom attaching bolts.

2-101. CLEANING — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

Clean fittings with clean cloths dampened with solvent (C112). Dry with clean cloths.

2-102. INSPECTION — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

Refer to table 2-3 to classify damage to fittings.

2-103. REMOVAL — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

Removal of fittings must be accomplished at higher maintenance level.

2-104. REPAIR — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

Repair of fittings must be accomplished at higher maintenance level.

2-105. INSTALLATION — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

Installation of fittings must be accomplished at higher maintenance level facility.

2-106. PAINTING, TOUCH-UP — FORWARD FUSELAGE TAILBOOM ATTACHMENT FITTINGS.

a. Remove tailboom if necessary to gain adequate access to fittings. Refer to paragraph 2-283.

b. Clean area where paint is damaged with fine grit sandpaper (C102). If damage exceeds limits set forth in table 2-3, the damaged fitting must be replaced. If damage is within limits, touch-up with two coats of primer (C88 or C91).

2-107. FORWARD AND AFT ENGINE FIREWALLS.

2-108. DESCRIPTION — FORWARD AND AFT ENGINE FIREWALLS.

The forward and aft engine firewalls in conjunction with the engine deck panel, the aft pylon fairing firewall, and the engine cowling doors form a closed compartment around the powerplant to protect the remaining structure in event of fire. The firewalls are constructed primarily of titanium with some aluminum clips, doublers and brackets.

2-109. REMOVAL — FORWARD ENGINE FIREWALL.

a. Remove the engine (paragraph 4-12).

b. Remove the tail rotor driveshaft fireshield. Refer to paragraph 2-119.

c. Disconnect engine power control lever (not illustrated) that passes through boot (32, figure 2-53). Disconnect lever at bellcranks and leave the lever in place in boot (32).

d. Disconnect the following lines at the forward firewall. Cap or plug open lines to prevent entry of foreign matter.

(1) Fuel lines at lower left side of firewall.

(2) Pneumatic line at upper left side of firewall.

(3) Pneumatic line at lower right side of firewall.

(4) Lubrication lines at lower right side of firewall.

e. Remove nuts (27, figure 2-53), washers (26), and bolts (24).

f. Remove screw (15) at left side of firewall. Remove two screws (20) at right side.

g. Remove screws (17).

h. Remove screws (21) at right side of firewall. Remove similar screws (not illustrated) at left side of firewall. Carefully lift firewall off engine deck and remove shims (16) and six shims (19). Index shims for reinstallation in the same location.

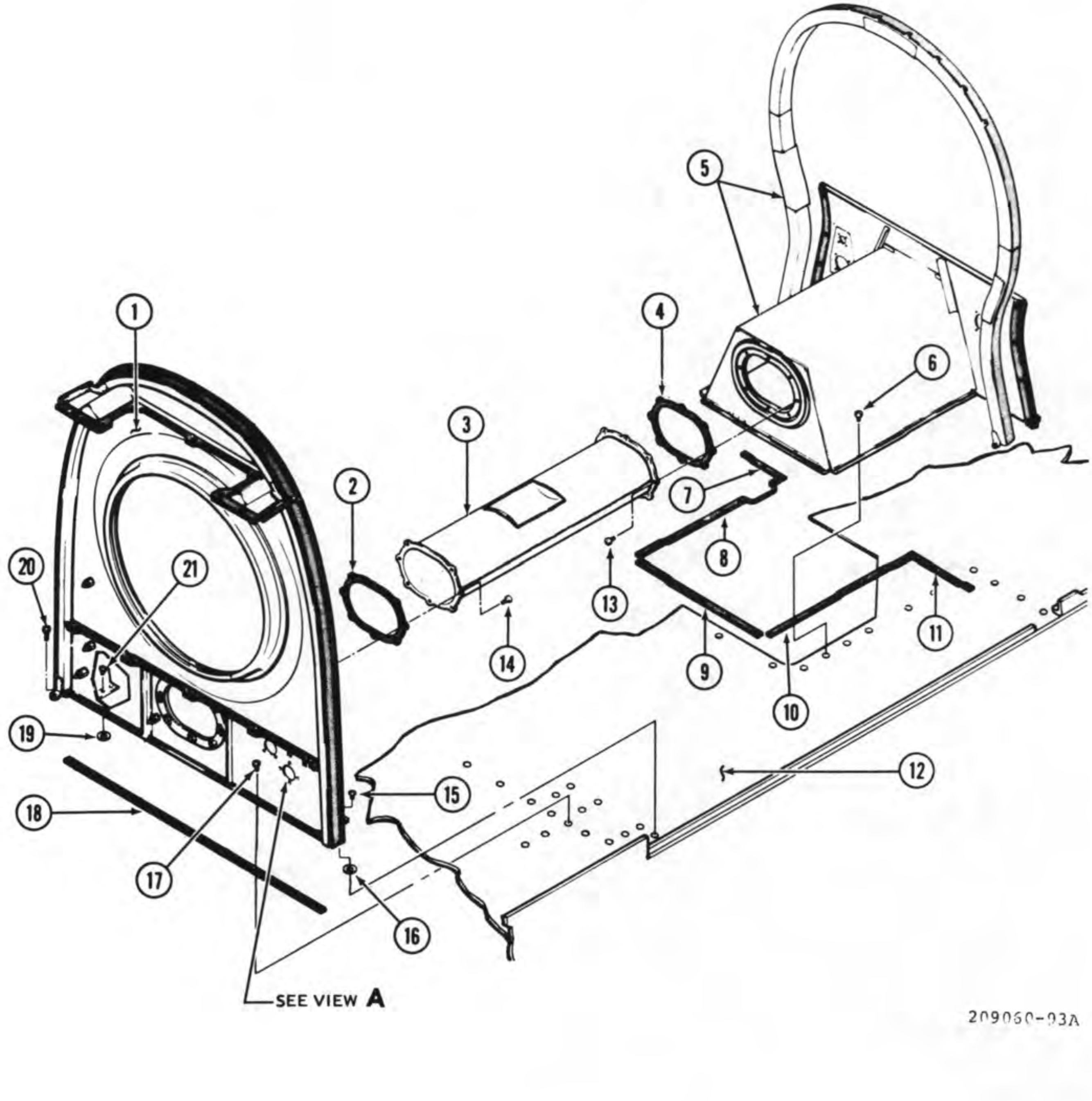
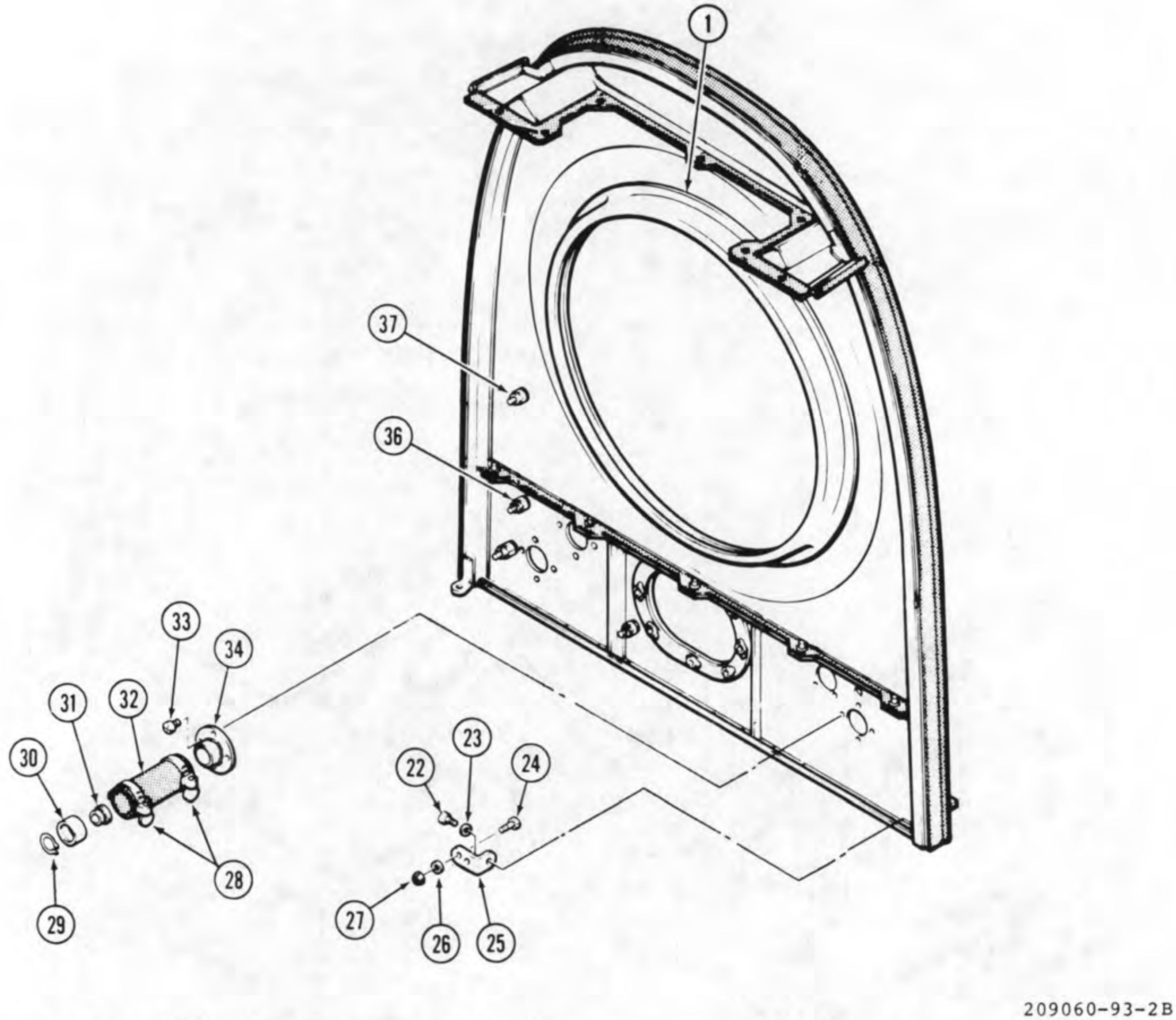


Figure 2-53. Firewalls and Driveshaft Fireshield Installation (Sheet 1 of 2)



1.	Forward engine firewall	17.	Screw	33.	Screw
2.	Gasket	18.	Gasket	34.	Retainer
3.	Tail rotor driveshaft fireshield	19.	Shim	35.	Deleted
4.	Gasket	20.	Screw	36.	Clamp, screw, washer and nut
5.	Aft engine firewall and cowl support	21.	Screw	37.	Clamp, screw, washer and nut
6.	Screw	22.	Bolt	38.	Deleted
7.	Seal	23.	Washer	39.	Deleted
8.	Seal	24.	Bolt		
9.	Seal	25.	Clip		
10.	Seal	26.	Washer		
11.	Seal	27.	Nut		
12.	Panel (engine deck)	28.	Clamps		
13.	Screw	29.	Retainer ring		
14.	Screw	30.	Boot retainer		
15.	Screw	31.	Split bushing bearing		
16.	Shim	32.	Power lever boot		

Figure 2-53. Firewalls and Driveshaft Fireshield Installation (Sheet 2 of 2)

2-110. REMOVAL — AFT ENGINE FIREWALL.

a. Remove the engine (paragraph 4-12).

b. Remove the tail rotor driveshaft fireshield. Refer to paragraph 2-119.

c. Disconnect electrical and firewarning cables at left and right sides of aft firewall.

d. Remove screws (6, figure 2-53) and remove aft engine firewall and cowl support from engine deck panel.

2-111. INSPECTION — FORWARD ENGINE FIREWALL.

a. Refer to table 2-3 to classify damage to firewall.

b. Inspect gasket (18, figure 2-53) for deterioration, damage, and secure installation.

c. Inspect seals and gaskets (2, 3, 4, 7, 9, 17 and 29, figure 2-54) for deterioration, damage, and secure installation.

2-112. INSPECTION — AFT ENGINE FIREWALL.

a. Refer to table 2-3 to classify damage to firewall.

b. Inspect diaphragm (34, figure 2-55) for deterioration, damage, and secure isntallation.

c. Inspect seals (3, 6, 7, 8, 9, 10, 12, 15, and 21) for deterioration, damage, and secure installation.

2-113. REPAIR — FORWARD ENGINE FIREWALL.

a. Refer to paragraph 2-21 for procedure to repair structural damage. See figure 2-54 for partial listing of materials used in the firewall.

b. Replace damaged or missing gaskets (2, 4, 7, 9, and 18, figure 2-53).

(1) remove old gasket and clean firewall surface where new gasket will be installed. Refer to paragraph 2-121, steps a(1), a(2), and a(3).

WARNING

Adhesive is flammable and toxic. Provide adequate ventilation when mixing and using. Avoid prolonged breathing of adhesive vapors and contact with skin or eyes.

NOTE

Ensure that expiration date stamped on adhesive container has not been exceeded.

(2) Brush adhesive (C12) on mating surfaces of firewall and gasket. If surface of gasket is very porous, apply a second coat of adhesive. Allow adhesive to dry to a tacky stage. Position one end of gasket on firewall and press firmly into place. Continue until gasket is bonded to firewall.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(3) Clean excess adhesive from firewall while it is still wet. Use a clean cloth dampened with MEK (C74).

(4) Apply pressure to gasket to hold it in firm contact with firewall. Maintain pressure for a minimum of four hours to air dry adhesive. Adhesive should be cured at a temperature of 75 degrees F (24 degrees C) or higher. If temperature is below 75 degrees F (24 degrees C) double the amount of cure time for each 12 degrees F (7 degrees C) below 75 (24 degrees C). Do not attempt to cure adhesive at temperatures below 50 degrees F (10 degrees C).

TYPICAL TEMPERATURES AND CURE TIME

Temperature Degrees F	Degrees C	Cure Time Hours
75	24	4
63	17	8
51	11	16

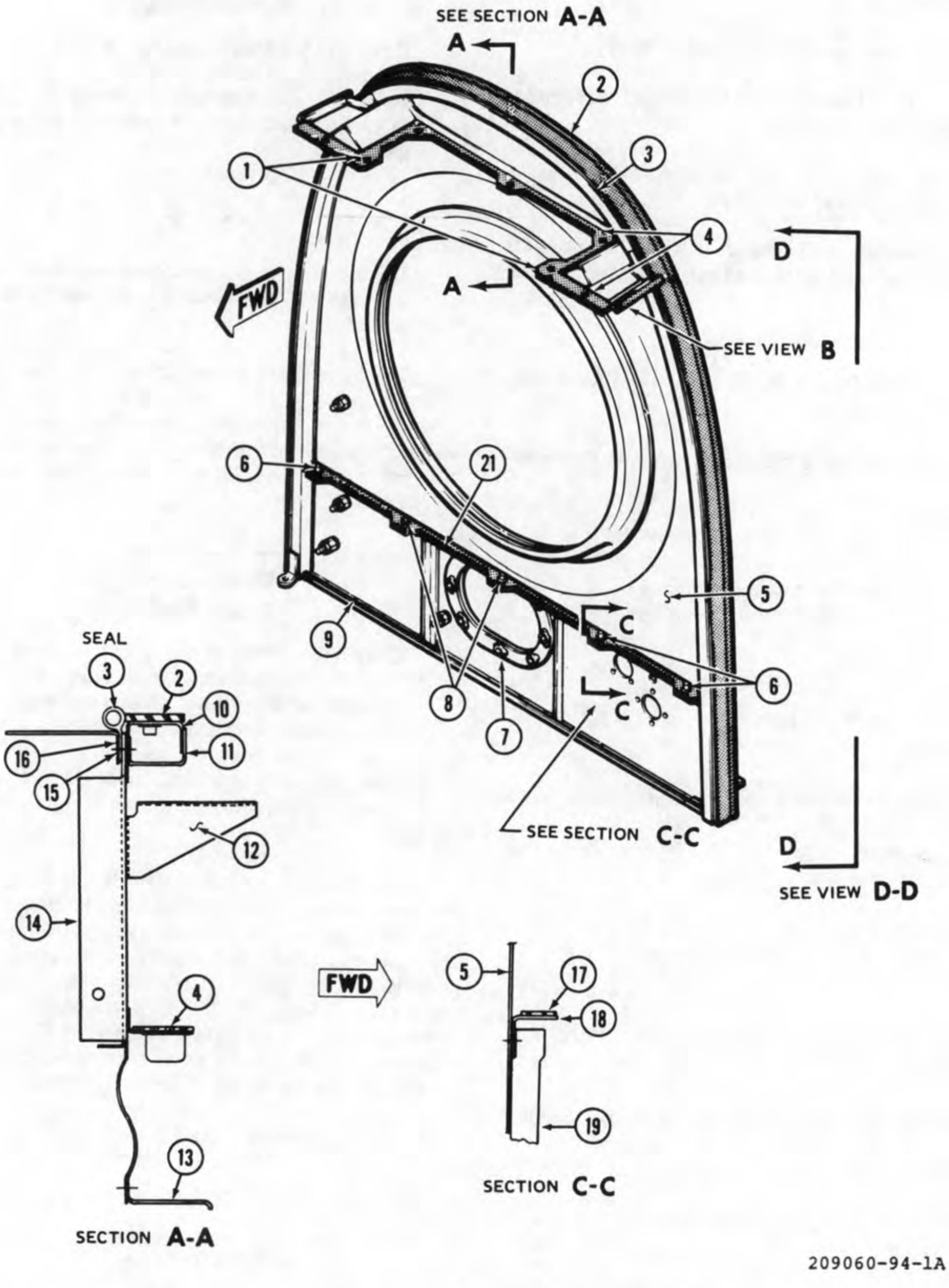


Figure 2-54. Forward Engine Firewall Assembly (Sheet 1 of 4)

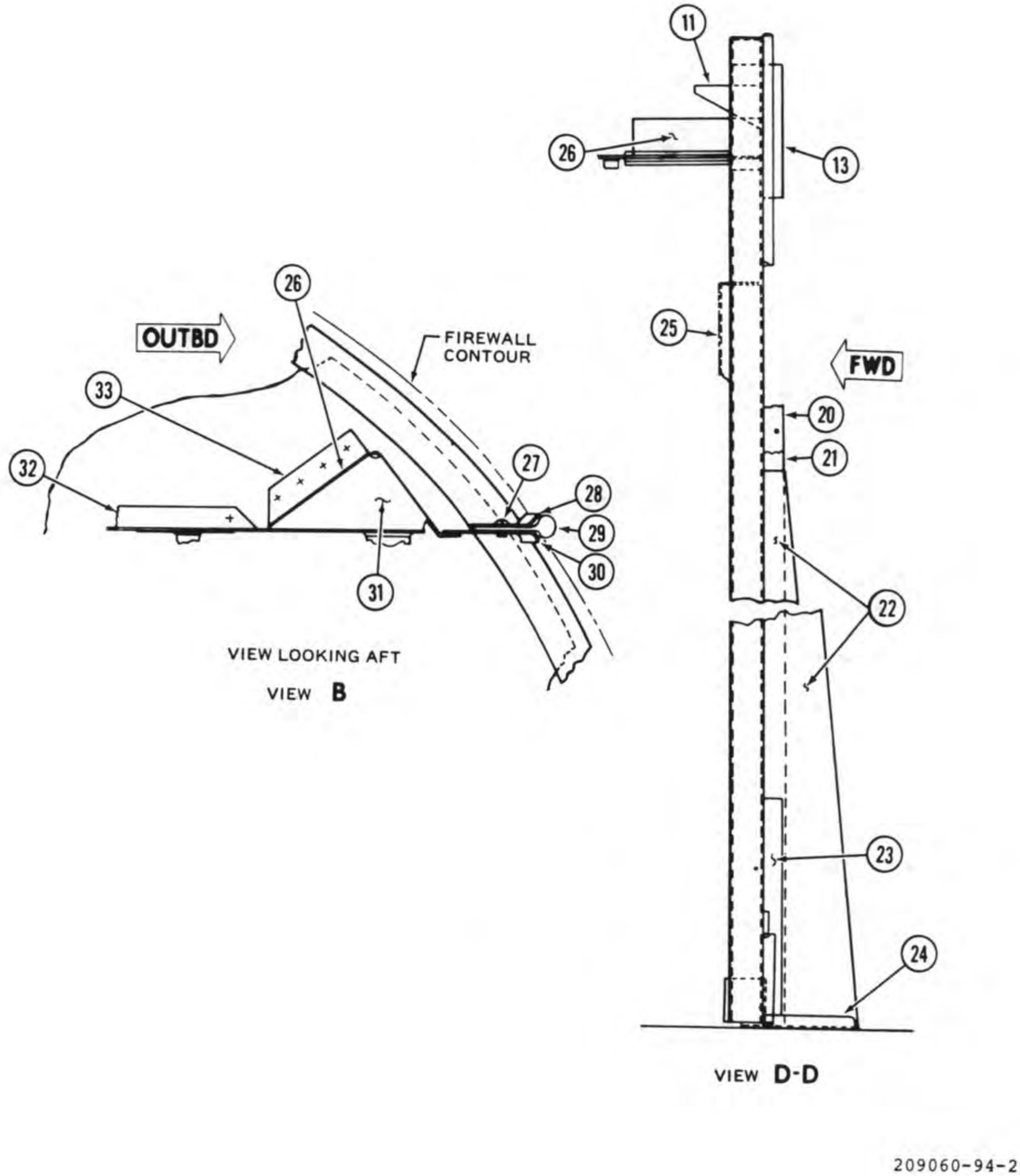


Figure 2-54. Forward Engine Firewall Assembly (Sheet 2 of 4)

INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
1	Receptacle	NA	RF-5	FSCM 72794
	Turnlock	NA	RF-5-5	FSCM 72794
2	Rubber gasket	NA	209-060-900-67	
3	Rubber seal	NA	209-060-900-61	
4	Rubber gasket	0.060	209-060-900-121	
5	Web	0.020	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B
6	Studs	NA	A5T26	FSCM 72794
	Grommets	NA	GH5	FSCM 72794
7	Rubber gasket	0.047	209-060-900-65	
8	Studs	NA	A5T18	FSCM 72794
	Grommets	NA	GH5	FSCM 72794
9	Rubber gasket	0.047	209-060-900-63	
10	Former	0.040	2024 Al Aly T42	QQ-A-250/5
11	Former	0.040	2024 Al Aly T42	QQ-A-250/5
12	Bracket	0.032	2024 Al Aly T3	QQ-A-250/5
13	Adapter	0.020	Titanium Alloy 65 Min.	AMS 4900
	Alternate	0.020	Titanium Alloy 80,000 PSI	MIL-T-9046, Type I, Comp B
	Alternate	0.020	Titanium Alloy 65 Min.	MIL-T-9046, Type I, Comp B
14	Angle	0.032	2024 Al Aly T3	QQ-A-250-3
15	Rivet	NA	NA	MS20600M
16	Former	0.020	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B
17	Rubber gasket	0.06	209-060-900-127	
18	Stiffener	0.050	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B
19	Doubler	0.032	7075 Al Aly T6	QQ-A-250/13
20	Doubler	0.070	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B
21	Doubler	0.070	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B
22	Stiffener	0.020	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B

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Figure 2-54. Forward Engine Firewall Assembly (Sheet 3 of 4)

INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
23	Doubler	0.016	Titanium Alloy 80 Min.	MIL-T-9046, Type I, Comp B
24	Clip	0.040	Titanium Alloy 80 Min.	MIL-T-9046 Type I, Comp B
25	Adapter	0.020	Titanium Alloy 65 Min.	AMS 4900
26	Hat	0.025	2024 Al Aly	QQ-A-250/5
27	Rivet	NA	NA	MS20470AD
28	Seal retainer	0.032	2024 Al Aly T42	QQ-A-250/5
29	Rubber seal	3/8 Dia.	Extrusion No. 962	FSCM 70485
30	Seal retainer	0.032	2024 Al Aly T42	QQ-A-250/5
31	End plate	0.025	2024 Al Aly T42	QQ-A-250/5
32	Stiffener	0.040	2024 Al Aly T42	QQ-A-250/5
33	Clip	0.040	2024 Al Aly T42	QQ-A-250/5

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Figure 2-54. Forward Engine Firewall Assembly (Sheet 4 of 4)

c. Replace damaged or missing seals (29, figure 2-54).

(1) Remove rivets (15). Remove former (16) and seal (3).

(2) Place new seal (3) on former (16) and cut or punch holes in new seal to match holes in former.

(3) Position seal (3) and former (16) on firewall and install rivets (15).

2-114. REPAIR — AFT ENGINE FIREWALL.

See figure 2-55.

NOTE

Remove screws (2) and pin (4) and remove cowl support (1) from firewall if necessary to accomplish repairs.

a. Repair firewall, using repair instructions in TM 55-1500-204-25/1. Stainless steel can be substituted for titanium of the same thickness. Use monel rivets for all repairs.

b. Replace damaged or missing seals (15 and 21).

(1) Remove rivets (28), angle (19), seal (21) and seal (3).

(2) Position new seal (21) and angle (19) on web (13) and secure with rivets (28). Make rivets flush on side where seal (3) will be installed.

(3) Install new seal (3). Refer to step **c**.

(4) Replace seal (15) in the same manner described in preceding steps.

c. Replace damaged seals (3, 6, 7, 8, 9, 10 and 12). Refer to paragraph 2-113 for procedure to bond new seals to firewall.

d. Replace damaged diaphragm (34).

(1) Remove rivets (32), plate (33), and diaphragm (34) from panel (11).

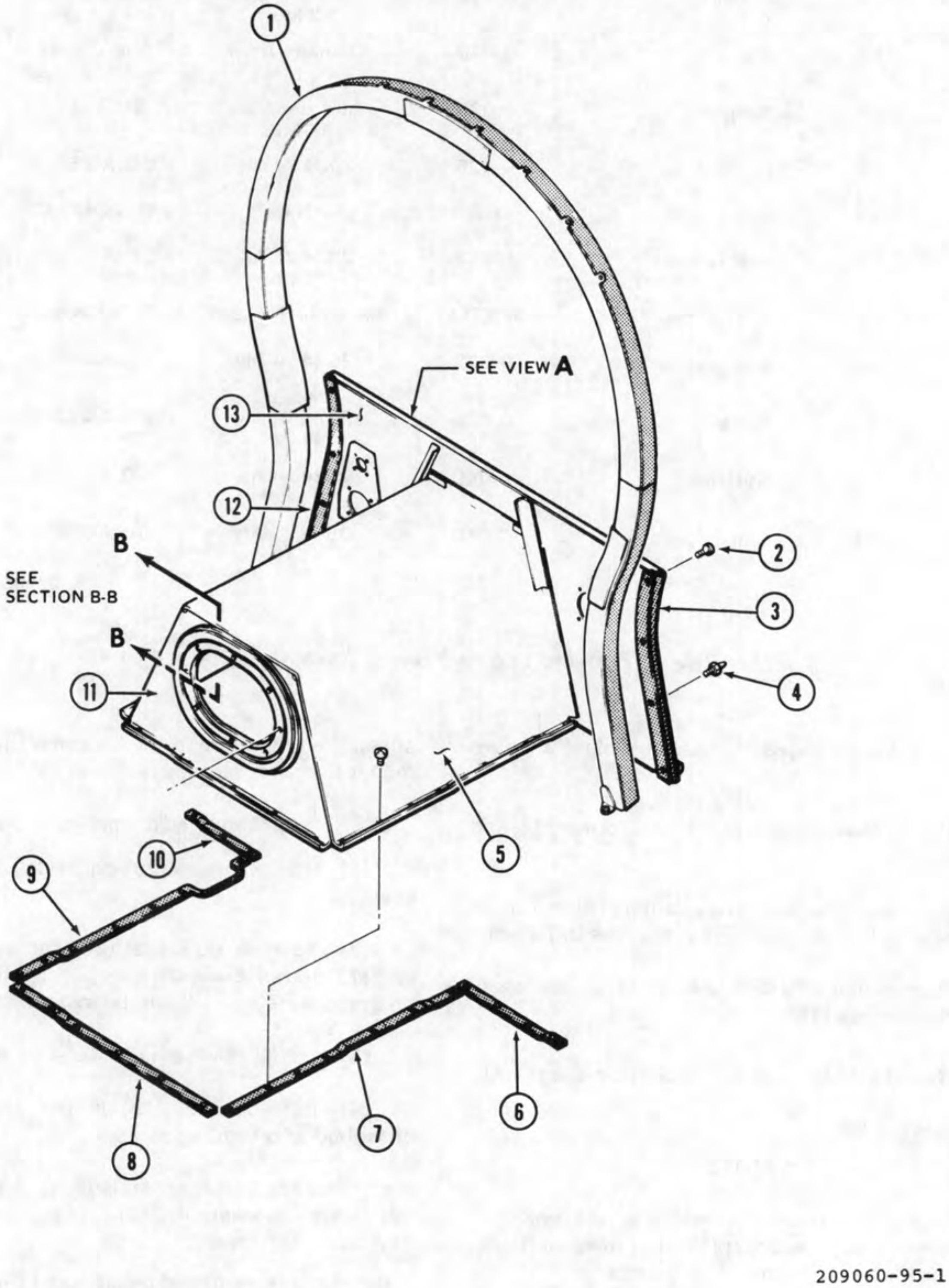
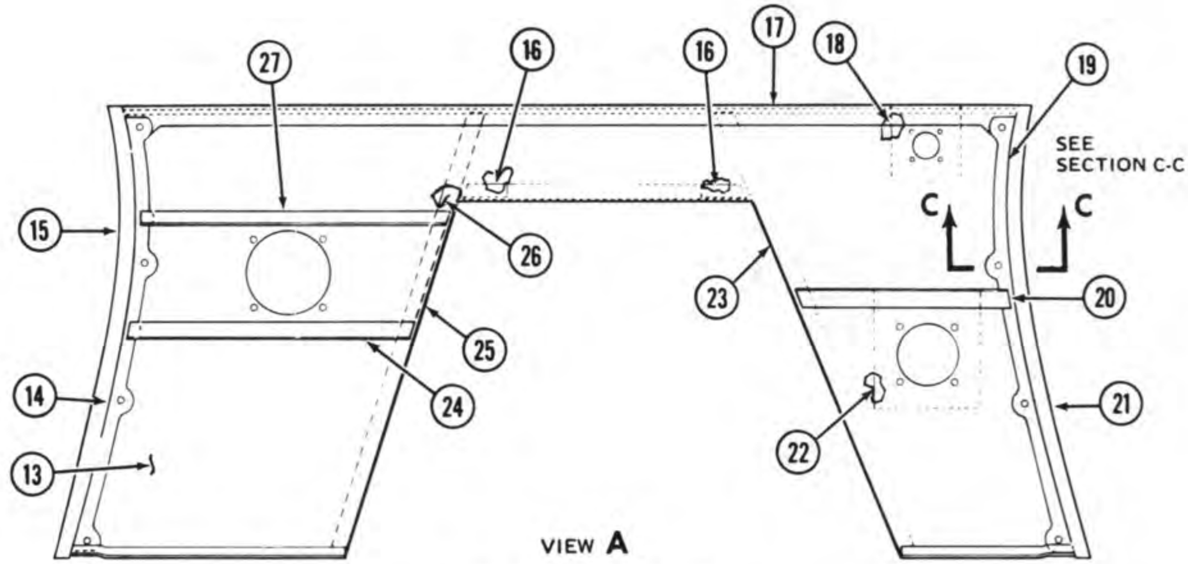
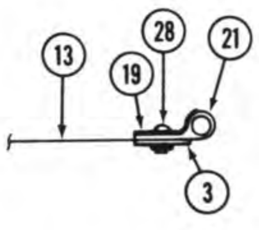


Figure 2-55. Aft Engine Firewall and Cowl Support (Sheet 1 of 4)

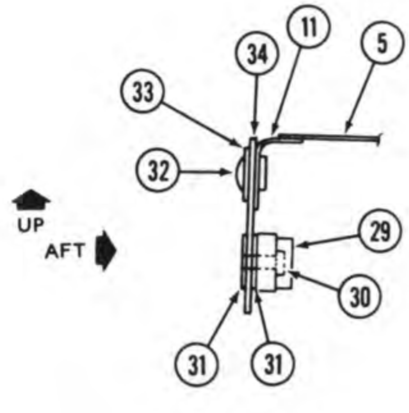


VIEW A

VIEW LOOKING FORWARD



SECTION C-C



SECTION B-B

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Figure 2-55. Aft Engine Firewall and Cowl Support (Sheet 2 of 4)

INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
1	Cowl Support Assembly	NA	NA	NA
2	Screw	NA	NA	NA
3	Seal	0.047	209-060-903-35	
4	Pin	NA	NA	NA
5	Plenum	0.020	Titanium	MIL-T-9046, Type I, Comp B
6	Seal	0.047	209-060-903-43	
7	Seal	0.047	209-060-903-39	
8	Seal	0.047	209-060-903-41	
9	Seal	0.047	209-060-903-49	
10	Seal	0.047	209-060-903-45	
11	Panel	0.020	Titanium	MIL-T-9046, Type I, Comp B
12	Seal	0.047	209-060-903-45	
13	Web	0.020	Titanium Min. 80	MIL-T-9046, Type I, Comp B
14	Angle	0.025		MIL-T-9046, Type I, Comp B
15	Seal	3/8	209-060-903-35	
16	Strap	0.020	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
17	Bead	0.016	CRES 18-8 75 Min.	MIL-S-5059 Comp 302 annealed
18	Doubler	0.040	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
19	Angle	0.025	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
20	Angle	0.032	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
21	Seal	3/8	209-060-903-47	
22	Doubler	0.040	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
23	Angle	0.025	Titanium 80 Min.	MIL-T-9046 Type I, Comp B

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Figure 2-55. Aft Engine Firewall and Cowl Support (Sheet 3 of 4)

INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
24	Angle	0.025	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
25	Doubler	0.012	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
26	Angle	0.025	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
27	Angle	0.025	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
28	Rivet	—	—	MS20427-3M
29	Nutplate	—	—	MS21060-L3
30	Rivet	—	—	MS20470-3M
31	Plate	0.020	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
32	Rivet	—	—	MS20615-4M
33	Plate	0.020	Titanium 80 Min.	MIL-T-9046 Type I, Comp B
34	Diaphragm	0.047	Style 89	FSCM 92798

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Figure 2-55. Aft Engine Firewall and Cowl Support (Sheet 4 of 4)

(2) Remove rivets (30), nutplate (29), and plates (31).

(3) Install plates (31) and nutplates (29) on new diaphragm with rivets (30).

(4) Position diaphragm and parts assembled in preceding step on firewall panel (11) with plate (33). Secure with rivets (32).

(5) If cowl support (1) was removed, ensure that serviceable seals (3 and 12) are bonded to firewall. Position cowl support (1) on aft firewall web (13) and secure with screws (20 and pins (4).

2-115. INSTALLATION — FORWARD ENGINE FIREWALL.

a. Ensure that a serviceable gasket (18, figure 2-53) is bonded to lower surface of firewall and that all holes for firewall attachment screws (17) are open through gasket.

b. Position forward firewall (1) on engine deck panel with twelve shims (16 and 19) in position under stiffeners on aft side of firewall. Install screws (15, 17 and 20).

NOTE

It may be necessary to add or remove shims (16 and 19) to adjust position of firewall. The maximum allowable gap around the adjacent engine and transmission compartment cowling access doors after rigging and final adjustments is 0.190 inch. Minimum gap is 0.040 inch.

c. Install cowling and check to ensure that fit is within limits noted in preceding note. Adjust thickness of shims (16 and 19) if necessary. Remove cowling.

d. Install two bolts (24), washers (26) and nuts (27).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

e. Inspect for gaps and voids where firewall contacts engine service deck and also at edges where individual parts of firewall are jointed. If any gaps or voids are detected, clean the area with cloths dampened with MEK (C74) and dry with clean cloths. Fill gaps and voids with sealant (C104). Use a wooden spatula (tongue depressor) to apply the sealant.

f. Assemble engine power control lever (not illustrated), boot (32) and associated parts if not previously accomplished. Connect ends of engine power control lever to bellcranks on each side of the firewall.

g. Install tail rotor driveshaft and tail rotor driveshaft fireshield. Refer to paragraph 2-122.

h. Install engine (paragraph 4-15).

i. Connect the following lines.

(1) Lubrication lines at lower right sides of firewall.

(2) Pneumatic line at lower right side of firewall.

(3) Pneumatic line at upper left side of firewall.

(4) Fuel lines at lower left side of firewall.

j. Perform functional check of engine and environmental control system. Refer to TM 55-1520-236-10.

2-116. INSTALLATION — AFT ENGINE FIREWALL AND COWL SUPPORT.

a. Ensure that serviceable seals (7, 8, 9, 10, and ll, figure 2-53) are bonded to firewall.

b. Position assembled firewall and cowl support (5) on engine deck panel (12) and install screws (6).

c. Install tail rotor driveshaft and tail rotor driveshaft fireshield (paragraph 2-122).

d. Seal all gaps and voids where firewall contacts service deck and also at edges where individual parts of firewall join. Refer to paragraph 2-115 for procedure.

e. Install engine (paragraph 4-15).

f. Connect electrical and fire detection cables at left and right sides of aft firewall.

g. Perform functional check of engine.

2-117. TAIL ROTOR DRIVESHAFT FIRESHIELD.

2-118. DESCRIPTION — TAIL ROTOR DRIVESHAFT FIRESHIELD.

The tail rotor driveshaft fireshield is constructed of titanium. It protects the section of tail rotor driveshaft between the two engine firewalls. See figure 2-53.

2-119. REMOVAL — TAIL ROTOR DRIVESHAFT FIRESHIELD.

a. Remove section of tail rotor driveshaft located below engine. Refer to paragraph 6-77.

b. Remove screws (13 and 14, figure 2-53), at each end of fireshield (3).

c. Remove fireshield (3), gaskets (2 and 4) which should be bonded to the fireshield.

2-120. INSPECTION — TAIL ROTOR DRIVESHAFT FIRESHIELD.

a. Refer to table 2-3 to classify damage to driveshaft fireshield.

b. Inspect fireshield for dents, holes, and distortion.

(1) Surfaces of flanges (2 and 5, figure 2-56), at ends of tail rotor driveshaft fireshield must be flat within **0.020** inch.

(2) For damage limits for dents, holes etc. refer to table 2-3.

2-121. REPAIR — TAIL ROTOR DRIVESHAFT FIRESHIELD.

a. Replace damaged or missing gaskets (1 and 6, figure 2-56) as follows:

(1) Remove old gasket from flanges at fireshield.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(2) Clean flange in area where gasket will be installed by sanding with 400 grit sandpaper (C102). Remove sanding residue with naphtha (C75) or MEK (C74).

(3) Ensure that new gasket is clean and dry and that hole pattern in gasket and flange match.

WARNING

Sealant is flammable and toxic. Provide adequate ventilation when mixing and using proseal 890. Avoid prolonged breathing of vapors and contact with skin or eyes.

(4) Mix two-part sealant (C105) in accordance with directions on container. Apply a thin, even coat of sealant to mating surfaces of gasket and to flange. If gasket is very porous, apply a second coat of sealant. Allow sealant to dry to a tacky stage. Position one edge of gasket on flange and press firmly into place. Continue until gasket is bonded to flange. Ensure that all holes match.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(5) Clean excess sealant from flange while it is still wet. Use a clean cloth dampened with MEK (C74).

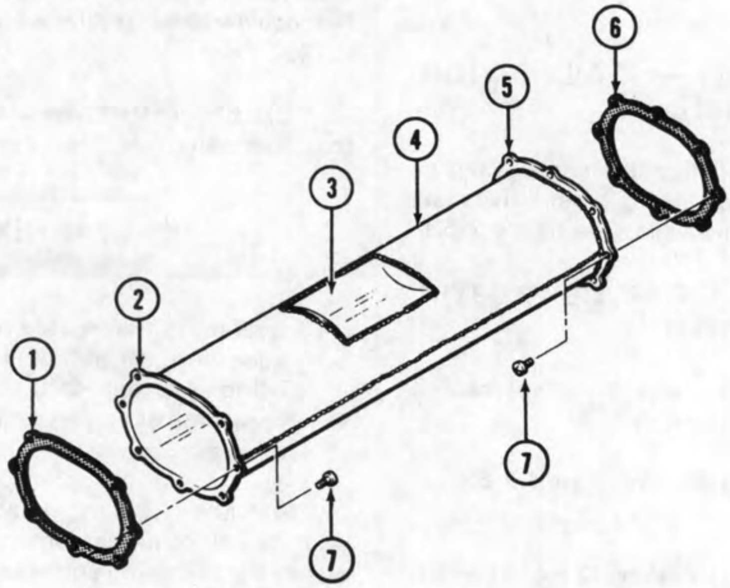
(6) Apply pressure to gasket to hold it in firm contact with flange. Maintain pressure for fifteen hours to air dry sealant.

b. Repair hole-type damage. Refer to TM 55-1500-204-25/1.

2-122. INSTALLATION — TAIL ROTOR DRIVESHAFT FIRESHIELD.

a. Ensure that serviceable gaskets (2 and 4, figure 2-53) are bonded to fireshield (3).

b. Position fireshield in helicopter with cover (3, figure 2-56) up and with flange (2) forward as illustrated. Note that flange (2) has seven holes and



INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
1	Gasket	0.047	209-060-904-11	
2	Flange	0.040	Titanium Heat Treat	MIL-T-9046 Type I, Comp B
3	Cover	0.020	Titanium Heat Treat	MIL-T-9046 Type I, Comp B
4	Tube	0.020	Titanium Heat Treat	MIL-T-9046 Type I, Comp B
5	Flange	0.040	Titanium Heat Treat	MIL-T-9046 Type I, Comp B
6	Gasket	0.047	209-060-904-9	
7	Screw	—		

209060-96B

Figure 2-56. Tail Rotor Driveshaft Fireshield Assembly that flange (5) has eight holes. Install screws (7) to secure fireshield to gasket (1), forward firewall gasket (6) and aft firewall.

c. Install section of tail rotor driveshaft located below engine. Refer to paragraph 6-77.

2-123. ENGINE AIR INDUCTION BAFFLES.

2-124. DESCRIPTION — ENGINE AIR INDUCTION BAFFLES.

The engine air induction baffles are constructed primarily of aluminum with rubber seals attached at the edges. The induction baffles enclose the sand and dust separator on the forward side of the forward engine firewall. Air enters the area enclosed by the air induction baffles through scoops located on the left and right transmission cowling doors. The air exits through the particle separator into the engine.

2-125. REMOVAL — AIR INDUCTION BAFFLES.

a. Open transmission cowling.

b. Release fasteners and remove shaft access panel (4, figure 2-57) which forms the forward left side of the induction baffle assembly.

c. Detach antenna lead from three brackets (10) on top panel and three brackets (9) on forward panel.

d. Release fasteners and remove top panel (2).

e. Disconnect tube assembly (7). Remove forward panel (8) and floor assembly (5).

2-126. INSPECTION — ENGINE AIR INDUCTION BAFFLES.

a. Refer to table 2-3 to classify damage to structure and fasteners in engine air induction panels.

b. Inspect gaskets (28, figure 2-58) for deterioration, damage, and secure installation.

c. Inspect seals (1, 8, 20, 25, 33, and 35) for deterioration, damage, and secure installation.

2-127. REPAIR — ENGINE AIR INDUCTION BAFFLES.

a. Refer to table 2-3 for procedure to repair structural damage and to replace damaged fasteners.

b. Replace damaged or missing gaskets (28, figure 2-58).

NOTE

The procedures in this paragraph are applicable to bonding gaskets (28) which are fabricated from silicone rubber.

(1) Remove all traces of old gasket with scrapers and 80 grit sandpaper (C102). Clean the area where the new gasket will be installed down to bare metal.

(2) Abrade the bonding surface of the new gasket with 80 grit sandpaper (C102).

WARNING

Toluene is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of toluene vapors and contact with skin or eyes.

(3) Clean mating surfaces of new gasket and the air induction baffle with clean cloths dampened with toluene (C130). Dry with clean dry cloths.

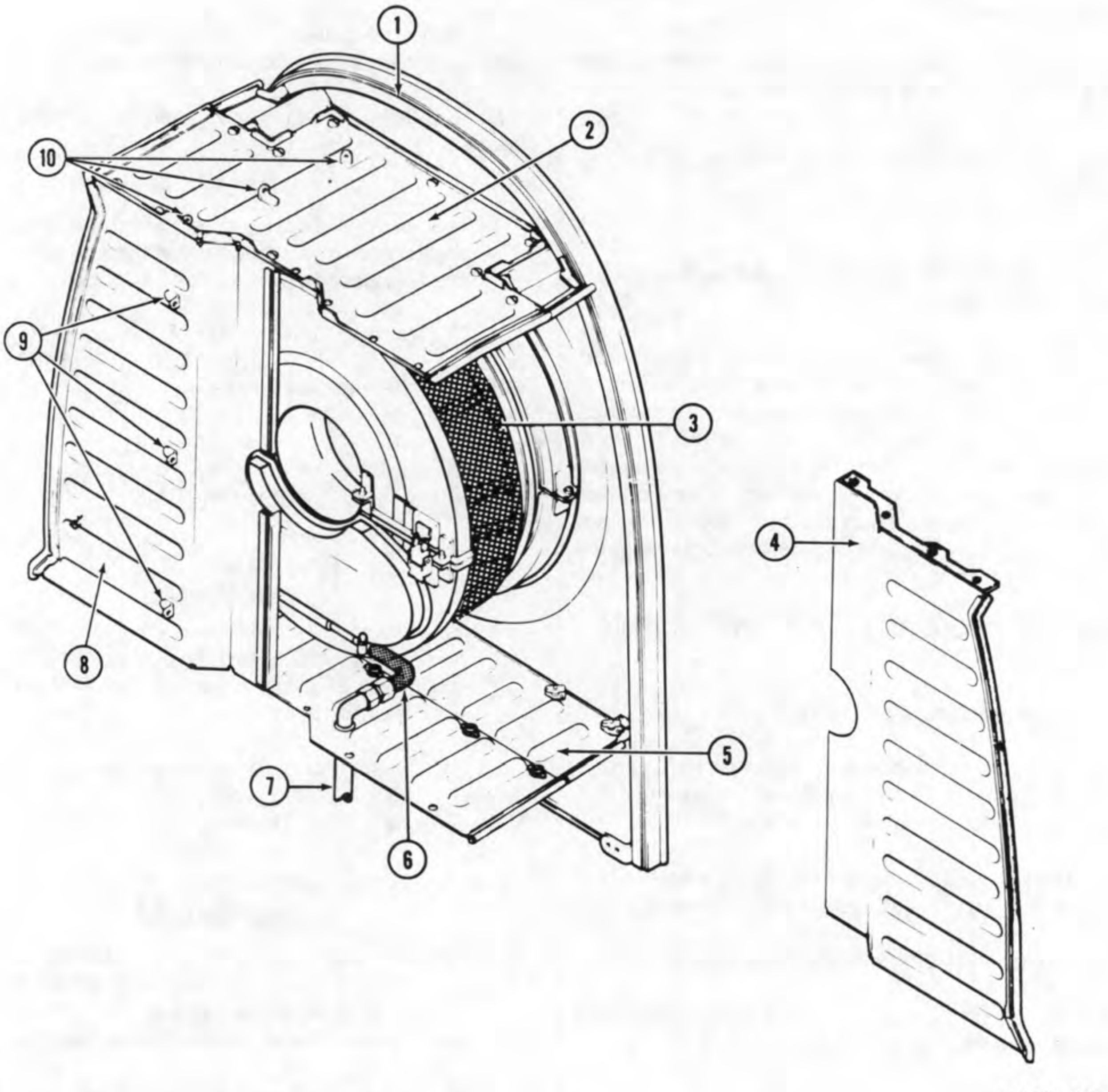
WARNING

Silicone adhesive primer is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of primer vapors and contact with skin or eyes.

(4) Use a pure bristle adhesive priming brush to apply a coat of silicone adhesive primer (C90) on the cleaned area of the air induction baffle. Do not apply primer to the rubber gasket. Allow the primer to air dry for thirty minutes.

WARNING

Adhesive is flammable. Hydrogen gas is released after the two-component adhesive is mixed. Do not cap container after combining components or pressure build-up may occur.



1. Forward engine firewall
2. Top panel assembly
3. Particle separator
4. Driveshaft access panel assembly
5. Floor assembly
6. Overboard (ejector) hose
7. Tube assembly
8. Forward panel assembly
9. Brackets
10. Brackets

Figure 2-57. Engine Air Induction Baffle Installation

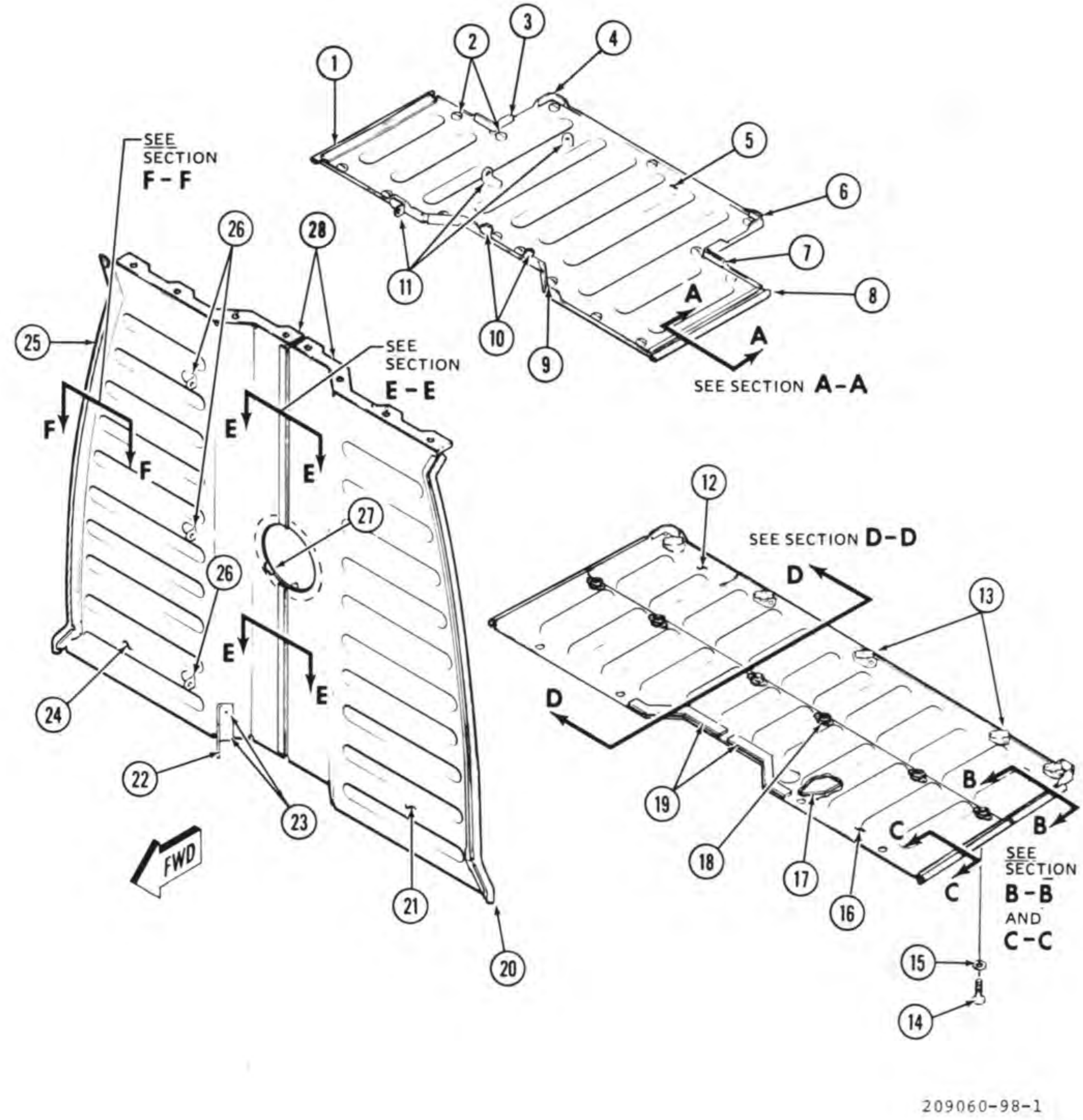


Figure 2-58. Engine Air Induction Baffle Assembly (Sheet 1 of 4)

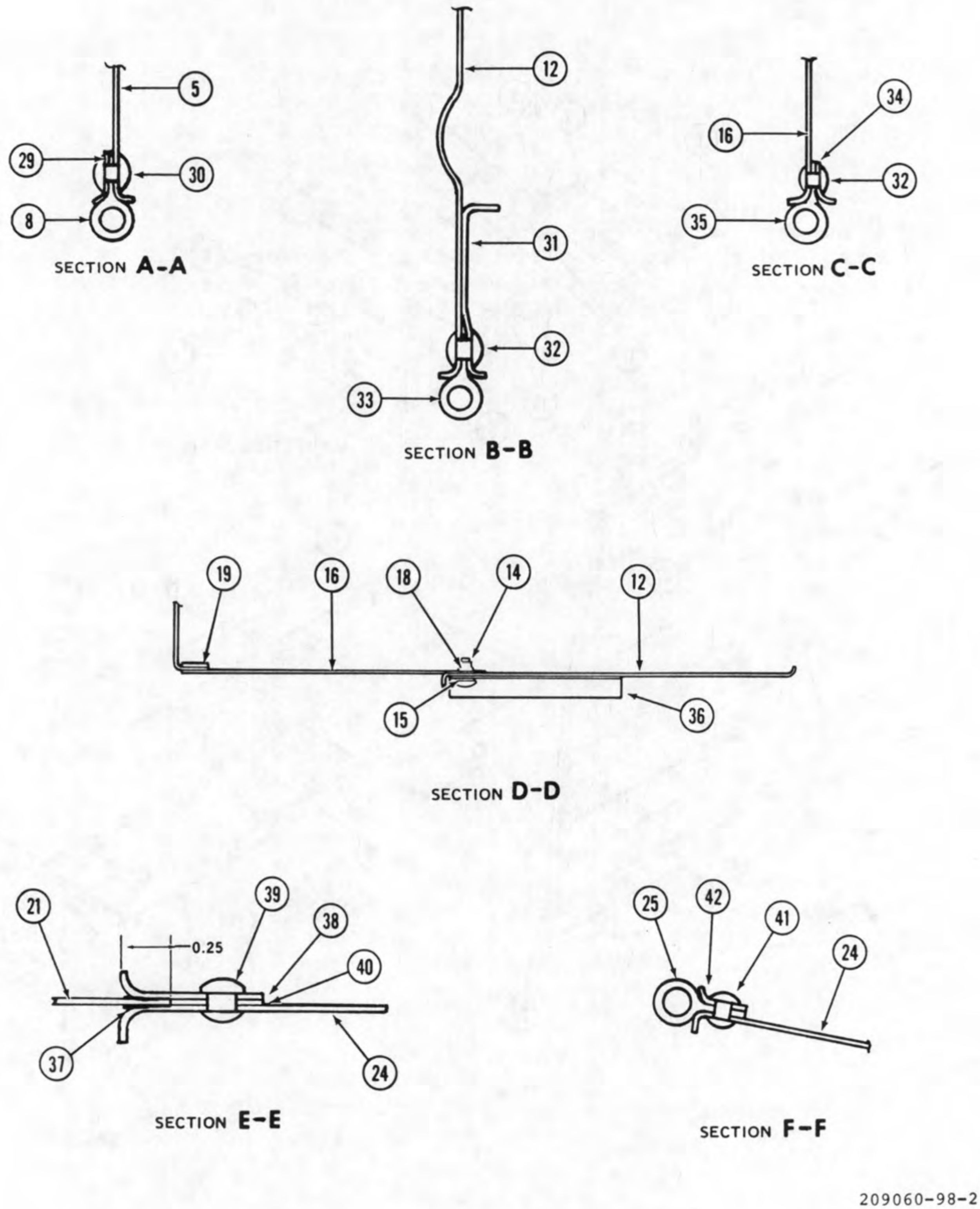


Figure 2-58. Engine Air Induction Baffle Assembly (Sheet 2 of 4)

INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
1	Seal	NA	209-060-200-17	
2	Turnlock fastener studs and grommets (eyelets)	NA NA NA NA		
3	Clip	0.032	2024 Al Aly T-42	QQ-A-250/5
4	Clip	0.032	2024 Al Aly T-42	QQ-A-250/5
5	Top panel	0.032	2024 Al Aly T-42	QQ-A-250/5
6	Clip	0.032	2024 Al Aly T-42	QQ-A-250/5
7	Clip	0.032	2024 Al Aly T-42	QQ-A-250/5
8	Seal	NA	209-060-200-17	
9	Clip	0.032	2024 Al Aly T-3	QQ-A-250/5
10	Doubler	0.032	2024 Al Aly T-3	QQ-A-250/5
11	Bracket	NA	NA	AN743-13
12	Floor panel	0.032	2024 Al Aly T-42	QQ-A-250/5
13	Receptacle	NA		
14	Screw	NA	NA	
15	Washer	NA	NA	
16	Floor panel	0.032	2024 Al Aly T-42	QQ-A-250/5
17	Doubler	0.032	2024 Al Aly T3	QQ-A-250/5
18	Nutplate	NA	NA	
19	Doubler	0.032	2024 Al Aly	QQ-A-250/5
20	Seal	NA	209-060-200-29	
21	Access panel	0.032	2024 Al Aly T42	QQ-A-250/5

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Figure 2-58. Engine Air Induction Baffle Assembly (Sheet 3 of 4)

INDEX NO.	NOMENCLATURE	GAUGE	MATERIAL AND HEAT TREAT	SPECIFICATION
22	Bracket	0.063	2024 Al Aly T3	QQ-A-250/5
23	Rivet	NA	NA	MS20470-AD3
24	Forward panel	0.032		QQ-A-250/5
25	Seal	NA	209-060-200-29	
26	Bracket	NA	NA	AN743-13
27	Doubler	0.032	2024 Al Aly T42	QQ-A-250/5
28	Rubber gasket	0.062	209-060-200-19 209-060-200-21	
29	Doubler	0.032	2024 Al Aly T42	QQ-A-250/5
30	Rivet	NA	NA	MS20470AD
31	Doubler	0.032	2024 Al Aly T42	QQ-A-250/5
32	Rivet	NA	NA	MS20470AD3
33	Seal		209-060-200-101	
34	Doubler	0.032	2024 Al Aly T42	QQ-A-250/5
35	Seal	NA	209-060-200-103	
36	Doubler	0.032	2024 Al Aly T42	QQ-A-250/5
37	Vinyl tape	0.003 x 0.500	No. 549	FSCM 76381
38	Clip	0.032	2024 Al Aly T3	QQ-A-250/5
39	Rivet	NA	NA	
40	Spacer	0.032	2024 Al Aly T3	QQ-A-250/5
41	Rivet	NA	NA	
42	Doubler	0.032	2024 Al Aly T42	QQ-A-250/5

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Figure 2-58. Engine Air Induction Baffle Assembly (Sheet 4 of 4)

NOTE

Inspect containers for expiration date prior to use.

(5) Mix two-component adhesive (C16) at a ratio, by weight, of 100 parts resin to 5 parts catalyst. The pot life of mixture-adhesive is four to eight hours, but best results are obtained when adhesives are used immediately after mixing.

(6) Use a pure bristle adhesive priming brush to apply a **10** to **15** mil coating of adhesive prepared in the preceding step to the rubber gasket (28) and the metal air induction baffle. Allow the adhesive to air dry for **15** to **30** minutes. Start with one end of gasket (28) and press onto baffle. Apply firm pressure to gasket with weights or clamps for **24** hours at room temperature, to obtain fifty percent adhesive strength. **Four** to **seven** days cure time at room temperature is required for adhesive to obtain full strength. Adhesive should be cured at a temperature of **75** degrees F (**34** degrees C) or higher. If temperature is below **75** degrees F (**24** degrees C) double the amount of cure time for each **12** degrees F (**7** degrees C) below **75** degrees F (**24** degrees C). Do not attempt to cure adhesive at temperatures below **50** degrees F (**10.0** degrees C).

TYPICAL TEMPERATURES
AND CURE TIME

Temperature Degrees F	Degrees C	Cure Time Hours
75	24	4 to 7
63	17	8 to 14
51	11	16 to 28

(7) Inspect bond after **24** hour cure time. There must be no evidence of edge lifting of the gasket.

c. Replace damaged or missing seals (1, 8, 20, 25, 33, and 35, figure 2-58.

(1) Remove rivets and doublers that retain seals to panels. See figure 2-58, section A-A, for typical view of seal installation.

(2) Place new seal (1, 8, 20, 25, 33, or 35), as applicable, on panel and cut or punch holes in new seal to match holes in panel.

(3) Place seal and doubler on panel and secure with rivets. See sectional views A-A, B-B and C-C for typical views.

d. Replace damaged or missing vinyl tape (C128) on edge of access panel (21). See sectional view E-E. Use tape **0.500** inch wide and wrap around edge of panel to form a strip approximately **0.250** inches wide on each side as illustrated.

2-128. INSTALLATION — ENGINE AIR INDUCTION BAFFLES.

a. Assemble two halves of floor assembly (5, figure 2-57) and forward panel assembly (8).

b. Position floor assembly (5) and forward panel (8) on forward engine firewall (1) and secure to firewall.

c. Install hose (6) and tube assembly (7).

d. Install forward access panel (4).

e. Install top panel (2).

f. Install antenna lead on brackets (9) and (10).

2-129. CREW DOORS.

2-130. DESCRIPTION — CREW DOORS.

The pilot door (1, figure 2-59) and the gunner door (1, figure 2-60) consist of metal frames with inset window panels of transparent acrylic plastic. The door handles are located on the lower side of the doors. Each door has a single piano-type hinge at the top and a gas spring (door support brace) to support the door when in the open position. The doors can be removed (jettisoned) in an emergency by the canopy removal system. Refer to chapter 17 for description of the canopy removal system. The door handles have lock cylinders installed so the doors can be locked with a key. Both doors can be locked or unlocked with the same key.

2-131. REMOVAL — CREW DOORS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Remove pilot door.

(1) Open pilot door (1, figure 2-59).

(2) Support door in open position manually and remove safety clip (23) from lower end of gas spring (3), then remove gas spring (3) from ball stud fitting (22). The socket fitting on end of gas spring should slide off ball stud fitting when moderate force is applied.

(3) Support the door in the open position manually and remove hinge pin (10). Remove door from helicopter.

b. Remove gunner door as follows:

(1) Open gunner door (1, figure 2-60).

(2) Support door in open position manually and remove safety clip (25) from lower end of gas spring (3); then remove gas spring (3) from ball stud fitting (24). The socket fitting on end of gas spring should slide off ball stud fitting when moderate force is applied.

(3) Support the door in the open position manually and remove hinge pin (20). Remove door from helicopter.

2-132. DISASSEMBLY — CREW DOORS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

NOTE

It is recommended that door be removed from helicopter for disassembly if extensive disassembly of latch mechanism is to be accomplished. Refer to paragraph 2-131.

a. Disassemble pilot door.

(1) Remove screw (24, figure 2-61) and handle (25)

CAUTION

One screw (23) at the top of spacer assembly (47) and a similar screw at the bottom of spacer assembly (47) must be left installed when door (11) is removed. The purpose of these two screws is to secure spacer assembly (47) to frame until spring (12) can be removed.

(2) Remove screws (22) and one screw (26). Leave two screws (23) installed as noted in "CAUTION" above. Remove door (11).

(3) Remove spring (12).

(4) Remove two screws (23) and spacer assembly (47).

(5) Remove screws (20) and plastic cover (7). Remove plastic covers (5), (14), and (16) in the same manner.

(6) Remove pin (31) to disconnect rod assembly (8) from bellcrank (46). Remove rod assemblies (10) and (15) in the same manner.

(7) Remove bellcrank (46) and toggle (35).

(8) Remove screws (42) and handle (41).

(9) Remove bolt (28) and toggle (35) from bellcrank (46).

(10) Replace seal (48) if damaged.

b. Disassemble gunner door.

(1) Place gunner door assembly (1, figure 2-62) on a padded work surface.

(2) Remove screw (2, figure 2-63) and handle (1).

CAUTION

Screw (4, figure 2-63) at top of spacer assembly (32) and a similar screw at the bottom of spacer assembly (32) must be left installed when door (6) is removed. The purpose of these two screws is to secure spacer assembly (32) to door frame (8) until spring (9) is removed.

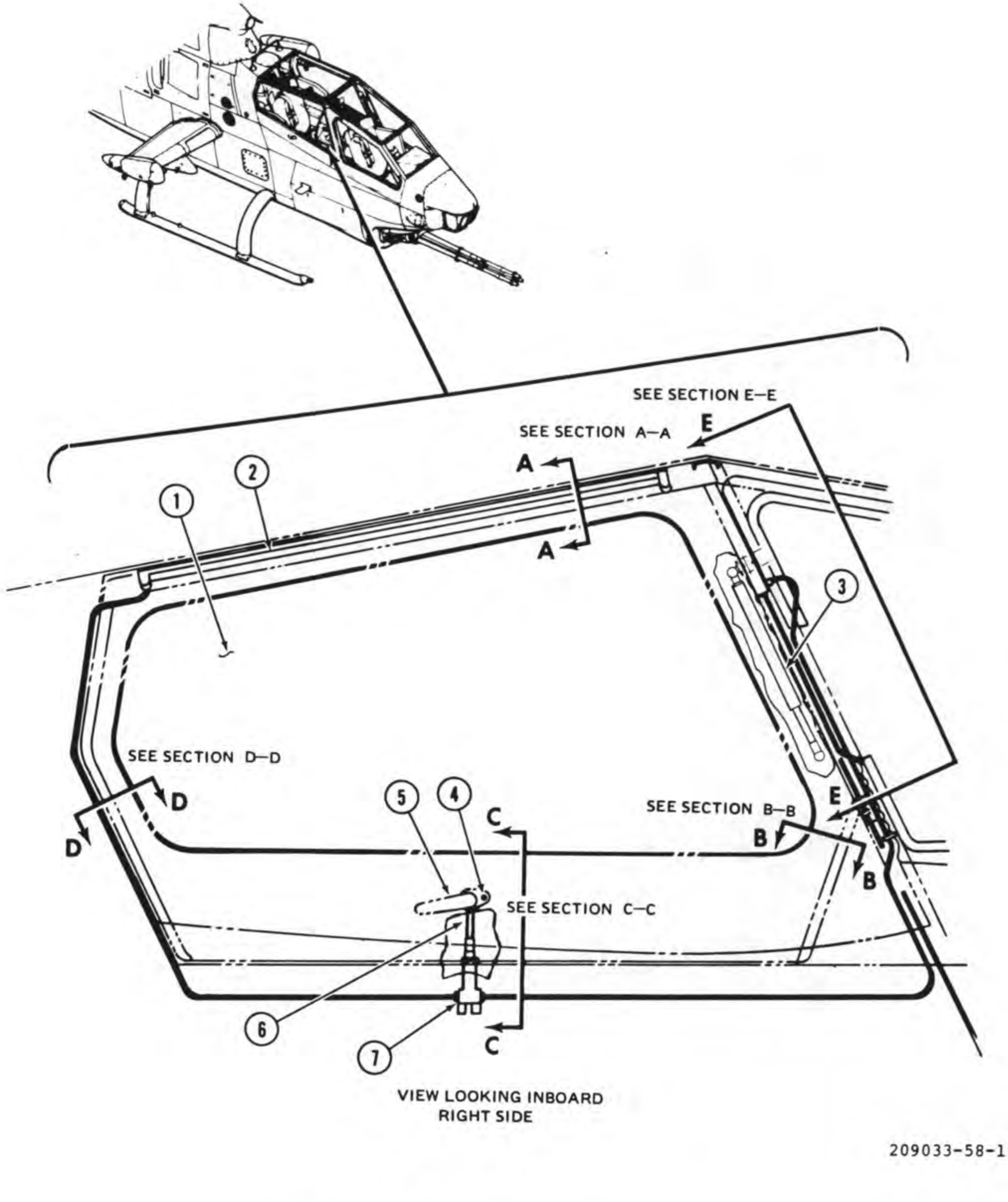
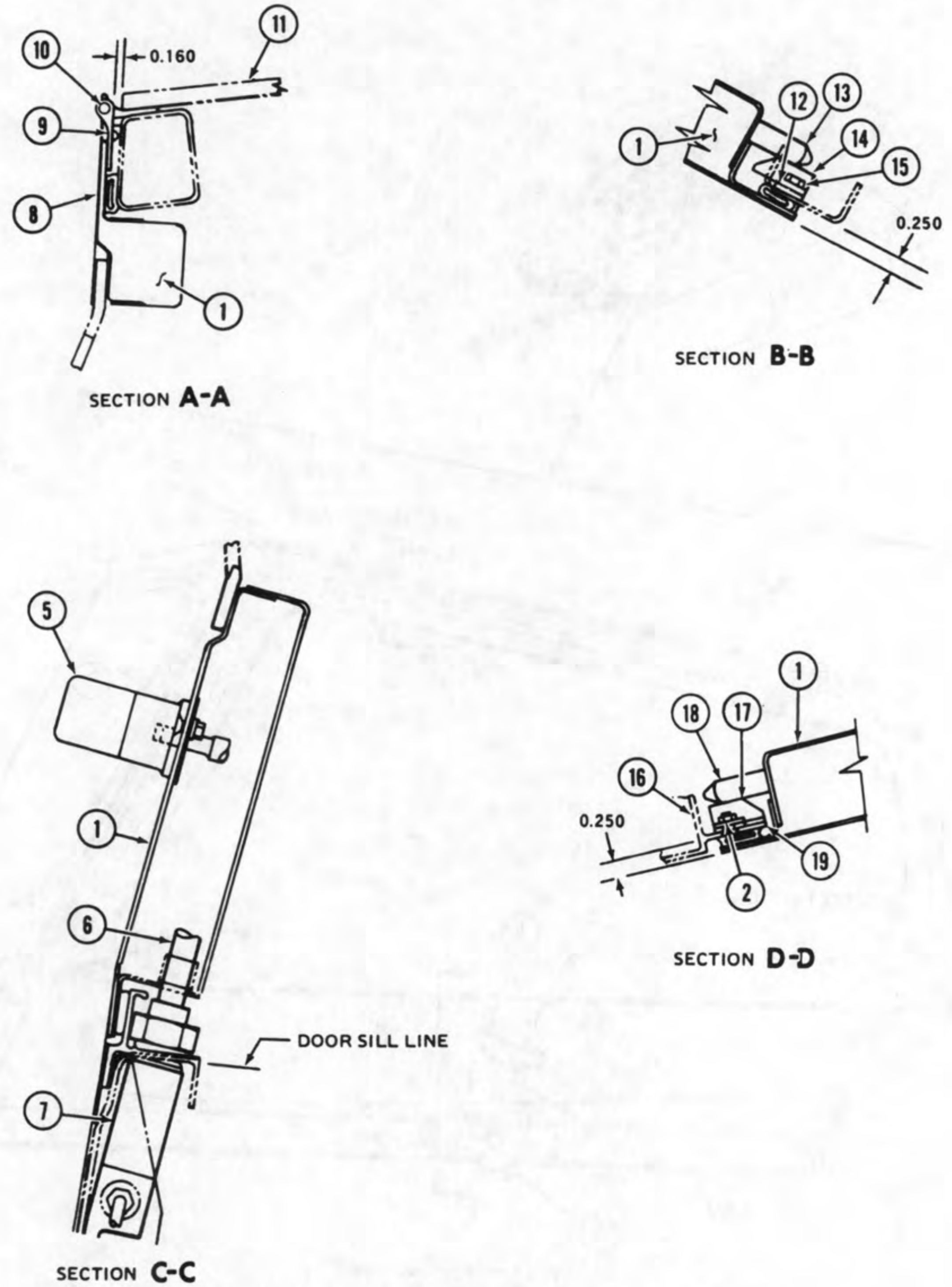


Figure 2-59. Pilot Door — Installation (Sheet 1 of 3)



NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

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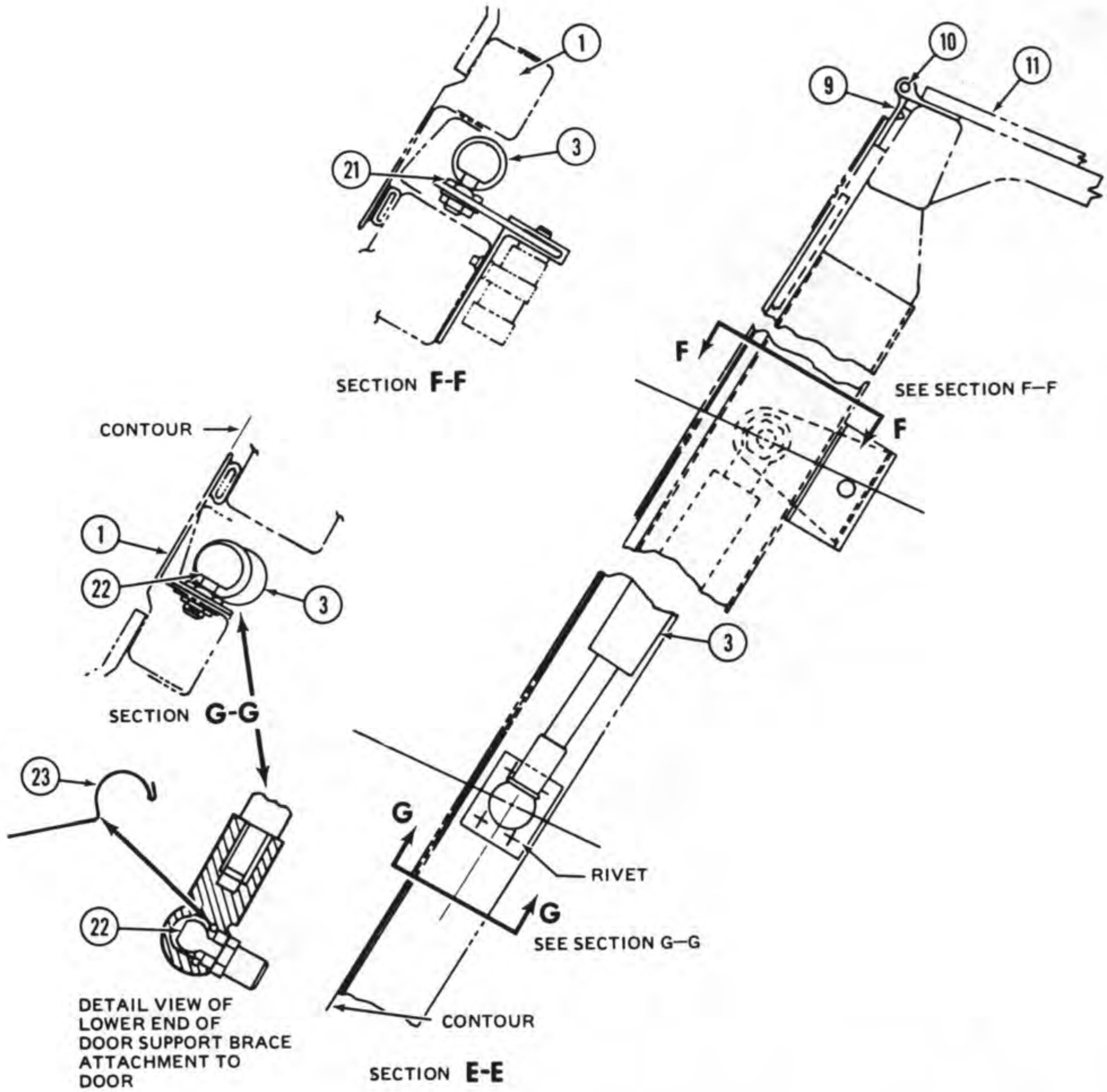
Figure 2-59. Pilot Door — Installation (Sheet 2 of 3)



1. Pilot door
2. Hinge and hinge pin
3. Gas spring (door support brace)
4. Lock cylinder
5. Door handle
6. Door latch rod
7. Thruster (canopy removal system)
8. Shield
9. Hinge
10. Hinge pin
11. Upper canopy
12. Shim (two required)
13. Door latch rod
14. Striker
15. Screws and nuts (two required)
16. Canopy frame
17. Striker
18. Door latch rod
19. Shim (two required)
20. Screws and nuts (two required)
21. Fitting (ball stud)
22. Fitting (ball stud)
23. Safety clip

209033-58-3

Figure 2-59. Pilot Door — Installation (Sheet 3 of 3)

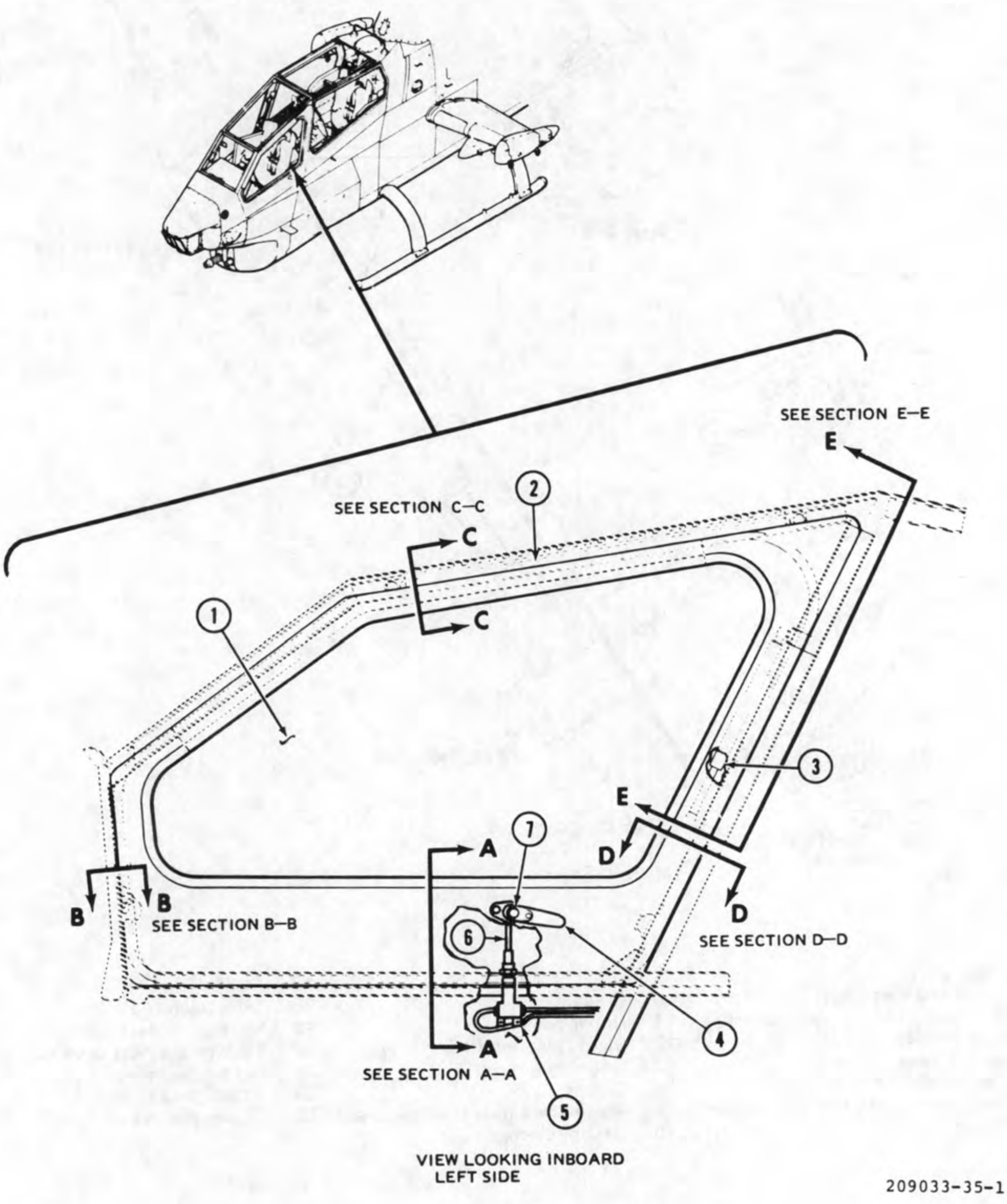


Figure 2-60. Gunner Door — Installation (Sheet 1 of 3)

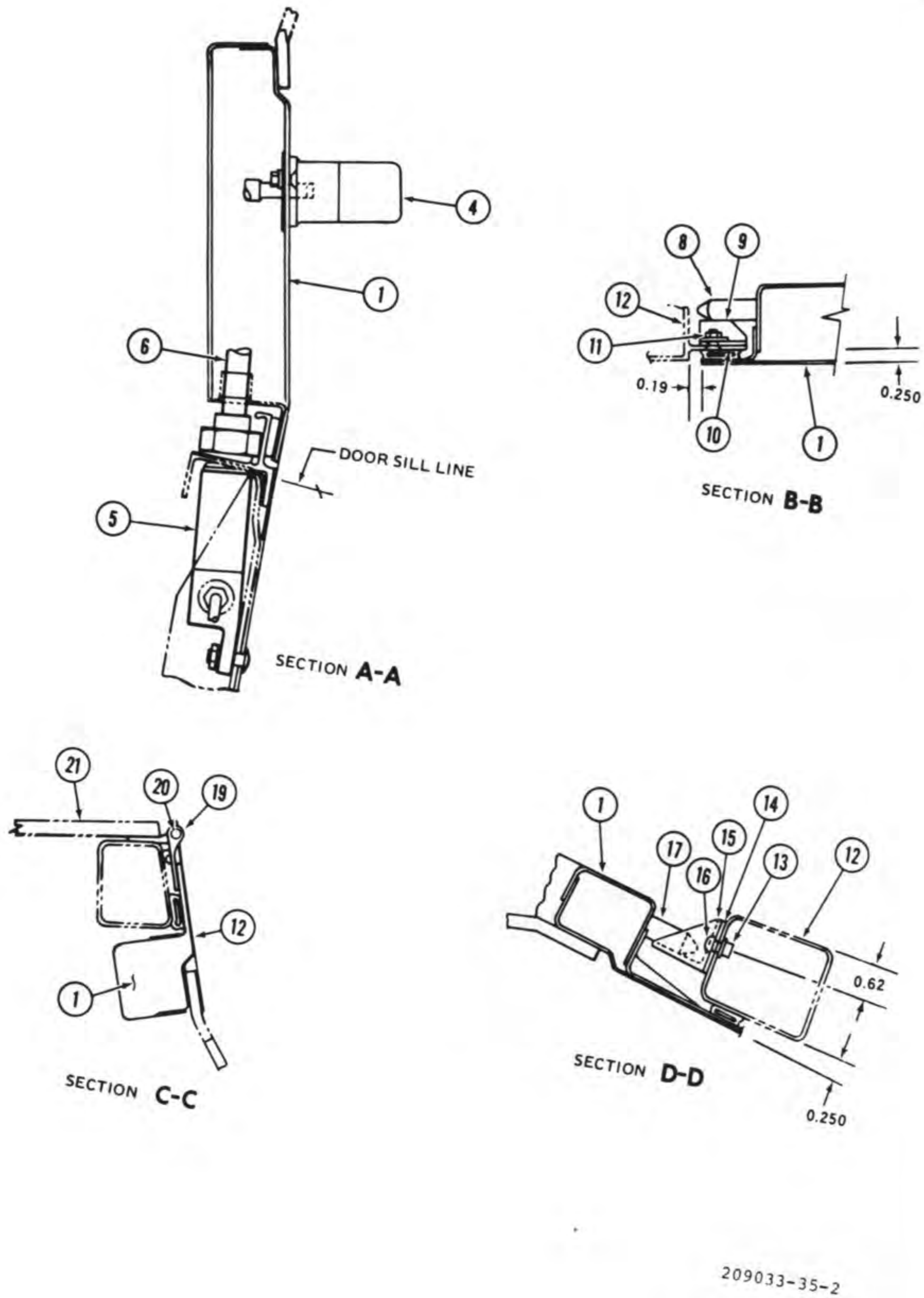
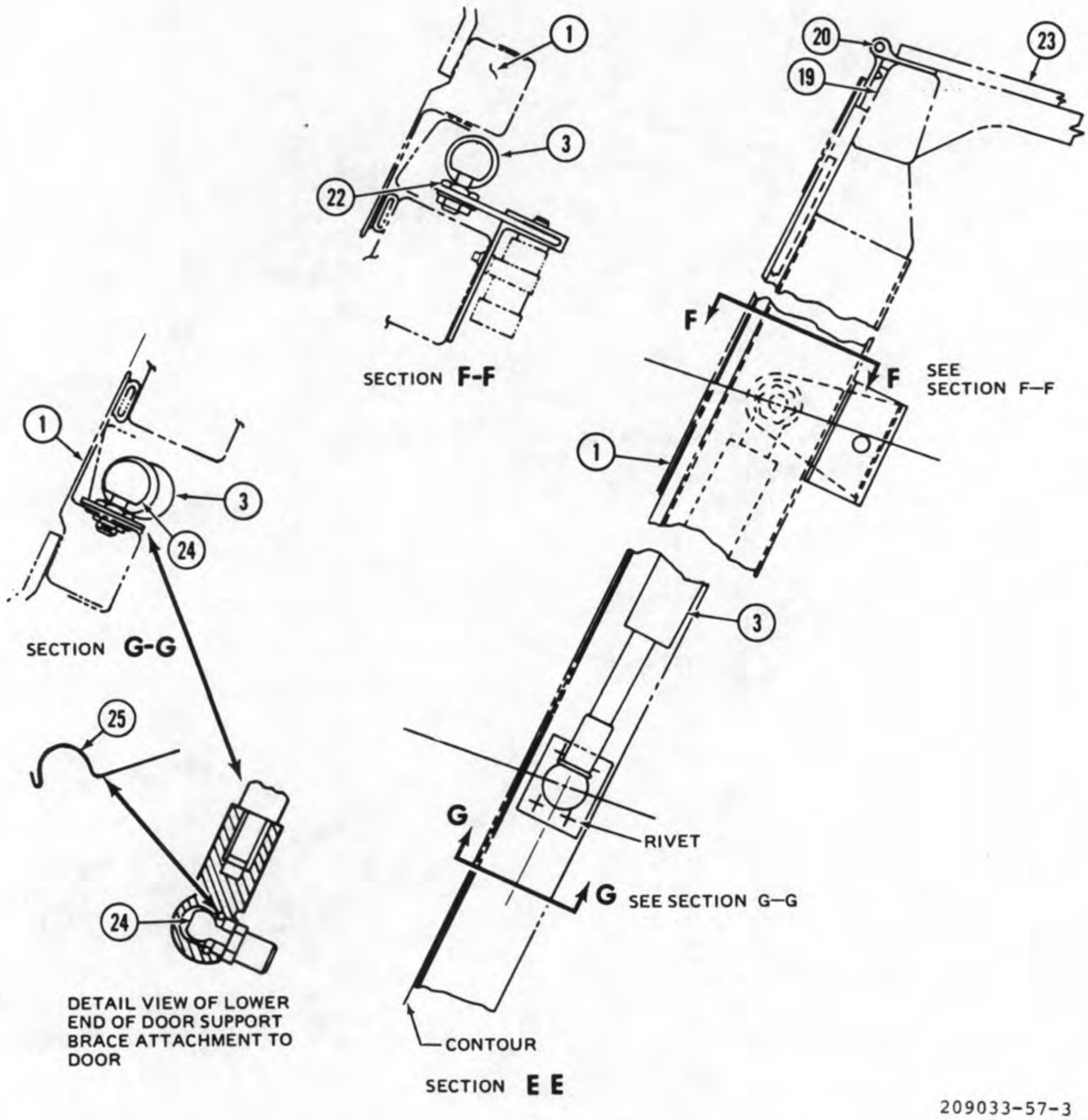
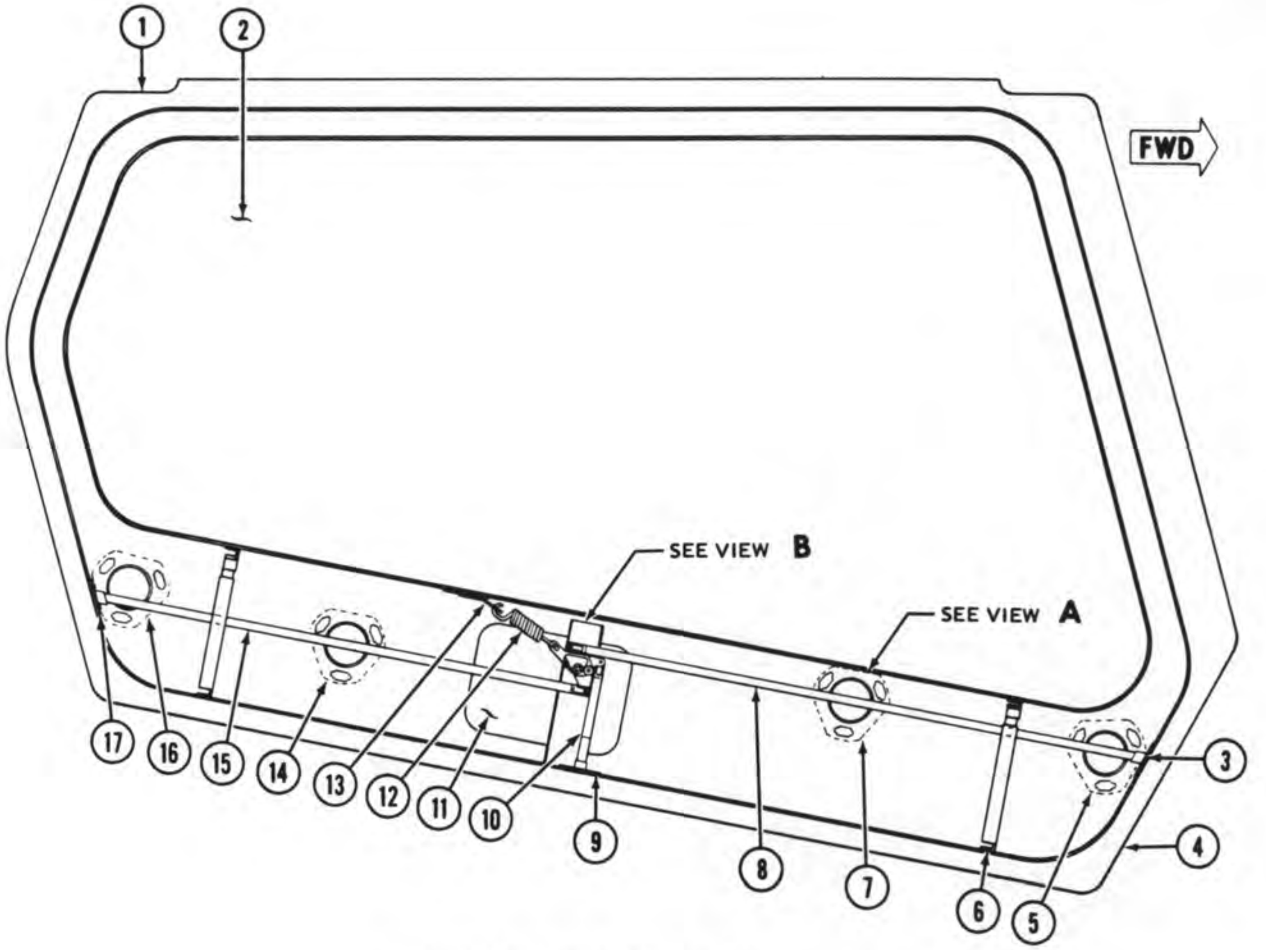


Figure 2-60. Gunner Door — Installation (Sheet 2 of 3)

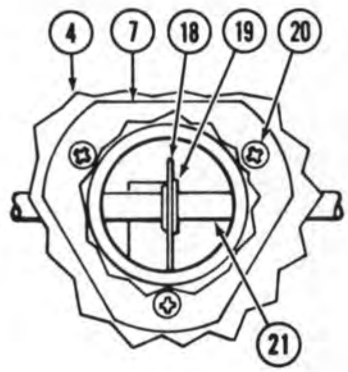


1. Gunner door
2. Hinge and hinge pin
3. Gas spring (door support brace)
4. Door handle
5. Thruster — canopy removal system
6. Door latch rod
7. Lock cylinder
8. Door latch rod
9. Striker
10. Shim (two required)
11. Screw (two required)
12. Canopy frame
13. Blind rivet nut
14. Aft strike plate
15. Aft striker
16. Screw (two required)
17. Door latch rod
18. Shield
19. Hinge
20. Hinge pin
21. Upper windshield
22. Fitting (ball stud)
23. Upper canopy
24. Fitting (ball stud)
25. Safety clip

Figure 2-60. Gunner Door — Installation (Sheet 3 of 3)



VIEW LOOKING INBOARD AT PILOT DOOR — OUTSIDE FRAME AND DOOR HANDLE REMOVED FOR CLARITY

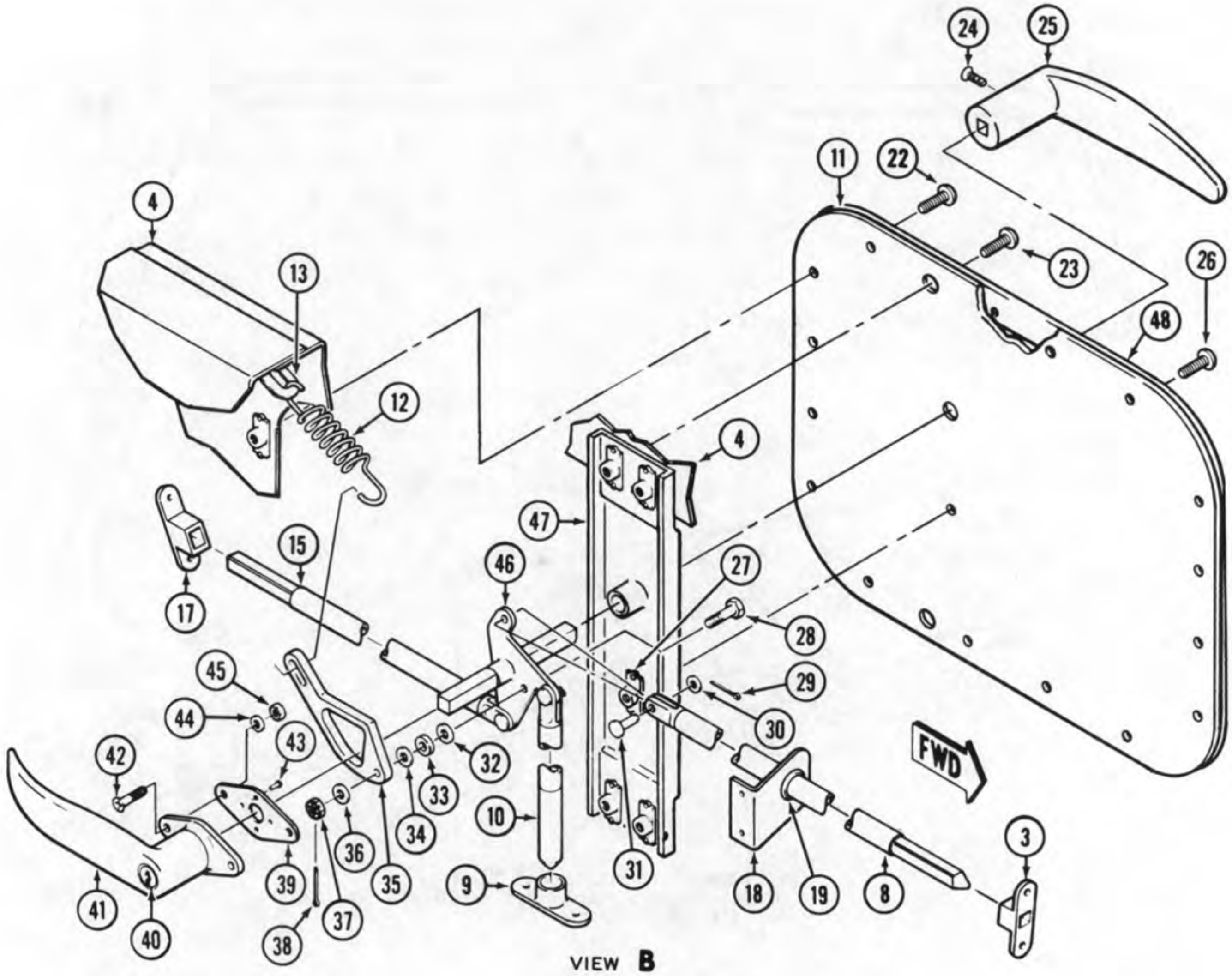


VIEW A

VIEW LOOKING OUTBOARD AT PILOT DOOR PLASTIC ACCESS COVER

209033-34-1A

Figure 2-61. Pilot Door — Assembly (Sheet 1 of 2)

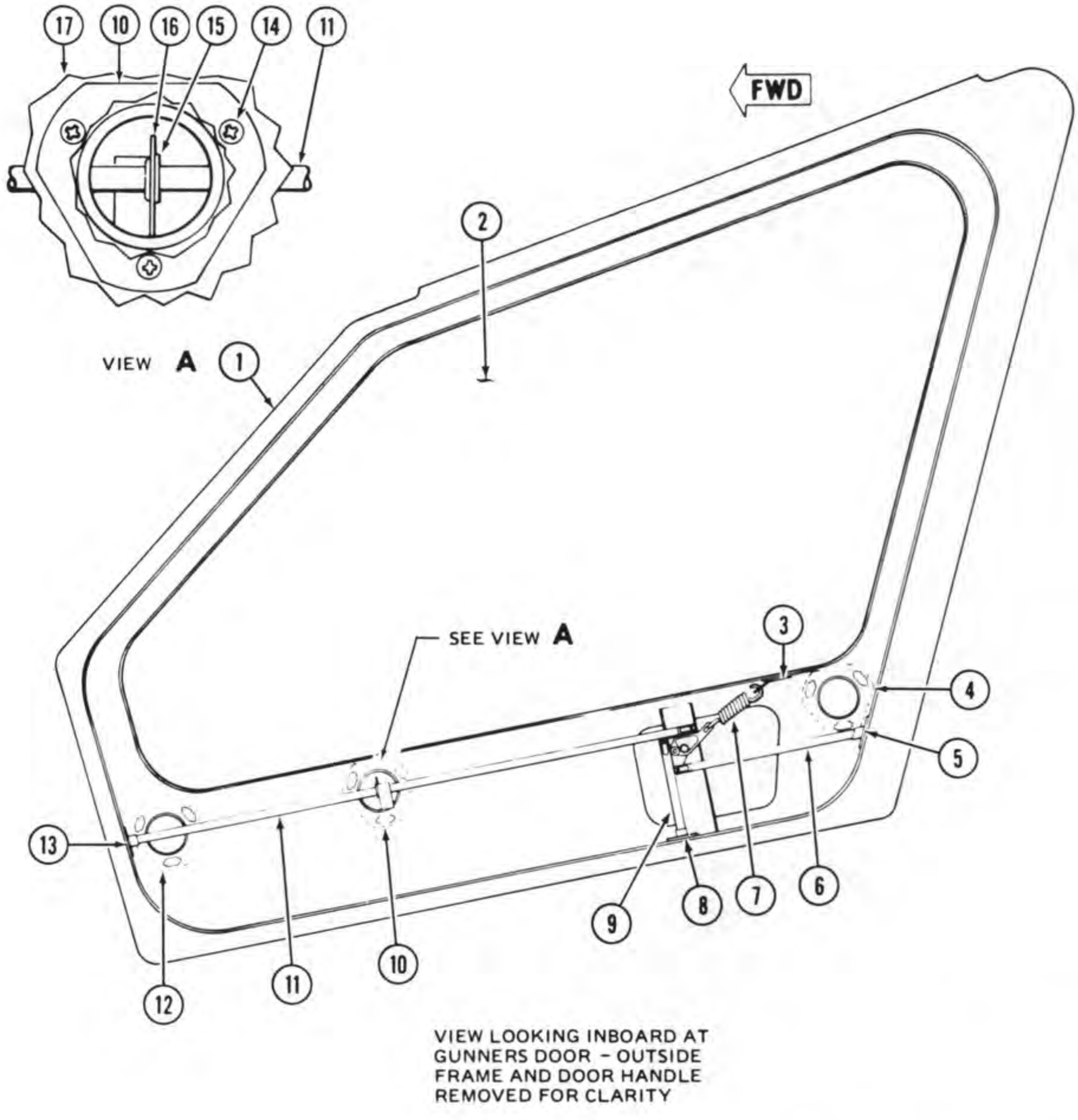


VIEW **B**

209033-34-2A

1. Pilot door
2. Acrylic plastic transparency
3. Guide
4. Door frame
5. Plastic cover
6. Stiffener
7. Plastic cover
8. Rod assembly
9. Guide
10. Rod assembly
11. Door
12. Spring
13. Clip
14. Plastic cover
15. Rod assembly
16. Plastic cover
17. Guide
18. Clip
19. Grommet
20. Screw
21. Rod assembly
22. Screw
23. Screw
24. Screw
25. Handle
26. Screw
27. Nutplate
28. Bolt
29. Cotter pin
30. Washer
31. Pin
32. Washer (standard aluminum)
33. Washer (corrosion resistant steel)
34. Washer (standard aluminum)
35. Toggle
36. Washer (thin aluminum)
37. Nut
38. Cotter pin
39. Doubler
40. Lock cylinder
41. Handle
42. Screw
43. Rivet
44. Washer
45. Nut
46. Bellcrank
47. Spacer assembly
48. Seal

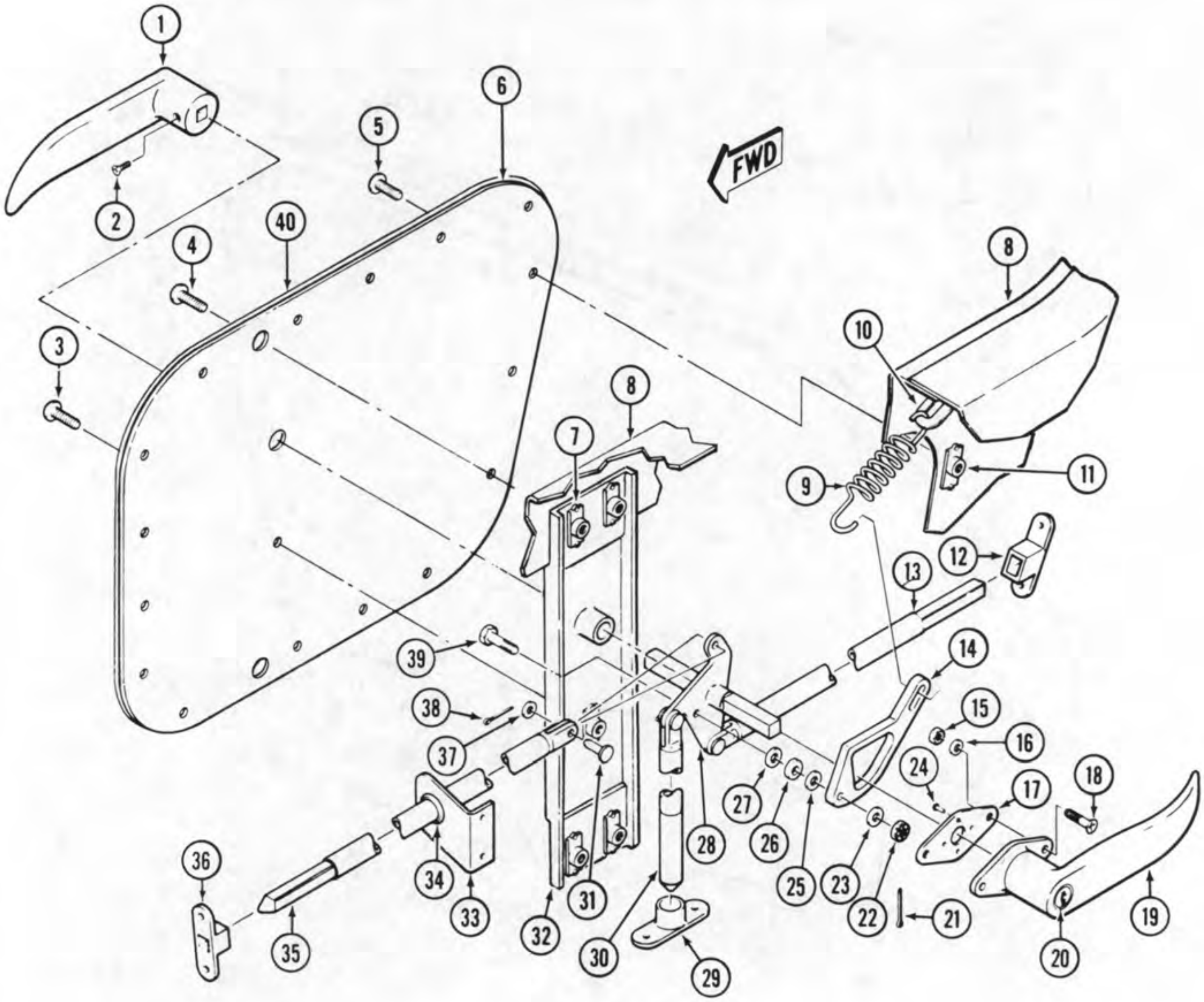
Figure 2-61. Pilot Door — Assembly (Sheet 2 of 2)



1. Gunners door
2. Acrylic plastic transparency
3. Clip
4. Plastic cover (door)
5. Guide
6. Rod assembly
7. Spring
8. Guide
9. Rod assembly
10. Plastic cover (door)
11. Rod assembly
12. Plastic cover (door)
13. Guide
14. Screw
15. Grommet
16. Bracket
17. Door frame

209033-43

Figure 2-62. Gunner Door Assembly



1. Handle
2. Screw
3. Screw
4. Screw
5. Screw
6. Door
7. Nutplate
8. Door frame
9. Spring
10. Clip
11. Nutplate
12. Guide
13. Rod assembly
14. Toggle
15. Nut
16. Washer
17. Doubler
18. Screw
19. Handle
20. Lock cylinder
21. Cotter pin
22. Nut
23. Washer (thin aluminum)
24. Rivet
25. Washer (standard aluminum)
26. Washer (corrosion resistant steel)
27. Washer (standard aluminum)
28. Bellcrank
29. Guide
30. Rod assembly
31. Pin
32. Spacer assembly
33. Bracket
34. Grommet
35. Rod assembly
36. Guide
37. Washer
38. Cotter pin
39. Bolt
40. Seal

Figure 2-63. Gunner Door Latch Assembly

(3) Remove sixteen screws (5) and one screw (3). Leave two screws (4) installed as noted in caution above.

(4) Remove spring (9).

(5) Remove door (6).

(6) Remove two screws (4) and spacer assembly (32).

(7) Remove three screws (14, figure 2-62) and plastic cover (4). Remove plastic covers (10 and 12) in the same manner.

(8) Remove pin (31, figure 2-62) to disconnect rod assembly (35) from bellcrank (28). Remove rod assemblies (13) and (30) in the same manner.

(9) Remove bellcrank (28) and toggle (14).

(10) Remove two screws (18) and handle (19).

(11) Remove bolt (39) and toggle (14) from bellcrank (28).

(12) Remove seal (40).

2-133. INSPECTION — CREW DOORS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Inspect acrylic plastic transparent windows in doors for scratches, nicks, cracks, crazing, and secure installation to door frame.

b. Inspect door frames and hinges for cracks, scratches, nicks, corrosion, and deformation. If a hinge is cracked or broken, continue to use it if it remains within limits.

(1) Not more than three segments cracked or broken.

(2) No two cracked or broken segments are closer than four segments apart.

(3) No cracked or broken segments among first four segments from either end of hinge.

c. Inspect door handles for cracks, nicks, corrosion and deformation.

d. Inspect locks in door handles for satisfactory operation.

e. Inspect door latch mechanism for smooth operation and for correct adjustment at two latch rod strikers for each door.

f. If pilot or gunner door latch mechanisms are binding or out of adjustment, remove plastic covers (5, 7, 14, and 16, figure 2-61) or (4, 10, and 12, figure 2-62) as applicable. Inspect latch linkage for cause of discrepancy.

2-134. CLEANING — CREW DOORS.

a. Clean transparent acrylic plastic windows. Refer to paragraph 2-142.

b. Clean crew door frames in same manner as canopy frames. Refer to paragraph 2-142.

2-135. REPAIR — CREW DOORS.

a. Repair small cracks in metal frame by stop drilling. Also, repair with sheet metal and rivets or spotwelds.

b. Replace door if frame is distorted so that it affects opening and closing the door.

c. Replace worn or corroded hinges.

d. Replace stripped and missing nut plates.

e. Polish out corrosion not severe enough to affect function. Use 300 grit sandpaper (C102). Apply primer (C88 or C91) touch-up paint to match existing finish. Refer to TB746-93-2 for paint instructions.

f. Replace damaged or missing grommets (19, figure 2-61). There is one grommet (19) behind plastic cover (7) and one grommet behind plastic cover (14). There is one similar grommet on the gunner door.

g. Replace defective lock cylinders (40, figure 2-61) and similar lock cylinder on gunner door.

h. Replace broken plastic covers (5, 7, 14 and 16, figure 2-61) and (4, 10, and 12, figure 2-62).

i. Replace cracked or crazed acrylic plastic transparent windows in doors.

j. Polish out cracks or nicks in acrylic plastic transparent windows in doors provided that length of damaged area does not exceed **0.5** inch and depth of polished area does not exceed **0.025** inch. Use windshield maintenance kit (T85), acrylic plastic polishing kit (T86) and water.

k. Replace door if frame is cracked in area of hinge or latch.

l. Replace cracked or broken hinge that is not within limits. Refer to paragraph 2-133, step b.

m. Replace seal (48) if damaged.

2-136. ASSEMBLY — CREW DOORS.

a. Assemble pilot door. See figure 2-59 and 2-61.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

NOTE

It is recommended that door be removed from helicopter for assembly if intensive disassembly has been accomplished. Refer to paragraph 2-131.

(1) Position toggle (35, figure 2-61) on bellcrank (46) in position shown. Install bolt (28) with standard aluminum washer (32), corrosion resistant steel washer (33) and standard aluminum washer (34) in position shown. Install nut (37) with thin aluminum washer (36). Install nut fingertight and check that toggle will move freely on bolt. Install cotter pin (38).

(2) Position handle (41) on door frame and install two screws (42).

(3) Position toggle (35) and bellcrank (46) in handle (41) with handle pointing aft as shown.

(4) Position spacer assembly (47) on bellcrank (46). Secure spacer assembly to door frame (4) with one screw (23) at the top and one similar screw at the bottom.

CAUTION

Spring (12) applies a strong force to spacer assembly (47) when the spring is installed. Ensure that screw (23) and a similar screw at the bottom of the spacer assembly are installed at all times when spring (12) is installed.

(5) Ensure that grommet (19) is in place and install rod assembly (8) through guide (3). Secure to bellcrank with pin (31), washer (30) and cotter pin (29). Install rod assemblies (10) and (15) in a similar manner.

(6) Install spring (12) on clip (13) and toggle (35). Operate handle (41) and check operation. There should be no binding of linkage. Spring (12) should return handle to horizontal position.

(7) Position door (11) on door frame (4) and install one screw (26) and sixteen screws (22).

(8) Position handle (25) on bellcrank (46) with handle pointing forward as illustrated. Install screw (24).

(9) Install plastic covers (5, 7, 14 and 16) with three screws each.

(10) Check operation of handle and latch linkage as outlined in step (6).

(11) Replace seal (48) if damaged.

b. Assemble gunner door as follows:

(1) Position gunner door (1, figure 2-62) on a padded work surface.

(2) Position toggle (14, figure 2-63) on bellcrank (28) in position shown. Install bolt (39) with standard aluminum washer (27), corrosion resistant steel washer (26) and standard aluminum washer (25) in position shown. Install nut (22) with thin aluminum washer (23). Install nut fingertight and check that toggle will move freely on bolt. Install cotter pin (21).

(3) Position handle (19, figure 2-63) on door frame (8) and install two screws (18).

(4) Position assembled toggle (14) and bellcrank (28) in handle (19) with handle pointing aft as shown.

(5) Position spacer assembly (32) on bellcrank (28). Secure spacer assembly (32) to door frame (8) with one screw (4) at the top and one similar screw at the bottom.

CAUTION

Spring (9) applies a strong force to spacer assembly (32) when the spring is installed. Ensure that screw (4) and a similar screw at the bottom of the spacer assembly are installed at all times when spring (9) is installed.

(6) Ensure that grommet (34) is in place. Install rod assembly (35) through guide (36). Secure rod to bellcrank with pin (31), washer (37), and cotter pin (38). Install rods (13) and (30) in the same manner.

(7) Install spring (9) on clip (10) and toggle (14). Operate handle (19) and check operation of latch mechanism. There should be no binding and spring (9) should return handle to horizontal position.

(8) Position door (6) on door frame (8) and install sixteen screws (5) and one screw (3).

(9) Position handle (1) on bellcrank (28) with handle pointing forward as shown. Install screw (2).

(10) Install plastic covers (4, 10, and 12, figure 2-62) with three screws each.

(11) Replace seal (40, figure 2-63) if damaged.

2-137. INSTALLATION — CREW DOORS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Install pilot door. See figure 2-59.

(1) Position door (1) on helicopter. Support the door in the open position, align hinge halves and install hinge pin (10).

(2) Align the socket on lower end of gas spring (3) with ball stud fitting (22). The socket on the end of the gas spring should slide on the ball stud fitting when moderate force is applied. Install safety clip (23).

(3) Close the door and check for **0.250** inch dimension at strikers (14) and (17). See sectional views B-B and D-D. Adjust thickness of shims (12) and/or (19) if required.

(4) Operate door handle (5) and check door latch rods (13) and (18) to ensure that they fully engage strikers and that the door latch mechanism operates smoothly.

(5) Lock and unlock cylinder (4) to ensure that operation is satisfactory.

b. Install gunner door. See figure 2-60.

(1) Position door (1) on helicopter. Support the door in the open position, align hinge halves and install hinge pin (20).

(2) Align the socket on lower end of gas spring (3) with ball stud fittings (24). The socket on the end of the gas spring should slide on the ball stud fitting when moderate force is applied. Install safety clip (25).

(3) Close the door and check for **0.250** inch dimension at strikers (9) and (15). See sectional views B-B and D-D. Adjust thickness of shim (10) and/or position of aft striker plate (14) if required.

(4) Operate door handle (4) and check door latch rods (8) and (17) to ensure that they fully engage strikers and that the door latch mechanism operates smoothly.

(5) Lock and unlock lock cylinder (7) to ensure that operation is satisfactory.

2-138. ADJUSTMENT — CREW DOORS.

Refer to paragraph 2-137.

2-139. PAINTING — CREW DOORS.

Touch up paint to match original finish. Refer to TB746-93-2 for general painting instructions.

2-140. CANOPY AND CREW DOOR WINDOWS AND WINDSHIELDS.

2-141. DESCRIPTION — CANOPY AND CREW DOOR WINDOWS AND WINDSHIELDS.

See figure 2-64. The canopy and crew door windows and windshields are fabricated from acrylic plastic. Acrylic impregnated nylon fabric edging is bonded to the edges of window and windshield sections. The windows and windshields are secured in the door frames or canopy frames as applicable with screws.

2-142. CLEANING — CANOPY AND CREW DOOR WINDOWS AND WINDSHIELDS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

CAUTION

Do not use compounds that contain any abrasive material or solutions that contain chlorinated carbons. Avoid excessive scrubbing of plastic panels during washing operation.

a. Clean the transparent plastic windows with clear water. Free all caked dirt with fingers. Do not use sponges or coarse cloths. Rinse frequently with water while removing dirt.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

CAUTION

Do not use aliphatic naphtha Type 1 in or around cockpit. Use of this solvent can result in damage to acrylic, plastic.

b. Remove any grease or oil that remains on windows after washing as describer in step a., with aliphatic naphtha, Type II (C75) and repeat cleaning with cleaning compound as described in step a.

c. Allow surfaces to drip dry.

d. Polish out minor scratches which may interfere with pilot or gunner vision. Use windshield maintenance kit (T85), acrylic plastic polishing kit (T86) and water.

e. Apply rain repellant in accordance with directions on container.

2-143. INSPECTION — CANOPY AND CREW DOOR WINDOWS AND WINDSHIELDS.

a. Inspect windows and windshields for scratches, nicks, gouges, cracks, holes, and crazing damage.

b. Inspect for bond separation between acrylic plastic and nylon fabric edging.

2-144. REMOVAL — CANOPY AND CREW DOOR WINDOWS AND WINDSHIELDS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Pilot window (10, figure 2-64) and gunner window (7) are equipped with explosive window cutting assemblies. The window cutting assemblies are retained by the window installation screws. Refer to Paragraph 17-6 for instructions to remove these two windows.

b. Remove fire and high air data subsystem boom.

c. Remove windshields and windows (1, 5, 8, 9 and 11).

NOTE

Procedure for removal of upper windshield (5) is given. Remove other windows and windshield in the same manner.

(1) Remove screws (4) around edge of upper windshield (5).

CAUTION

Do not exceed 250 degrees F (121 degrees C) or acrylic plastic may be damaged.

(2) Push upper windshield (5) out of canopy frame (6). If windshield (5) is difficult to remove, apply heat with heat lamp to soften sealant.

(3) Clean old sealant from canopy frames (6). If the same upper windshield is to be reinstalled, also clean sealant from the windshield. Use a sharp plastic scraper to remove old sealant.

(4) Refer to paragraph 13-104 for removal of rain removal thermal switch from lower windshield (1).

2-145. REPAIR — CANOPY AND CREW DOOR — WINDOWS AND WINDSHIELDS.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Polish out minor scratches and nicks in windshields and windows. Use windshield maintenance kit (T85) and acrylic plastic polishing kit (T86).

b. Repair leaks at edges of windshields and windows by removing windshield or window and reinstalling with new sealant. Refer to paragraphs 2-144 and 2-146.

2-146. INSTALLATION — CANOPY AND CREW DOOR WINDOWS AND WINDSHIELDS.

WARNING

Ensure that both the pilot and gunner arming/firing handles are secured with safety pins prior to entry into the cockpit area.

a. Pilot window (10, figure 2-64) and gunner window (7) are equipped with explosive window cutting assemblies. The cutting assemblies are retained by the window installation screws. Refer to paragraph 17-8 for instructions to install windows.

b. Install windshields and windows (1, 5, 8, 9, and 11).

NOTE

Procedure for installation of upper windshield (5) is given. Install other windows and windshield in the same manner.

(1) Ensure that each rivet nut and nut plate for windshield attaching screws (4) is securely installed and the threads are not damaged. Replace any damaged rivet nuts or nut plates.

(2) Ensure that there are no obstructions on the canopy frame (6) or the windshield (5) that would prevent a close fit when the windshield is installed.

(3) If a new windshield (5) is being installed, drill holes in windshield for screws (4) to match holes in frame (6). Use hole finder to locate holes. Drill holes **0.203 to 0.208** inches in diameter.

WARNING

Adhesive and sealants are flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of adhesive vapor and contact with skin, or eyes.

(4) Ensure that edgings (2) and (3) are securely bonded to upper windshield (5). If any small areas are not bonded, repair loose area with adhesive (C10). Mix two-part adhesive in accordance with instructions on container. Mask off acrylic plastic to avoid damage by contact with adhesive. Apply mixed adhesive to unbonded area with a small squeegee. Clean up excess adhesive and remove masking. Allow adhesive to cure for **24** hours at room temperature.

WARNING

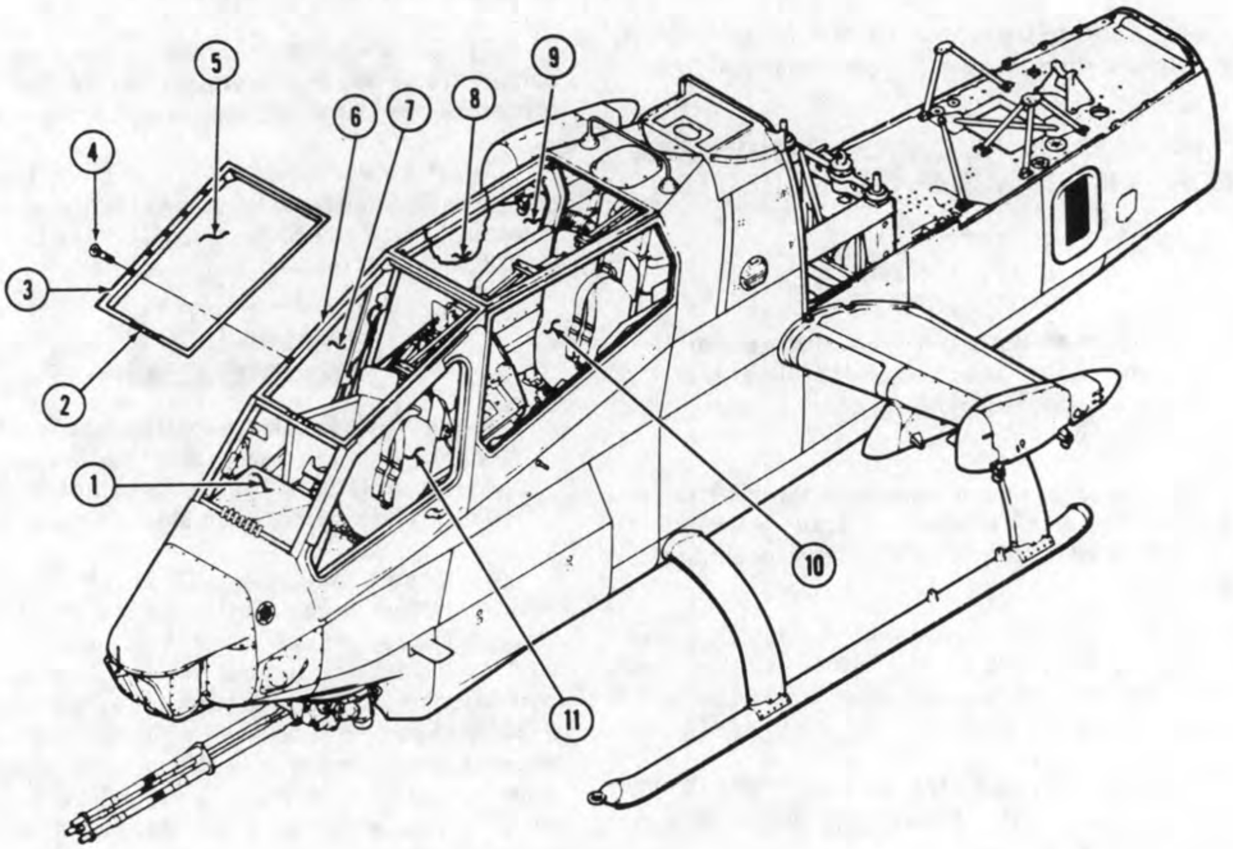
Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(5) Clean mating surfaces of frame (6) and upper windshield (5) with naphtha (C75) and clean cloths.

WARNING

Sealant is flammable and toxic. provide adequate ventilation. Avoid prolonged breathing of vapors and contact with skin or eyes.

(6) Mix two-part sealant (C105). Use 10 parts of grey color base to one part white color accelerator by weight. Mix in a clean, non-absorbent container. Mix



1. Lower windshield
2. Nylon fabric edging (four circular sections 0.50 inch in diameter)
3. Nylon fabric strip edging
4. Screw
5. Upper windshield
6. Frame
7. Gunner window
8. Pilot door window
9. Canopy top
10. Pilot window
11. Gunner door window

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Figure 2-64. Canopy Window and Windshield — Installation the accelerator thoroughly in its container before mixing with the base material; then mix the two accelerators with the base material. Pot life of the mixed sealant is two hours.

(7) Apply a small bead of sealant prepared in preceding step to edge of frame (6) just outboard of holes for screws (4). The correct size bead of sealant will result in a slight amount of squeeze out when windshield is installed. Use a pressure gun to apply sealant if available.

(8) Position windshield (5) in frame (6) and install screws (4) finger tight. Use screws (4) of correct length for thread engagement with rivet nuts. Tighten screws (4) evenly. Clean excess sealant squeeze out with a sharp plastic scraper after sealant cures. It may take up to 14 days for sealant to cure.

(9) Refer to paragraph 13-105 for installation of rain removal thermal switch in lower windshield (1).

2-147. CANOPY FRAMES.

2-148. DESCRIPTION — CANOPY FRAMES.

The canopy frame assembly supports the pilot and gunner doors, windows, and windshields. The frames are constructed from aluminum alloy (figure 2-65).

2-149. REMOVAL — CANOPY FRAMES.

Canopy frames must be removed at the depot level maintenance activity.

2-150. INSPECTION — CANOPY FRAMES.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Inspect canopy frames for obvious damage such as distortion and cracks. Canopy frames with this type damage must be replaced.

b. Inspect canopy frames for nicks, dents, distortion and corrosion.

c. Inspect canopy frames for secure installation of windshields, windows, and doors.

d. If any windows or windshields have been removed from canopy frames, inspect exposed blind rivet nuts for secure installation and for damaged threads.

2-151. CLEANING — CANOPY FRAMES.

a. Clean canopy frames with biodegradable cleaner (C32), water, and clean cloths.

b. Remove all cleaner and water with clean dry cloths.

c. If any windows of windshields have been removed, clean old sealant from frames with sharp plastic scraper.

2-152. REPAIR — CANOPY FRAMES.

a. Replace damaged blind rivet nuts. Two types of blind rivet nuts are used. Refer to TM 55-1520-236-23P.

b. Touch-up damaged paint to match existing finish. Refer to TM 746-93-2.

2-153. INSTALLATION — CANOPY FRAMES.

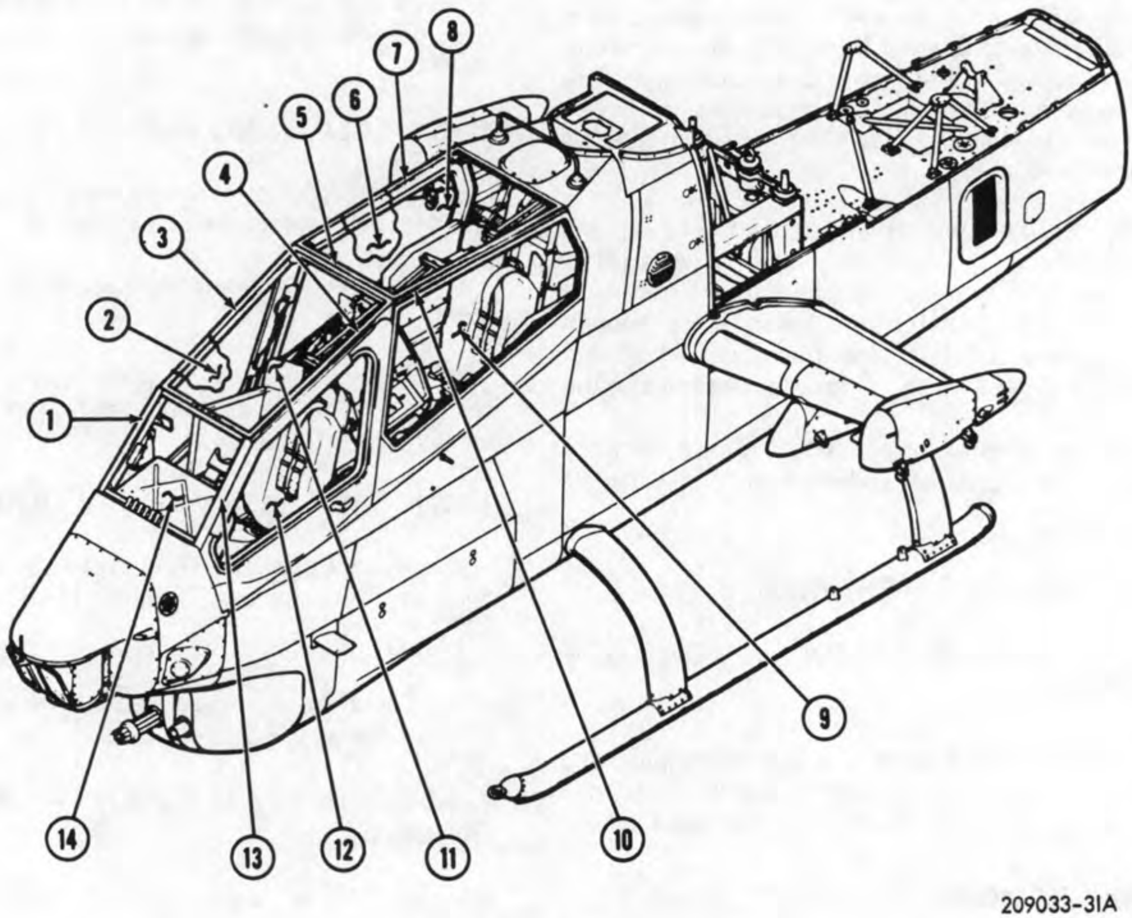
Canopy frames must be replaced at higher maintenance level.

2-154. PILOT AND GUNNER SEAT ASSEMBLIES.

2-155. DESCRIPTION — PILOT AND GUNNER SEAT ASSEMBLIES.

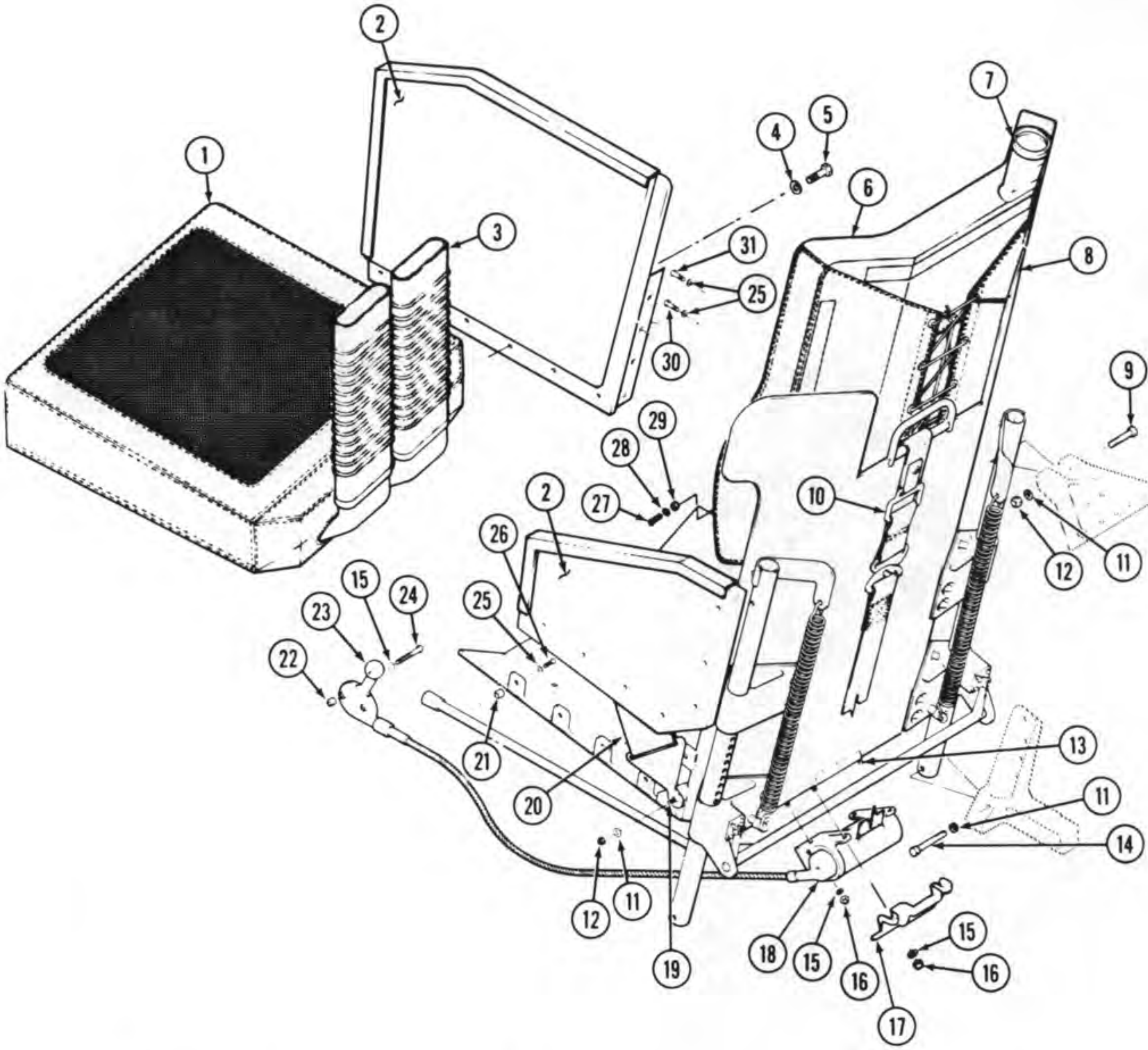
a. The pilot seat is one-piece, bucket-type seat mounted on two vertical tubes which hold it in place on the airframe structure and serve to make the seat adjustable vertically. See figure 2-66. The seat is constructed of armor steel with fittings for armor side panels.

b. The gunner seat is a two-piece, bucket type seat. The two major components are the back and the bottom. See figure 2-67. Construction is ceramic plate armor.



1. Forward frame
2. Gunners window
3. Forward upper frame
4. Forward upper frame
5. Top frame
6. Pilots door
7. Aft upper frame
8. Top canopy
9. Pilots window
10. Aft upper frame
11. Upper windshield
12. Gunners door
13. Foward frame
14. Lower windshield

Figure 2-65. Canopy Frame — Installation



1. Seat cushion
2. Side armor panel
3. Air ducts
4. Washer
5. Screw
6. Seat back cushion
7. Air inlet
8. Seat assembly
9. Bolt
10. Shoulder harness
11. Washer
12. Nut
13. Screw
14. Bolt
15. Washer
16. Nut
17. Cover, inertia reel
18. Inertia reel
19. Bolt
20. Seat lap belt
21. Spacer
22. Spacer
23. Inertia reel control
24. Screw
25. Washer
26. Screw
27. Bolt
28. Washer
29. Nut
30. Screw
31. Screw

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Figure 2-66. Pilot Seat — Installation

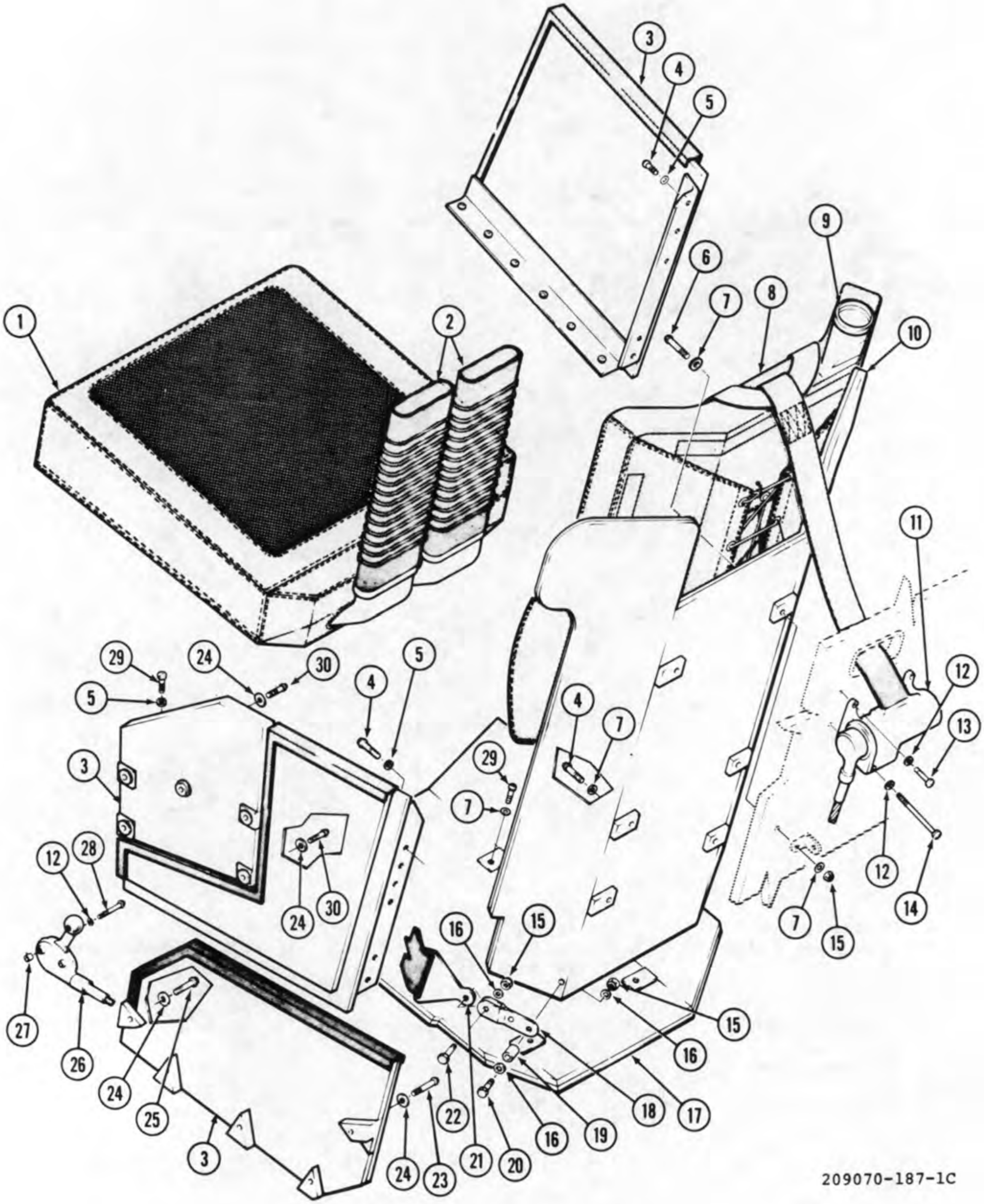

Figure 2-67. Gunner Seat — Installation (Sheet 1 of 2)

1. Seat cushion	16. Washer
2. Air ducts	17. Seat bottom panel
3. Side armor panel	18. Attaching strap
4. Screw	19. Spacer
5. Washer	20. Bolt
6. Screw	21. Seat lap belt
7. Washer	22. Bolt
8. Seat back cushion	23. Screw
9. Air inlet	24. Washer
10. Seat back	25. Screw
11. Inertia reel	26. Inertia reel control
12. Washer	27. Spacer
13. Screw	28. Screw
14. Screw	29. Screw
15. Nut	30. Screw

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Figure 2-67. Gunner Seat — Installation (Sheet 2 of 2)

2-156. REMOVAL — PILOT AND GUNNER SEAT ASSEMBLIES.

WARNING

Ensure that both pilot and gunner arming/firing mechanism handles are secured by safety pins prior to entry into the cockpit area.

a. Remove pilot seat from cockpit.

(1) Loosen clamp and disconnect air distribution duct from duct cushion air inlet (7, figure 2-66).

(2) Remove seat back cushion (6) and air ducts (3).

(3) Remove seat cushion (1).

CAUTION

Handle side armor panels and seat with care; ceramic tile is easily broken.

(4) Remove side armor panels (2) by removing screws (5, 26, 30, and 31), washers (4 and 25), and spacers (21).

(5) Detach inertia reel control (23) from side of cockpit by removing screws (24), washers (15), and spacer (22).

(6) Remove bolts (9 and 14), washers (11), and nuts (12). Remove seat assembly from helicoter.

(7) Remove nuts (12), washers (11), and bolts (19) and remove seat lap belt (20).

(8) Detach shoulder harness (10) from inertia reel strap by removing nut (29), washer (28), and bolt (27).

(9) Remove four nuts (16), washers (15), and screws (13) attaching inertia reel (18) and cover (17). Remove cover and inertia reel.

b. Remove gunner seat from cockpit.

(1) Loosen clamp and disconnect air distribution duct from air inlet (9, figure 2-67).

(2) Remove seat cushion (1) and air ducts (2).

(3) Remove seat back cushion (8).

CAUTION

Handle armor panels and seat with care; ceramic tile is easily cracked.

(4) Remove side armor panels (3) by removing screws (4, 23, 25, 29, and 30) and washers (5 and 24).

(5) Remove six screws (6) and washers (7) which attach seat back (10) to bulkhead and remove seat back.

(6) Remove screws (28), washers (12) and spacers (27) which attach inertia reel control (26) to side of cockpit. Loosen knurled nut and disconnect control cable from handle.

(7) Remove four screws (13 and 14) and washers (12). Work shoulder harness back through bulkhead and remove inertia reel (11) from helicopter.

(8) Remove bolts (22), washers (16) and nuts (15) which attach seat lap belt (21) to attaching strap (18). Remove seat lap belt from helicopter.

CAUTION

Handle side armor panels and seat with care; ceramic tile is easily broken.

(9) Remove screws (29) and washers (7) which attach seat bottom panel (17) to structure. Remove seat bottom panel from helicopter.

2-157. INSPECTION — PILOT AND GUNNER SEAT ASSEMBLIES.

a. Inspection. Inspect installed pilots seat for the following defects:

(1) Refer to paragraph 2-178 for inspection procedure for side armor panels (2, figure 2-66) and armor seat (2, figure 2-68).

(2) Cracks. No cracks allowed.

(3) Secure mounting of the seat in the helicopter and secure installation of the inertia reel and armor panels.

(4) Seat cushion and back cushion for wear and damage. Sun fading is not cause for rejection. Wear and damage that affect comfort must be corrected by repair or replacement.

(5) Check seat vertical adjustment, ease of operation, and secure locking in various height positions.

b. Inspection. Inspect installed gunner seat for the following defects.

(1) Refer to paragraph 2-175 for inspection procedure for side armor panels (3, figure 2-67), seat back (10) and seat bottom panel (17).

(2) Seat cushion (1) and back cushion (8) for wear and damage. Use same procedure described for pilot seat cushions.

(3) Secure mounting of the seat in the helicopter and secure installation of the inertia reel and armor panels.

c. Inspect disassembled pilot seat assembly as follows: See figure 2-68.

(1) Inspect upper guide fittings (4) and lower guide fittings (7) by fluorescent penetrant method. Refer to TM 43-0103.

(2) Inspect handle assembly (1), support tubes (3), latch springs (9), return spring (5), and latch pins (10) by magnetic particle method. Refer to TM 43-0103.

(3) Inspect seat netting for tears, cuts and holes. Damage greater than one inch in length or diameter is not repairable. Temporary repairs can be made to damage less than **one** inch in length or diameter.

(4) Inspect seat netting for deterioration and discoloration which indicate a decrease in strength. If integrity of netting is doubtful, the netting must be replaced.

2-158. DISASSEMBLY — PILOT AND GUNNER SEAT ASSEMBLIES.

a. Disassemble pilot seat.

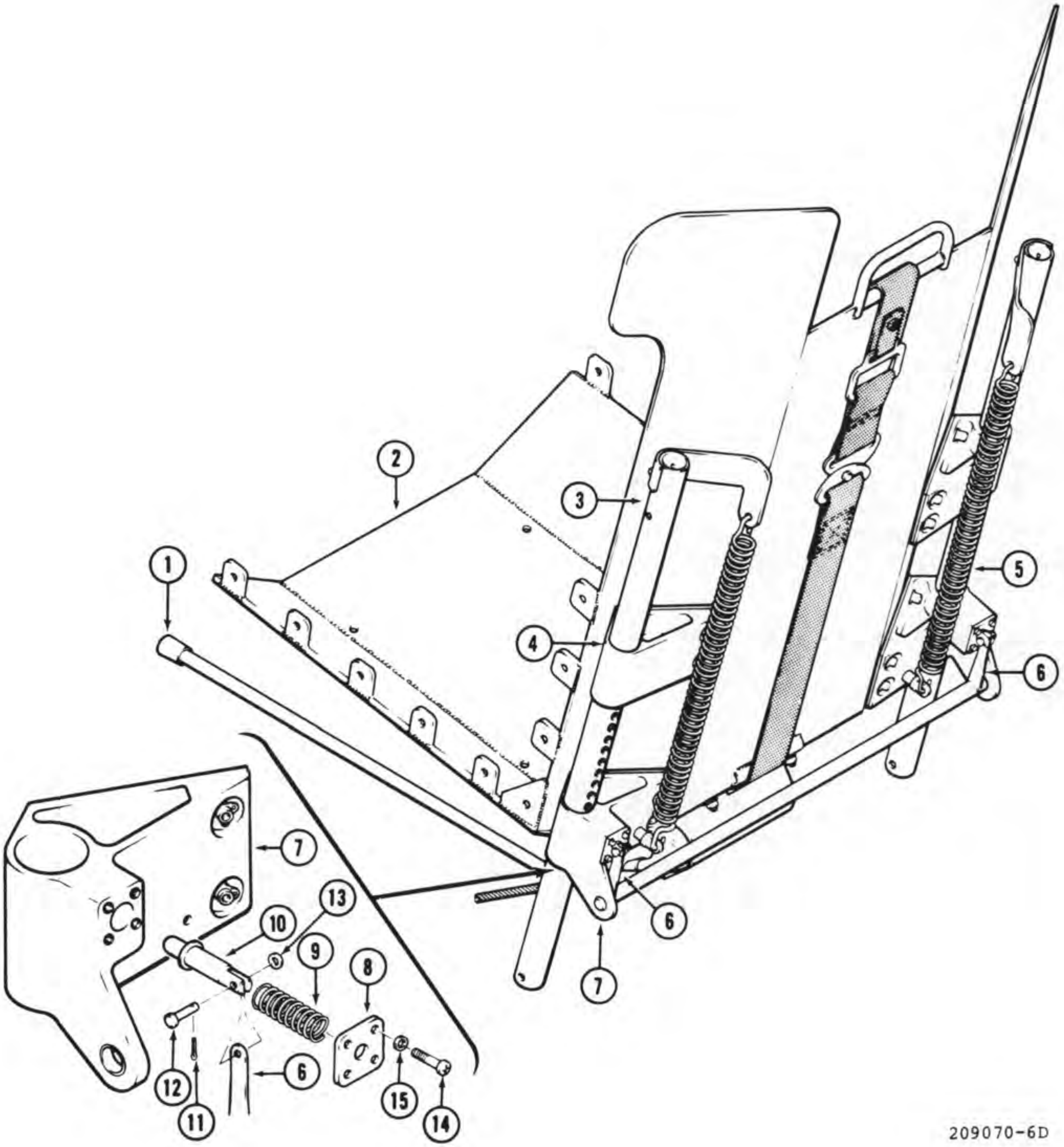
(1) Adjust the pilot seat to "UP" position on support tubes (3, figure 2-68). Remove two return springs (5).

(2) Pull up on handle (1) to withdraw latch pins (10) from support tubes (3). Pull upward on support tubes (3) and remove them from fittings (4 and 7).

(3) Disconnect handle levers (6) from latch pins (10) by removing cotter pins (11), washers (13), and pins (12) at each side of seat.

(4) Remove screws (14), washers (15) and retainer plates (8) from lower fittings (7) and remove latch pins (10) and latch springs (9).

(5) Remove two upper fittings (4) and lower fittings (7) from seat (2).



1. Handle assembly	6. Levers (handle)	11. Cotter pin
2. Seat assembly	7. Fittings (lower)	12. Pin
3. Support tubes	8. Retainer plate	13. Washer
4. Fittings (upper)	9. Latch spring	14. Screw
5. Return spring (2)	10. Latch pin	15. Washer

Figure 2-68. Pilot Seat — Assembly

b. Disassemble gunner seat. The gunner seat is disassembled during removal (paragraph 2-156).

2-159. REPAIR — PILOT AND GUNNER SEAT ASSEMBLIES.

a. Repair pilot seat.

(1) Refer to paragraph 2-179 for repair procedure for side armor panels (2, figure 2-66) and armor steel seat (8, figure 2-66).

(2) Repair tears, cuts, or holes in netting that are **one** inch maximum length or diameter if new cushion is not available. Use nylon thread to repair by darning procedure. Pick up at least **0.250** inch of good material around the repair area. Maintain thread tension to produce a mend that disturbs the natural lines of the seat netting as little as possible.

(3) Replace cushion if deteriorated or damaged beyond repair limits. Comfort is the determining factor for replacement of cushions.

(4) Replace any parts of the seat vertical adjustment mechanism that are damaged to the degree that function is affected.

b. Repair gunner seat.

(1) Refer to paragraph 2-179 for repair procedure for side armor panels (3, figure 2-67) seat back (10) and seat bottom panel (17).

(2) Repair tears, cuts, and holes in seat cushion (1) and back cushion (8). Use same procedure described for pilot seat cushions.

2-160. ASSEMBLY — PILOT AND GUNNER SEAT ASSEMBLIES.

a. Assemble pilot seat.

(1) Position handle assembly (1, figure 2-68) in place of each lower fitting (7).

(2) Install lower fittings (7) on seat assembly (2).

(3) Install upper fittings (4) on seat assembly.

(4) Install a latch pin (10) and latch spring (9) in each lower fitting (7). Install retainer plates (8) to secure latch pins and springs.

(5) Connect latch pins (10) to levers (6) of handle assembly (1) with clevis pins, washers, wand cotter keys.

(6) Install support tubes (3) down through upper fittings (4) and lower fittings (7). Hold handle (1) in UP position to permit passage of support tubes through lower fittings (7).

(7) Install return springs (5).

b. Assemble gunner seat. The gunner seat is assembled during installation in the helicopter (paragraph 2-161).

2-161. INSTALLATION — PILOT AND GUNNER SEAT ASSEMBLIES.

WARNING

Before performing any maintenance in or near the cockpit area, ensure that both pilot and gunner arming/firing mechanism handles are secured by safety pins.

a. Install pilot seat assembly.

(1) Position inertia reel (18, figure 2-66) and cover (17) on back of seat assembly (8). Install screws (13), washers (15), and nuts (16) with heads of screws on inside of seat bucket.

(2) Thread shoulder harness (10) through guide at top of seat assembly (8). Attach inertia reel strap with bolt head facing seat back.

(3) Install seat lap belt (20) with bolts (19), washers (11), and nuts (12). Install belt half with lock on left side. install bolts (19) with bolt heads on inside of seat bucket.

(4) Position seat assembly (2, figure 2-68) in helicopter. Fit support tubes (3) into fittings (4 and 7). Route inertia reel cable inboard of left support tube as illustrated on figure 2-66. Install seat attaching bolts (9 and 14, figure 2-66), washers (11), and nuts (12).

(5) Tighten knurled nut on inertia reel control (23). Position inertia reel control (23) on side of cockpit and secure with spacers (22), washers (15), and screws (24). Lockwire knurled nut with lockwire (C137).

(6) Install seat (1), air ducts (3), and seat back cushion (6).

(7) Position air distribution duct on air inlet (7). Tighten clamp to secure duct.

(8) Install side armor panels (2) with screws (5, 26, 30, and 31), washers (4 and 25), and spacers (21).

b. Install gunner seat assembly.

(1) Position seat bottom panel (17, figure 2-67) in cockpit and secure with screws (29) and washers (1).

(2) Position seat back (10) in cockpit and secure with bolts (4) and washers (7).

(3) Work shoulder harness through bulkhead. Position inertia reel (11) on bulkhead. Secure with screws (13 and 14) and washers (12). Place one washer (12) under each screw head and one washer (12) under each inertia reel (11) attachment lug.

(4) Route inertia reel control cable along left side of seat and connect to inertia reel control (26). Tighten knurled nut and position inertia reel control (26) on beam. Install screws (28), washers (12) and spacers (27). Lockwire knurled nut with lockwire (C137).

(5) Attach seat lap belt (21) to attaching strap (18) with bolts)22), washers (16), and nuts (15).

(6) Connect air ducts (2) on seat cushions (1) and install cushion.

(7) Connect air ducts (2) to seat back cushion (8) and install cushion.

(8) Position air distribution duct on air inlet (9) and tighten clamp to secure duct.

(9) Install side armor panels (3) with swcrew (4, 6, 23, 25, 30) and washers (5, 7, and 24).

2-162. ADJUSTMENT — PILOT AND GUNNER SEAT ASSEMBLIES.

a. Adjust pilot and gunner inertia reel and control to make sure the inertia reel will lock, unlock and rewind as applicable.

b. Perform funcitonal check of pilot seat vertical adjustment to make sure pilot seat will lock in all vertical positions, up and down.

c. The gunner seat is non-adjustable and has no functional check.

2-163. SHOULDER HARNESS AND INERTIA REEL.

2-164. DESCRIPTION — SHOULDER HARNESS AND INERTIA REEL.

The pilot and gunner shoulder harness serves to prevent injury and restrain their movement during helicopter operations. The inertia reel controls the shoulder harness through cable connections between the harness and the reel. The pilot and gunner can select "Lock" or "Auto" with their individual controls.

2-165. REMOVAL — SHOULDER HARNESS AND INERTIA REELS.

2-166. INSPECTION — SHOULDER HARNESS AND INERTIA REEL.

a. Inspect pilot and gunner shoulder harness for tears, fraying, wear, and general condition.

b. Refer to TM 55-1500-204-25/1. See figures 2-66 and 2-67.

c. Inspect pilot inertia reel (18, figure 2-66) and control (23).

(1) Place control (23) in "Lock" position and pull on shoulder harness; the inertia reel should hold the shoulder harness and not extend. Inertia reels that will not lock are not acceptable.

(2) Place control (23) in "Auto" position and pull on shoulder harness. The inertia reel should permit the shoulder harness to be pulled out against spring tension and should rewind when pulling pressure on shoulder harness is decreased. Inertia reels that will not operate as described in this paragraph are not acceptable.

(3) Inspect inertia reel strap for wear, fraying, and general condition.

(4) Inspect inertia reel (18) and control (23) for secure mounting and damage.

(5) Inspect cable between inertia reel (18) and control (23) visually for fraying and damage.

(6) Inspect gunner inertia reel and control in similar manner. See figure 2-67.

2-167. REPAIR — SHOULDER HARNESS AND INERTIA REEL.

a. Replace inertia reel that fails to pass functional check.

b. Replace worn inertia reel strap.

(1) Move inertia reel control handle to "Auto" position and pull out slowly on strap assembly until web retaining insert is visible through lower slot in reel housing.

CAUTION

If reel is inadvertently released while strap is removed, replace entire reel assembly.

(2) Move control handle to LOCK position.

(3) Remove web retaining insert and withdraw strap from reel.

(4) Insert end of new strap through upper slot in reel housing and through slot in main shaft until end of strap protrudes through lower slot in reel housing. Install web retaining insert. Pull upward on strap with at least **six** pounds force and hold. Move control handle to **AUTO** position and allow strap to rewind.

c. Replace inertia reel and/or control if cable is frayed or if the components have incurred damage that may affect function.

d. Refer to TM 55-1500-204-25/1 for repair procedures for pilot and gunner shoulder harness.

2-168. INSTALLATION — SHOULDER HARNESS AND INERTIA REEL.

Refer to paragraph 2-161 as applicable for installation and functional check instructions.

2-169. SEAT BELTS.

2-170. DESCRIPTION — SEAT BELTS.

The pilot and gunner seat lap belts are secure to the sides of the seats. The belts serve to restrain movement of the crew during helicopter operations.

2-171. REMOVAL — SEAT BELTS.

Refer to paragraph 2-156 as applicable.

2-172. INSPECTION — SEAT BELTS.

a. Inspect pilot and gunner seat lap belts for fraying, wear, tears, and general condition.

b. Refer to TM 55-1500-204-25-1/1.

2-173. REPAIR — SEAT BELTS.

Refer to TM 55-1500-204-25/1 for repair procedures for pilot and gunner seat belts.

2-174. INSTALLATION — SEAT BELTS.

Refer to paragraph 2-161 as applicable.

2-175. ARMOR PANELS.

2-176. DESCRIPTION — ARMOR PANELS.

The crew and engine are protected against hostile arms fire by ceramic-plastic armor panels. The pilot and gunner seats have armor installed on sides, back, and bottom. The engine compartment has armor installed at station 195 to protect the fuel control.

2-177. REMOVAL — ARMOR PANELS.

a. Refer to paragraph 2-156 for removal of armor panels at pilot and gunner seats. See figure 2-66 and 2-67.

b. Open engine cowling and remove engine armor assembly on left and right side. See figure 2-69.

2-178. INSPECTION — ARMOR PANELS.

a. Inspect armor installations on pilot and gunner seats and engine cowl for damaged brackets and cracks.

b. Inspect armor panels for the following defects:

(1) Damage caused by a ballistic projectile. Panels with this type damage are not reparable and must be replaced.

(2) Damage that results in loose nylon cloth shield and/or neoprene rubber edge moulding. Mark loose areas for rebonding.

(3) Damage that results in delamination is not reparable.

(4) Damage to threads in threaded inserts, loose bonding of threaded inserts to panel and missing threaded inserts.

(5) Damage to armor panel attaching brackets. Minor damage is reparable.

(6) Refer to TM 55-1500-204-25/1 for additional inspection criteria if required.

2-179. REPAIR — ARMOR PANELS.

WARNING

Adhesive is flammable and toxic. Provide adequate ventilation when mixing and using. Avoid prolonged breathing of vapors and contact with skin or eyes.

a. Rebond loose nylon cloth shield or neoprene rubber edge moulding with adhesive (C17).

b. Repair threaded fasteners with slightly damaged threads by cleaning up threads with a tap. Replace the threaded fastener with a new fastener if thread damage is severe. Refer to step **d.** for bonding procedure.

c. Repair a loose threaded insert by rebonding. Drill two small holes in the backing at an angle down to bottom of threaded insert and clean out holes. Place masking tape over the two small holes and the threaded hole in the insert to keep adhesive out of the threads. use a sharp pointed tool to open holes through the masking tape at the two drilled holes. Inject adhesive (C8) into one hole with a syringe. Continue injecting adhesive until it is forced from the second hole. Allow to cure for **24** hours.

WARNING

Adhesive is flammable and toxic. Provide adequate ventilation when mixing and using. Avoid prolonged breating of adhesive vapors and contact with skin or eyes.

d. Replace threaded fastener with faulty threads or one that is very loose in the panel. Drill out the old fastener carefully to avoid damage to the panel. Clean out the hole and bond a new fastener in the panel in the same manner outlined in the preceding step.

e. Repair cracked or distorted armor panel attaching brackets with standard metalworking procedures if practical. Replace brackets that are not reparable.

2-180. INSTALLATION — ARMOR PANELS.

a. Refer to paragraph 2-161 for installation of armor panels at pilot and gunner seats.

b. Open engine cowling. Install armor panels left and right as shown in figure 2-69.

NOTE

Temporary removal of armor panels: All crew and engine armor may be removed in non-combat areas at the discretion of the unit commander. If armor is removed, comply with the following requirements.

Identify armor panels for installation and retain as flyaway equipment in a safe storage area where it is readily available.

Reinstall armor prior to transfer of helicopter.

NOTE

Make entries in helicopter weighing record and chart C, basic weight and balance record, when armor is removed and again when it is reinstalled.

2-181. SOUNDPROOFING BLANKET.

2-182. DESCRIPTION — SOUNDPROOFING BLANKET.

A soundproofing blanket assembly is installed behind the pilot station to reduce the noise level during flight operations. The blanket is made from flame resistant quilted material and bound with cloth tape.

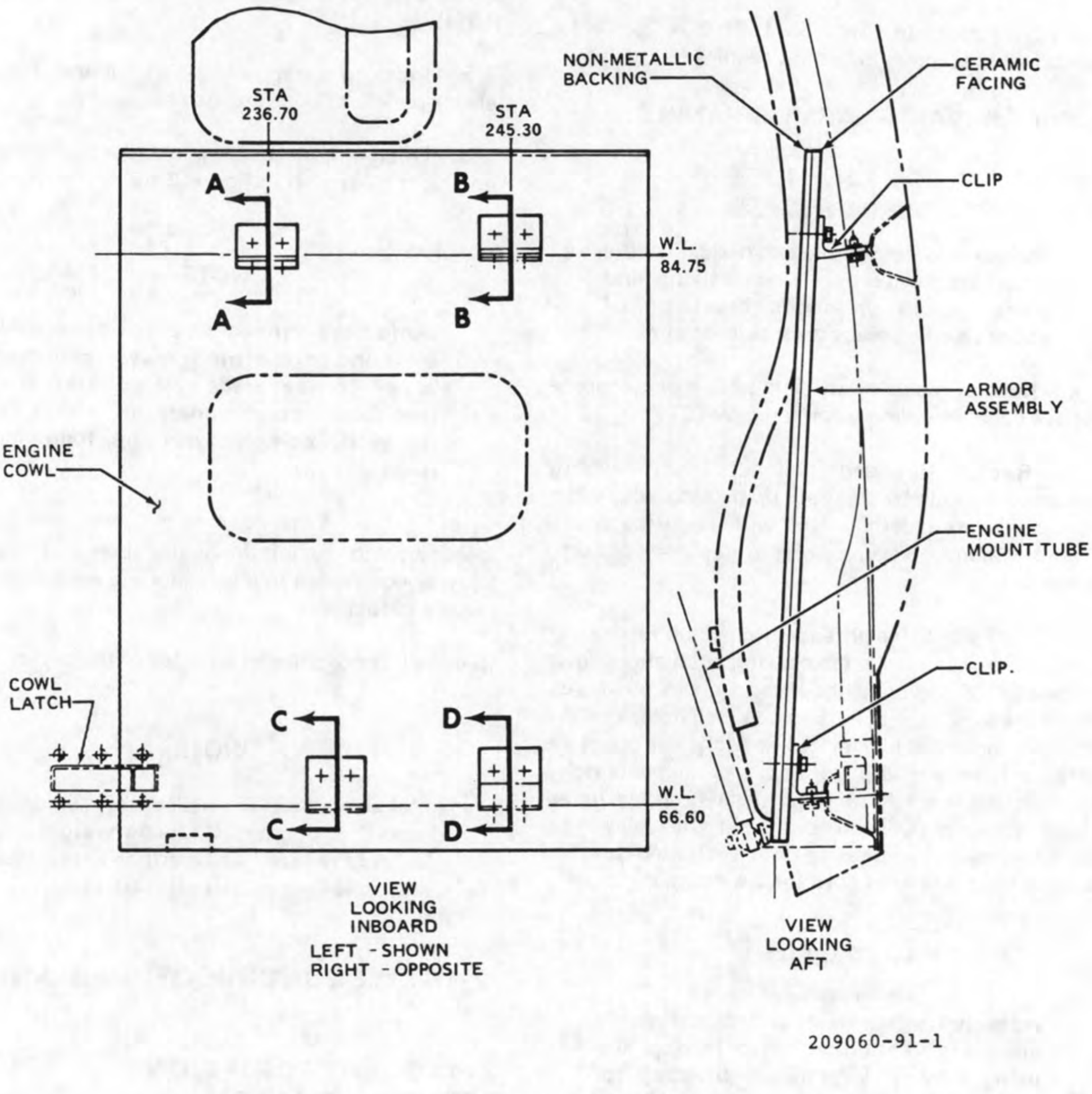
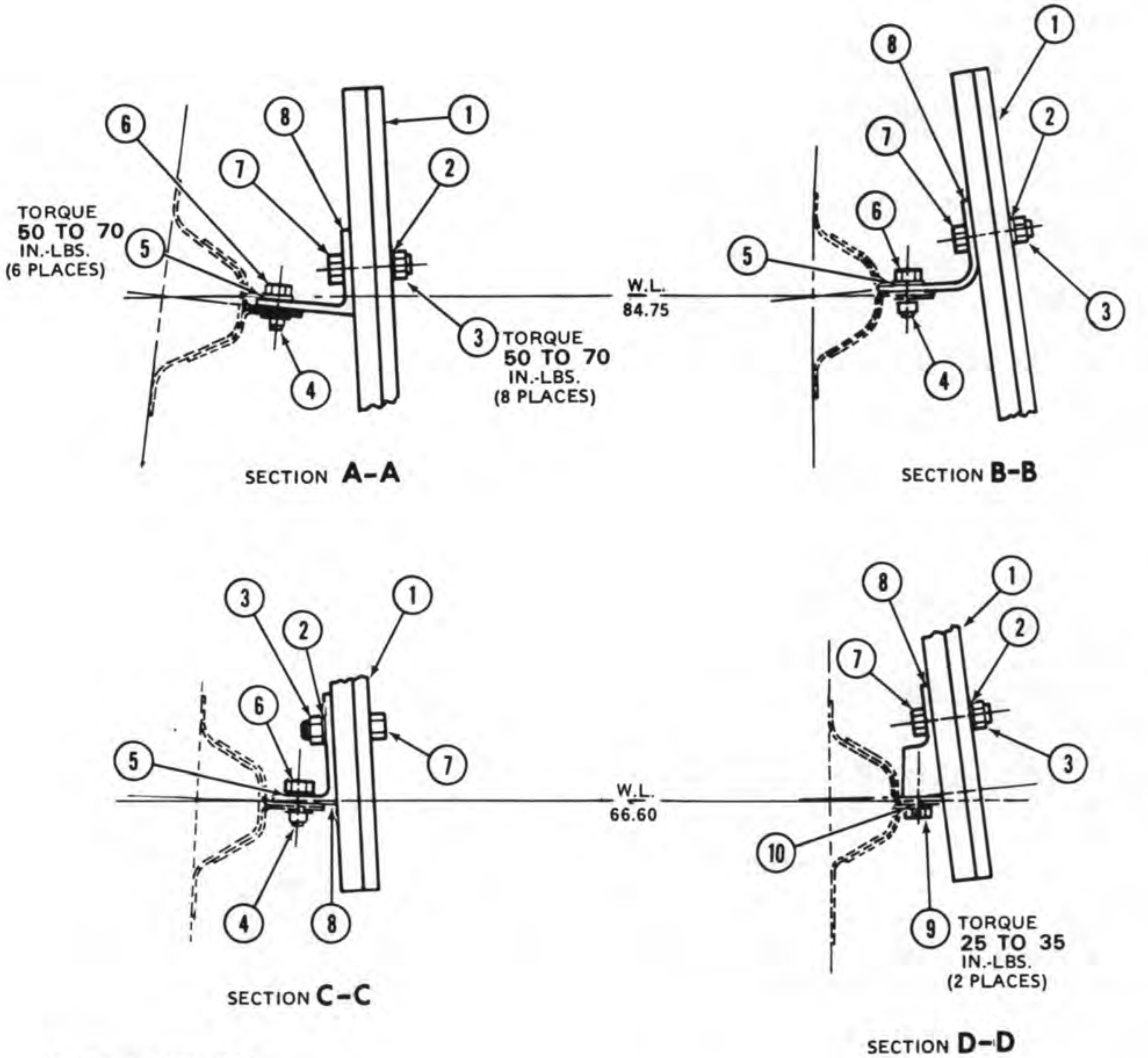


Figure 2-69. Engine Armor — Installation (Sheet 1 of 2)



1. Armor assembly
2. Washer (2 required)
3. Nut (2 required)
4. Nutplate
5. Washer (2 required)
6. Bolt (2 required)
7. Bolt (2 required)
8. Clip
9. Bolt (2 required)
10. Washer (2 required)

Install lockwire (C137) between heads of bolts (9). TORQUE BOLTS 25 TO 35 INCH-POUNDS.

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Figure 2-69. Engine Armor — Installation (Sheet 2 of 2)

2-183. REMOVAL — SOUNDPROOFING BLANKET.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism .handles are secured with safety pins prior to entry into the cockpit area.

a. P Remove first aid kit, survival kit and storage net. Remove control box (SCAS pylon compensator unit). Refer to TM 11-1520-236-20.

b. E Remove first aid kit, survival kit and storage net.

c. M Remove survival kit, storage net and ADS unit (air data system). Refer to TM 11-1520-236-20.

d. Release hook and pile fasteners and remove soundproofing blanket.

2-184. INSPECTION — SOUNDPROOFING BLANKET.

Inspect blanket for minor tears, loose or missing tape or fasteners, and security of installation.

2-185. REPAIR — SOUNDPROOFING BLANKET.

Refer to TM 55-1500-204-25/1 for instructions for minor repairs to soundproofing blanket.

2-186. INSTALLATION — SOUNDPROOFING BLANKET.

WARNING

Ensure that both the pilot and gunner arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

a. Position the soundproofing blanket (figure 2-70) assembly behind the pilot station and fasten the hook and pile fasteners.

b. P Install storage net, survival kit and first aid kit. Install control box (SCAS pylon compensator unit). Refer to TM 11-1520-236-20, Chapter 2.

c. E Install first aid kit, survival kit, and storage net.

d. M Install storage net, survival kit and ADS unit (air data system). Refer to TM 11-1520-236-20, Chapter 2.

2-187. ENGINE MOUNT INSTALLATION.

CAUTION

Perform an engine to transmission alignment check (paragraph 6-7) when an engine mount component is replaced or when any engine deck mount fitting is removed and installed.

2-188. DESCRIPTION — ENGINE MOUNT INSTALLATION.

The engine is supported by two aft mounts (bipod and tripod) and the engine mount leg (forward). See figure 2-71 for view of engine mounts. All three mounts are made from steel tubing and rod end bearings. Investment casting-type fittings are used at the upper end of the two aft mounts (bipod and tripod). Hinged pillow blocks are attached to the two aft mounts (bipod and tripod). The pillow blocks support the engine through trunnions mounted on the engine diffuser housing. The engine mount leg (forward) supports the forward end of the engine through a trunnion mounted on engine inlet housing. The three engine mounts attach to fittings on the engine compartment deck. Shims are installed under the fittings to align the engine with the transmission. Ball bearings in the rod end bearings are softer than the outer part of the rod end bearing. If the ball bearings are worn, they may be replaced without replacing the entire rod end bearing.

1-189. AFT ENGINE MOUNT (BIPOD).

2-190. DESCRIPTION — AFT ENGINE MOUNT (BIPOD).

Refer to paragraph 2-188.

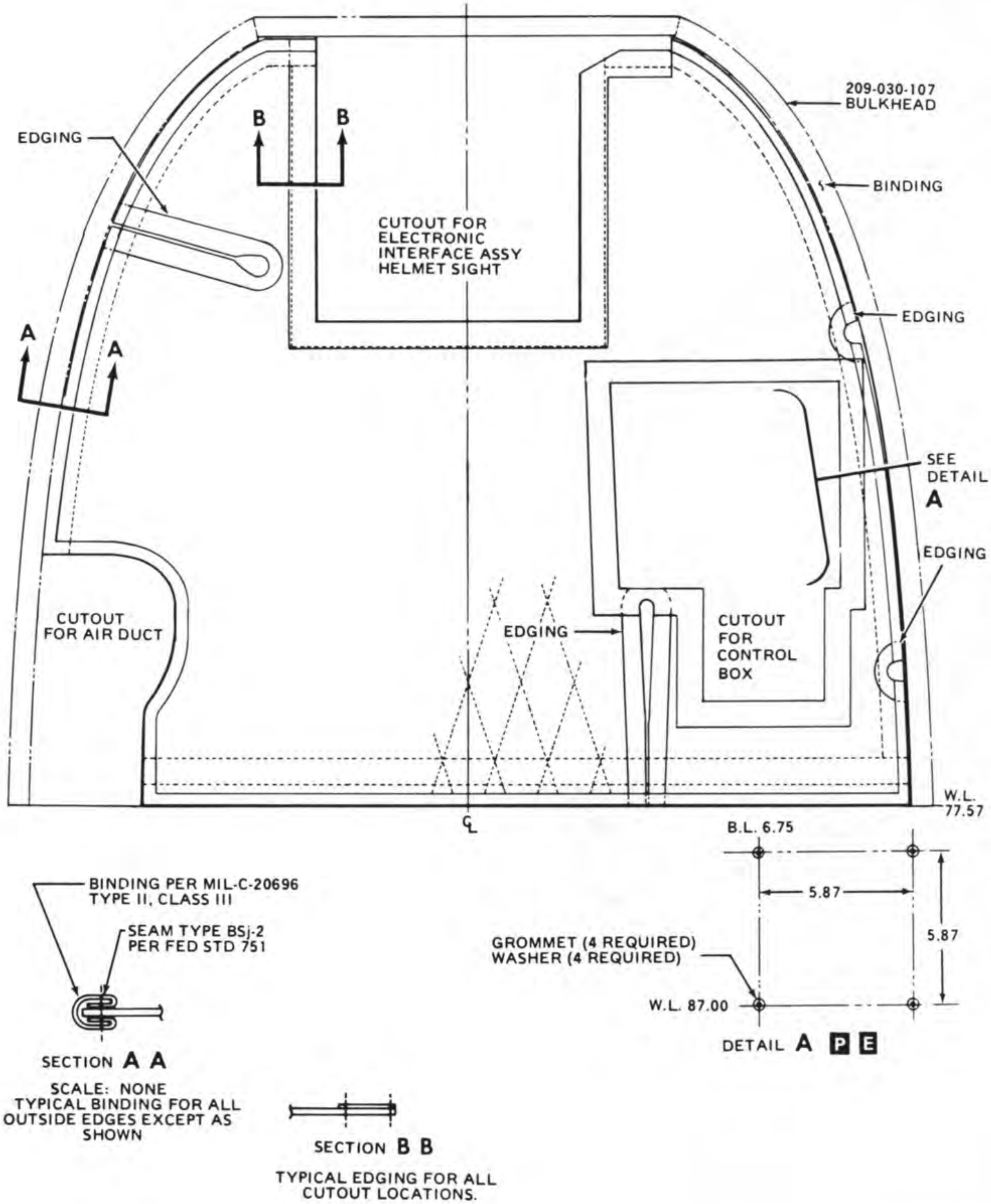

Figure 2-70. Soundproofing Blanket — Installation

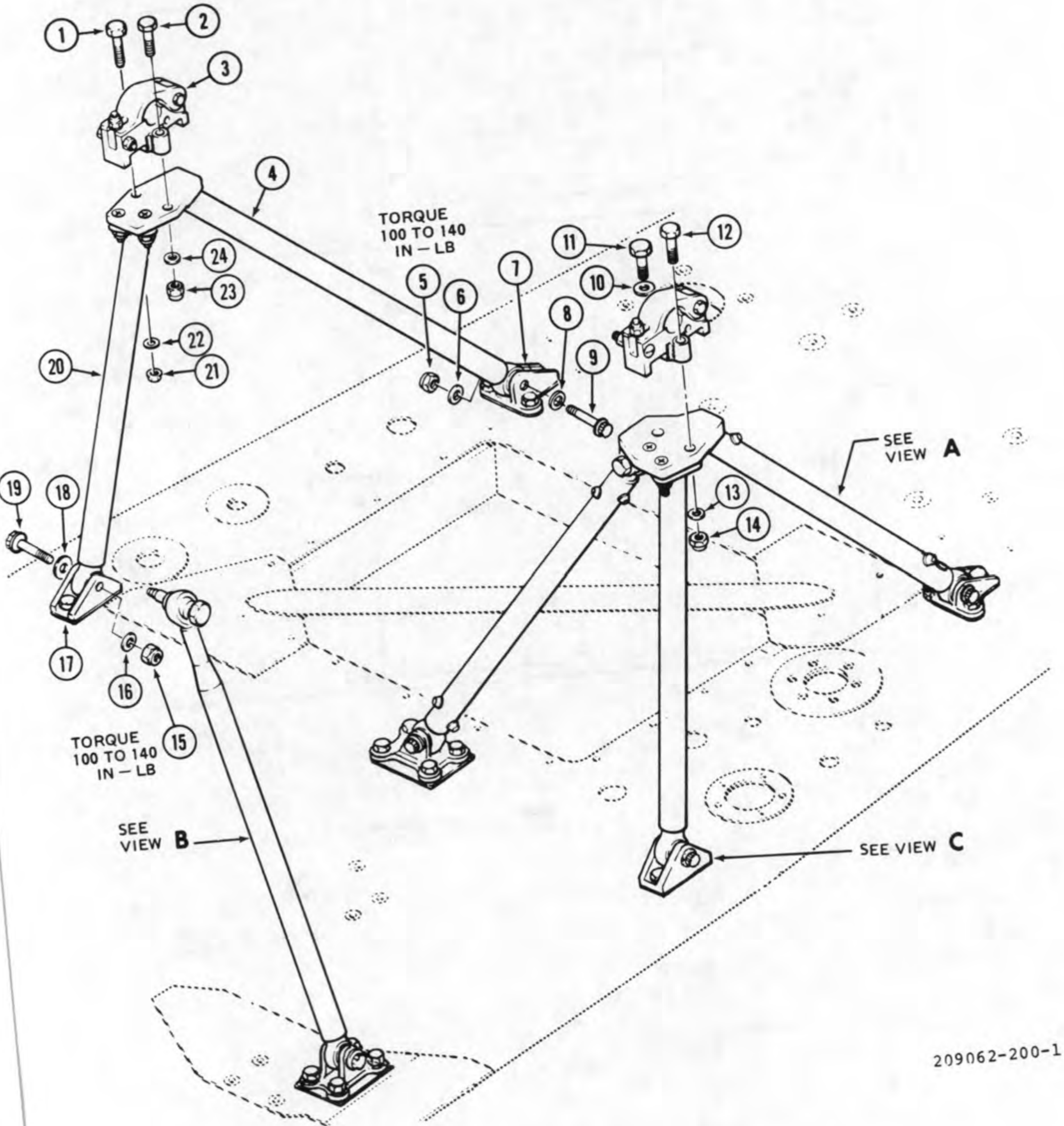

Figure 2-71. Engine Mount Installation (Sheet 1 of 3)

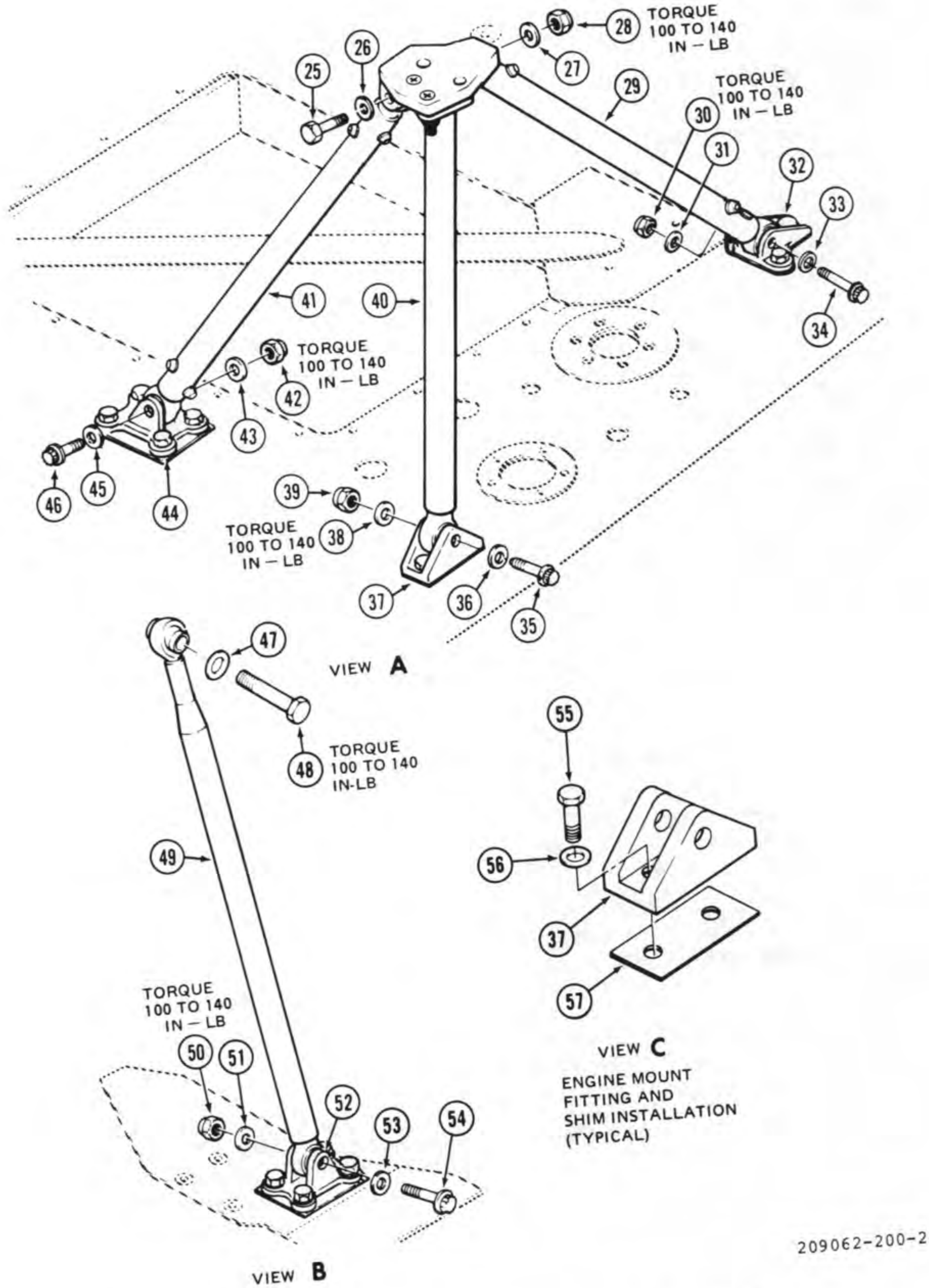

Figure 2-71. Engine Mount Installation (Sheet 2 of 3)

1. Bolt
2. Bolt
3. Pillow block
4. Engine mount leg
5. Nut
6. Flat washer
7. Engine mount fitting
8. Recessed washer
9. Flanged bolt
10. Washer
11. Bolt
12. Bolt
13. Washer
14. Bolt
15. Nut
16. Flat washer
17. Engine mount fitting
18. Recessed washer
19. Flanged bolt
20. Engine mount leg
21. Nut
22. Washer
23. Nut
24. Washer
25. Tension bolt
26. Recessed washer
27. Flat washer
28. Extended washer nut
29. Engine mount leg
30. Nut
31. Flat washer
32. Engine mount fitting
33. Recessed washer
34. Flanged bolt
35. Flanged bolt
36. Recessed washer
37. Engine mount fitting
38. Flat washer
39. Nut
40. Engine mount leg
41. Engine mount leg
42. Nut
43. Flat washer
44. Engine mount fitting
45. Recessed washer
46. Flanged bolt
47. Flat washer
48. Engine mount bolt
49. Engine mount leg
50. Nut
51. Flat washer
52. Engine mount fitting
53. Recessed washer
54. Flanged bolt
55. Bolt
56. Recessed washer
57. Shim

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Figure 2-71. Engine Mount Installation (Sheet 3 of 3)

2-191. REMOVAL — AFT ENGINE MOUNT (BIPOD).

CAUTION

Do not remove fittings (7 and 17, figure 2-71) under bipod mounts on engine compartment deck unless fittings must be replaced.

a. Support engine with engine sling (T9) and hoist (T45) to relieve weight from mounts. Refer to paragraph 1-31.

b. Remove nut and washer from eyebolt and hinge open pillow block (3, figure 2-71).

c. Remove aft engine mount (bipod).

(1) Remove nut (5), bolt (9), and washers (6 and 8) from engine mount fitting (7).

(2) Remove nut (15), bolt (19), and washers (16 and 18) from engine mount fitting (17).

(3) Remove aft engine mount (bipod) from helicopter.

d. If engine mount fittings (7 and 17) must be removed, remove bolts (53), washers (54), and fittings (7 and 17) with shims (55).

2-192. INSPECTION — AFT ENGINE MOUNT (BIPOD).

a. Inspect aft engine mount (bipod) for following:

(1) Dents. Small, smooth dents which have not removed material from tubing and occur at least 1.5 inches from upper fittings are considered negligible and do not require repair. Dents greater than negligible are cause for replacement of the affected engine mount.

(2) Scratches. Transverse scratches longer than 0.313 inch are cause for replacement of the mount. Other scratches that are less than 0.010 inch deep may be polished out.

(3) **Distortion.** Inspect for bends, nicks, pin hole elongation, and similar damage. Any distortion-type damage that can be detected visually is cause for replacement of the affected mount.

(4) **Wear.** Inspect for worn rod end bearings (10, figure 2-72) in the engine mount tubes. If noticeable wear is present, remove the affected engine mount and check bearing wear with a dial indicator. Maximum allowable radial play is **0.008** inch. Maximum allowable axial play **0.016** inch.

(5) **Corrosion.** Inspect for corrosion damage that could affect function of engine mounts.

(6) **Cracks.** No cracks are acceptable. Inspect for cracks visually. If any area are suspect, inspect by fluorescent penetrant method. Refer to TM 43-0103.

(7) Inspect for security of bolts and rivets.

b. Inspect fittings (7 and 17, figure 2-71) for following:

(1) Cracks. No cracks are acceptable.

(2) Nicks and dents severe enough to affect function.

(3) Secure attachment to deck.

(4) Corrosion damage severe enough to affect function.

c. Inspect pillow block (3) eye bolt for damaged threads.

2-193. REPAIR — AFT ENGINE MOUNT (BIPOD).

CAUTION

Rod ends and ball bearings are not reparable by polishing.

a. Polish out minor corrosion damage using fine India stone (C116), and touch up with primer (C88 or C91).

b. (AVIM) Replace engine mount parts that are damaged or worn beyond allowable limits. Replace rod end bearings in the engine mounts that are worn beyond allowable limits, or are not suitable for further service for other reasons, as follows:

CAUTION

The 209-062-127-1 rod end allows removal and replacement of the ball bearing (11) only. The replaceable ball bearing is made of softer steel than the rod end.

(1) Rotate ball bearing (11) ninety degrees, axially align with slot in rod end and push out replaceable ball bearing with finger pressure.

(2) Position new ball bearing (11) perpendicular to slots in outer portion of rod end bearing (10). Push ball bearing into outer portion of rod end bearing and rotate ball bearing ninety degrees.

2-194. INSTALLATION — AFT ENGINE MOUNT (BIPOD).

a. Install fittings (7 and 17, figure 2-71) if not previously accomplished. It may be necessary to change shim thickness under fittings during engine to transmission alignment procedure (paragraph 6-7).

b. Install aft engine mount (bipod).

(1) Position engine mount legs (4 and 20) in engine mount fittings (7 and 17).

NOTE

Install recessed washers (8 and 18) with countersinks against heads of bolts (9 and 19).

(2) Install bolts (9 and 19), washers (6, 8, 16, and 18), and nuts (5 and 15).

(3) Torque nuts (5 and 15) **100 TO 140** inch-pounds.

c. Install pillow block (3) if not previously accomplished. Refer to paragraph 2-206.

2-195. AFT ENGINE MOUNT (TRIPOD).

2-196. DESCRIPTION — AFT ENGINE MOUNT (TRIPOD).

Refer to paragraph 2-188 for description of aft engine mount (tripod).

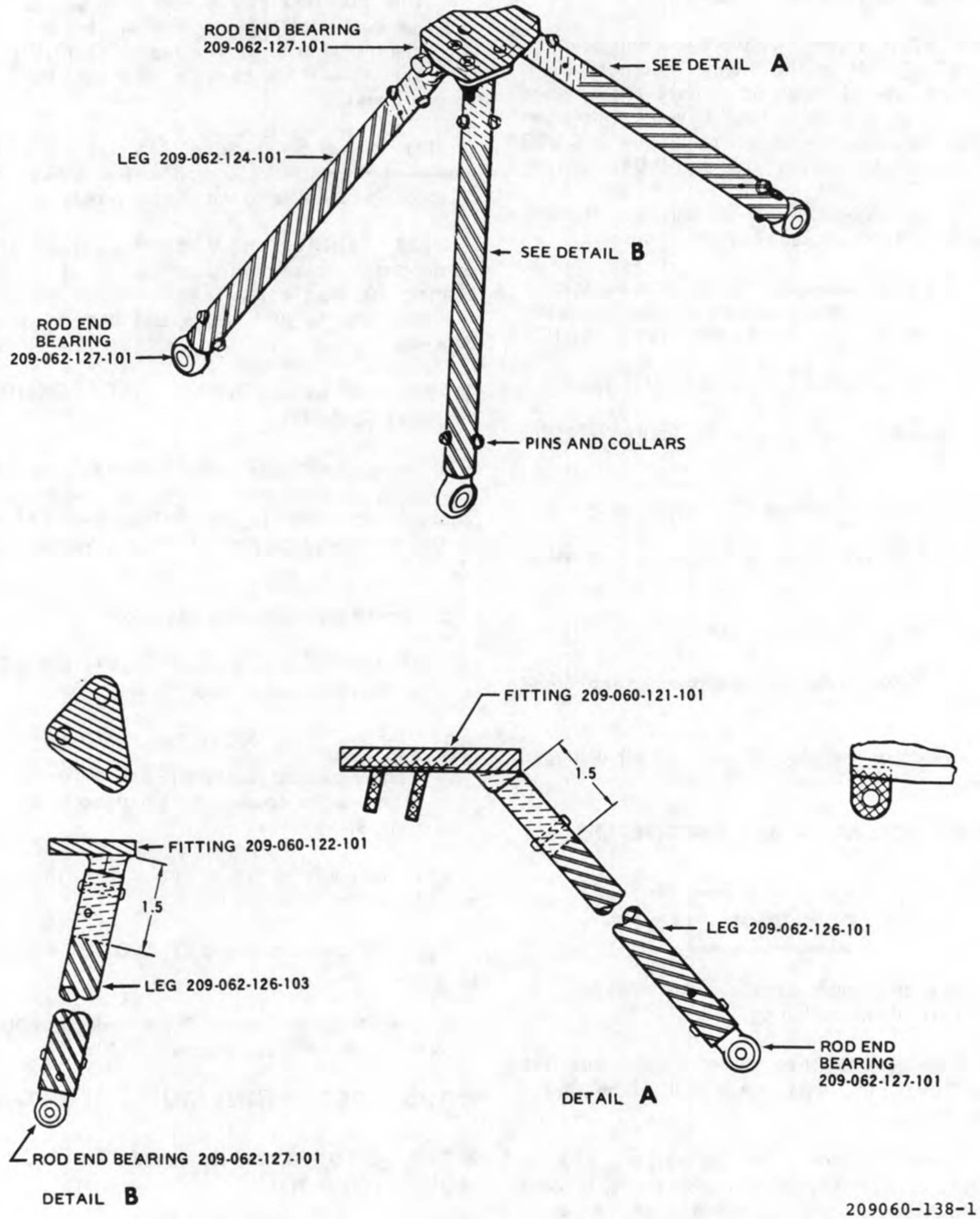

Figure 2-72. Damage Limits — Aft Engine Mount Assembly (Tripod) (Sheet 1 of 2)

	DAMAGE LOCATION SYMBOLS			
TYPE OF DAMAGE				
	MAXIMUM DAMAGE AND REPAIR DEPTH			
CRACKS	None	None	None	None
NICKS, DENTS & CORROSION	0.002	0.005	0.010	0.010
SCRATCHES	Aany transverse scratch longer than 5/16 inch on a leg is cause to replace the affected part. Other scratches that are within limits below after polishing out are acceptable.			
	0.002	0.005	0.010	0.010
Maximum area per full depth repair	Not critical	Not critical	Not critical	Not critical
Number of repair areas	Not critical	Not critical	Not critical	Not applicable
Edge chamfer	0.002	0.005	0.010	Not applicable
Rod end bearing wear (looseness)	Radial axial	Looseness looseness	0.005 0.012	
Pins and collars (Hy-Loks)	No loose or missing pins and collars (Hy-Loks) are acceptable			

NOTE:
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-72. Damage Limits — Aft Engine Mount Assembly (Tripod) (Sheet 2 of 2)

2-197. REMOVAL — AFT ENGINE MOUNT (TRIPOD).

CAUTION

Do not remove fittings (32, 37, or 44, figure 2-71) under engine mount legs unless fitting must be replaced.

a. Support engine with engine sling (T9) and hoist (T45) to relieve weight from mounts. Refer to paragraph 1-31.

b. Remove engine fuel control linkage and bellcrank from tripod mount on left side. Remove base clamps from mount tubes.

c. Remove nut and washer from eyebolt and hinge open pillow block.

d. Remove aft engine mount (tripod).

(1) Remove nut (30), bolt (34), and washers (31 and 33) from engine mount fitting (32).

(2) Remove nut (39), bolt (35), and washers (36 and 38) from engine mount fitting (37).

(3) Remove nut (42), bolt (46), and washers (43 and 45) from engine mount fitting (44).

(4) Remove aft engine mount (tripod) from helicopter.

e. If engine mount fittings (32, 37, or 44) must be removed, remove bolts (53), washers (54), and fittings with shims (55).

f. Refer to paragraph 2-203 for pillow block (3) removal.

2-198. INSPECTION — AFT ENGINE MOUNT (TRIPOD).

a. Inspect aft engine mount (tripod) for damage in excess of limits shown on figure 2-72.

b. If aft engine mount (tripod) is installed on helicopter, inspect all attaching bolts for secure installation.

c. Inspect engine mount fittings (32, 37, and 44, figure 2-71) for damage in excess of limits shown on figure 2-73.

2-199. REPAIR — AFT ENGINE MOUNT (TRIPOD).

a. Replace engine mount legs (32, 37 and 44, figure 2-71) that have damage in excess of limits (paragraph 2-198).

b. Replace ball bearings (1 or 11, figure 2-74) in rod end bearings (10) that have wear (looseness) in excess of limits shown on figure 2-72 as follows:

(1) Rotate ball bearing ninety degrees axially to outer portion of rod end bearing. Align ball bearing with slots in outer portion. Push the ball bearing out through the slots.

(2) Position new ball bearing perpendicular to slots in outer portion of rod end bearing. Push ball bearing into outer portion of rod end bearing and rotate ball bearing ninety degrees.

c. Polish out mechanical and corrosion damage that is within limits shown on figure 2-72 with fine India stone (C116). Touch up repair area with primer (C88 or C91).

2-200. INSTALLATION — AFT ENGINE MOUNT (TRIPOD).

a. Install engine mount fittings (32, 37 and 44, figure 2-71) on engine service deck if not previously accomplished. It may be necessary to change shims under the engine mount fittings during engine to transmission alignment procedure (paragraph 6-7).

b. Assemble engine mount legs (5 and 9, figure 2-74) with two bolts (2), washers (1) and nuts (8).

c. Position engine mount leg (13) on two engine mount legs assembled in step b. Install tension bolt (14), recessed washer (15) with countersink against bolt head, washer (3) and nut (4).

d. Identify engine mount leg (13) as the forward inboard leg of the tripod. This is the only leg of the tripod that has a rod end bearing in each end of the leg.

e. Position assembled aft engine mount (tripod) on engine mount fittings (32, 37, and 44, figure 2-71) with engine mount leg (41) in engine mount fitting (44).

f. Secure aft engine mount (tripod) to engine mount fittings.

NOTE

Install recessed washers (33, 36, and 45) with countersinks against heads of bolts (34, 35, and 46).

(1) Install bolt (34), washers (33 and 31), and nut (30).

(2) Install bolt (35), washers (36 and 38), and nut (39).

(3) Install bolt (46), washers (45 and 43), and nut (42).

(4) Torque nuts (30, 39, and 42) **100 TO 140** inch-pounds.

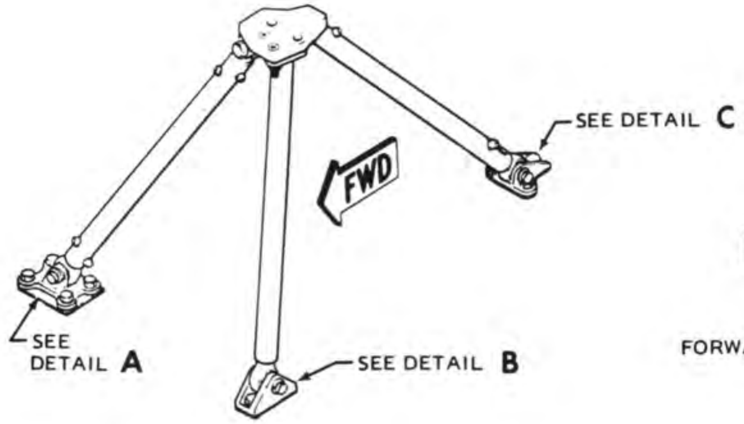
g. Install pillow block (paragraph 2-206).

h. Install engine fuel control linkage. Move fuel control linkage through full throw and inspect for binding and interference with adjacent parts.

CAUTION

Perform an engine to transmission alignment check (paragraph 6-7) when any engine mount component is replaced or when any engine deck mount fitting is removed and installed.

i. Remove engine hoist (T45) and sling (T9).



FORWARD INBOARD FITTING FOR ENGINE MOUNT (TRIPOD)
209-062-123-101 DETAIL A

FORWARD OUTBOARD FITTING FOR ENGINE MOUNT (TRIPOD)
209-062-123-130-101 DETAIL B

AFT FITTING FOR ENGINE MOUNT (TRIPOD)
209-062-129-101 DETAIL C

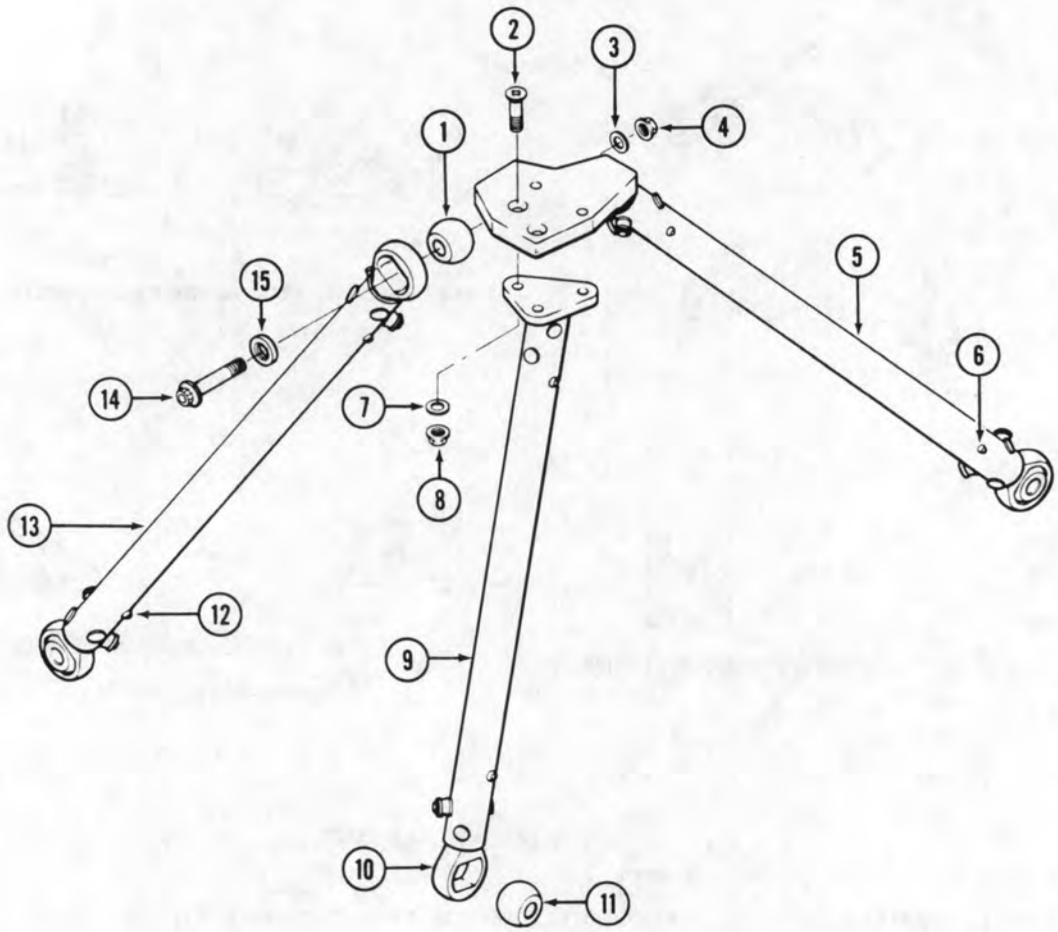
DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH	
No cracks allowed		
Nicks, scratches, and dents	0.002	0.010
Corrosion	0.001 Before repair 0.002 after repair	0.005 Before repair 0.010 after repair
Maximum area per full depth repair	Not critical	Not critical
Number of repair areas	One	Two
Edge chamfer	0.002	0.010
Bore damage	0.002 for 1/4 circumference	

NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

209062-198

Figure 2-73. Damage Limits — Fittings for Aft Engine Mount (Tripod)



1. Ball bearing
2. Bolt
3. Flat washer
4. Extended washer nut
5. Engine mount leg
6. Hi-Lok rivet
7. Thin steel washer
8. Extended washer nut
9. Engine mount leg
10. Rod end bearing
11. Ball bearing
12. Rivet (plug)
13. Engine mount leg
14. Tension bolt
15. Recessed washer

209062-201

Figure 2-74. Aft Engine Mount (Tripod) Assembly

2-201. PILLOW BLOCK.

2-202. DESCRIPTION — PILLOW BLOCK.

The pillow block installed on top of aft engine mounts (bipod and tripod) is designed to transfer engine vibrations from aft end of engine to the engine mounts. Both pillow blocks are the same part number.

2-203. REMOVAL — PILLOW BLOCK.

a. Support engine with engine sling (T9) and hoist (T45) to relieve weight from engine mounts.

b. Remove engine fuel control linkage from pillow block mounted on aft engine mount (tripod).

c. Remove nut and washer from eyebolt and hinge open pillow block (3, figure 2-71).

d. Remove nuts (21 and 23), washers (22 and 24), and bolts (1 and 2).

e. Remove pillow block (3) from bipod mount.

NOTE

An additional washer (10) is used under the head of bolt (11) for pillow block installation on tripod mount.

f. Remove pillow block from tripod mount in similar manner.

2-204. INSPECTION — PILLOW BLOCK.

a. Inspect pillow block (3, figure 2-71) for damage in excess of limits shown on figure 2-75.

b. If pillow block is installed, inspect attaching bolts for secure installation.

2-205. REPAIR — PILLOW BLOCKS.

a. Replace eye bolt, and/or pillow block if damaged in excess of limits (paragraph 2-204).

b. Polish out mechanical and corrosion damage that is within limits shown on figure 2-75 with fine India stone (C116). Touch up repair area with primer (C88 or C91).

2-206. INSTALLATION — PILLOW BLOCKS.

a. Support engine with engine sling (T9) and hoist (T45).

b. Install aft engine mount fittings (trunnions) if not previously accomplished (paragraph 4-119).

c. Position pillow block (3, figure 2-71) on aft engine mount (bipod) with eye bolt forward. Install bolt (1), washer (22), and nut (21). Install bolt (2), washer (24), and nut (23).

NOTE

An additional washer (10) is used under the head of bolt (11) for pillow block installation on tripod mount.

d. Install pillow block on aft engine mount (tripod) with eyebolt forward. Install bolt (11), washer (10), bolt (12), two washers (13) and two nuts (14).

e. Hinge upper half of pillow block (3, figure 2-71) on aft engine mount (bipod) closed over bearing on engine mount fitting (trunnion). Install washer and nut. Repeat this procedure for pillow block on aft engine mount (tripod).

f. Remove hoist (T45) and engine sling (T9).

g. Install engine fuel control linkage. Move fuel control linkage through full throw and inspect for binding and interference with adjacent parts.

2-207. ENGINE MOUNT LEG (FORWARD)

2-208. DESCRIPTION — ENGINE MOUNT LEG (FORWARD).

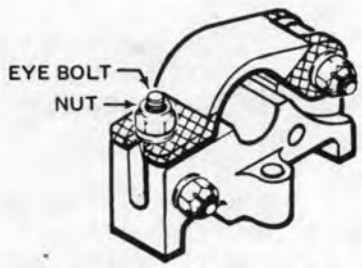
The engine mount leg is a steel tube with replaceable rod end bearings, which is installed between the left trunnion on the engine and a fitting on the engine compartment deck. The leg supports the forward end of the engine.

2-209. REMOVAL — ENGINE MOUNT LEG (FORWARD).

a. Support engine with suitable hoist to relieve weight from the mounts.

CAUTION

Do not remove fitting (52) and shim under engine mount leg (forward) on compartment deck unless fitting must be replaced.



PILLOW BLOCK 204-061-101-1

DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DEPTH AND REPAIR AREAS ALLOWED	
CRACKS ALLOWED	None	None
NICKS, SCRATCHES, DENTS, AND CORROSION	0.010	0.020
MAXIMUM AREA PER FULL DEPTH REPAIR	Not critical	Not critical
NUMBER OF REPAIR AREAS	Not critical	Not critical
EDGE CHAMFER	0.010	0.020
BORE DAMAGE	0.002 for 1/4 Circumference	
THREAD DAMAGE TO EYE BOLT AND NUT	None acceptable	

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204061-1016

Figure 2-75. Damage Limits — Engine Mount Pillow Blocks (Left and Right)

b. Remove bolt (48, figure 2-71) and washer (47) from top of leg. Remove bolt (54), washers (51) and (53) and nut (50) from bottom of leg. Remove engine mount leg (forward).

2-210. INSPECTION — ENGINE MOUNT LEG (FORWARD).

a. Inspect engine mount leg (49, figure 2-71) for following:

(1) Dents. Small, smooth dents which have not removed material from tubing and occur at least **1.5** inches from points where tubes intersect rod end bearings are considered negligible and do not require repair. Dents greater than negligible are cause for replacement of the engine mount leg (forward).

(2) Scratches. Transverse scratches longer than 5/16 inch are cause for replacement of the engine mount leg (forward). Other scratches that are less than **0.010** inch deep may be polished out using fine India stone (C116).

(3) Distortion. Inspect for bends, nicks, pin hole elongation, and similar damage. Any distortion-type damage that can be detected visually is cause for replacement of the engine mount leg (forward).

(4) Wear. Inspect for worn rod end bearings in both ends of engine mount leg (forward). If noticeable wear is present, remove the affected engine mount and check bearing wear with a dial indicator. Maximum allowable radial play is **0.008** inch. Maximum allowable axial play is **0.016** inch.

(5) **Corrosion.** Inspect for corrosion damage that could affect function of engine mount leg (forward).

(6) **Cracks.** No cracks are acceptable. Inspect for cracks visually. If any areas are suspect, inspect by fluorescent penetrant method. Refer to TM 43-0103.

(7) **Security.** Check for secure installation of all bolts and rivets.

b. Inspect engine mount fitting (52, figure 2-71) for secure attachment to engine compartment deck and for damage in excess of limits shown on figure 2-73.

2-211. REPAIR — ENGINE MOUNT LEG (FORWARD).

CAUTION

The forward engine mount leg (49, figure 2-71) has a replaceable ball type bearing in the lower end. The bearing at the upper end is a high misalignment bearing and is not replaceable.

Repair engine mount leg (forward) by same procedures outlined for aft engine mount (tripod) (paragraph 2-119).

2-212. INSTALLATION — ENGINE MOUNT LEG (FORWARD).

a. Support engine with suitable hoist to relieve weight from the mounts.

b. Position engine mount leg (forward) (49, figure 2-71) on engine and install bolt (48) and washer (47). Torque bolt **100 TO 140** inch-pounds. Install flanged bolt (54), washers (51 and 53), and nut (50). Torque nut **100 TO 140** inch pounds.

c. Remove hoist.

2-213. DIAGONAL BRACE TUBES.

2-214. DESCRIPTION — DIAGONAL BRACE TUBES.

The diagonal brace tube is a load carrying member of the fuselage structure. The right is larger in diameter than the left diagonal brace tube. The tubes are adjustable to specified lengths and are located in the fuselage adjacent to the wing attachment area.

2-215. REMOVAL — DIAGONAL BRACE TUBES.

a. Remove right and left access panels (17, figure 2-76).

b. Remove nuts (1 and 17, figure 2-76), special bolt (3), bolt (13), and washers (2, 11, and 13). Remove right diagonal brace tube (18) from helicopter.

c. Remove nuts (7 and 10), bolts (4 and 12), and washers (5, 6, 9, and 11). Remove left diagonal brace tube (8) from helicopter.

2-216. INSPECTION — DIAGONAL BRACE TUBES.

Inspect diagonal brace tubes for damage in excess of the following limits as follows:

(1) Dents in excess of **0.010** inch. Smooth dents up to **0.010** inch deep are acceptable without polishing out.

(2) Nicks and scratches in excess of **0.010** inch depth. Nick and scratch damage less than **0.010** inch deep is acceptable if the damage is polished out using fine India stone (C116).

(3) Corrosion damage in excess of **0.010** inch deep after polishing out and/or which affects over **twenty** percent of the area of the tube is not acceptable. Replace tube.

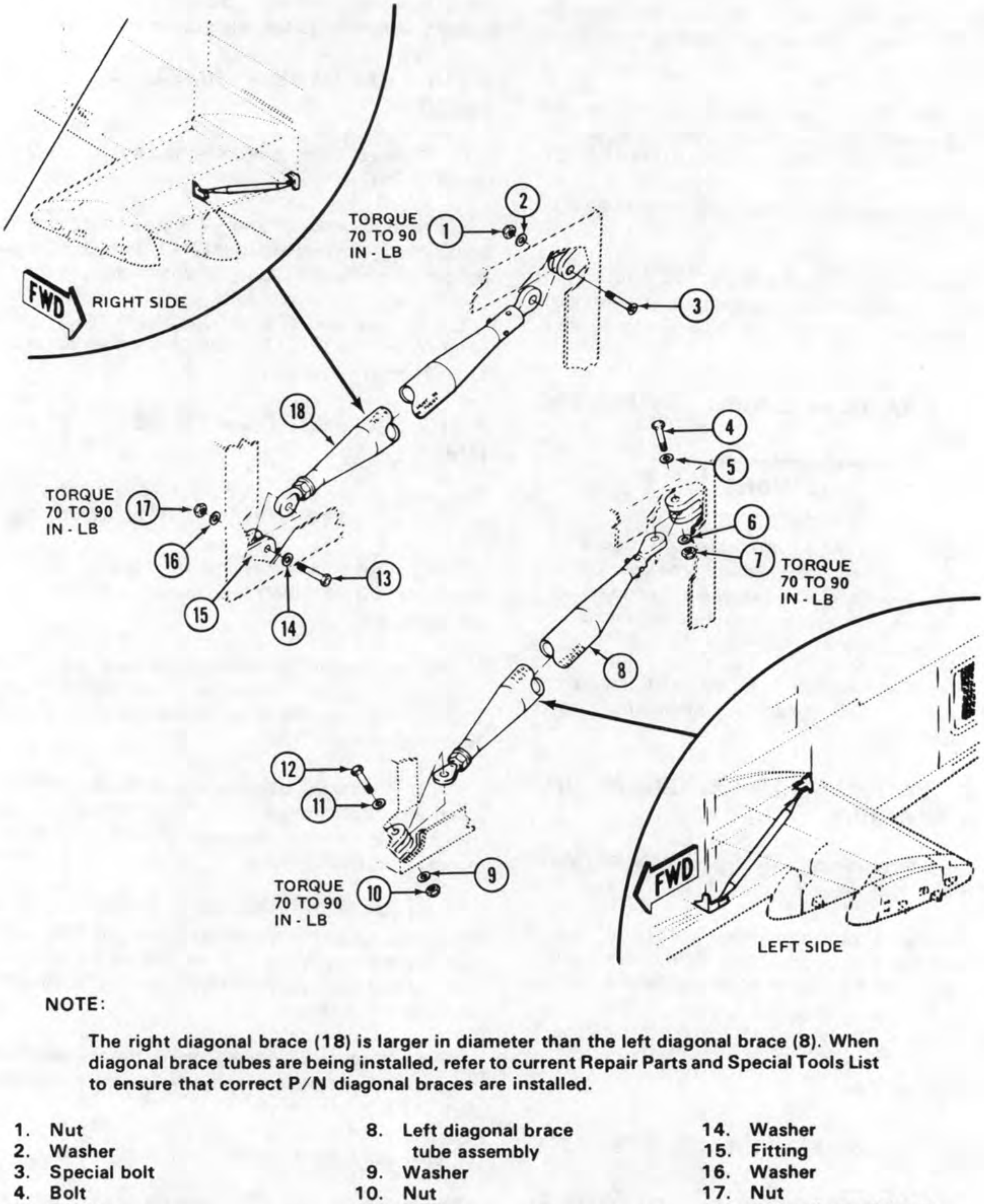
(4) Wear in bolt holes in fittings in ends of diagonal brace assemblies in excess of **0.005** inch is not acceptable. Make the inspection for bolt hole wear only if the diagonal brace tubes are removed for some other purpose.

(5) Distortion of the diagonal brace assemblies that can be detected visually is not acceptable. Replace tube.

(6) **Cracks.** No cracks are acceptable.

2-217. REPAIR — DIAGONAL BRACE TUBES.

a. Polish out nicks, scratches and corrosion damage that is within limits, using fine India stone (C116).



NOTE:

The right diagonal brace (18) is larger in diameter than the left diagonal brace (8). When diagonal brace tubes are being installed, refer to current Repair Parts and Special Tools List to ensure that correct P/N diagonal braces are installed.

1. Nut
2. Washer
3. Special bolt
4. Bolt
5. Washer
6. Washer
7. Nut
8. Left diagonal brace tube assembly
9. Washer
10. Nut
11. Washer
12. Bolt
13. Bolt
14. Washer
15. Fitting
16. Washer
17. Nut
18. Right diagonal brace tube assembly

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Figure 2-76. Diagonal Brace Tube — Installation

b. Touch up repair area with primer (C88 or C91).

c. Replace adjustable rod end connector if bolt hole is worn beyond **0.005** inch limit. Replace entire diagonal brace tube assembly if the bolt hole in the fixed fitting is worn beyond the **0.005** inch limit.

2-218. INSTALLATION — DIAGONAL BRACE TUBES.

CAUTION

Diagonal brace tubes must be installed prior to flight.

a. Position left diagonal brace tube assembly (8, figure 2-76) in helicopter. Install bolt (4), washers (5 and 6) and nut (7). Adjust rod end connector in opposite end of left diagonal brace tube assembly if necessary. Install bolt (12), washers (9 and 11) and nut (10). Torque nuts (7 and 10) **70 TO 90** inch-pounds.

b. Position right diagonal brace tube (18) in helicopter. Install special bolt (3), washer (2), and nut (1) in forward end. Adjust rod end connector in opposite end of brace tube assembly if necessary. Install bolt (13), washers (14 and 16), and nut (17). Torque nuts (1 and 17) **70 TO 90** inch-pounds.

c. Install right and left access panels (17, figure 2-3).

2-219. PYLON SUPPORT INSTALLATION.

2-220. DESCRIPTION — PYLON SUPPORT INSTALLATION.

The pylon support installation consists of provisions for mounting the transmission in the airframe. See figure 2-77. Major components of the pylon support installation are as follows:

a. Four transmission mount assemblies.

b. Two damper assemblies.

c. Two damper fittings.

d. One fifth mount support fitting assembly.

e. One lift beam assembly.

f. One lift link.

2-221. TRANSMISSION MOUNTS.

2-222. DESCRIPTION — TRANSMISSION MOUNTS.

Four transmission mount assemblies are located on the pylon support structure. The transmission support case rests on the mount assemblies. See figure 2-77. Each transmission mount assembly consists of a cylindrical molded rubber core bonded between steel outer and inner sleeves, with outer sleeve flange secured on the pylon support by four bolts. A large mount bolt extends up through the mount inner sleeve to seat in tapered bushing of transmission support case leg, and is secured by a retaining bolt installed from top through a broad special washer and threaded into tapped upper end of the mount bolt. Silicone rubber protective boots, with supporting bushings, cover both ends of mount.

2-223. REMOVAL — TRANSMISSION MOUNTS.

NOTE

New aircraft are delivered without lockwire on bolts (1 and 20, figure 2-77). This is an acceptable condition. However, all subsequent bolt installations must be accomplished with drilled head bolts and must be lockwired.

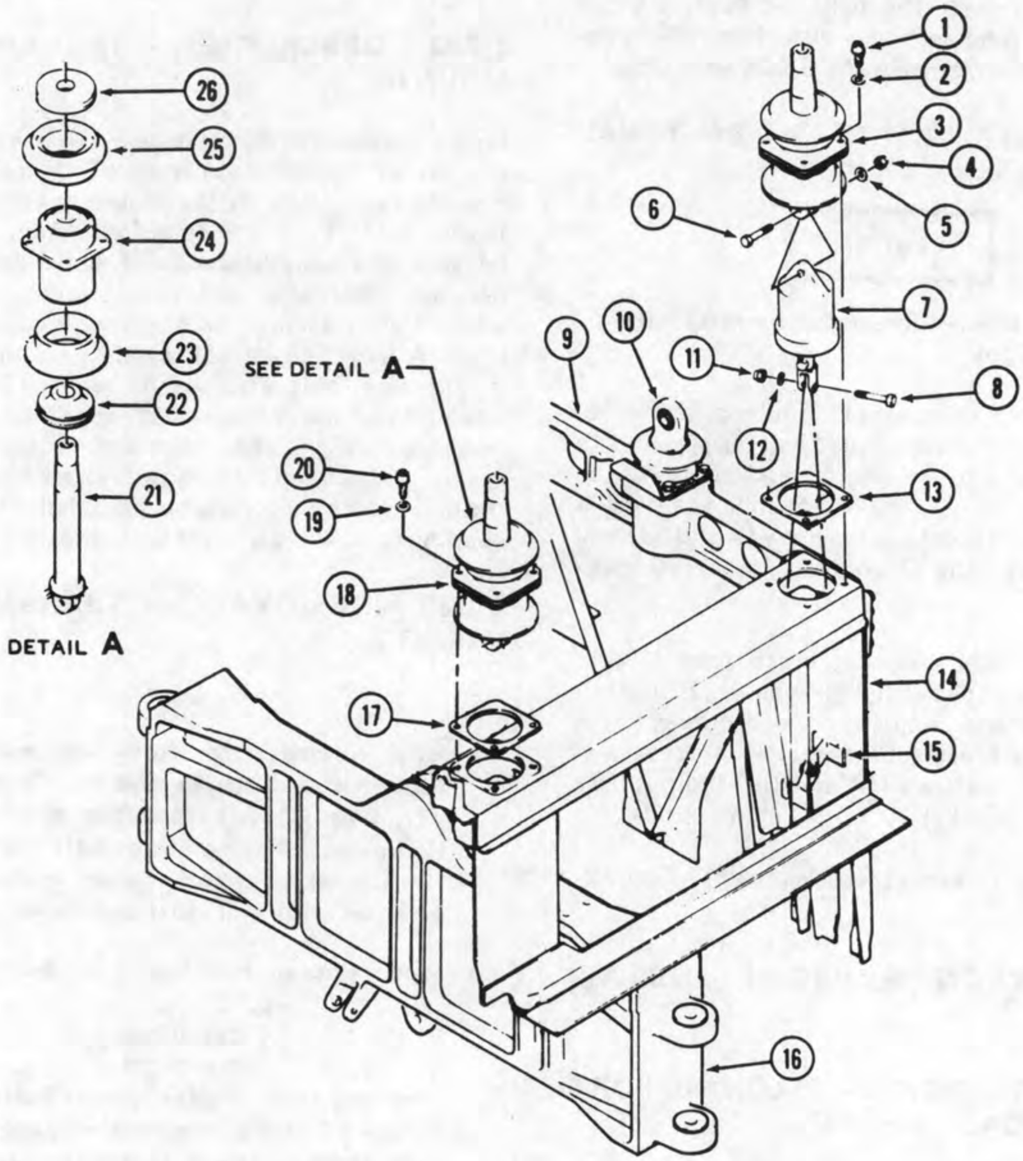
a. Remove transmission (Paragraph 6-24).

CAUTION

Anytime transmission mount bolts (21, figure 2-77) are loosened or removed, care must be taken to ensure they do not fall. Damage to airframe panels could occur.

NOTE

To aid in removing and installing bolts (6, figure 2-77) attaching dampers (7) to mount bolts (21), holes may be drilled in pylon supports (14) (figure 2-78). Use a hole cutter or other suitable tool. Care must be taken to prevent damage to adjacent parts. Clean and deburr edges of holes to preclude stress risers. Apply primer (C88 or C91) to edges of holes.



1. Bolt
2. Recessed washer
3. Pylon mount assembly
4. Nut
5. Flat washer
6. Bolt
7. Damper assembly
8. Bolt
9. Fifth mount support fitting
10. Fifth mount
11. Nut
12. Flat washer
13. Filler plate
14. Pylon support
15. Damper fitting
16. Lift beam
17. Filler plate
18. Pylon mount assembly
19. Recessed washer
20. Bolt
21. Mount bolt
22. Bushing
23. Boot
24. Pylon mount
25. Boot
26. Bushing

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Figure 2-77. Pylon Support — Installation

b. Remove left rear mount assembly (3, figure 2-77) and right rear mount assembly (not illustrated).

(1) Remove lockwire from bolts (1).

(2) Remove bolts (1) and washers (2).

(3) Dampers (7) can be left in place if desired. Remove nut (4), bolt (6), and washer (5).

CAUTION

Do not remove slotted head bolt through damper piston to remove damper.

NOTE

Remove hydraulic cylinders if damper (7) is to be removed with pylon mount assembly.

(3) Refer to paragraph 7-60.

(4) Remove nut (11), bolt (8) and washer (12). Lift damper out with mount assembly.

(5) Secure filler plate (13) in position with lockwire (C137).

(6) Separate upper and lower bushings (26 and 22) and upper and lower boots (25 and 23), from mount bolt (21).

(7) Remove right rear mount assembly, using procedures outlined in steps (1) through (6) above.

c. Remove left forward mount assembly (18) and right forward mount assembly (not illustrated).

(1) Remove lockwire from bolts (20).

(2) Remove bolts (20) and washers (19).

(3) Keep filler plate (17) at location.

(4) Separate upper and lower bushings (26 and 22) and upper and lower boots (25 and 23) from mount bolt (21).

(5) Remove right forward mount assembly using procedures outlined in steps (1) through (4) above.

2-224. INSPECTION — TRANSMISSION MOUNTS.

a. Inspect mount bolts, bushings, and retaining washers for wear, nicks or cracks.

b. Inspect boots for tears or deterioration.

c. Inspect rubber and steel washers on inner face of bushing for security of bonding.

CAUTION

Exercise care in inserting feeler gage to avoid damaging rubber core.

d. Inspect rubber core at both ends of mount for deterioration and separation. If vibration, roughness or mount bottoming was noted, inspect mount for bond separation between rubber core and inner and outer sleeves with a **0.010** inch feeler gage. If any separation exceeds **0.250** inch maximum depth for **33** percent of the circumference or if separation exceeds **0.750** inch at any one point, replace the mount.

2-225. REPAIR — TRANSMISSION MOUNTS.

a. Replace defective mounts or boots.

NOTE

It is important to note that a properly installed boot will extend the service life of the mount by keeping it free and clean of oil contamination. Any boot that is ripped or cut should be replaced.

b. Replace mount bolts, bushings, or retaining washers when worn, scored or nicked, or for any indication of cracks. Replace unserviceable protective boots.

WARNING

Adhesive is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of vapors and contact with skin or eyes.

c. If rubber and steel washers on inner face of bushing become detached, rebond with adhesive (C12) or replace bushing assembly. Adhesive should be cured at a temperature of **75** degrees F (**24** degrees C) or higher. If temperature is below **75** degrees F (**24** degrees C) double the amount of cure time for each **12** degrees F (**7** degrees C) below **75** degrees F (**24** degrees C). Do not attempt to cure adhesive at temperatures below **50** degrees F (**10** degrees C).

TYPICAL TEMPERATURES AND CURE TIME

Temperature Degrees F	Degrees C	Cure Time Hours
75	24	4
63	17	8
51	11	16

d. Replace mounts under following conditions:

(1) When excessive vibration in operation is believed to indicate that mounts no longer have proper spring rate to isolate normal pylon vibrations.

(2) When rubber-to-metal bond has separated deeper than raised rubber fillets at inner or outer sleeves.

2-226. INSTALLATION — TRANSMISSION MOUNTS.

a. Install left rear mount assembly (3, figure 2-77) and right rear mount assembly (not illustrated).

(1) Assemble boot (25) and bushing (26) on upper end of mount (24).

(2) Assemble boot (23) and bushing (22) on lower end of pylon mount (24).

(3) Insert mount bolt (21) through assembly from lower end of mount.

(4) If damper assembly (7) is not installed, position damper assembly on rear mount (3) and install bolt (6), flat washer (5) and nut (4). If damper assembly (7) is already installed, proceed to step (5).

NOTE

Ensure that replacement filler plate (13) is correct part number. Check TM 55-1520-236-23P.

(5) Position mount assembly (3) in pylon support (14) and on filler plate (13).

(6) Install four bolts (1) and washers (2).

(7) Lockwire heads of bolts (1) in pairs with lockwire (C137).

(8) If damper (7) was installed with mount assembly (3), install bolt (8), flat washer (12), and nut (11). If damper was already installed, proceed to step (9).

(9) If damper (7) was installed previously, install bolt (6), flat washer (5), and nut (4).

(10) Install hydraulic cylinders if they were removed during pylon mount removal procedure (paragraph 7-63).

b. Install left forward mount assembly (18) and right forward mount assembly (not illustrated).

(1) Assemble mount (18) using procedures in steps (1) through (3), above.

NOTE

Ensure that replacement filler plate (17) is correct part number. Check TM 55-1520-236-23P.

(2) Position mount assembly (18) in pylon support (14) and on filler plate (17).

(3) Install bolts (20) and washers (19).

(4) Lockwire head of bolts (20) in pairs with lockwire (C137).

(5) Install right forward mount using procedures given for left forward mount.

2-227. FIFTH MOUNT AND FIFTH MOUNT SUPPORT FITTING.

2-228. DESCRIPTION — FIFTH MOUNT AND FIFTH MOUNT SUPPORT FITTING.

A fifth mount (10, figure 2-77), similar to the four transmission mounts (3 and 18), is located at the center of the fifth mount support fitting (9), across the rear of the pylon support (14). The purpose of the fifth mount is to assist the other four transmission mounts in the isolation of normal pylon vibrations and to restrict fore and aft movement of the transmission. The fifth mount is attached to the transmission support case by a bolt through a self-aligning bearing in the mount upper end.

2-229. REMOVAL — FIFTH MOUNT AND FIFTH MOUNT SUPPORT FITTING.

NOTE

Removal of the fifth mount while transmission is installed in helicopter requires removal of the fifth mount support fitting (15, figure 2-79).

a. Remove induction baffle mounted aft of fifth mount support fitting (15).

b. Remove fifth mount bolt.

(1) E M Remove cotter pin (1), nut (2), washer (3), and fifth mount bolt assembly (5).

(2) P Remove cotter pin (11), nut (10), bolt (6), and washers (7 and 9).

(3) P Remove fifth mount spacer (8) from transmission case fifth mount support (4).

c. P Remove pylon transducer from pylon transducer bracket (20) in accordance with instructions contained in paragraph 11-129.

d. Remove forward section of tail rotor driveshaft. Refer to paragraph 6-77.

e. Remove four bolts (17) and washers (16) securing each end of fifth mount support fitting (15) to pylon support (19) and remove fifth mount support fitting.

f. If shims (18) are loose, remove and identify for reinstallation at same location.

g. Remove lockwire, four bolts (22) and washers (21).

h. P Remove pylon transducer bracket (20).

i. Lift fifth mount (13) and shim (14) from fifth mount support fitting (15). Save the shim for reinstallation.

i. Remove boot (12) from top of fifth mount (13).

2-230. INSPECTION — FIFTH MOUNT AND FIFTH MOUNT SUPPORT FITTING.

a. Inspect fifth mount (13, figure 2-79).

(1) Inspect boot (12) for cuts, tears or deterioration.

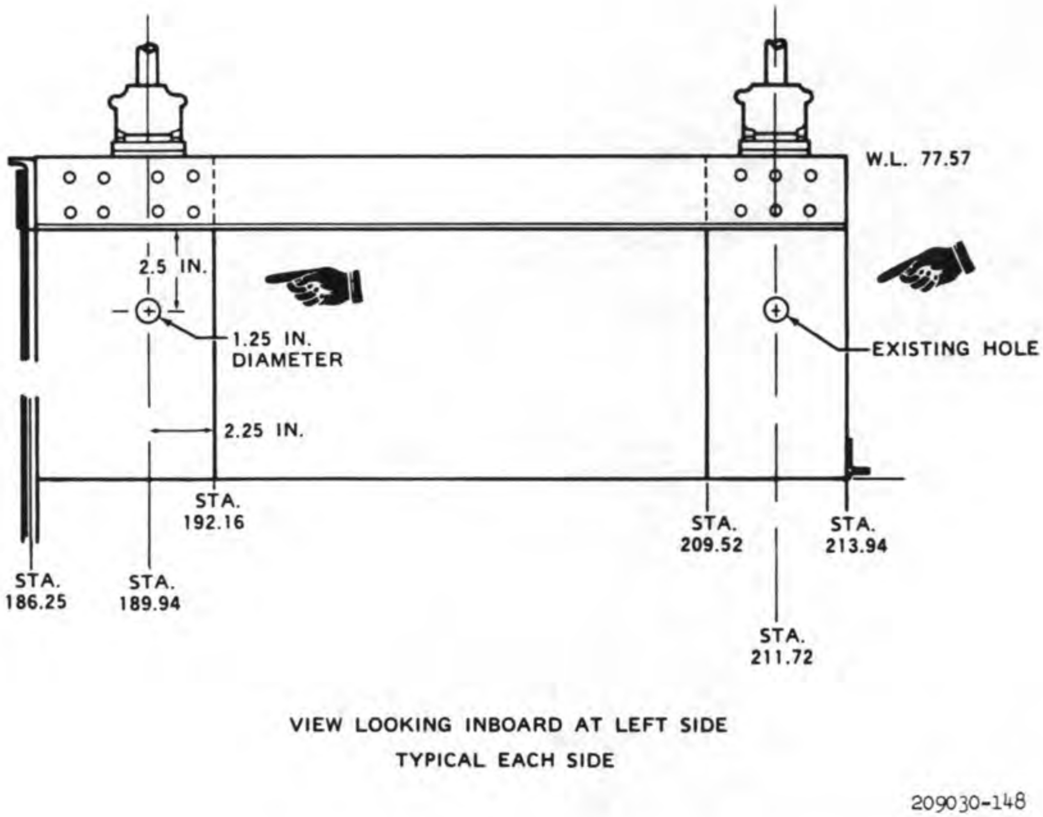

Figure 2-78. Access Hole for Damper to Damper Support Fitting Mount Bolts

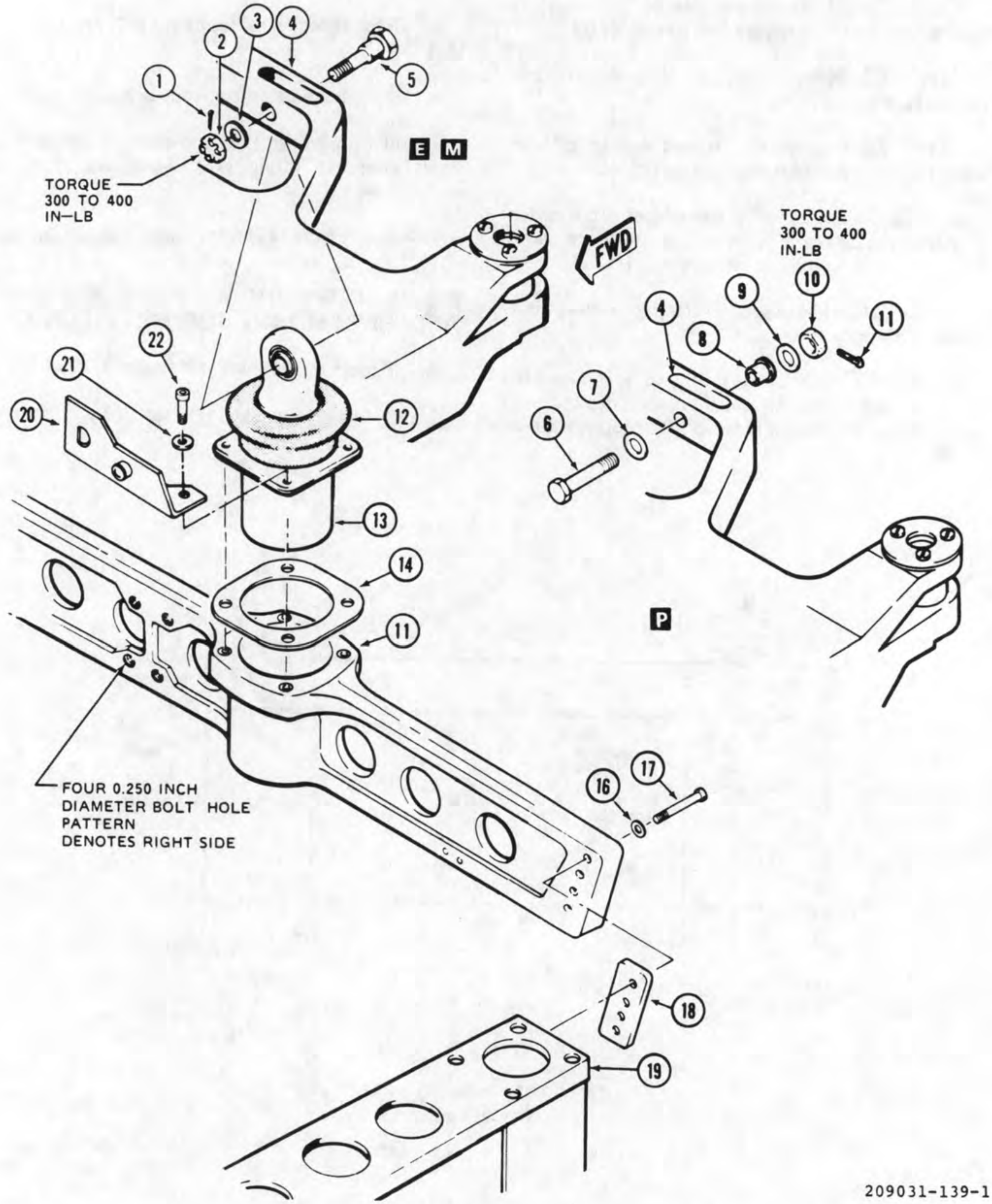

Figure 2-79. Fifth Mount and Fifth Mount Support Fitting — Installation (Sheet 1 of 2)

1. Cotter pin
2. Nut
3. Washer
4. Transmission case fifth mount support
5. E M Fifth mount bolt assembly
6. P Fifth mount bolt
7. P Special washer
8. P Fifth mount spacer
9. Washer
10. Nut
11. Cotter pin
12. Boot
13. Fifth mount
14. Shim
15. Fifth mount support fitting
16. Aluminum washer
17. Bolt
18. Shim
19. Pylon support
20. P Pylon transducer bracket
21. Thin steel washer
22. Bolt

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Figure 2-79. Fifth Mount and Fifth Mount Support Fitting — Installation (Sheet 2 of 2)

CAUTION

Exercise care in inserting feeler gage to avoid damaging rubber core.

(2) Inspect rubber core at both ends of fifth mount (13) for deterioration and separation. If vibration, roughness, or mount bottoming was noted, inspect mount for bond separation between rubber core and inner and outer sleeves with a 0.010 feeler gage. Maximum acceptable separation is 0.250 inch depth for one-third of the circumference or a separation of 0.750 inch depth at any one point.

(3) Inspect bearing in fifth mount (13) for wear (play). Maximum acceptable wear (play) is 0.008 inch radial and 0.016 inch axial.

(4) Inspect fifth mount (13) for cracks. No cracks are acceptable.

(5) **Inspect shims (14) installation for working or missing shims.**

b. Inspect fifth mount support fitting (15) for scratches, nicks, and cracks in accordance with figure 2-88.

c. Inspect mount bolts (22, figure 2-79) and washers (21) for damage or cracks.

d. Inspect fifth mount support fitting bolts (17) for wear, nicks, cracks, or damaged threads. Inspect washers (16) for cracks.

e. E M Inspect fifth mount bolt assembly (5) and nut (2) for cracks, nicks, wear, damage, and damaged threads. Inspect washer (3) for cracks.

f. P Inspect fifth mount bolt (6, figure 2-79) and nut (10) for cracks, nicks, wear, damage, and damaged threads. Inspect special washer (7) and washer (9) for cracks.

g. P Inspect fifth mount spacer (8) for cracks, wear and damage.

h. P Inspect pylon transducer bracket (20) for cracks and damage.

2-231. REPAIR OR REPLACEMENT — FIFTH MOUNT AND FIFTH MOUNT SUPPORT FITTING.

a. Replace boot (12, figure 2-79) if cut, torn or deteriorated.

(1) Remove all traces of old boot from mount by lightly sanding.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(2) Clean area using MEK (C74).

WARNING

Adhesive is flammable and toxic. Provide adequate ventilation when mixing and using proseal 890. Avoid prolonged breathing of vapors and contact with skin or eyes.

(3) Apply adhesive (C14) to area where boot makes contact with mount.

(4) Position new boot on mount and cure in accordance with table 1-11.

b. Replace fifth mount (13) if damage exceeds inspection limits.

c. Repair fifth mount support fitting (15) using procedures contained in paragraph 2-231.

d. Replace mount bolts (22) and washers (21) if damaged or cracked.

NOTE

Fifth mount support beam bolts may have non-drilled head bolts installed; however, when bolt removal and/or tare torque cannot be met, replace the fifth mount support beam bolts with drilled head bolts. Tare torque need not be checked until bolt removal becomes necessary.

e. Replace fifth mount support fitting bolts (17) if worn, nicked, cracked, or threads damaged; washers (16) if worn.

f. E M Replace fifth mount bolt assembly (5), or nut (2) if cracked, nicked, worn, damaged or if threads are damaged.

g. P Replace fifth mount bolt (6) or nut (10) if cracked, nicked, worn, damaged, or if threads are damaged.

h. P Replace fifth mount spacer (8) if cracked, worn or damaged.

i. P Replace pylon transducer bracket (20, figure 2-79) if cracked or damaged.

j. Replace missing shims (14). When working shims are evident, check shim adjustment and bolt (22) torque.

2-232. INSTALLATION — FIFTH MOUNT AND FIFTH MOUNT SUPPORT FITTING.

CAUTION

It is possible to install the fifth mount support fitting backwards. Ensure that four 0.250 inch diameter bolt hole pattern is on right side when fitting is installed. See figure 2-79.

a. Position shim (14, figure 2-79) on fifth mount support fitting (15).

b. Insert fifth mount (13) into fifth mount support fitting (15) and align holes.

c. P Position pylon transducer bracket (20) on flange of fifth mount.

d. Install four bolts (22) with thin steel washers (21). Do not lockwire bolts at this time.

e. Ensure that shims (18) are in place on aft side of pylon support (19) for both ends of fifth mount support fitting (15). Bond loose shims (18) to pylon support (19) with adhesive (C12), if necessary.

f. Support transmission with a suitable hoist to relieve tension on eyebolt of fifth mount (13).

g. Position ends of fifth mount support fitting (15) on shims (18). Align holes and install bolts (17) with aluminum washers (16) under heads.

h. Align fifth mount (15) eyebolt with bushing of transmission case fifth mount support (4).

(1) E M Fifth mount bolt assembly (5) should be easily inserted without moving transmission.

(2) P Fifth mount bolt (6) should be easily inserted without moving transmission.

i. If unable to align, procure new shim (14) and/or shim (18). Peel shims as necessary to obtain proper alignment.

NOTE

Bolts (17) or (22) must not bottom out. For each 0.06 inch shim removed, install steel washers on attaching bolts at that location.

j. Reinstall bolt (22) and thin steel washer (21) if removed. Lockwire bolts in pairs with lockwire (C137).

k. Reinstall bolts (17) and washers (16) if removed.

l. E M Install fifth mount bolt assembly (5), through eyebolt of fifth mount (13) and transmission case fifth mount support (4). Install washer (3) and nut (2). Torque bolt (5) **300 TO 400** inch-pounds. Install cotter pin (1).

m. **P** Install fifth mount spacer (8, figure 2-76, detail A) in transmission case fifth mount support (4).

n. **P** Install bolt (6) with special washer (7), (countersink against bolt head), through eyebolt of fifth mount (13, figure 2-76) and transmission case fifth mount support (4).

o. **P** Install washer (9) and nut (10). Torque nut (10) **300 TO 400** inch-pounds. Install cotter pin (11).

p. **P** Install pylon transducer on pylon transducer bracket (20) using instructions contained in paragraph 11-130.

q. Install tail rotor driveshaft using instructions contained in paragraph 6-81.

r. Install induction baffle.

2-233. TRANSMISSION DAMPERS.

2-234. DESCRIPTION — TRANSMISSION DAMPERS.

Two fluid-type dampers are used in the pylon mounting system to help control motion of the pylon and prevent vibration. One damper is connected between the pylon support structure and the lower end of each of the rear pylon mounts (figure 2-77).

2-235. REMOVAL — TRANSMISSION DAMPERS.

To remove dampers with transmission and mounts installed, remove bolts from upper and lower attachment fittings. Remove hydraulic cylinder for access; where necessary (figure 2-77).

2-236. INSPECTION — TRANSMISSION DAMPERS.

a. Mount boots for proper installation and deterioration.

b. Mounts for evidence of bottoming out and deterioration.

c. Underside of dampers for leaks.

d. Bearing in damper and damper fitting for maximum of **0.012** axial and **0.006** inch radial play.

e. After any hard landing, remove mount dampers to check for possible internal yielding as follows: (figure 2-80).

(1) Use a feeler gage to measure gap between spirolox retainer (10, figure 2-81) and spring seat (12).

(2) Measure gap between spring seat (12) and shims (9 and 11) under end of cylinder barrel.

(3) Damper is unserviceable if either measured gap exceeds **0.030** inch. See figure 2-80.

2-237. DISASSEMBLY — TRANSMISSION DAMPERS (AVIM).

a. Remove cotter pin (32, figure 2-81) nut (31), washer (30), and bolt (18) from piston (17) and clevis end (26).

b. Remove clevis end (26), dowel pin (27), and spool assembly (24) from piston (17).

c. Remove dowel pin (27) from spool assembly (24) and separate clevis end (26) from spool assembly. Remove and discard packings (25) from spool assembly.

d. Remove spirolox retainer (10), upper shim (7), barrel assembly (8), and lower shim (9) from body assembly (2).

NOTE

Shims must be placed in the same position on reassembly. Tag and identify the upper and lower shim.

e. Remove spirolox retainer (23), end cap (21), and piston (17) from barrel assembly (8).

f. Remove spirolox retainer (14), spring seats (12), spring (13), and shim (11) from barrel (15). Discard spirolox retainer (14).

g. Remove and discard packing (28), double delta seal (22), and packing (29) from end cap (21).

h. Remove and discard double delta seal (20) and packing (19) from piston (17).

i. Remove retaining ring (6) and retainer (3) from body assembly (2).

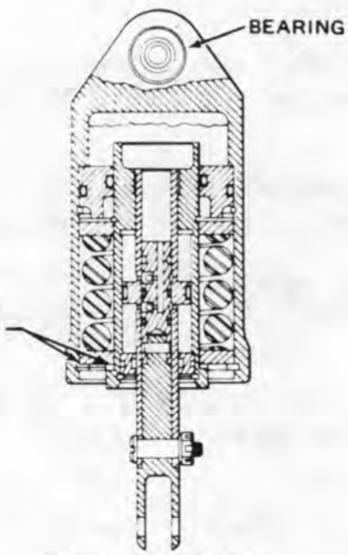


Figure 2-80. Damper — Internal Yielding Inspection

j. Remove and discard double delta seal (16), packing (4), and packing (5) from retainer (3).

2-238. CLEANING — TRANSMISSION DAMPERS (AVIM).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

Clean disassembled parts with solvent (C112) and dry with clean cloth or compressed air.

2-239. REPAIR — TRANSMISSION DAMPERS (AVIM).

Replace dampers if leaking or if found to be yielding after a hard landing. See figure 2-80.

2-240. ASSEMBLY — TRANSMISSION DAMPERS (AVIM).

a. Lubricate all packings and seals with hydraulic fluid (C62) prior to assembly.

b. Install packing (19, figure 2-81) in groove of piston (17). Install double delta seal (20) over packing (19). Use care to prevent stretching and malforming of seal and packing.

c. Assemble pylon damper seal installation tool (T64) and pylon damper piston as follows:

(1) Place seal holder (2, figure 2-82) on shaft (1).

(2) Place bolt end of piston (17, figure 2-81) on shaft (1).

(3) Thread guide (3, figure 2-82) into shaft (1).

d. Work double delta seal (20, figure 2-81) under lip of seal holder (2, figure 2-82) and hold in position. Insert guide end of assembled parts into large hole of barrel (15, figure 2-81) until the seal holder bottoms inside barrel. Hold parts in position.

CAUTION

Double delta seal (20) is easily damaged. Maintain pressure to hold lip of double delta seal under lip of seal holder and to keep assembled parts bottomed inside barrel (15).

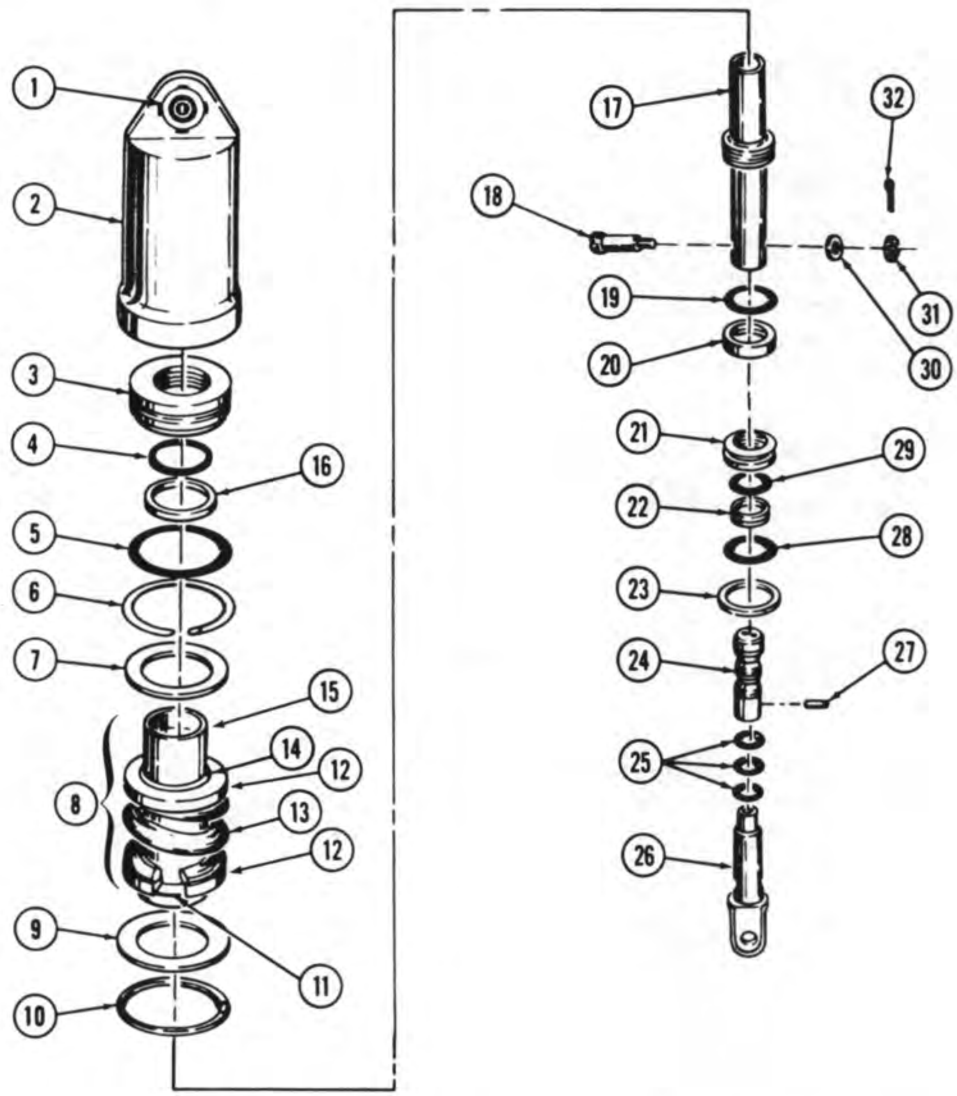
e. Hold barrel (15) firmly and rap shaft (1, figure 2-82) with heel of hand to force piston (17, figure 2-81) into position within barrel (15).

f. Remove guide (3, figure 2-82) from shaft (1) and remove shaft and seal holder from barrel and piston assembled in preceding step. Remove seal holder (2) from shaft (1).

g. Insert shaft (1) through piston (17, figure 2-81), thread guide (3, figure 2-82) into shaft (1), and align holes in piston and guide. Install pin (4) in aligned holes and install screw (5) in pin (4) to lock special tools to piston.

h. Install packing (29, figure 2-81) inside groove of end cap (21). Place double delta seal (22) over packing (29). Install packing (28) in groove on outside of end cap.

i. Place beveled end of end cap (21) down on guide that was pinned to piston (17) in step g. Force end cap into position within barrel (15).



1. Bearing
2. Body assembly
3. Retainer
4. Packing
5. Packing
6. Retaining ring
7. Upper shim
8. Barrel assembly
9. Lower shim
10. Spirolox retainer
11. Shim
12. Spring seat
13. Spring
14. Spirolox retainer
15. Barrel
16. Double-delta seal
17. Piston
18. Bolt
19. Packing
20. Double-delta seal
21. End cap
22. Double-delta seal
23. Spirolox retainer
24. Spool assembly
25. Packings
26. Clevis end
27. Dowel pin
28. Packing
29. Packing
30. Washer
31. Nut
32. Cotter pin

Figure 2-81. Transmission Damper — Assembly

j. Remove screw (5, figure 2-82), pin (4), and guide (3) from shaft (1). Remove shaft (1).

k. Install spirolox retainer (23, figure 2-81) into barrel (8).

l. Install packing (4) in retainer (3) and install double-delta seal (16) over packing. Install packing (5) on retainer. Install retainer (3) and packings on barrel (15). Turn retainer on barrel to seat and size double-delta seal (16). After a minimum of five minutes, remove retainer from barrel and inspect double delta seal for correct seating and for damage.

m. If double delta seal (16) is properly seated and is not damaged, install the retainer, seal, and packings into body assembly (2) and secure with retaining ring (6).

n. Select shim (11) of proper thickness as follows:

(1) Determine dimension A and dimension B as shown on figure 2-83.

(2) Subtract dimension B from dimension A to obtain measured gap. Determine proper shim from table on figure 2-83.

o. Install shim (11, figure 2-81) with inside chamfer of shim against radius of barrel (15). Install spring seat (12), spring (13), second spring seat (12), and spirolox retainer (14) on barrel (15).

p. Install clevis-end (26) in piston (17). Align round holes in piston and clevis-end and install bolt (18), washer (30) and nut (31). Do not install cotter pin (32) at this time.

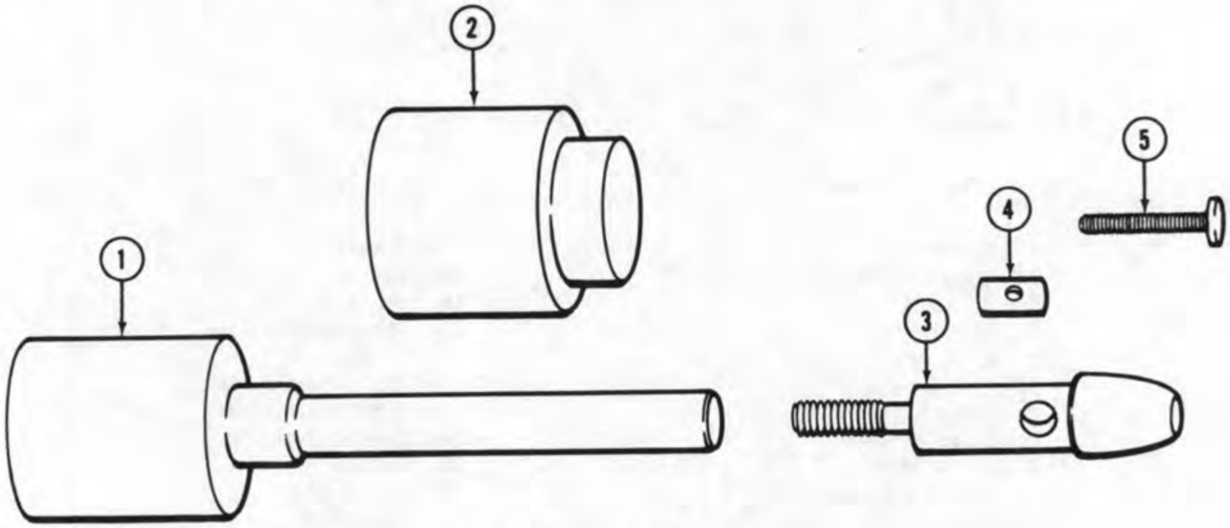
q. Select upper shim (7) of proper thickness as follows:

(1) Determine dimension C as shown on figure 2-84.

(2) Subtract dimension C from **5.82** inches to obtain measured gap. Determine proper shim by using table on figure 2-84.

r. Remove barrel assembly (8, figure 2-81) from body assembly (2). Install upper shim (7) in body assembly (2) and reinstall barrel assembly (8).

s. Temporarily install spirolox retainer (10). Using feeler gage measure gap between spring seat and spirolox retainer as shown on figure 2-85. Select proper lower shim based on measured gap from table on figure 2-85.



1. Shaft
2. Holder
3. Guide
4. Pin
5. Screw

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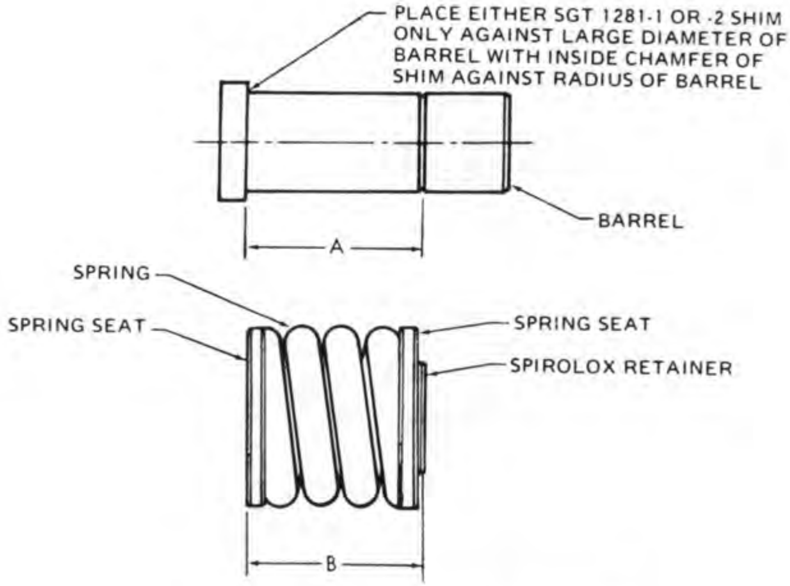
Figure 2-82. Damper Seal — Installation Tool



SGT 1281 SHIM REQUIRED

	-1	-2	-3	-4	-5	-6
MEASURED GAP	.070	.050	.040	.035	.030	.025
.070	1					
.071 .075		1				1
.076 .080		1			1	
.081 .085		1		1		
.086 .090		1	1			
.091 .095	1					1
.096 .100	1				1	
.101 .105	1			1		
.106 .110	1		1			
.111 .115		1		1	1	
.116 .120	1	1				
.121 .125		1	1	1		
.126 .130	1			1		1
.131 .135	1			1	1	

ALL DIMENSIONS ARE IN INCHES

Figure 2-83. Damper Barrel Shim — Replacement

t. Remove spirolox retainer (10, figure 2-81). Install lower shim (9) and reinstall spirolox retainer (10).

u. Remove bolt (18) and clevis-end (26) from piston (17).

v. Hold damper in vertical position. Add hydraulic fluid (C62) through piston rod (17). Slowly cycle piston rod (17) until air is removed. Leave piston rod (17) in retracted position.

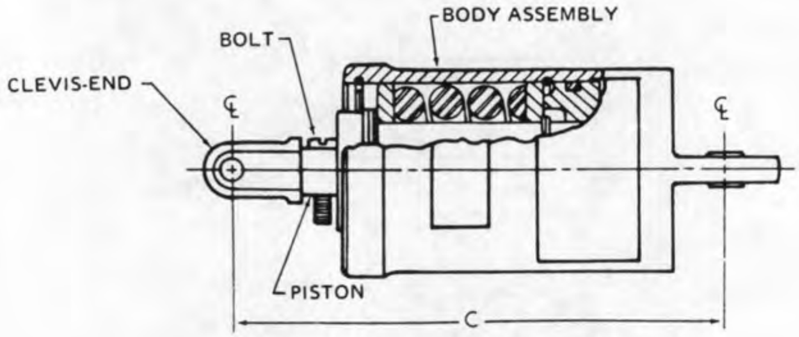
w. Install packings (25) on spool assembly (24). Align holes in spool assembly (24) and clevis-end (26). Insert dowel pin (27).

x. Install spool assembly (24) in piston (17). Align holes in piston (17) and clevis-end (26). Install bolt (18), washer (30), nut (31), and cotter pin (32).

y. Pack bearing (1) with grease (C55).

CAUTION

Any attempt to move the piston, spool, or clevis assembly with the damper in a position other than vertical may introduce air into the piston and spool assemblies.



MEASURED WITH SPOOL REMOVED AND DAMPER IN RETRACTED POSITION

SGT 1282 SHIM REQUIRED

	-1	-2	-3	-4	-5	-6	-7
MEASURED GAP	.060	.040	.035	.030	.025	.020	.015
.015							1
.016 .020						1	
.021 .025					1		
.026 .030				1			
.031 .035			1				
.036 .040		1					
.041 .045					1	1	
.045 .050				1		1	
.051 .055				1	1		
.056 .060	1						
.061 .065		1			1		
.066 .070		1		1			
.071 .075		1	1				
.076 .080	1					1	
.081 .085	1				1		
.086 .090	1			1			
.091 .095	1		1				
.096 .100	1	1					
.101 .105	1				1	1	
.106 .110	1			1		1	
.111 .115	1			1	1		
.116 .120	1		1		1		

Figure 2-84. Damper Upper Shim — Replacement

z. After damper is serviced and spool and clevis assembly is installed, hold damper assembly vertically, piston (clevis-end) down. Check for free movement or play of piston. If there is any free movement or play, the pylon damper is not properly serviced and/or not properly assembled.

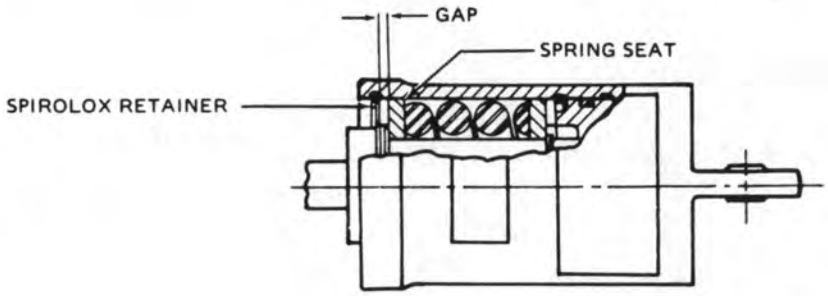
aa. If laminated shims were replaced with solid shims during assembly, stamp a letter "C" after serial number.

2-241. INSTALLATION — TRANSMISSION DAMPERS.

a. Place damper, with cylinder up, into pylon support from inboard side (figure 2-77 and paragraph 2-226).

b. Align cylinder bearings in eyebolt of aft mount, and clevis on support fitting in structure.

c. Install bolts, nuts, and washers.



SGT 1282 SHIM REQUIRED (OUTBOARD)

	-1	-2	-3	-4	-5	-6	-7
MEASURED GAP	.060	.040	.035	.030	.025	.020	.015
.015 .019							1
.020 .024						1	
.025 .029					1		
.030 .034				1			
.035 .039			1				
.040 .044		1					
.045 .049					1	1	
.050 .054				1		1	
.055 .059				1	1		
.060 .064	1						
.065 .069		1			1		
.070 .074		1		1			
.075 .079		1	1				
.080 .084	1					1	
.085 .089	1				1		
.090 .094	1			1			
.095 .099	1		1				
.100 .104	1	1					
.105 .109	1				1	1	
.110 .114	1			1		1	
.115 .119	1			1	1		
.120 .124	1		1		1		
.125 .129	1	1			1		
.130 .134	1	1		1			
.135 .139	1	1	1				
.140 .144	2					1	
.145 .149	2				1		
.150 .154	2			1			
.155 .159	2		1				
.160 .164	2						
.165 .169	2				1	1	
.170 .174	2			1		1	
.175 .179	2			1	1		
.180 .184	2		1		1		
.185 .189	2		1	1			
.190 .194	2	1		1			
.195 .199	2	1	1				

Figure 2-85. Damper Lower Shim — Replacement

d. Reinstall hydraulic cylinder removed for access.

2-242. TRANSMISSION BUSHINGS.

2-243. DESCRIPTION — TRANSMISSION BUSHINGS.

The transmission bushings are tapered metal wear surfaces which have steel and rubber washers bonded to the bushing inner face. The bushings cushion and support each of the five transmission mounts and are installed on the mount between the leg of the transmission and the pylon support.

2-244. REMOVAL — TRANSMISSION BUSHINGS.

Refer to paragraph 2-223 for removal of transmission mounts.

2-245. INSPECTION — TRANSMISSION BUSHINGS.

Refer to paragraph 2-224 for inspection of transmission mounts.

2-246. REPAIR — TRANSMISSION BUSHINGS.

Refer to paragraph 2-225 for repair of transmission mounts.

2-247. INSTALLATION — TRANSMISSION BUSHINGS.

Refer to paragraph 2-226 for installation of transmission mounts.

2-248. TRANSMISSION FITTINGS (AVIM).

2-249. DESCRIPTION — TRANSMISSION FITTINGS.

The transmission fittings form structural attachment points for the pylon support and the lower end of the dampers. See figures 2-86 and 2-77.

2-250. REMOVAL — TRANSMISSION FITTINGS.

a. Remove support (1, figure 2-86) as follows:

(1) Remove hydraulic lines and fittings from support (1). Cap or plug hydraulic lines to prevent entry of foreign material.

(2) Remove nut, screw and clamp from outboard side of support (1).

(3) Carefully remove six rivets which secure support to lift beam and remove support. Do not elongate holes in lift beam.

b. Remove the pylon damper fitting (15, figure 2-77).

(1) Remove transmission (paragraph 6-24).

(2) Remove the two aft transmission mount assemblies (3, figure 2-77) (paragraph 2-223).

(3) Carefully drill out rivets which secure damper fittings to structure and remove fitting. See figure 2-87 for detail view of rivet. Remove fitting.

c. Remove fifth mount support fitting (15, figure 2-79) (paragraph 2-229).

2-251. INSPECTION — TRANSMISSION FITTINGS.

a. Inspect support (1, figure 2-86) and support assembly (2) for cracks, corrosion damage, and secure attachment to lift beam (3).

b. Inspect damper fitting (15, figure 2-77) for defects:

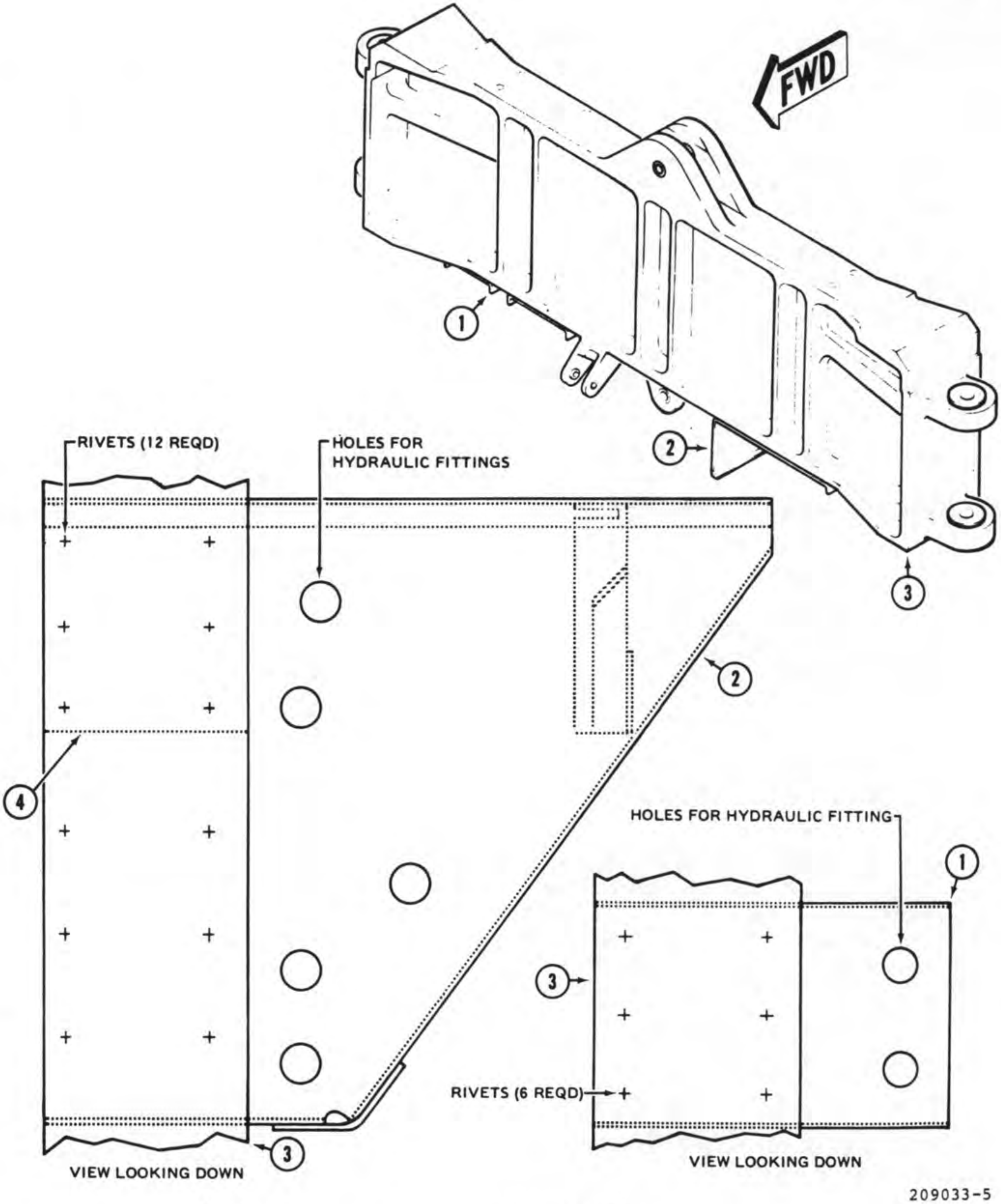
(1) Cracks. No cracks allowed.

(2) Corrosion. Severe corrosion damage is cause for replacement of damper fittings. Minor corrosion damage may be repaired, using fine India stone (C116).

(3) Secure installation of all rivets which attach the two fittings (15) to the structure.

(4) Secure installation of bearing in damper fitting and condition of bearing.

c. Inspect fifth mount support fitting (15, figure 2-79) for damage in excess of limits shown on figure 2-88.



1. Support
2. Support assembly
3. Lift beam
4. Radius block

Figure 2-86. Hydraulic Fitting Supports — Installation

2-252. REPAIR — TRANSMISSION FITTINGS.

NOTE

Do not repair a damaged support assembly (2, figure 2-86). Install a new support assembly.

a. Remove radius block (4) from old support assembly or fabricate a new support from **0.050** inch thick material.

a.1. INSPECTION — PYLON DAMPER FITTINGS. Inspect pylon damper fittings for loose or missing rivets.

b. Repair damper fitting (6, figure 2-87).

(1) Replace damper fitting if cracked.

CAUTION

Do not replace loose or missing rivets with steel fasteners. Rivets are designed to shear before doing excessive damage to pylon.

(2) Polish out superficial corrosion damage using fine India stone (C116). Apply primer (C88 or C91) to bare metal surfaces.

(3) If bearing in pylon damper fitting failed to meet inspection requirements, remove old bearing and install new bearing by roll staking method. Refer to chapter 5 for general instructions to remove and install roll staked bearings. If roll staking tools are not available install a new fitting.

(4) If rivet holes in pylon damper fitting are elongated, install a new fitting.

(5) If rivet holes in helicopter structure for rivets (1) are not elongated, proceed to step (b.7). If any holes in structure are elongated, install bushings as outlined in steps (6) through (9).

(6) Drill out elongated holes in web (3) and extrusion (4). Use a letter size N twist drill. Ream the hole for a class FN2 fit with a 77-3-31 bushing. Make the hole **0.0004 TO 0.0014** inch smaller than the bushing.

(7) Coat bushing (2) and the hole with primer (C88 or C91) and press bushing into position while primer is wet. Install the bushing with the flanged end on the opposite side of the structure from fitting (6) as illustrated. The bushing must extend through the web (3) and extrusion (4). Face off bushing flush with extrusion (4) as shown on detail view A.

(8) Repair all elongated holes as described in steps (6) and (7).

(9) Touch up bare metal with primer (C88 or C91).

c. Repair fifth mount support fitting (15, figure 2-79) as follows:

(1) Polish out mechanical and corrosion damage using fine India stone (C116) that is within limits shown on figure 2-88.

(2) Replace support fitting if damage exceeds limits or if any cracks are detected.

(3) Touch-up repair areas with chemical film (C31) and primer (C88 or C91).

2-253. INSTALLATION — TRANSMISSION FITTINGS.

a. Install support (1, figure 2-86).

(1) Position support (1) on lift beam in original position so that hydraulic fittings can be reinstalled and clamp in place. Drill out holes for six rivets to match holes in lift beam. Remove support and deburr holes. Position support on lift beam and install six rivets (53, table 2-2).

(2) Install hydraulic fittings on support and install hydraulic lines on fittings.

(3) Install clamp removed from outboard side of support.

(4) Perform functional check of hydraulic system with hydraulic test stand or by ground run of helicopter. Refer to paragraph 7-3. Check for correct operation of hydraulic system and for hydraulic fluid leaks.

b. Install support assembly (2).

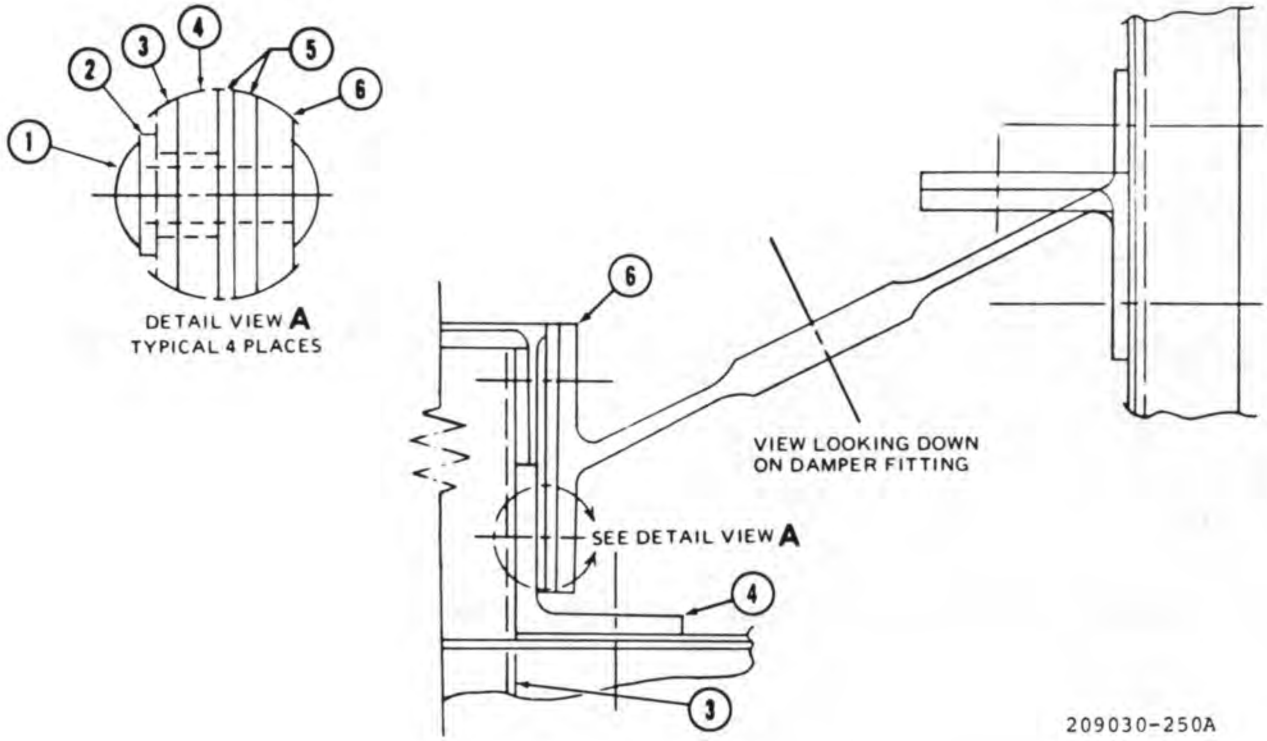
(1) Clamp support assembly (2) and radius block (4) on lift beam at position illustrated. Ensure

that radius block (4) is nested against mating radius of the support assembly.

(2) Drill out rivet holes in new support assembly (2) and radius block to match holes in lift beam. Remove support and radius block (4). Deburr holes.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.



1. Rivet
2. Bushing
3. Web
4. Extrusion
5. Shims (as required)
6. Fitting

Figure 2-87. Damper Support Fitting — Elongated Holes

(3) Clean mating surfaces at support assembly (2) and radius block (4) with 400 grit sandpaper (C102). Remove all residue with MEK (C74).

(4) Mix a small quantity of adhesive (C14) according to instructions on container and apply a thin coat of adhesive to mating surfaces of support assembly and radius block (table 1-11).

(5) Place a **4** mil glass yarn string in bond line at one inch intervals. The glass yarn will serve as a spacer to ensure that adhesive thickness will be **3 TO 8** mils after curing.

(6) Clamp support assembly (2) and radius block (4) in position on lift beam with radius block radius nested in support assembly radius. Install twelve rivets.

(7) Clean all adhesive squeeze out from the parts before adhesive hardens.

(8) Paint support assembly (2) and radius block (4) with primer (C88 or C91).

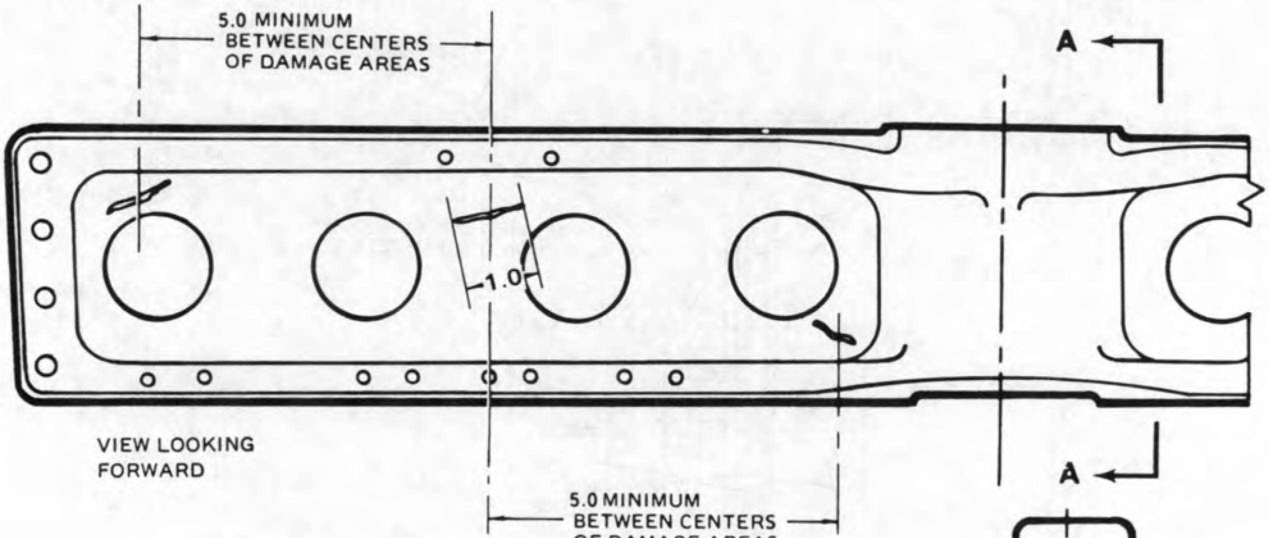
(9) Install hydraulic fittings on support assembly (2) and install hydraulic lines on fittings.

(10) Perform functional check for correct operation of hydraulic system with hydraulic test stand or by ground run of helicopter. Check for correct operation of hydraulic system and for hydraulic fluid leaks. Refer to chapter 7.

c. Install damper fitting (15, figure 2-77).

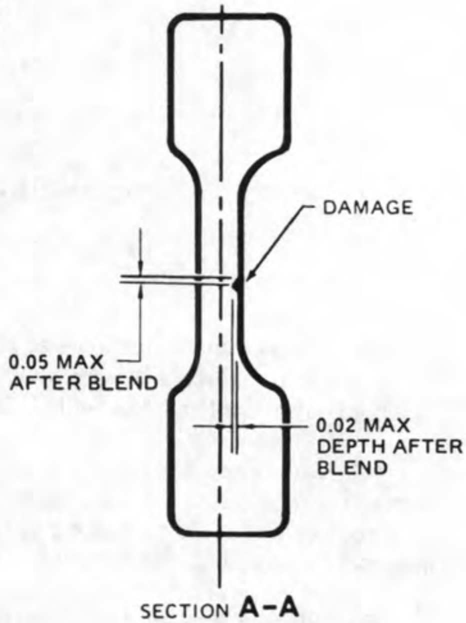
(1) Position fitting in helicopter and install rivets (1, figure 2-87).

(2) Install damper (7, figure 2-77), mount (3) and transmission. Refer to chapter 6.



SCRATCHES, NICKS, AND GOUGES IN WEB OF FITTING

1. No cracks allowed.
2. Scratches, nicks, and gouges may be polished out provided they do not exceed limitations shown.
3. The maximum length of all damages shall not exceed 1.0 after blend.
4. Five repairable damages allowed on each face, with a minimum spacing of 5.0 on center.
5. Replace fitting when damages exceed limitations listed above.



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ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

Figure 2-88. Damage Limits — Fifth Mount Support Fitting

(3) Perform ground run for functional check of flight controls and hydraulic system components affected by transmission removal/installation. Refer to chapter 7.

d. Install fifth mount support fitting (15, figure 2-79). Refer to paragraph 2-227.

2-254. MAP AND DATA CASE.

2-255. DESCRIPTION — MAP AND DATA CASE.

The data case for maps, flight reports etc., is located under the right arm rest in gunner compartment.

2-256. REMOVAL — MAP AND DATA CASE.

Release fasteners and remove data case on gunner right arm rest.

2-257. INSPECTION — MAP AND DATA CASE.

Inspect data case for damage which would affect its function.

2-258. REPAIR — MAP AND DATA CASE.

Replace data case if damage is beyond functional limits.

2-259. INSTALLATION — MAP AND DATA CASE.

Install data case and secure fasteners as applicable.

2-260. TOW AND JACK FITTINGS.

2-261. DESCRIPTION — TOW AND JACK FITTINGS.

a. Four jack fittings with mooring shackles attached are provided as loose equipment for use at two jack points on the fuselage and on two outboard wing locations. (Figure 2-89). The forward jack fitting is attached by bolts under the structure of the right main beam and the ammunition compartment rear bulkhead. The aft jack fitting is screwed into a socket on the left main beam ahead of the tailboom attach splice. Wing jack fittings are attached by bolts to sockets under the outboard ejector racks.

b. The tow fitting is a casting with an eyehole which is riveted to the front of the skid tubes (figure 2-89).

2-262. REMOVAL — TOW AND JACK FITTINGS.

a. If damaged, drill out rivets and remove the tow fitting from each skid tube as applicable.

b. Remove forward jack and mooring fitting (figure 2-89), aft jack and mooring fitting, and two wing jack and mooring fittings (paragraph 1-33).

2-263. INSPECTION — TOW AND JACK FITTINGS.

a. Inspect forward jack fitting for cracks and other defects which would affect its function.

b. Inspect aft jack fitting for cracks and other defects which would affect its function.

c. Inspect wing jack fittings for cracks and other defects which would affect their function.

d. Inspect tow ring on skid tube for cracks and other defects which would affect its function. Inspect for loose, cracked or missing rivets.

e. Perform magnetic particle inspection of tow and jack fittings. Refer to TM 43-0103.

2-264. REPAIR — TOW AND JACK FITTINGS.

a. Replace cracked or damaged jack fittings.

b. Polish out minor scratches, nicks, or gouges, using fine India stone (C116).

c. Replace cracked or damaged tow fitting.

2-265. INSTALLATION — TOW AND JACK FITTINGS.

a. Install tow fitting (figure 1-8) with rivets (TM 55-1520-236-23P).

b. Refer to paragraph 1-35 for removal of jack fittings.

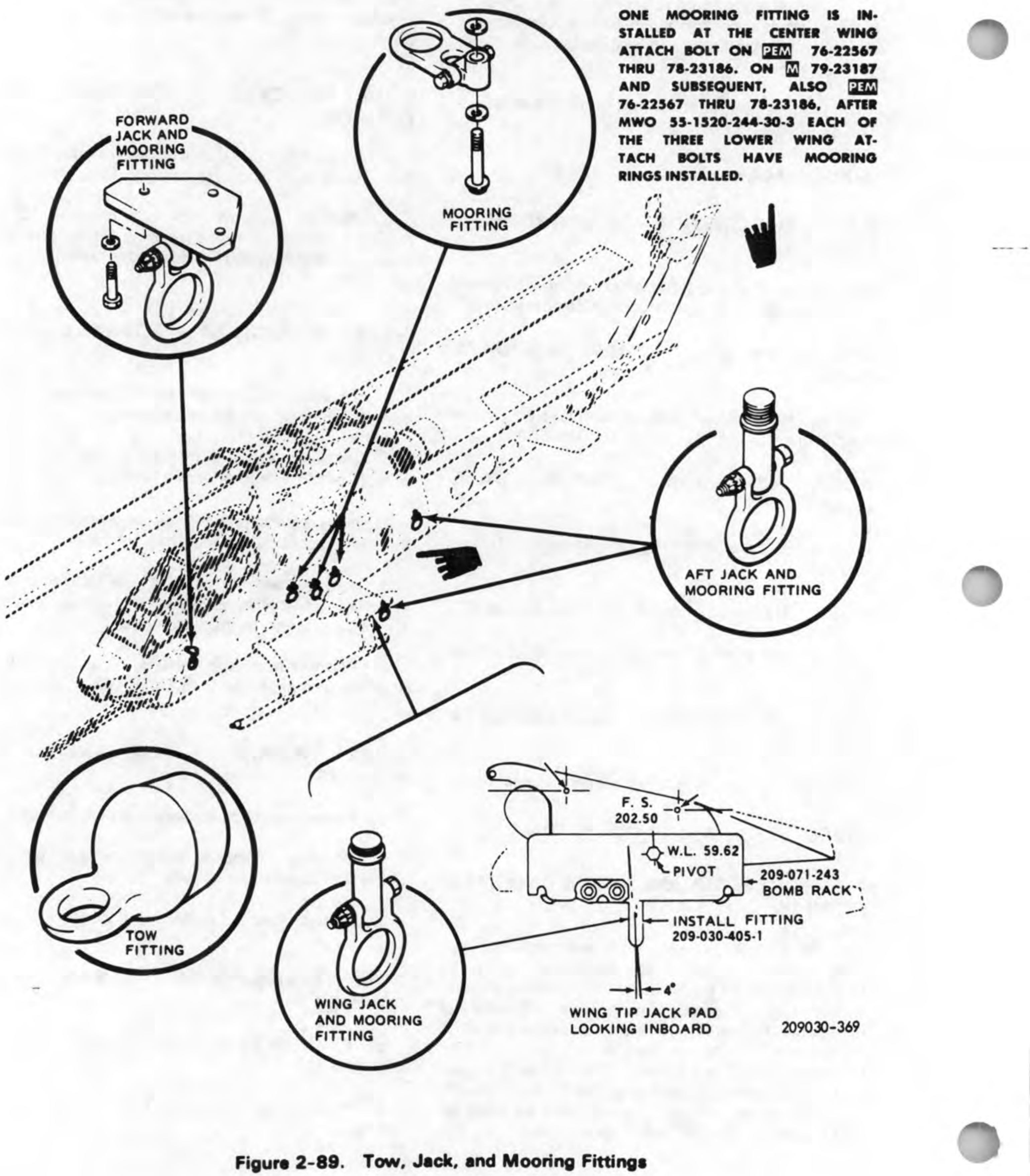


Figure 2-89. Tow, Jack, and Mooring Fittings

2-266. MOORING FITTINGS.

2-267. DESCRIPTION — MOORING FITTINGS.

a. Mooring fittings are steel rings that swivel and are bolted to the forward, aft, and wing jack fittings.

b. Two additional mooring fittings are installed under the wings at wing attach points (figure 2-89).

2-268. REMOVAL — MOORING FITTINGS.

(Refer to paragraph 1-40.)

2-269. INSPECTION — MOORING FITTINGS.

a. Refer to paragraph 2-263. Inspect all mooring fittings in same manner.

b. Inspect wing attach mooring fitting bolts (figure 2-89) for cracks, nicks, and damaged threads.

c. Inspect washers and bushings at wing attach mooring fittings (figure 2-89) for cracks and damage.

2-270. REPAIR — MOORING FITTINGS.

a. Replace cracked or damaged mooring fittings.

b. Polish out minor scratches, nicks, or gouges with fine India stone (C116).

c. Replace bolts at wing attach mooring fittings (figure 2-89) that do not pass inspection.

d. Replace washers and bushings at wing attach mooring fittings (figure 2-89) that do not pass inspection.

2-271. INSTALLATION — MOORING FITTINGS.

(Refer to paragraph 1-40).

2-272. TIEDOWN ASSEMBLY.

2-273. DESCRIPTION — TIEDOWN ASSEMBLY.

The helicopter is provided with two main rotor tiedown straps and one tail rotor tiedown strap.

2-274. REMOVAL — TIEDOWN ASSEMBLY.

Remove tiedown straps as applicable. Refer to paragraph 1-36.

2-275. INSPECTION — TIEDOWN ASSEMBLY.

Inspect tiedown straps for fraying, torn straps, or other defects which may affect function.

2-276. REPAIR — TIEDOWN ASSEMBLY.

Repair torn or frayed straps and replace defective straps as applicable.

2-277. INSTALLATION — TIEDOWN ASSEMBLY.

Install tiedown straps as applicable. Refer to paragraph 1-36.

2-278. LEVELING PADS.

2-279. DESCRIPTION — LEVELING PADS.

Six leveling pads are located on floor of ammunition compartment. Two are used to level helicopter in fore-and-aft direction. Two (either two on forward track for ammunition pallet or two on aft track for ammunition pallet) are used to level helicopter in lateral direction. Each fore-and-aft leveling pad is a leveling shim assembly consisting of a spacer with a laminated shim bonded to it. Each leveling shim assembly is bonded to splice plate running lengthwise along left side of ammunition compartment floor. Each lateral leveling pad is a leveling pad attached near outboard ends of track for ammunition pallet by means of two rivets. Locations of leveling pads are shown in figure 1-3. Lateral leveling pads are installed on forward track for ammunition pallet as well as on aft track. Height and condition of each leveling pad is of critical importance in leveling helicopter.

2-280. REPLACEMENT — LEVELING PADS.

CAUTION

Do not attempt to replace leveling pad(s) if structure in pylon area of helicopter is damaged. Send helicopter having damaged pylon structure to depot.

NOTE

Any or all leveling pads may be replaced as necessary.

a. Open transmission cowl assembly (11, figure 2-3).

b. Check structure in pylon area including lift beam (16, figure 2-77) pylon support (14) and fifth mount support (9).

c. Place bubble protractor in fore-and-aft direction on lift beam (16).

NOTE

Fore-and-aft member of pylon support (14) may be used instead of lift beam (16).

d. Jack up helicopter. Refer to paragraph 1-32, steps a. through g.

e. Adjust jacks to level helicopter in fore-and-aft direction. Use bubble protractor to check level.

f. Place bubble protractor in lateral direction on lift beam (16) or fore-and-aft member of pylon support (14).

g. Adjust jacks to level helicopter in lateral direction. Use bubble protractor to check level.

h. Repeat steps **c.** and **e.** through **g.** to make sure helicopter is level.

i. Open ammunition compartment doors (21, figure 2-3).

j. If either or both fore-and-aft leveling pads (1, figure 1-3) are damaged or missing, replace as follows:

(1) Remove any remaining portion of leveling shim assembly.

(2) Use Scotch-brite (C103) to clean area.

(3) Use adhesive (C8) to bond new leveling shim assembly in place. Allow adhesive to dry.

(4) Place bubble protractor on leveling pads. Check fore-and-aft level of leveling pads.

(5) As necessary, peel laminations from shim until leveling in fore-and-aft direction is accomplished.

k. If any or all lateral leveling pads are damaged or missing, replace as follows:

(1) Remove five screws and remove ammunition floor track having damaged or missing leveling pads (2, figure 1-3).

(2) Place new ammunition floor track in position and attach with five screws.

(3) Place bubble protractor on leveling pads of new ammunition floor track. Check lateral level of leveling pads.

(4) Place shim under ammunition floor track as necessary, and repeat steps (3) and (4) until leveling in lateral direction is accomplished.

l. Check leveling in both directions to ensure that it is satisfactory.

m. Remove bubble protractor and other tools. Lower helicopter slowly and evenly.

n. Remove jacks (paragraph 1-32, steps **h.** through **k.**).

o. Close access doors.

SECTION III. TAILBOOM

2-281. TAILBOOM ASSEMBLY.

2-282. DESCRIPTION — TAILBOOM ASSEMBLY.

The tailboom (9, figure 2-90) is an aluminum alloy semi-monocoque structure made up of bulkheads, longerons and stringers covered by aluminum skin. The tail fin is an integral part of the tailboom and is made up of aluminum ribs, a spar and honeycomb panels. The tailboom supports the synchronized elevator, tail rotor, tail rotor driveshaft, control systems, avionics equipment, armament system equipment, and cooling equipment for the avionics equipment.

2-283. REMOVAL — TAILBOOM ASSEMBLY.

WARNING

If the tailboom is removed with the tail rotor gearbox and tail rotor installed, the tailboom may rotate out of control due to the turning moment caused by the high center of gravity.

a. Remove tail pipe fairing and open tail rotor driveshaft covers.

b. Remove clamps on tail rotor driveshaft section at forward end of tailboom and remove section of driveshaft.

c. Open access panel on right side of fuselage and just forward of tailboom attachment point.

d. Disconnect electrical connectors.

e. Disconnect tail rotor control.

f. Disconnect synchronized elevator controls.

g. Fabricate a stand or padded support to hold the tailboom after removal (figure 2-91).

h. Place stands, prepared in preceding step, under tailboom.

i. Position three persons on each side of tailboom to support the tailboom and lower it into stands. Remove two lower bolts (15 and 16, figure 2-92). Direct persons to support tailboom. Remove two upper bolts (1 and 6). Lift up on vertical fin and slide tailboom back to clear helicopter. Lower tailboom into position on stands and install bolts to secure tailboom to forward stand as shown on figure 2-91.

2-284. INSPECTION — TAILBOOM ASSEMBLY.

a. Inspect for loose or missing hardware and loose or missing rivets.

b. Inspect for minor dents, cracks, holes, scratches and corrosion.

2-285. REPAIR — TAILBOOM ASSEMBLY.

NOTE

Repair is limited to repair of minor oil can dents, cracks, holes, scratches, corrosion and replacement of loose or missing hardware. If major damage occurs which requires use of jigs and fixtures to repair, forward tailboom to depot maintenance for repair.

2-286. INSTALLATION — TAILBOOM ASSEMBLY.

NOTE

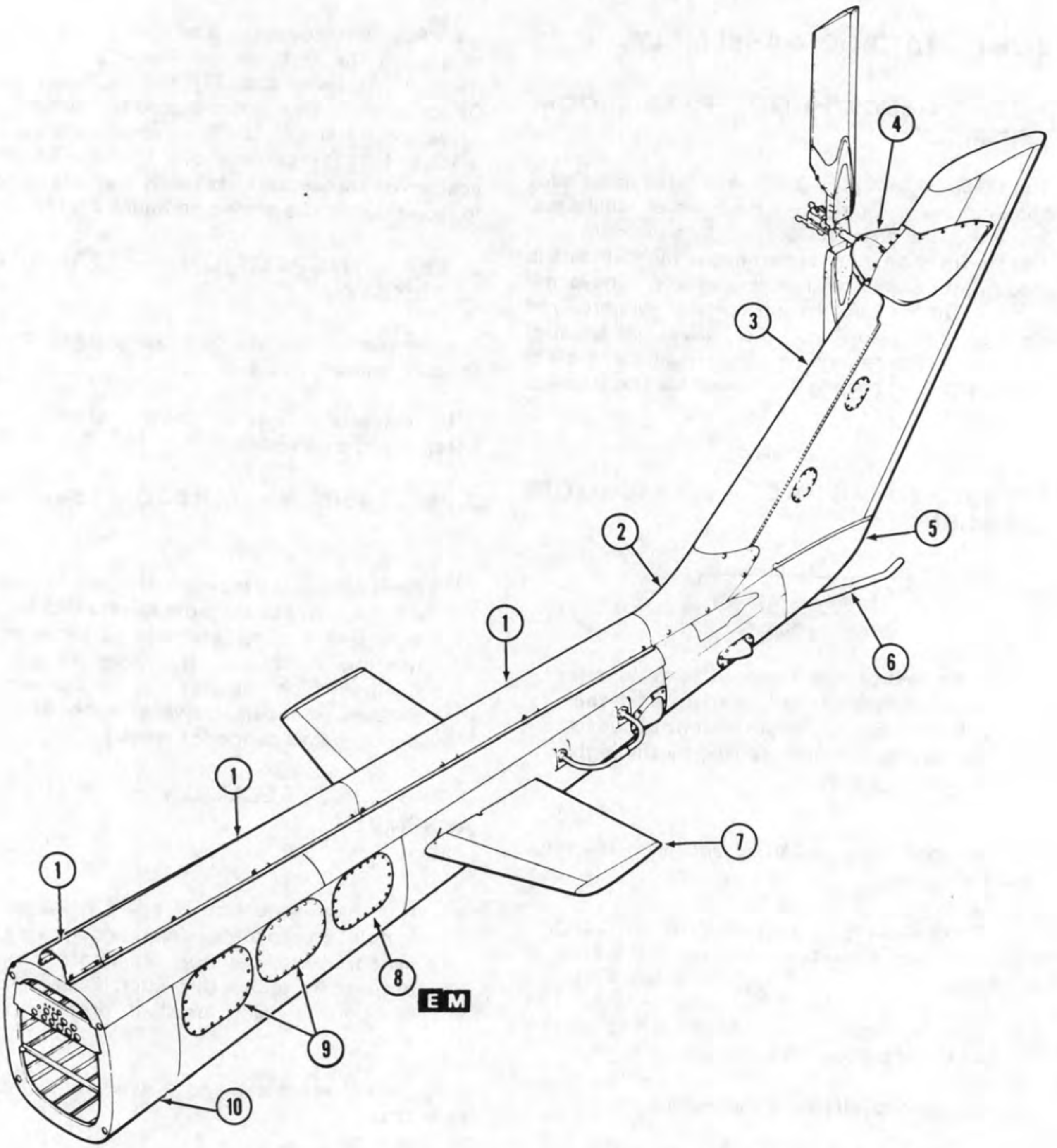
If a new tailboom is being installed, install electrical/avionics equipment, synchronized elevator and controls as outlined in steps a. through f. If the same tailboom is being installed, proceed to step g.

a. Install electrical and avionics equipment in tailboom.

b. Install synchronized elevator and control system. Refer to paragraphs 2-334 and 11-159.

c. Install tail rotor control linkage. Refer to paragraph 11-71.

d. Install intermediate and tail rotor gearboxes (paragraphs 6-105 and 6-121).



1. Driveshaft covers
2. Intermediate gearbox cover
3. Vertical fin driveshaft door
4. Tail rotor drive gearbox fairing
5. Lower tailboom to fin fairing
6. Tail skid
7. Synchronized elevator
8. E M Electrical access door
9. Electrical access doors
10. Tailboom assembly

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Figure 2-90. Aft Section Assembly

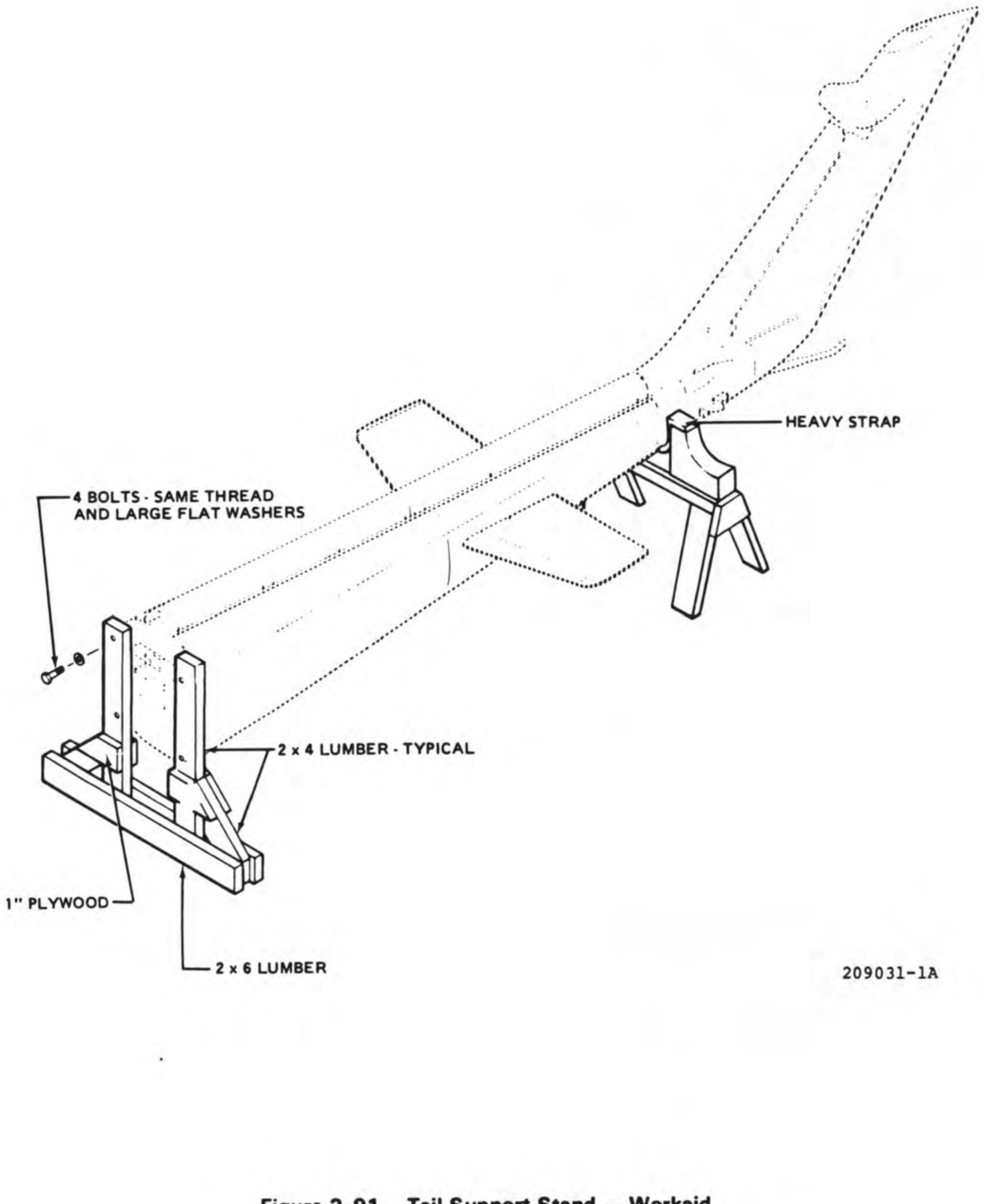
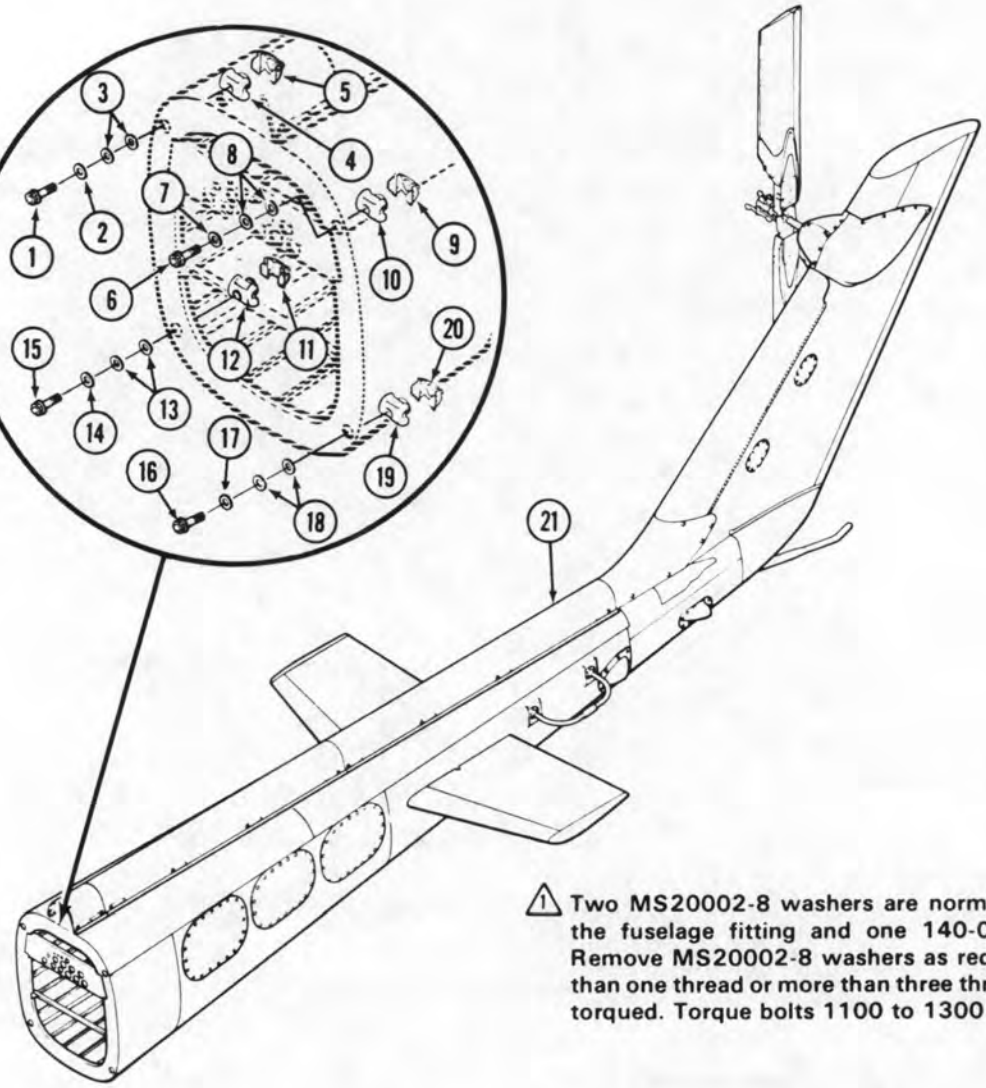


Figure 2-91. Tail Support Stand — Workaid



△1 Two MS20002-8 washers are normally installed between the fuselage fitting and one 140-007-33-27E6 washer. Remove MS20002-8 washers as required, so that no less than one thread or more than three threads show after bolt is torqued. Torque bolts 1100 to 1300 inch-pounds.

- △1 1. Bolt P/N 20-065-08026
- 2. Washer P/N 140-007-33-27E6
- 3. Washer P/N MS 20002-8
- 4. Barrel nut
- 5. Retainer
- △1 6. Bolt P/N 20-065-08030
- 7. Washer P/N 140-007-33-27E6
- 8. Washer MS20002-8
- 9. Retainer
- 10. Barrel nut
- 11. Retainer
- 12. Barrel nut
- 13. Washer P/N MS20002-8
- 14. Washer P/N 140-007-33-27E6
- △1 15. Bolt P/N 20-065-08024
- △1 16. Bolt P/N 20-065-08026
- 17. Washer P/N 140-007-33-27E6
- 18. Washer P/N MS20002-8
- 19. Barrel nut
- 20. Retainer
- 21. Tailboom

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Figure 2-92. Tailboom Installation

e. Install tail rotor driveshaft (paragraph 6-81).

f. Install tail rotor assembly (paragraph 5-87).

g. Open access panel on right side of fuselage just forward of tailboom attachment point.

h. Place recessed washers (2, 7, 14, and 17, figure 2-92) on tailboom attaching bolts with recessed side of washers toward bolt heads. Note that the bolts are of varying lengths. Identify bolts so they can be installed in the proper location.

i. Position three persons on each side of tailboom to lift the tailboom into position for installation. Direct persons to support tailboom. Remove bolts that secure front stand to tailboom (figure 2-91).

j. Ensure that four retainers (5, 9, 11 and 20, figure 2-92) are in place and that barrel nuts (4, 10, 12, and 19) are aligned for installation of bolts.

k. Lift tailboom into position and install bolts with washers that were prepared in step h. Ensure that the correct length bolt is installed for each location. Install two upper bolts (1 and 6) first, then install two lower bolts (15 and 16). Tighten bolts carefully to ensure that bolt threads do not bottom in barrel nuts. Two MS200020 washers (3, 8, 13, and 18) are normally installed between recessed washers (2, 7, 14, and 17) and fuselage fittings to obtain proper thread engagement. See NOTE on figure 2-92. Torque the four bolts (1, 6, 15, and 16) **1100 TO 1300** inch-pounds. Retorque bolts after first flight and apply slippage index marks with lacquer (C69) or other suitable marking material.

l. Install tail rotor driveshaft section.

m. Connect synchronized elevator controls and check rigging.

n. Connect tail rotor controls and check rigging.

NOTE

If tail rotor controls are found to be out of rig during preceding step, determine whether tail rotor has been removed and reinstalled. If tail rotor has been removed and reinstalled, check for proper installation of nylatron washer under bearing at outboard end of crosshead that supports tail rotor counterweights. Refer to chapter 5 for illustration and installation instructions for nylatron washer.

o. Connect electrical connectors for electrical and avionics equipment.

p. Install access panels.

q. Perform functional check of electrical/ avionics/ armament equipment in the tailboom and perform maintenance test flight. Refer to TM 55-1520-236-MTF.

2-287. PAINTING — TAILBOOM ASSEMBLY.

Refer to TB746-93-2 for general painting instructions.

2-288. TAILBOOM SHEET METAL PANELS AND SKINS.

2-289. DESCRIPTION — TAILBOOM SHEET METAL PANELS AND SKINS.

Sheet metal panels, fairings, and skins cover the tail rotor gearboxes and internal components of the tailboom. The panels make the components accessible, the fairings lessen aerodynamic drag, and the skins consist of structural and non-structural sections.

2-290. REMOVAL — TAILBOOM SHEET METAL PANELS AND SKINS.

Remove fasteners and remove panels and/or skins as applicable (figure 2-93).

2-291. INSPECTION — TAILBOOM SHEET METAL PANELS AND SKINS.

a. Inspect panels and fairings for the following defects (paragraph 2-25).

(1) Cracks.

(2) Corrosion.

(3) Security of fasteners and/or hinges.

(4) Deformity that causes improper fit.

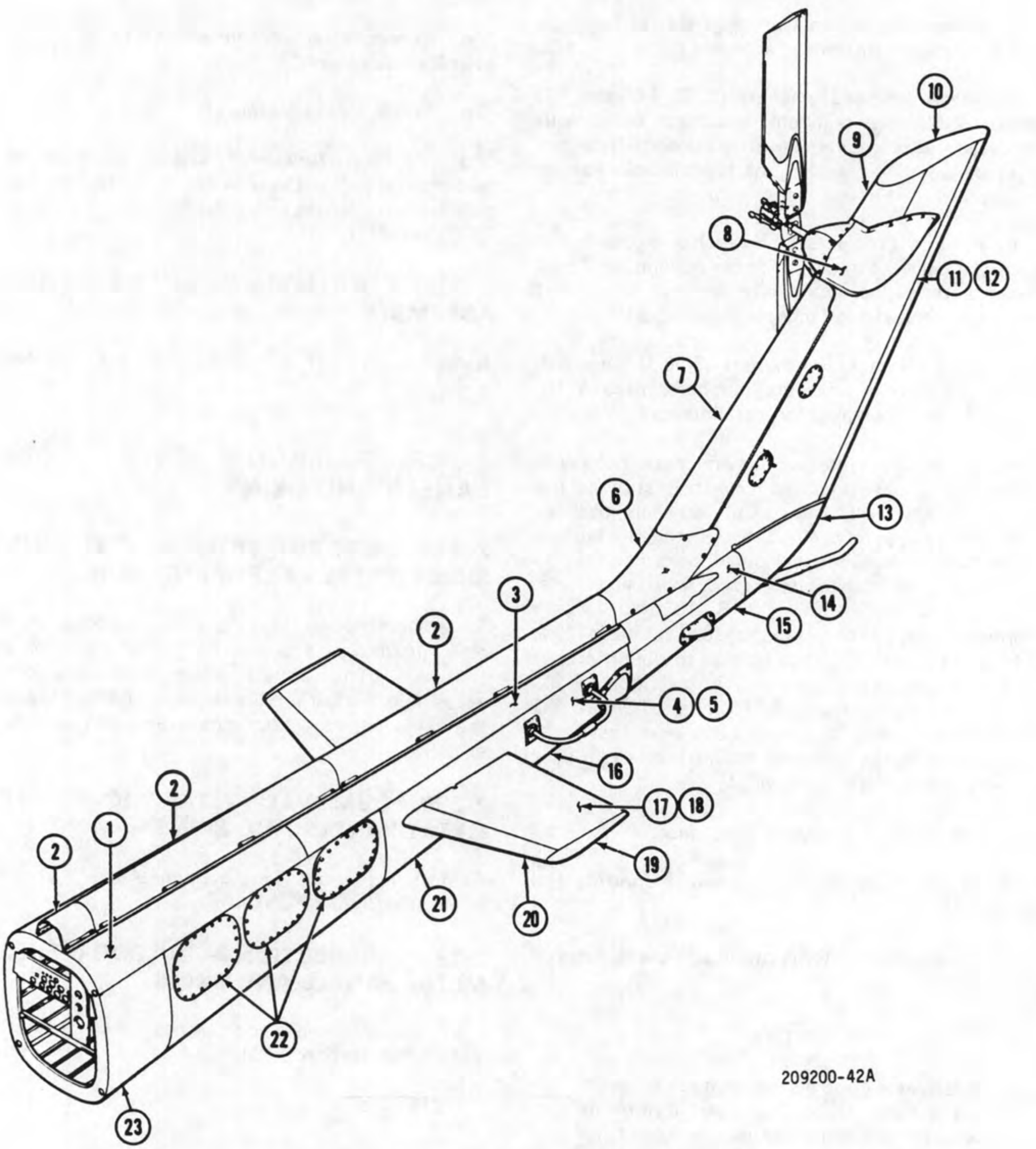

Figure 2-93. Tailboom and Elevator Skins (Sheet 1 of 2)

ITEM	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
1	7075 Al. Alloy	QQA250/13	T6	0.032
2	5052 Al. Alloy	QQA250/8		0.040
3	7075 Al. Alloy	QQA250/13	T6	0.032
4	7075 Al. Alloy	QQA250/13	T6	0.032
5	7075 Al. Alloy	QQA250/13	T6	0.032
6	6061 Al. Alloy	QQA250/11	T6	0.040
7	Fiberglass (Inner Skin) and 7075 Al. Alloy (Outer Skin)	QQA250/13	T6	0.012
8	Fiberglass			
9	7075 Al. Alloy	QQA250/13	T6	0.025
10	Kydex 100			
11	Al. Faced Honeycomb Sandwich			
12	Al. Faced Honeycomb Sandwich			
13	Fiberglass			
14	7075 Al. Alloy	QQA250/13	T6	0.050
15	7075 Al. Alloy	QQA250/13	T6	0.050
16	7075 Al. Alloy	QQA/13	T6	0.032
17	2024 Al. Alloy	QQA250/5	T3	0.040
18	2024 Al. Alloy	QQA250/5	T3	0.040
19	Fiberglass			
20	2024 Al. Alloy	QQA250/5		0.050
21	7075 Al. Alloy	QQA250/13	T6	0.032
22	7075 Al. Alloy	QQA250/13	T6	0.032
23	7075 Al. Alloy	QQA250/13	T6	0.032

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Figure 2-93. Tailboom and Elevator Skins (Sheet 2 of 2)

(5) Deteriorated or missing chafing strips.

b. Inspect tailboom skin.

(1) Wrinkles and buckled areas. No damage of this type is allowable.

(2) Popped and cocked rivets. No damage of this type is allowable.

(3) Holes through skin. Limits for holes and tears in skin are the same as for cracks. Refer to following step.

(4) Cracks in skin. Identify cracks less than **3.0** inches in length for repair by stop drilling and application of a lay-on patch. Identify cracks over **3.0** inches in depth for repair by installation of a filler plate and backing patch of like material and gage.

(5) Surface scratches, dents and nicks. Disregard this type damage if dents are smooth contour, there is no evidence of cracks and no other damage to adjoining structure or rivets can be detected. If it appears that damage could progress into a crack, classify it as a crack. Refer to step (4).

(6) Corrosion damage severe enough to affect function of tailboom skin is cause to replace tailboom. Refer to paragraph 2-10 for corrosion treatment information.

2-292. REPAIR — TAILBOOM SHEET METAL PANELS AND SKINS.

a. Repair tailboom skins. Refer to paragraph 2-27.

(1) Replace loose, missing or cocked rivets if no other structural damage is present.

(2) Repair cracks, holes and tears less than three inches in length as follows:

(a) Stop drill cracks.

(b) Smooth out edges of holes and tears.

(c) Apply a lay-on patch of like material. See figure 2-93. Install a minimum of four rivets on each side of patch. Install rivets using same rivet spacing as skin being repaired. Refer to TM 55-1500-204-25/1 for standard repair instructions.

(3) Repair cracks, holes and tears more than 3.0 inches in length.

(a) Remove all the damaged skin and fabricate a filler plate of the same material as the skin to match the hole in the skin. Fabricate a backing patch of the same material. See figure 2-93.

(b) Rivet filler plate and backing patch in place. Refer to TM 55-1500-204-25/1 for standard repair instructions.

(4) Repair corrosion damage.

(a) Polish out minor corrosion damage.

(b) Apply chemical film (C31) to bare aluminum surfaces.

(c) Prime repaired area with primer (C89).

(d) Touch up paint to match surrounding area. Refer to TB746-93-2 for general painting instructions.

b. Repair tailboom panels and fairings.

(1) Repair minor cracks. Refer to TM 55-1500-204-25/1.

(2) Polish out minor corrosion on aluminum parts. Apply chemical film (C31) to bare metal surfaces. Touch up with primer (C89) and paint to match surrounding area.

(3) Replace missing and unserviceable turnlock fasteners, hinges and screws.

(4) Replace panels and fairings that are deformed to the degree that they do not fit when installed.

(5) Replace deteriorated or missing chafing strips.

2-293. INSTALLATION — TAILBOOM SHEET METAL PANELS AND SKINS.

a. Position panels on tailboom and engage fasteners.

b. Position skins on tailboom and install fasteners.

2-294. TAILBOOM STRUCTURAL MEMBERS.

2-295. DESCRIPTION — TAILBOOM STRUCTURAL MEMBERS.

The tailboom structure consists primarily of bulkheads, longerons, and stringers (figure 2-94).

2-296. REMOVAL — TAILBOOM STRUCTURAL MEMBERS.

Remove skins, panels, and/or fairings to gain access and remove structural members as applicable (figure 2-94).

2-297. INSPECTION — TAILBOOM STRUCTURAL MEMBERS.

a. Inspection. Inspect tailboom structure (such as; stringers, bulkheads, longerons, channels, and fittings) for defects (paragraph 2-25).

(1) Cracks. No cracks are allowed in tailboom structural members.

(2) Distortion. No distortion is allowed in tailboom structural members.

(3) Corrosion. Corrosion damage severe enough to affect function of a tailboom structural member is cause to replace the tailboom.

b. Inspect longeron attach fittings between boom stations 41.37 and 70.00. Nicks, scratches, and gouges may be polished with fine India stone (C116) provided they do not exceed following limitations.

(1) Axial damage (parallel to bolt axis) must not exceed **0.020** inch in depth or **3.00** inches in length.

(2) Radial damage (perpendicular to bolt axis) must not exceed **0.010** inch in depth or **3.00** inches in length.

(3) Nicks, scratches or gouges are not allowed within one diameter of bolt hole, longeron splice rivets or within **0.250** inch of end of longeron at splice.

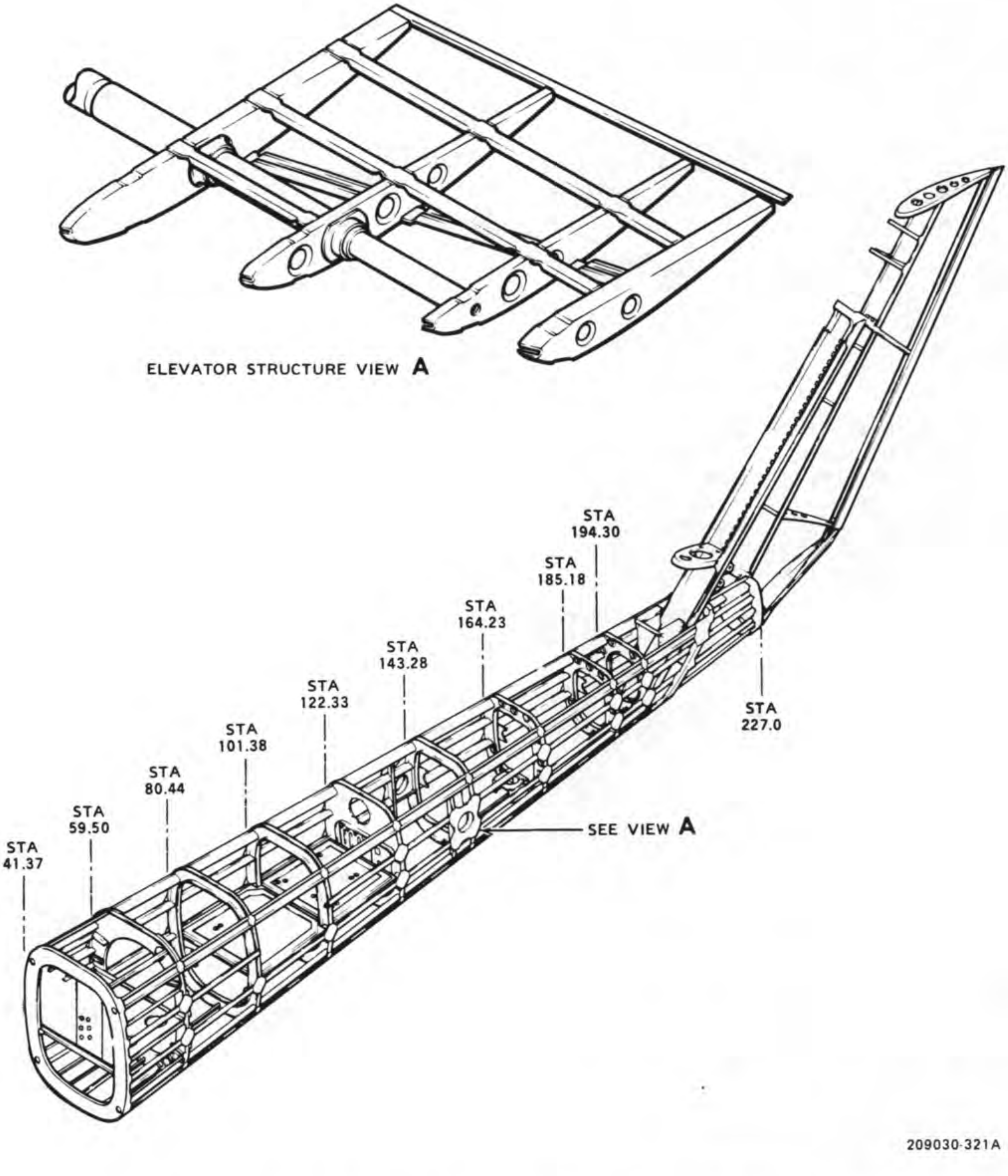


Figure 2-94. Tailboom and Synchronized Elevator — Structure

WARNING

Any cracks to the longeron attach fittings forward of boom station 70.00, or damage exceeding the above limitations, require the part to be replaced by depot maintenance.

(4) **Turnlock Fastener Replacement — Vertical Fin.** Replace turnlock receptacles, located on vertical fin, with less than **0.025** inch material remaining in stud pin slot.

2-298. REPAIR — TAILBOOM STRUCTURAL MEMBERS.

Refer to paragraphs 2-29, 2-30, 2-31, and 2-32.

NOTE

Repair is limited to repair of minor scratches, corrosion and replacement of loose or missing hardware. If damage such as cracking or other damage that requires use of jigs and fixtures to repair is incurred, forward tailboom to depot maintenance.

a. Cracks and damage resulting in distortion of structural members is not repairable. Replace tailboom.

b. Cracks or other damage that does not result in distortion of structural members may be repairable.

c. **Corrosion.** Use fine India stone (C116) to polish out minor corrosion damage to structural members. Apply chemical film (C31) to bare metal. Prime repair area with primer (C88 or C91).

2-299. INSTALLATION — TAILBOOM STRUCTURAL MEMBERS.

Install structural members and skins, panels, fairings as applicable (figure 2-94).

2-300. TAILBOOM ACCESS COVERS AND DOORS.

2-301. DESCRIPTION — TAILBOOM ACCESS COVERS AND DOORS.

The access covers and doors of the tailboom are shown in figure 2-90. They include tail rotor driveshaft covers, intermediate gearbox cover, and electrical access doors.

2-302. REMOVAL — TAILBOOM ACCESS COVERS AND DOORS.

a. Remove fasteners and/or hinges to remove tailboom doors as applicable (figure 2-90).

b. Remove fasteners and/or hinges to remove access covers on tailboom as applicable (figure 2-90).

2-303. INSPECTION — TAILBOOM ACCESS COVERS AND DOORS.

Refer to paragraph 2-25 for inspection.

2-304. CLEANING — TAILBOOM ACCESS COVERS AND DOORS.

Refer to TM 55-1500-204-25/1 for cleaning requirements.

2-305. REPAIR — TAILBOOM ACCESS COVERS AND DOORS.

Refer to paragraph 2-28 for repair.

2-306. INSTALLATION — TAILBOOM ACCESS COVERS AND DOORS.

a. Install tailboom doors with fasteners and/or hinges as applicable (figure 2-90).

b. Install tailboom covers with fasteners and/or hinges as applicable (figure 2-90).

2-307. PAINTING — TAILBOOM ACCESS COVERS AND DOORS.

Refer to TB746-93-2 for general painting instructions.

2-308. TAIL ROTOR DRIVESHAFT ACCESS DOORS.

2-309. DESCRIPTION — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

The tail rotor driveshaft access doors consist of three hinged door sections made from aluminum alloy. The first two sections are installed between the front of the tailboom and the intermediate gearbox. The third section is installed between the aft end of the intermediate gearbox and the tail rotor gearbox on the vertical fin (figure 2-90).

2-310. REMOVAL — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

a. Open fasteners and door sections between front of tailboom and gearbox. Remove hinges and door sections.

b. Open fasteners and door section on vertical fin. Remove hinge and door section.

2-311. INSPECTION — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

Refer to paragraph 2-25 for inspection.

2-312. CLEANING — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

Refer to TM 55-1500-204-25/1 for cleaning requirements.

2-313. REPAIR — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

Refer to paragraph 2-33 for repair.

2-314. INSPECTION — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

a. Install hinges and door sections between the front of tailboom and gearbox. Close door and secure fasteners (figure 2-90).

b. Install hinge and door section on vertical fin. Close door and secure fasteners.

2-315. PAINTING — TAIL ROTOR DRIVESHAFT ACCESS DOORS.

Refer to TB746-93-2 for general painting instructions.

2-316. TAILBOOM SKID.

2-317. DESCRIPTION — TAILBOOM SKID.

The tailboom skid is located at the aft end of the tailboom. The purpose of the tail skid is to warn the pilot of a tail-low attitude when landing.

WARNING

It is possible to install the wrong tailboom skid. Helicopters coded P require lead shot ballast in the skid tube. If skid is to be replaced, ensure old and new parts have identical part numbers.

CAUTION

Ground handling forces should not exceed 450 pounds (vertical direction) and 150 pounds (horizontal direction).

2-318. REMOVAL — TAILBOOM SKID.

a. Remove taillight and access covers (1, figure 2-95) on aft end of tailboom.

b. Remove nut (8), washer (7), and bolt (6) that attach forward end of skid to tailboom. Remove screws (4), and support block (3).

c. Pull tail skid aft out through hole at boom station 227 with packing (5). Discard packing.

2-319. INSPECTION — TAILBOOM SKID.

a. Scratches and Nicks. Minor surface scratches and nicks are negligible and do not require repair. Slight scratches and nicks require polishing out. Replace tail skid if very deep scratches or nicks are present.

b. Dents. Smooth dents up to **0.0625** inch deep are negligible and do not require repair. Replace tail skid if dents deeper than **0.0625** inch are present.

c. Cracks. No cracks allowed. Replace tail skid if any cracks are present.

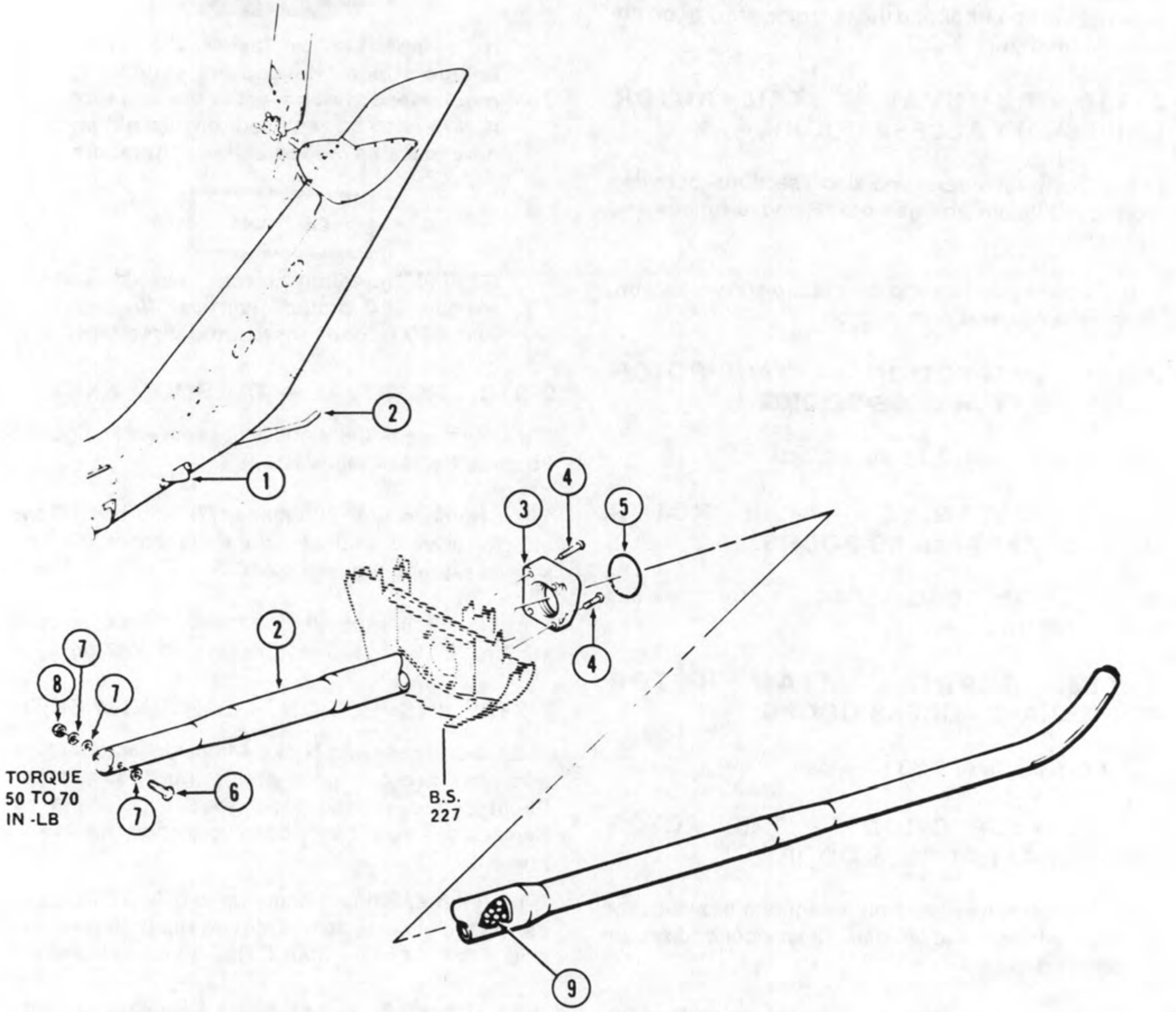
d. Deformity. Replace tail skid if deformed (bent) to the degree that it can be detected visually.

e. Loose Attachment to Tailboom. Determine cause for loose attachment.

f. Insufficient Lead Shot. P Ensure tailboom skid tube is completely filled with lead shot (C109).

2-320. REPAIR — TAILBOOM SKID.

a. Polish out slight scratches and nicks. If complete clean up of damage results in removal of enough material to weaken the tail skid, replace the



1. Taillight and access cover (2)
2. Tailskid
3. Support block
4. Screw (4)
5. Packing
6. Bolt
7. Washer
8. Nut
9. P Lead shot

Figure 2-95. Tailskid — Installation

tail skid. Apply primer (C88 or C91) to bare metal surfaces and touch up paint to match surrounding surfaces. Refer to TB746-93-2 for general painting instructions.

b. Replace tail skids that are cracked, deformed, or have dents in excess of **0.0625** inch limit.

2-321. INSTALLATION — TAILBOOM SKID.

a. **P** Ensure that tail skid is completely filled with lead shot (C109) (approximately **15.6** pounds). Do not pack lead shot.

NOTE

Space washers (7, figure 2-95) so that tail skid (2) is centered, and to prevent buckling of the brace on which tail skid is installed.

b. Position tail skid through hole at boom station 227.0. Install bolt (6), washer (7) and nut (8) to secure forward end of tail skid to tailboom. Torque nut **50 TO 70** inch pounds.

c. Install support block (3), packing (5) and screws (4).

d. Install access covers and tail light (1) on left and right side of tailboom.

2-322. FIN BALLAST INSTALLATION.

2-323. DESCRIPTION — BALLAST.

Temporary lead ballast weights are available for installation on the tailboom. Weights to be installed will be determined by weight and balance requirements.

2-324. REMOVAL — BALLAST INSTALLATION.

a. Remove tail light and access covers (6, figure 2-96) on tailboom.

b. Remove bolts (2), washers (1), and ballast weights (3 and 4) as applicable.

2-325. INSTALLATION — BALLAST INSTALLATION.

a. Determine ballast weights to be installed as required by weight and balance computations.

b. Install ballast weights (3, 4 and 8, figure 2-96), washers (1) and secure with bolts (6). **E** **M** Install ballast weight (8), using washers (9) and bolts (10).

c. Install taillights and access cover (6) on tailboom.

2-326. SYNCHRONIZED ELEVATORS.

2-327. DESCRIPTION — SYNCHRONIZED ELEVATORS.

The synchronized elevator consists of the right and left elevators, horn, supports and attaching parts. See figure 2-97. The horn is mounted inside the tailboom in supports which act as bearings and permit rotational movement of the horn. The synchronized elevator control linkage from the swashplate is attached to the horn and controls rotational movement. The two elevators are mounted on the horn. Their position is determined by rotational movement of the horn.

2-328. REMOVAL — SYNCHRONIZED ELEVATORS.

a. Remove bolt (2, figure 2-97) and washer (3). Slide elevator (1) outboard until elevator tubular spar is clear of horn (11).

b. Remove opposite elevator in same manner.

2-329. INSPECTION — SYNCHRONIZED ELEVATORS.

a. Minor scratches on the elevator skins are negligible if no crack damage is involved.

b. Cracks, tears, holes, and nicks within the following limits are repairable. Replace part if damage exceeds limits.

(1) Cracks in elevator skin are repairable by patching if they do not exceed **6.0** inches.

(2) Holes and tears and cracks in elevator skins are repairable by cutting out damaged area and patching with insert plate and backup plate when the repaired area is not over **3.0** inches in diameter.

(3) No damage to tubular elevator spar (17, figure 2-97) allowed.

(4) Nicks in elevator trailing edge that are less than **0.025** inch deep are acceptable if polished out.

(5) Inspect for correct drag on elevators (paragraph 11-144).

c. **Corrosion.** Inspect elevators for corrosion damage. Minor corrosion damage that does not exceed **0.005** inch in depth is repairable. Maximum allowable corroded area is **4.0** square inches in a single area or **20** percent of the elevator skin area.

d. Refer to paragraph 11-161 for inspection of horn (11), support assembly (8), and bracket (4).

2-330. CLEANING — SYNCHRONIZED ELEVATORS.

Refer to TM 55-1500-204-25/1 for cleaning requirements.

2-331. REPAIR — SYNCHRONIZED ELEVATORS.

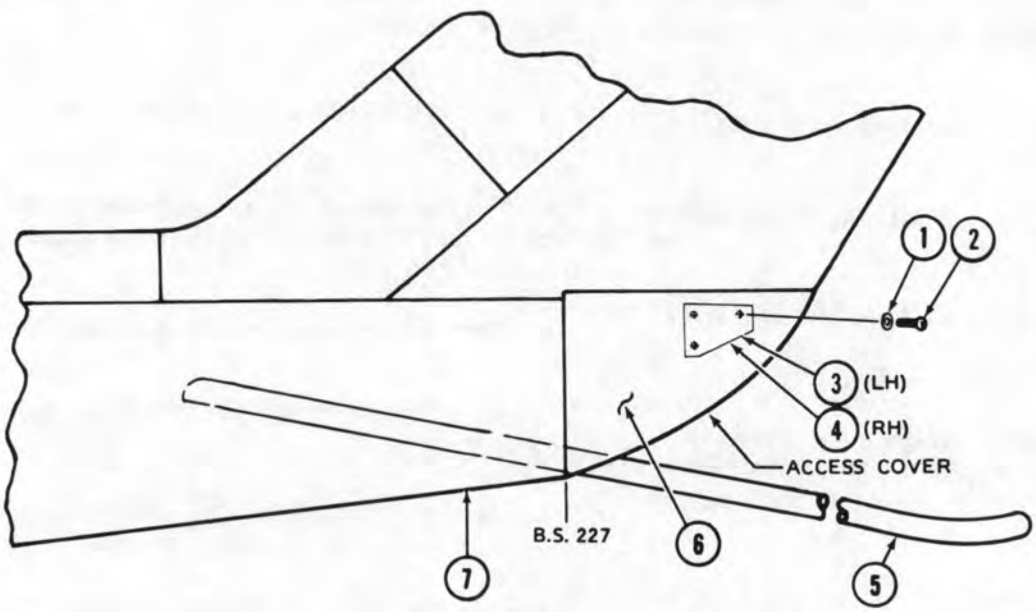
a. Polish out minor scratch damage on elevators. Apply primer (C88 or C91) and touch up paint to match adjacent area.

b. Repair elevators with crack damage that is within limits for patch repairs.

(1) Stop drill each end of crack.

(2) Ensure that tubular spar inside elevator has not been damaged.

(3) Fabricate a patch from the same material as the skin. See figure 2-93 for description of elevator skin. Install patch in accordance with standard instructions in TM 55-1500-204-25/1.



P LEFT SIDE VIEW

THE 209-033-839-1 AND 209-033-840-1 WEIGHTS TO BE TRIMMED TO OBTAIN A COMBINED WEIGHT OF 21.0 PLUS OR MINUS 0.2 POUNDS, EXCLUDING ATTACHING HARDWARE.

1. Washer (AN960PD416)
2. Bolt (AN4-13)
3. Ballast (209-033-839-1) (LH)
4. Ballast (209-033-840-1) (RH)
5. Tailskid (with lead shot)
6. Access cover
7. Tailboom

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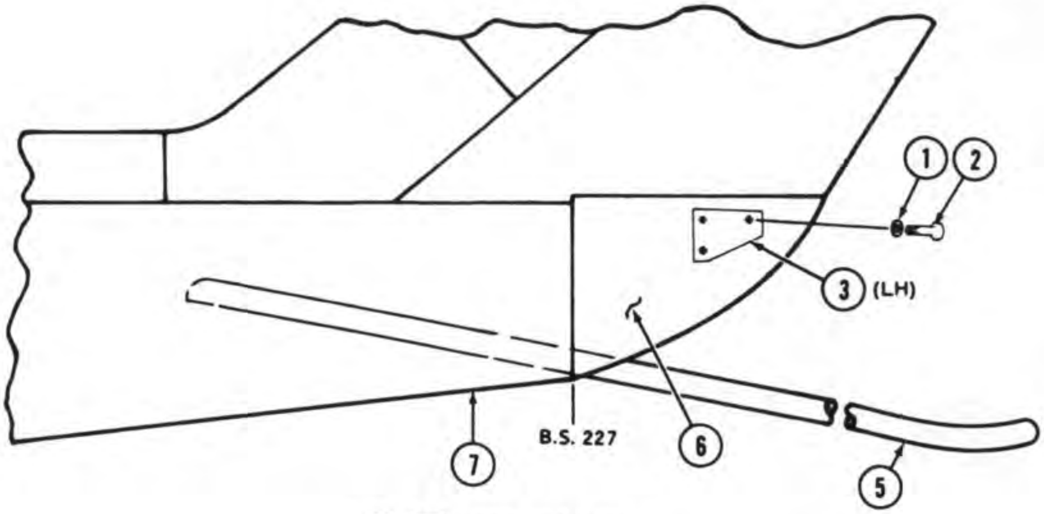
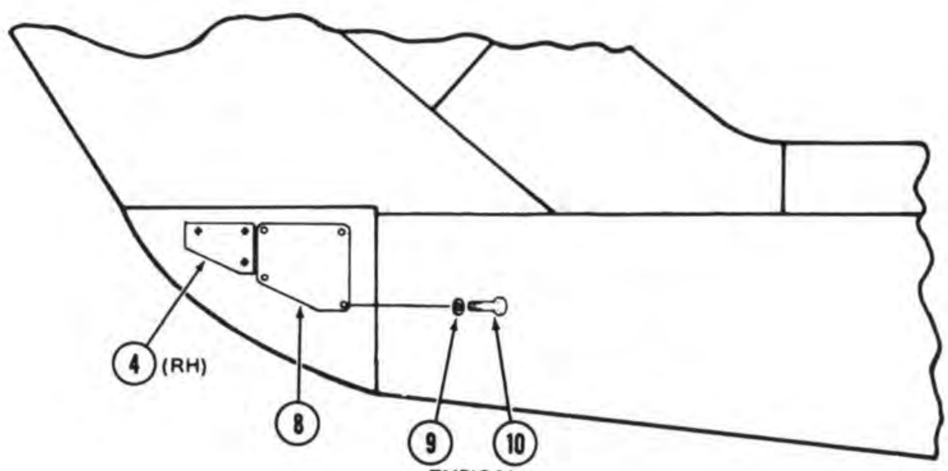
Figure 2-96. Aft Ballast — Installation (Sheet 1 of 2)



E M LEFT SIDE VIEW



E M RIGHT SIDE VIEW

NOTES.

1. Weights P/N 209-033-839-101, 209-033-840-101, and 209-033-841-1 are trimmed to a combined weight of 62.0 ± 0.2 pounds at time of installation.

2. The exact required combined weight of the weights listed above is determined when weight and balance is computed.

1. Washer (AN960PD416)
2. Bolt (AN4-13)
3. Ballast (209-033-839-101 (LH)
4. Ballast (209-033-840-101 (RH)
5. Tailskid (no lead shot)
6. Access cover
7. Tailboom
8. Ballast (209-033-841-1) (RH)
9. Washer (AN960-416L)
10. Bolt (AN4-14)

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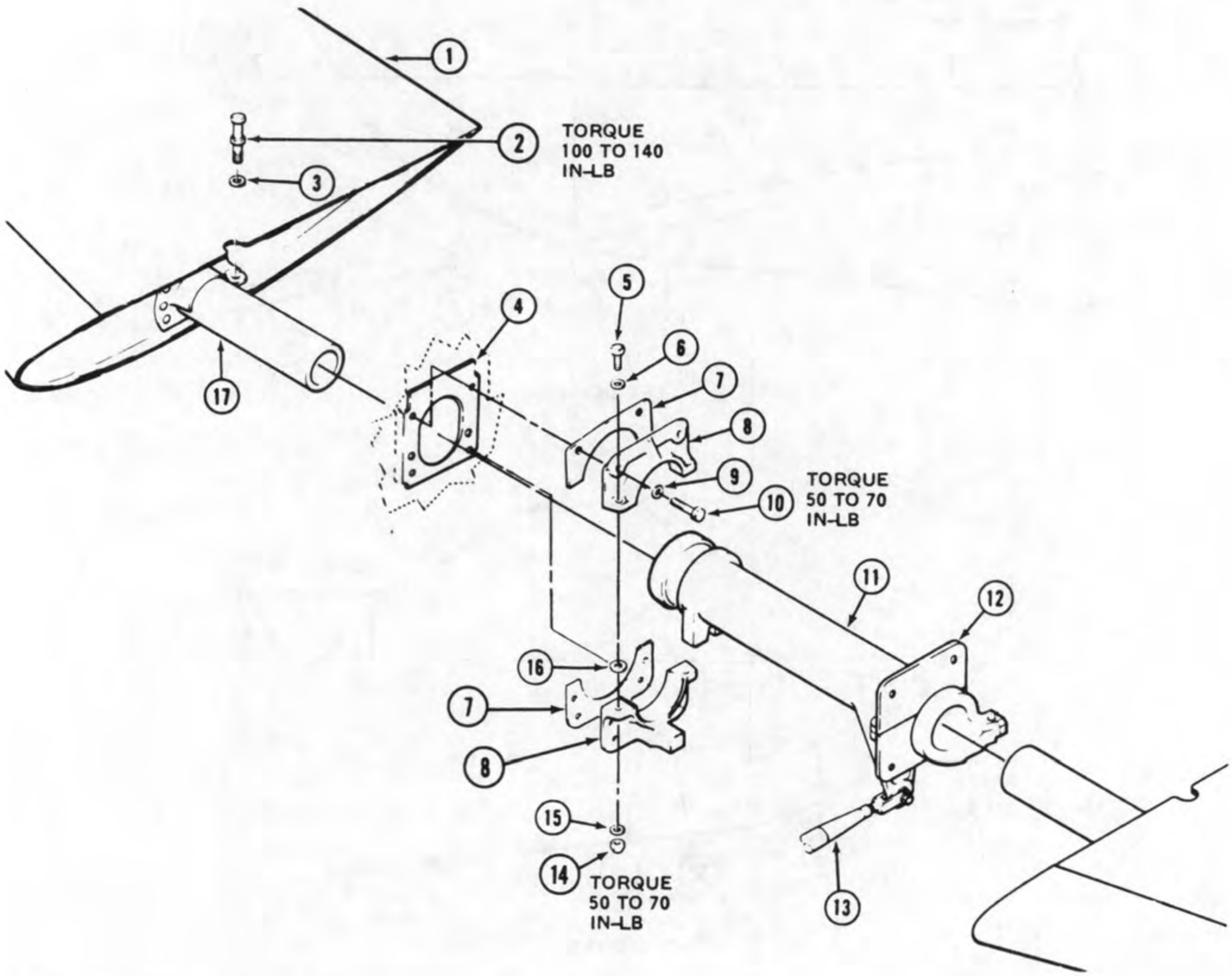
Figure 2-96. Aft Ballast — Installation (Sheet 2 of 2)



1. Elevator
2. Retaining bolt
3. Washer
4. Tailboom bracket (mounted on fuselage)
5. Screw
6. Aluminum washer
7. Shim set (upper and lower)
8. Support assembly (upper and lower)
9. Aluminum washer
10. Bolt
11. Horn
12. Support assembly (upper and lower)
13. Control tube
14. Nut
15. Aluminum washer
16. Shim (laminated)
17. Elevator spar

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Figure 2-97. Synchronized Elevators — Installation

c. Repair holes and tears that are within **3.0** inch diameter limit.

(1) Cut out the damaged area. Ensure that tubular spar inside elevator has not been damaged.

(2) Fabricate a filler plate to fit the cutout prepared in the preceding step from the same material as the skin. See figure 2-93 for description of elevator skin. Fabricate backup patch from the same material to use with filler plate. Install filler plate and backup patch in accordance with standard instructions in TM 55-1500-204-25/1.

d. Repair minor corrosion damage on elevators. Polish out corrosion and apply chemical film treatment (C31). Apply primer (C88 or C91). Touch up paint on elevators to match adjacent area. Refer to TB 746-93-2 for general painting instructions.

2-332. INSTALLATION — SYNCHRONIZED ELEVATORS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

a. Clean the inside part of the horn (11, figure 2-97) that mates with the tabular spars (17) of the elevators. Also clean tabular spars. If there is any zinc chromate or similar material in mating surfaces, clean down to bare metal with MEK (C74) and clean cheesecloth (C30). Do not use excess MEK or allow it to saturate the tabular spar as it may remove the solid film lubricant. Allow the MEK to dry.

b. Apply a thin coat of compound (C43) or (C44) to the surfaces of horn (11) contacted by the elevator spars.

c. Position elevator tubular spar (17) in horn (11).

d. Install bolt (2) and washer (3). Torque bolt **100 TO 140** inch-pounds.

e. Check rigging of elevator. Refer to paragraph 11-138.

2-333. ADJUSTMENT — SYNCHRONIZED ELEVATORS.

Refer to paragraph 11-138 for adjustment procedures.

2-334. PAINTING — SYNCHRONIZED ELEVATORS.

Refer to TB 746-93-2 for general painting instructions.

SECTION IV. WING

2-335. WING ASSEMBLY.

2-336. DESCRIPTION — WING ASSEMBLY.

Stub wings, mounted on the fuselage, supply additional lift and provide mounting accommodations for weapons pylons. The structure is built up with aluminum alloy spars and ribs covered with sheet aluminum skin. Each wing is attached to fuselage fittings with attaching bolts. Four removable panels allow access to internal provisions.

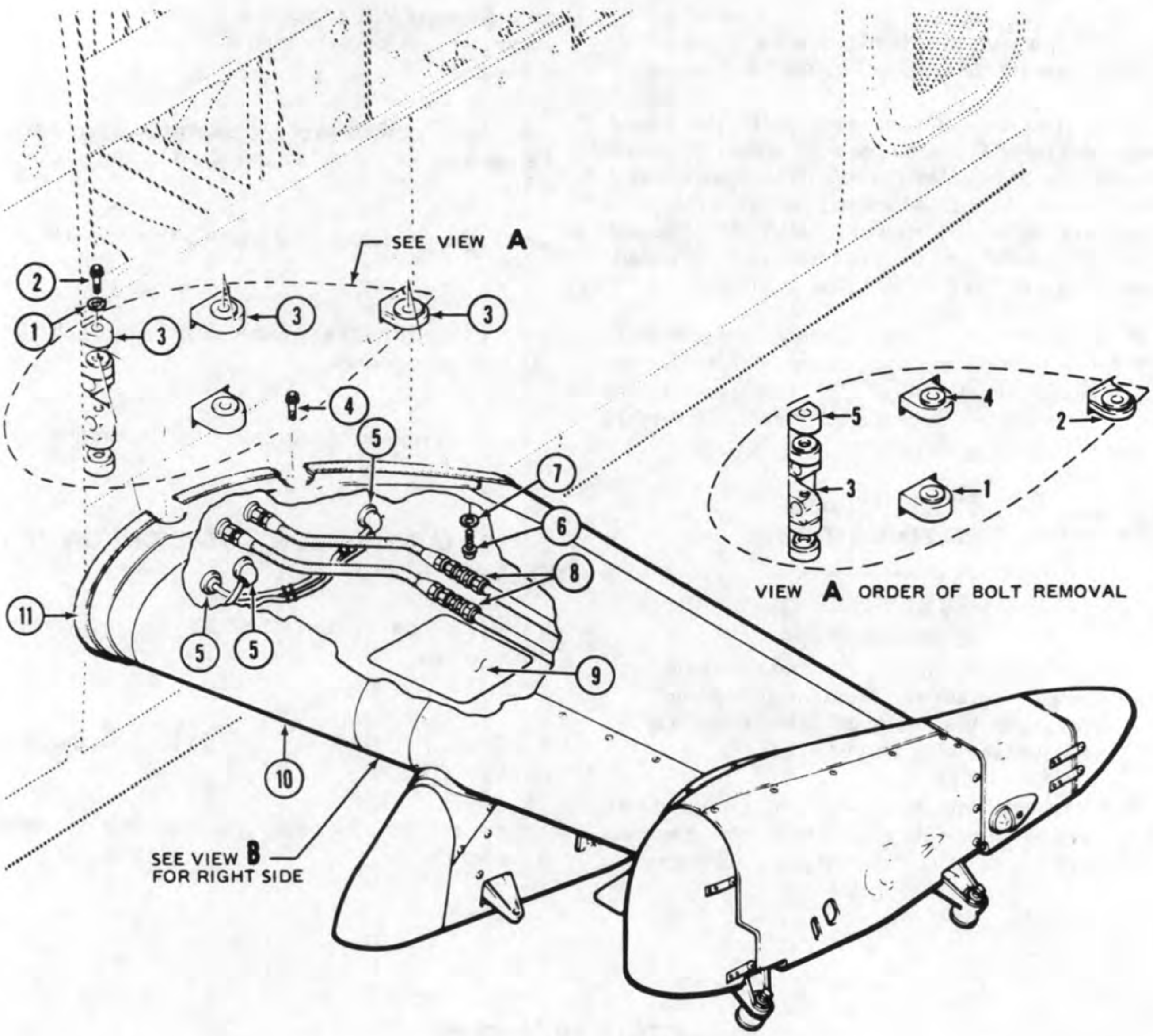
2-337. REMOVAL — WING ASSEMBLY.

NOTE

The removal procedure is the same for both wings.

a. Remove external stores from weapon pylon, if installed. Refer to chapter 16.

b. Remove lower access panel (9, figure 2-98) on each wing.



1. Washer
2. Bolt
3. Fitting
4. Bolt
5. Electrical connectors
6. Bolt
7. Washer
8. Hydraulic connections
9. Access panel
10. Wing
11. Bumper
12. Washer
13. Bolt
14. Wing mooring fitting
15. Barrel nuts
16. Washer

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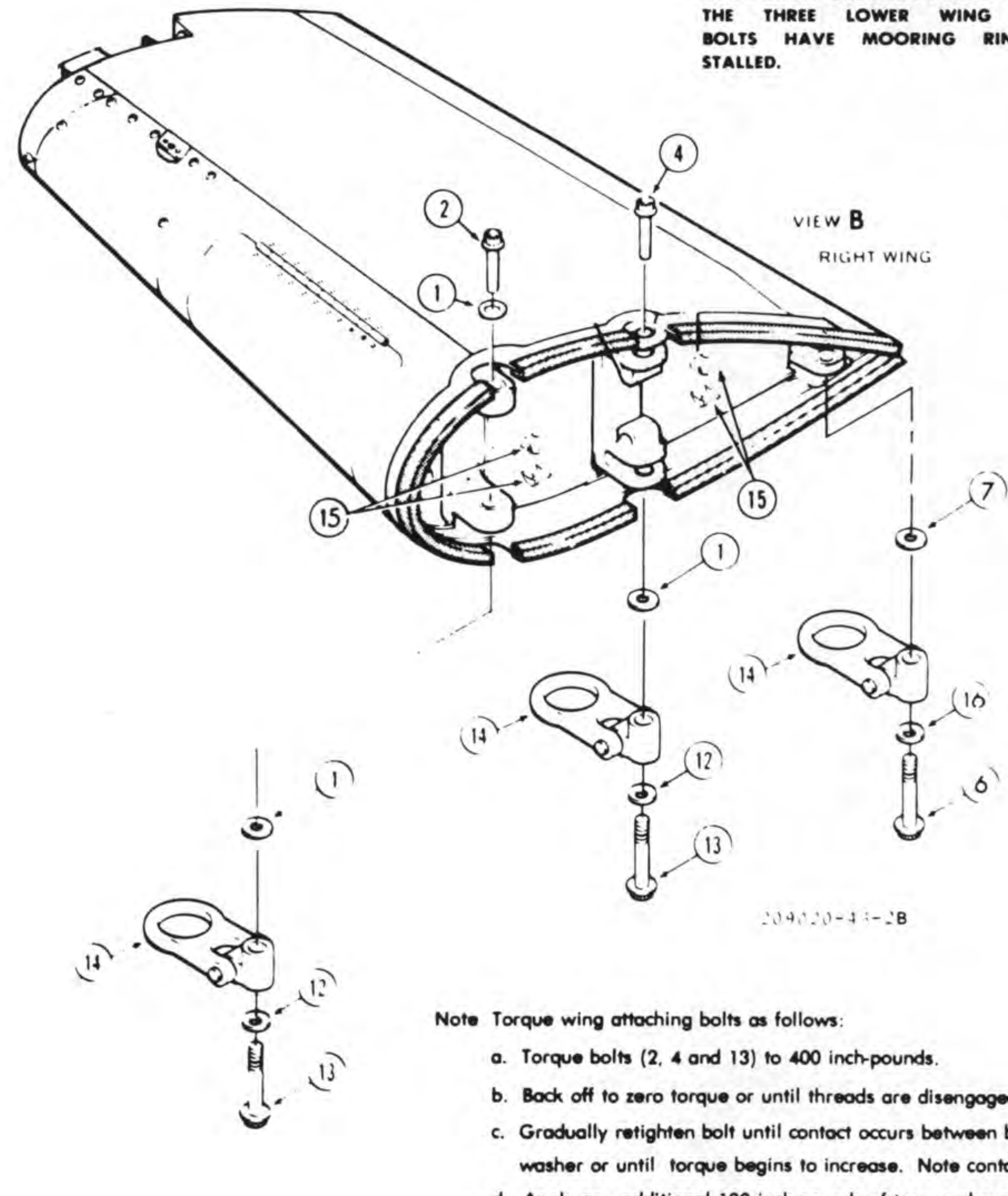
Figure 2-98. Wing Assembly — Installation (Sheet 1 of 2)

ONE MOORING FITTING IS INSTALLED AT THE CENTER WING ATTACH BOLT ON PEM 76-22567 THRU 78-23186. ON M 79-23187 AND SUBSEQUENT, ALSO PEM 76-22567 THRU 78-23186, AFTER MWO 55-1520-244-30-3 EACH OF THE THREE LOWER WING ATTACH BOLTS HAVE MOORING RINGS INSTALLED.



Note Torque wing attaching bolts as follows:

a. Torque bolts (2, 4 and 13) to 400 inch-pounds.

b. Back off to zero torque or until threads are disengaged.

c. Gradually retighten bolt until contact occurs between bolt head and washer or until torque begins to increase. Note contact torque level.

d. Apply an additional 100 inch-pounds of torque above the contact torque to insure a snug fit. Total torque not to exceed 450 inch-pounds.

e. Torque aft bolt (6) **80 TO 100** inch-pounds.

Figure 2-98 Wing Assembly — Installation (Sheet 2 of 2)

c. Disconnect two pylon hydraulic connections (8) in each wing. Cap all open lines.

CAUTION

Support wings to prevent bolts from binding. Remove bolts in sequence as shown in figure 2-98, view A.

d. Remove five attachment bolts and separate wing from fuselage.

e. Disconnect electrical connectors (5) between wing root and fuselage.

2-338. INSPECTION — WING ASSEMBLY.

a. Inspect wing skins, access doors, and leading and trailing edge of fairing. Refer to table 2-5.

Table 2-5. WING Classification of Damage

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
WING; SKIN, ACCESS DOORS, COVERS, AND LEADING AND TRAILING EDGE FAIRINGS	Dents, nicks, scratches, and gouges.	Small smooth dents, nicks, scratches, and gouges that do not exceed 0.005 inch after polishing out.	Damage exceeding negligible limits can be patched if patching limits are not exceeded.	
	Corrosion		Minor surface corrosion can be polished out and area refinished.	Corrosion other than minor surface type requires replacement of wing.
	Sharp dents, holes, and cracks or nicks, scratches and gouges which exceed negligible limits.		Damage to skin not exceeding 1.25 inches long and not involving damage to wing structure can be repaired by patching (figure 2-101).	Damage exceeding repairable limits requires replacement of wing.
	Wrinkled skin			Replace wing if skin is wrinkled to the degree that internal structure is involved.
WING; SPARS, RIBS, AND OTHER INTERNAL STRUCTURE	Dents, nicks, scratches and gouges.	Small smooth dents, and minor nicks, scratches, and gouges which will not affect strength.		Damage which exceeds negligible requires replacement of wing.
	Cracks, holes or other damage.			Any cracks, hole or other damage to wing internal structure requires replacement of wing.

Table 2-5. WING Classification of Damage (Cont)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
WING BUMPERS	Cuts, debonding, or deterioration.			Bumpers damaged enough to affect function will be replaced.

b. Inspect wing bumper (11, figure 2-98) for cuts, tears, deterioration and debonding which would affect its function.

c. Inspect wing fitting bushing and corresponding bushings on pylon structure for damage and wear beyond limits shown on figure 2-99.

2-339. REPAIR — WING ASSEMBLY.

a. Repair damage to skin that is within repairable limits. See figures 2-100 through 2-102 for typical repairs. Wing materials are shown on figure 2-103.

b. Repair damage to leading and trailing edge fairings that is within repairable limits. See figure 2-104 for typical repair.

c. Replace damaged bumpers (11, figure 2-98).

(1) Remove wing if not previously accomplished.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(2) Remove defective bumper with plastic scraper. Clean remaining particles with MEK (C74) or naphtha (C75). Wipe area dry with clean cloth.

(3) Sand mating surfaces of bumper and metal with 180 grit sandpaper (C102).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(4) Clean sanded area with MEK (C74) or naphtha (C75). Dry with a clean cloth.

(5) Apply an even coat of adhesive (C12) to bond surfaces of bumper and metal.

(6) Allow adhesive to air dry 10 to 15 minutes at 70 TO 80 degrees F (21 TO 27 degrees C) or until tacky to touch. Apply second coat of adhesive in same manner.

(7) Install bumper on wing. Roll bumper to expel air from bond area. Air cure adhesive for a minimum of four hours.

2-340. PAINTING — WING ASSEMBLY.

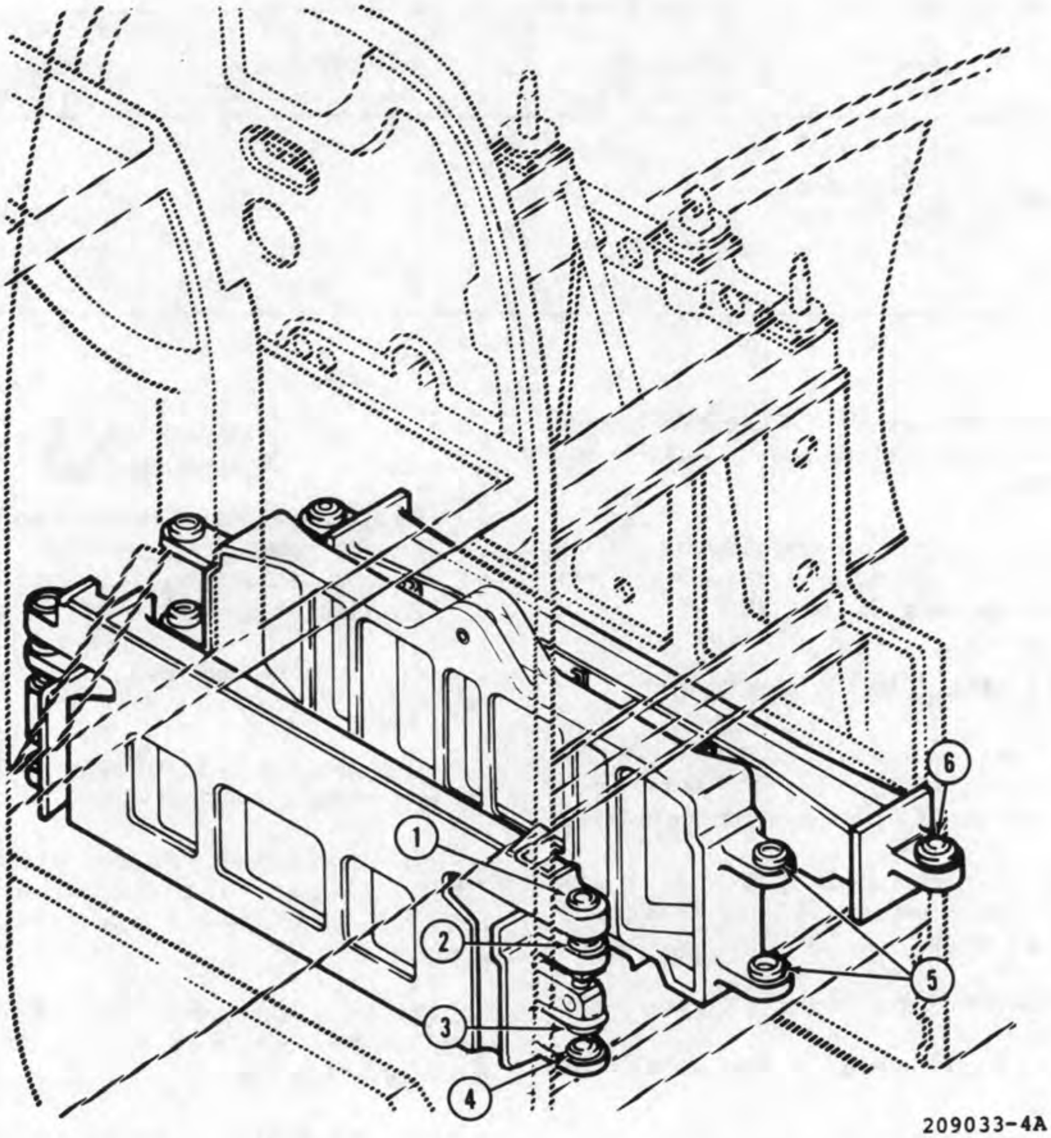
Paint repairs on wing to match surrounding area. Refer to TB746-93-2 for general painting instructions.

2-341. INSTALLATION — WING ASSEMBLY.

NOTE

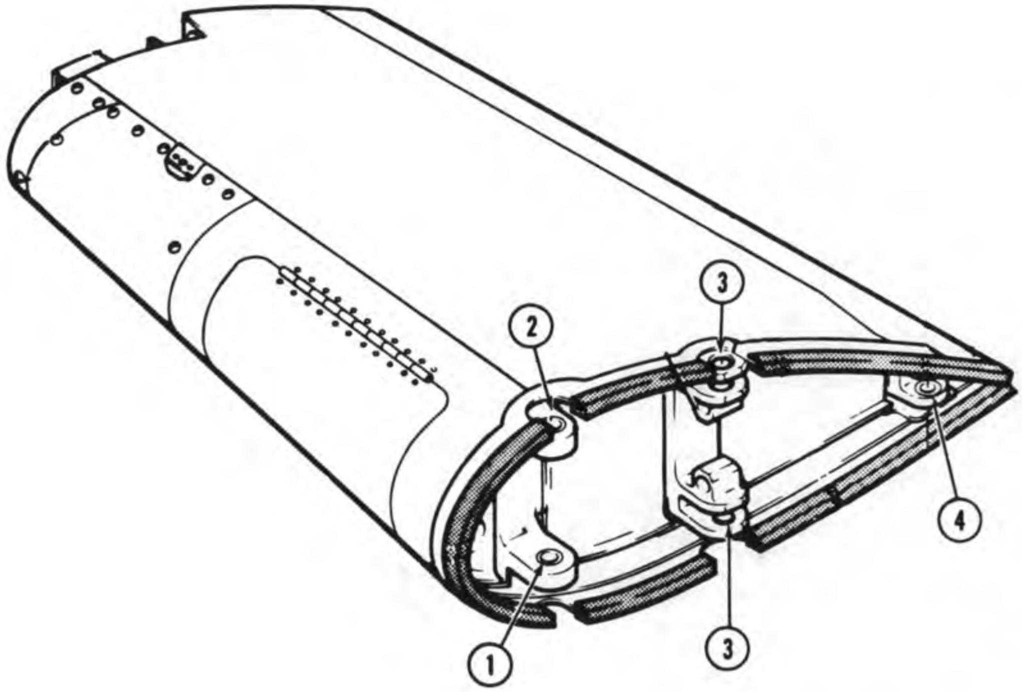
Installation procedure is the same for both wings.

a. Install and align barrel nuts in fittings.



ITEM	NOMENCLATURE	PART NUMBER	MAXIMUM INSIDE DIAMETER
1	BUSHINGS	209-032-167-7	0.6260
2	BUSHINGS	209-032-167-9	0.6260
3	BUSHING	209-032-167-3	0.6260
4	BUSHINGS	209-032-167-5	0.6260
5	BUSHINGS	209-032-167-1	0.6260
6	BUSHINGS	209-030-319-1	0.3775

Figure 2-99. Wing Bushings — Limits Chart (Sheet 1 of 2)



ITEM	NOMENCLATURE	PART NUMBER	MAXIMUM INSIDE DIAMETER
1	BUSHING	209-032-166-1	0.6260
2	BUSHING	209-032-166-3	0.6260
3	BUSHING	209-032-166-5	0.6260
4	BUSHING	21-009-11-12	0.3775

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Figure 2-99. Wing Bushings — Limits Chart (Sheet 2 of 2)

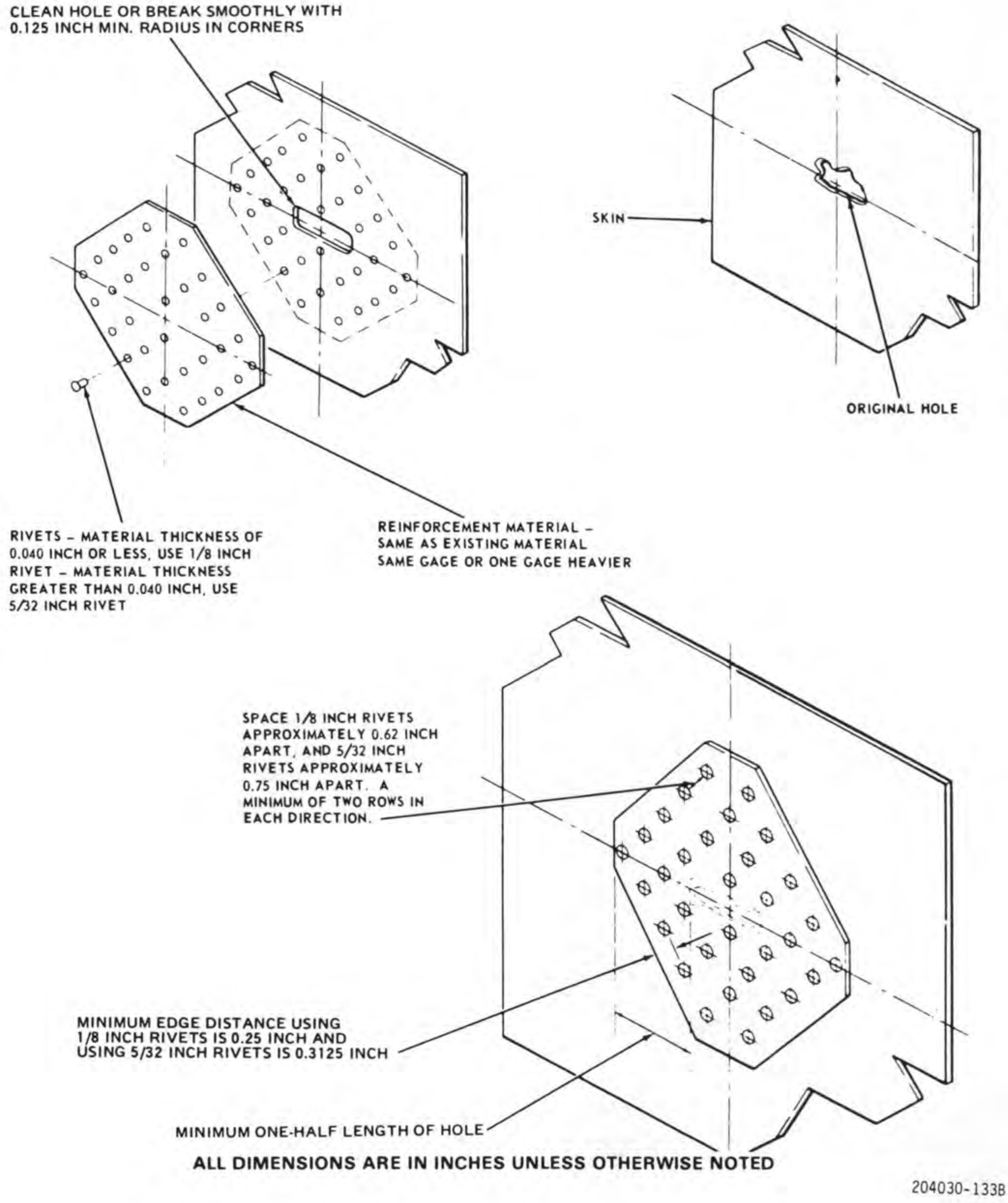
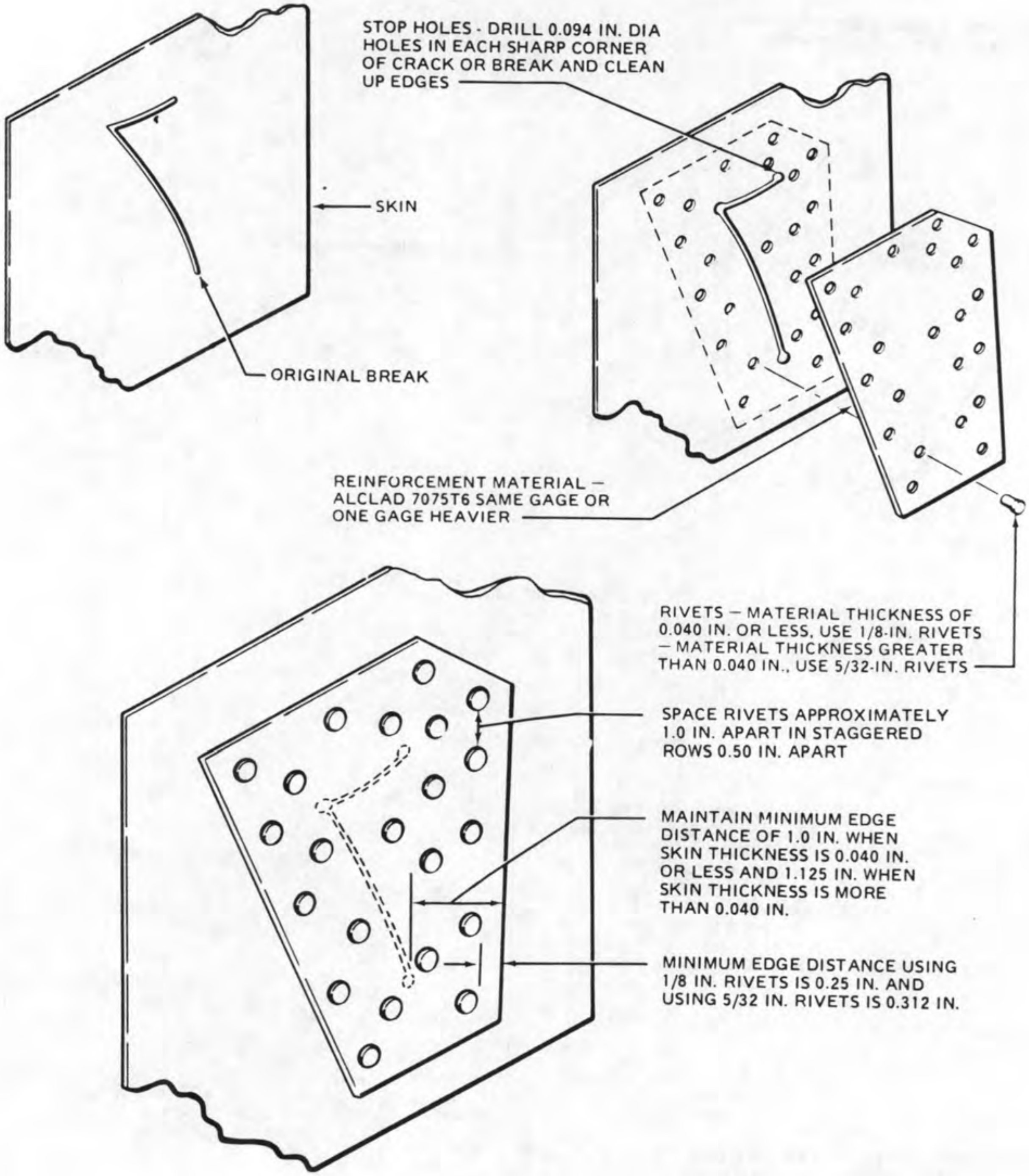


Figure 2-100. Wing Skin Repair (External Hole)



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-101. Wing Skin Repair (External Crack)

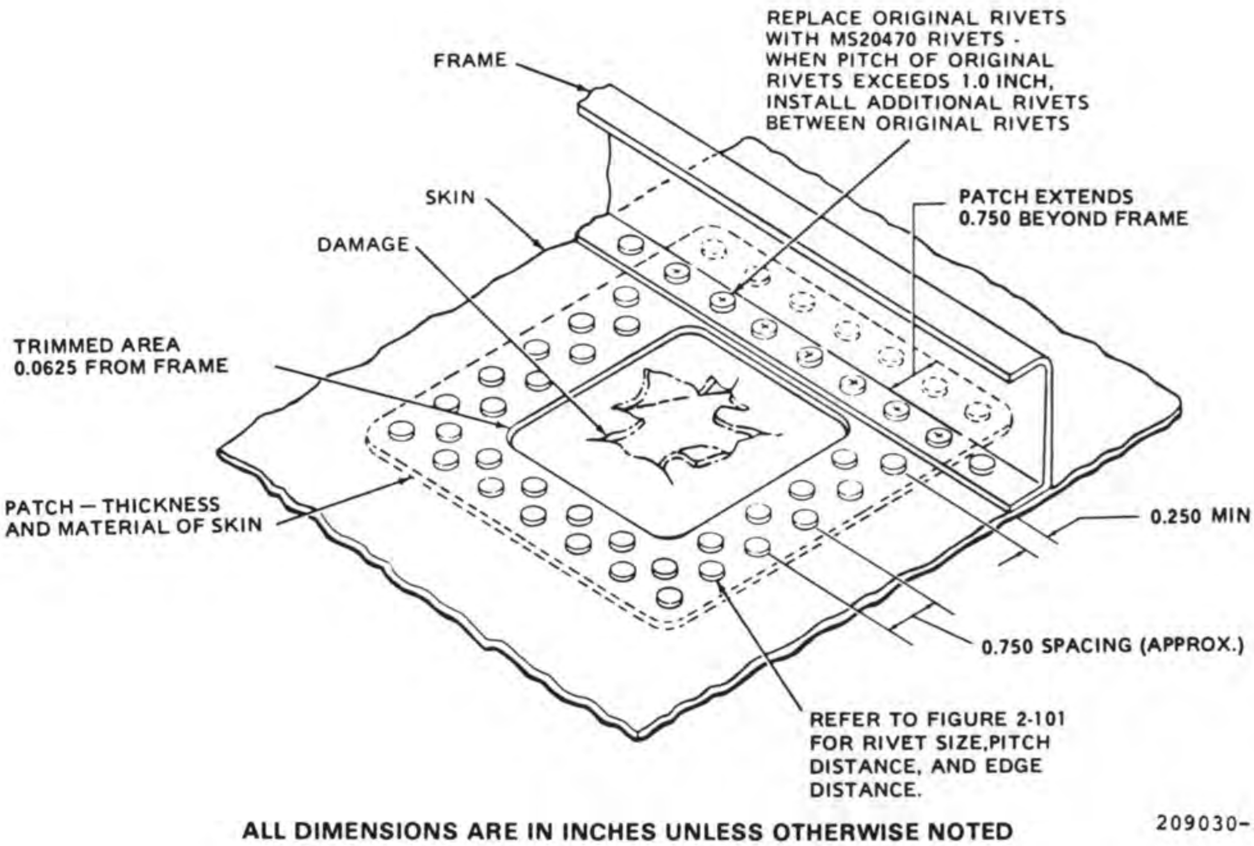
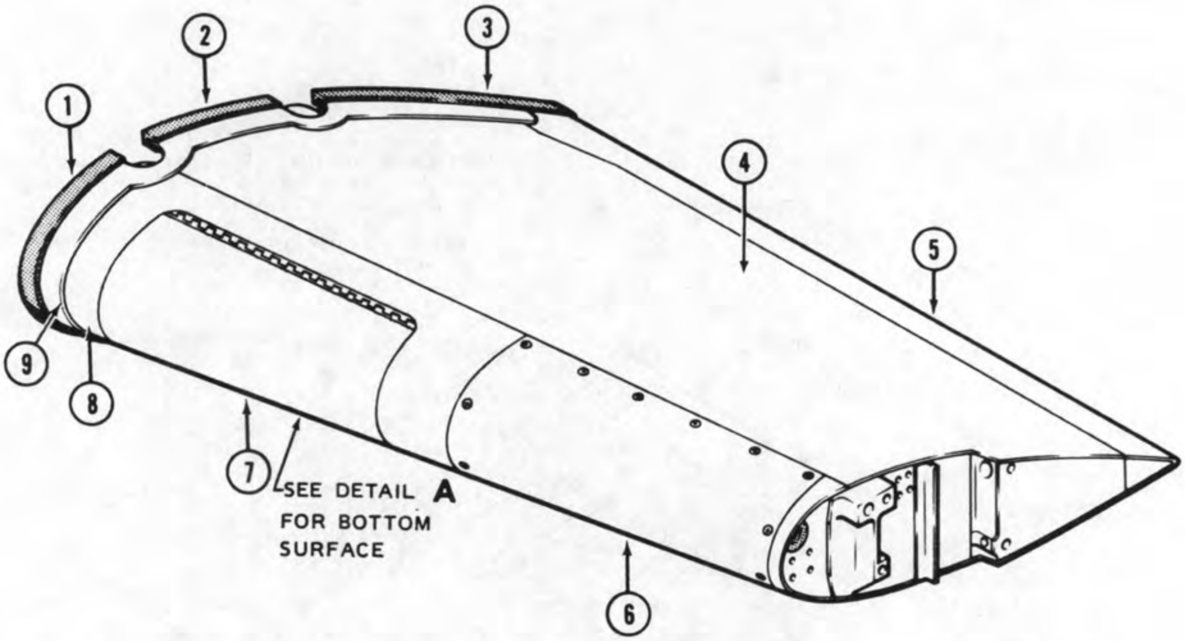
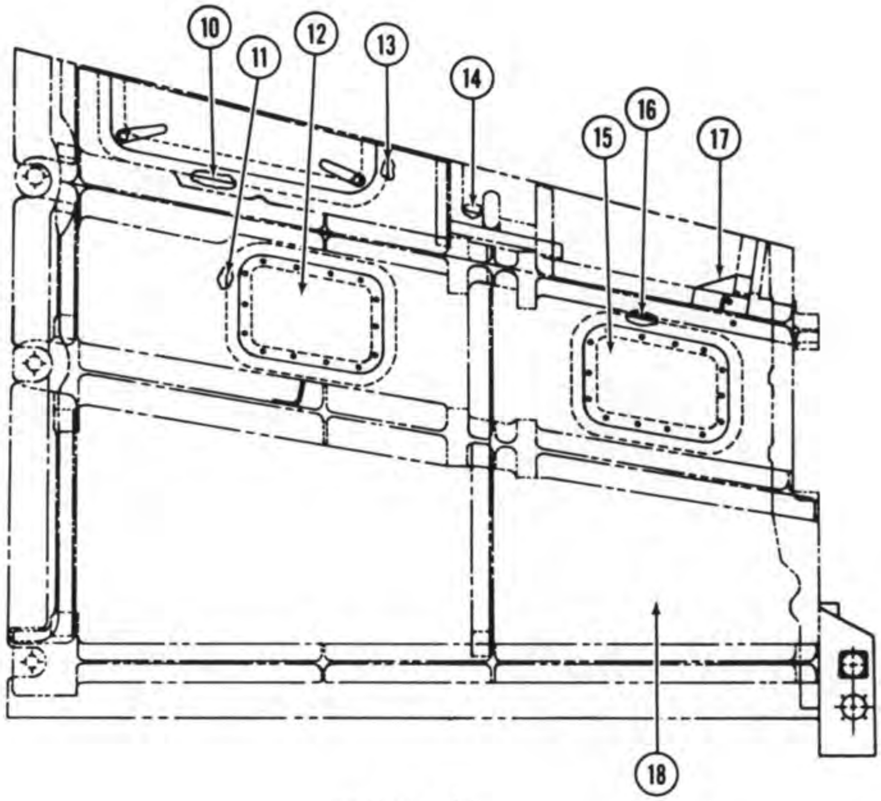


Figure 2-102. Wing Skin Repair (Close to Frame, Spar, or Ribs)



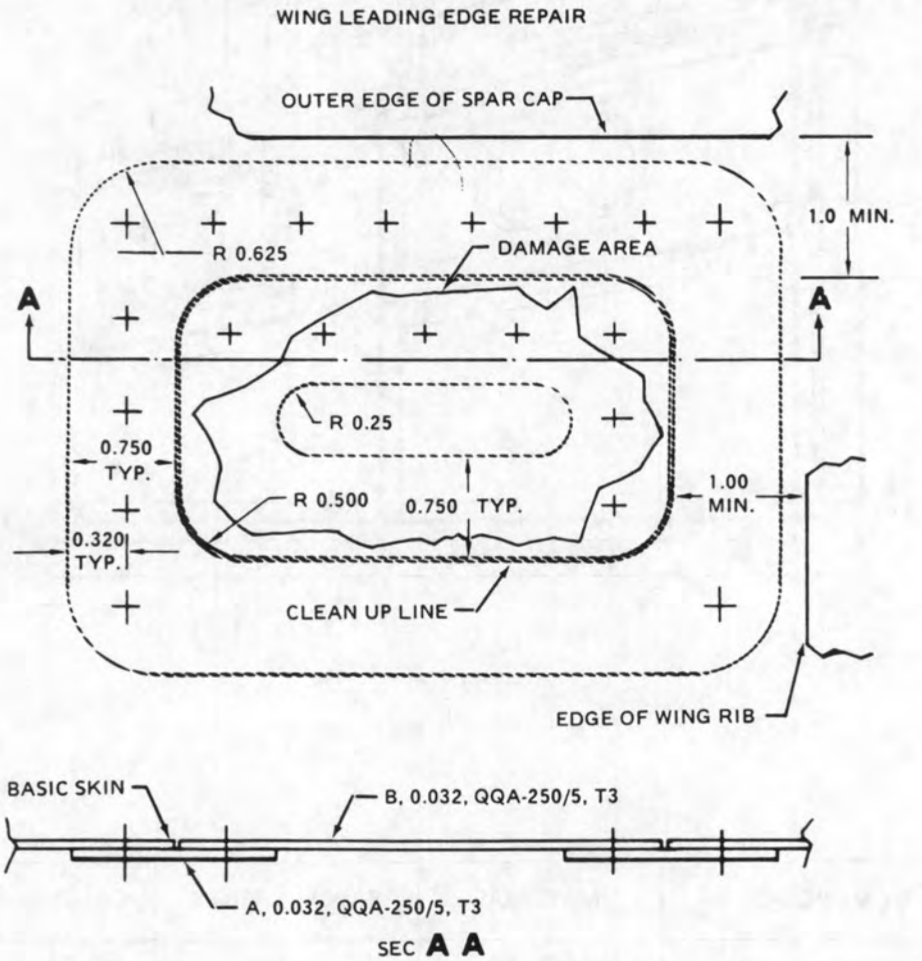
INDEX NO.	NOMENCLATURE	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
1	Bumper	Rubber synthetic extruded	MIL-R-6855, Class 3, Grade 60		
2	Bumper	Same	Same		
3	Bumper	Same	Same		
4	Skin, upper	7075 Al. alloy	QQ-A-250/13	T6	0.063
5	Fairing, aft	2024 Al. alloy	QQ-A-250/5	T3	0.032
6	Cover	2024 Al. alloy	QQ-A-250/5	T3	0.032
7	Cover	2024 Al. alloy	QQ-A-250/5	T3	0.032
8	Fairing	2024 Al. alloy	QQ-A-250/5	T3	0.032
9	Closure	2024 Al. alloy	QQ-A-250/5	T3	0.040

Figure 2-103. Wing Skins, Fairings, Covers, Doors (Sheet 1 of 2)



INDEX NO.	NOMENCLATURE	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
10	Double	2024 Al. alloy	QQ-A-250/5	T3	0.020
11	Doubler	7075 Al. alloy	QQ-A-250/13	T6	0.063
12	Door	7075 Al. alloy	QQ-A-250/13	T6	0.063
13	Doubler	2024 Al. alloy	QQ-A-250/5	T3	0.032
14	Doubler	2024 Al. alloy	QQ-A-250/5	T3	0.040
15	Door	7075 Al. alloy	QQ-A-250/13	T6	0.063
16	Doubler	7075 Al. alloy	QQ-A-250/13	T6	0.063
17	Doubler	2024 Al. alloy	QQ-A-250/5	T3	0.032
18	Skin, lower	7075 Al. alloy	QQ-A-250/13	T6	0.063

Figure 2-103. Wing Skins, Fairings, Covers, Doors (Sheet 2 of 2)



NOTE

1. Clean up damage area.
2. Install plates A and B with MS20470AD4 rivet at 6D spacing.
3. If patch is installed in blind area, NAS1738B4 cherry blind rivets may be used.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-104. Wing Fairing Repair (Leading — Trailing Edge)

b. Connect and lockwire electrical connectors (5, figure 2-98).

c. After MWO 55-1520-244-30-3, mount wing in fuselage fittings and install bolts. Tighten wing attach bolts.

(1) Torque bolts (2, 4, and 13) **400** inch-pounds.

(2) Back off to zero torque or until threads are disengaged.

(3) Gradually retighten bolts until contact occurs between bolthead and washer or until torque begins to increase. Note contact torque level.

(4) Apply an additional **100** inch-pounds of torque above the contact torque to ensure a snug fit, but do not exceed **450** inch-pounds torque.

(5) Torque aft bolt (6) **80** to **100** inch-pounds.

c.1. Before MWO 55-1520-244-30-3, mount wing in fuselage fittings and install bolts. Tighten wing attach bolts. Torque bolts (2, 4, and 13) **100 TO 150** inch-pounds, and aft bolt **80 TO 100** inch-pounds.

d. Remove caps from hydraulic connections (8) and connect.

e. Install lower access panel (9).

f. Attach weapons pylon to wing, if required. Refer to Installation — Outboard Ejection Rack and Installation — Inboard Ejector Rack, chapter 16.

g. Perform functional check of hydraulically actuated articulated pylon and all electrical circuits in the wing (chapters 7, 9, 16).

2-342. WING ACCESS COVERS AND DOORS.

2-343. DESCRIPTION — WING ACCESS COVERS AND DOORS.

To provide access to internal provisions in the wing two doors are on the wing lower skin and two covers are in the wing leading edge fairing. The inboard leading edge cover is hinged at the top and secured at the bottom with two turnlock fasteners. Doors and covers are made of aluminum alloy.

2-344. REMOVAL — WING ACCESS COVERS AND DOORS.

a. To remove doors (12 and 15, figure 2-103) and cover (6), remove attaching screws and remove door or cover.

b. To remove cover (7), release fasteners at bottom of cover, remove hinge pin and remove cover.

2-345. INSPECTION — WING ACCESS COVERS AND DOORS.

Inspect covers and doors for damage. (Refer to table 2-5.)

2-346. CLEANING — WING ACCESS COVERS AND DOORS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

a. Clean covers and doors with solvent (C112).

b. Dry with clean dry cloths.

2-347. REPAIR — ACCESS COVERS AND DOORS.

a. Repair doors on bottom skin using skin repair procedures in figures 2-98, 2-100, 2-102, 2-103 and 2-104.

b. Repair covers on leading edge using fairing repair procedures in figures 2-98, 2-100, 2-102, 2-103 and 2-104.

c. Replace hinge half on cover (7, figure 2-103) on mating hinge half on wing using rivets of same type. Use rivets of same diameter or one size larger.

2-348. INSTALLATION — ACCESS COVERS AND DOORS.

a. Position doors (12 and 15, figure 2-103) and cover (6) in place and install attaching screws.

b. Position cover (7) to align hinge half on cover with hinge half on wing, install hinge pin. Secure fasteners at bottom of cover.

2-349. PAINTING — ACCESS COVERS AND DOORS.

Paint covers and doors to match surrounding area. Refer to TB746-93-2 for general painting instructions.

2-350. WING PYLON INSTALLATIONS.

2-351. DESCRIPTION — WING PYLON INSTALLATIONS.

The wing pylon consists of an inboard and outboard ejector rack each enclosed in an aerodynamic shaped fiberglass fairing. Refer to paragraph 16-40 for maintenance instruction on the ejector rack fairings.

SECTION V. DELETED

2-352. DELETED.

All data on pages 2-259 through 2-282 including figure 2-105, sheets 1 through 24, deleted.

CHAPTER 3

LANDING GEAR

SECTION I. LANDING GEAR

3-1. LANDING GEAR ASSEMBLY.

3-2. DESCRIPTION — LANDING GEAR ASSEMBLY.

The landing gear assembly (figure 3-1) consists of two skid tubes and two arched crosstubes of formed aluminum alloy, fastened together with skid saddles and attaching hardware. The assembly is attached to the lower fuselage structure with support assemblies at four points. The crosstubes extending from the fuselage are enclosed with thermoplastic fairings which are streamlined to reduce aerodynamic drag. The lower fuselage openings are covered with aluminum alloy covers. Eyebolts are mounted on the skid tubes to accommodate ground handling wheels. To prevent damage from contact with the ground, replaceable steel skid shoes attach to the bottom side of the skid tubes.

Premaintenance Requirements for Landing Gear

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	(S3) (S9)
Minimum Personnel Required	Three
Consumable Materials	(C36) (C38) (C74) (C75) (C98) (C105) (C116) (C106) (C91)
Special Environmental Conditions	None

3-3. REMOVAL — LANDING GEAR ASSEMBLY.

NOTE

The landing gear can be removed as a complete assembly, or skid tubes (15, figure 3-1) and crosstubes (7 and 17) can be removed separately.

a. Remove the complete landing gear as follows:

(1) Jack or hoist helicopter off floor. If using jacks, align legs of jacks to allow clearance for removing landing gear (paragraph 1-34 or 1-45).

(2) Remove step (22), fairing (21), seal (23). Remove screws (18 and 20) and cover (19). Remove aft cover (not illustrated) in the same manner.

(3) Support landing gear. Remove bolts (29 and 30), washers (28 and 31) and two forward support assemblies (32). Remove bolts (43 and 44), washers (42 and 45), and two aft support assemblies (46). Lower landing gear assembly to floor. Turn landing gear to clear jacks and slide clear of helicopter.

b. Remove one or both skid tubes (15) from crosstubes (7 and 17) as follows:

(1) Remove screws (3) and washers (2).

(2) Remove screws (4) and washers (5).

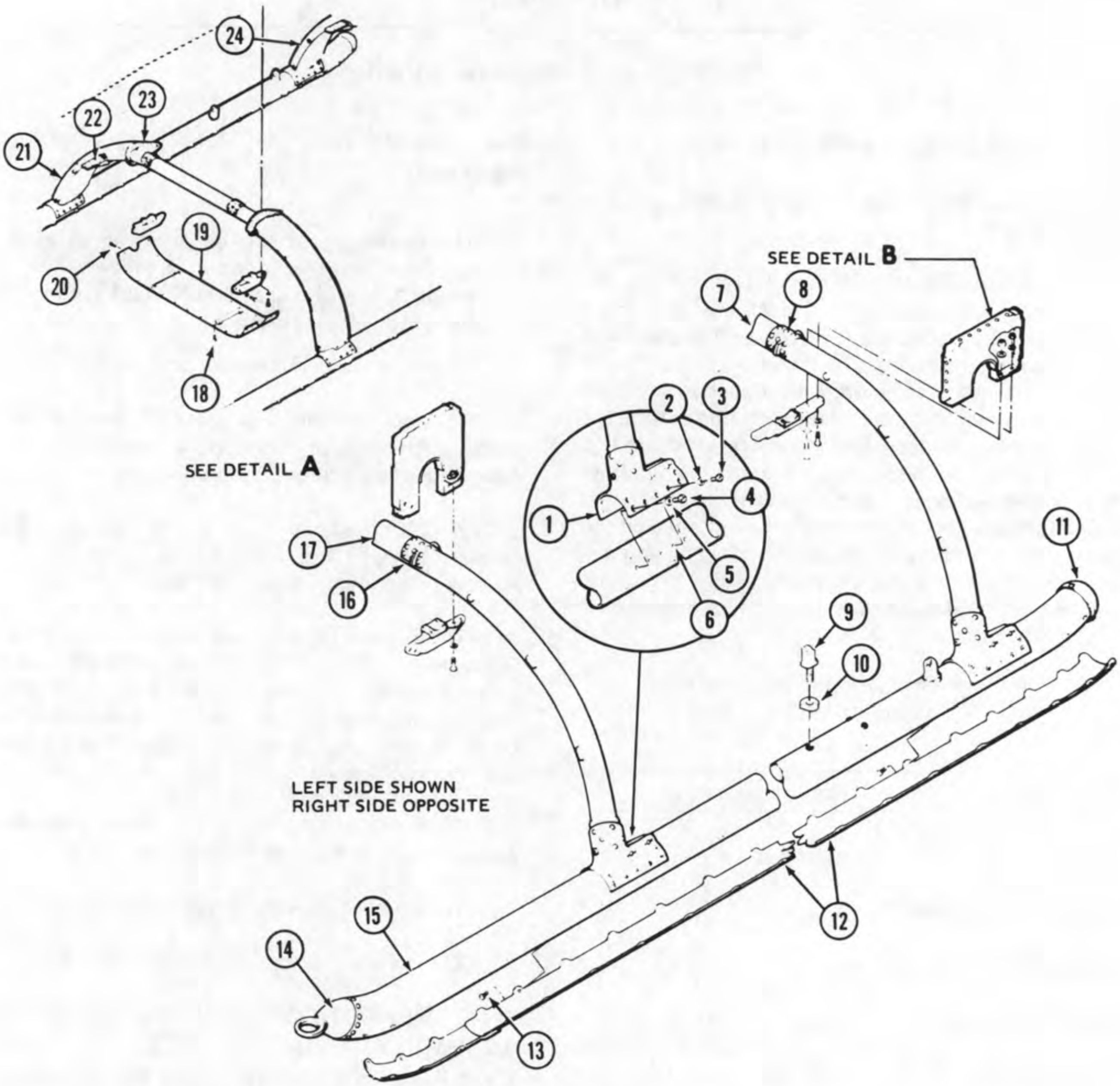
3-4. INSPECTION — LANDING GEAR ASSEMBLY.

a. Inspect skid tubes (15, figure 3-1) for damage. Refer to paragraph 3-16 for limits.

b. Inspect skid shoes (12) for damage. Refer to paragraph 3-22 for limits.

c. Inspect skid saddles (1) for damage. Refer to paragraph 3-28 for inspection procedure.

d. Inspect crosstubes (7 and 17) for damage and cracks. Refer to paragraphs 3-8 and 3-10 for limits and inspection procedure.



1. Skid saddle (2 places)
2. Washer
3. Screw
4. Screw
5. Washer
6. Nutplate
7. Aft crosstube
8. Retainer
9. Eyebolts
10. Washer
11. Skid cap
12. Skid shoes
13. Screw
14. Tow ring
15. Skid tube
16. Retainer
17. Forward crosstube
18. Screw
19. Forward cover (aft cover similar)
20. Screw
21. Crosstube fairing
22. Step
23. Fairing seal
24. Aft fairing

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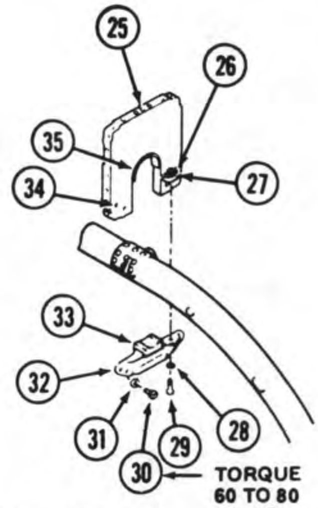
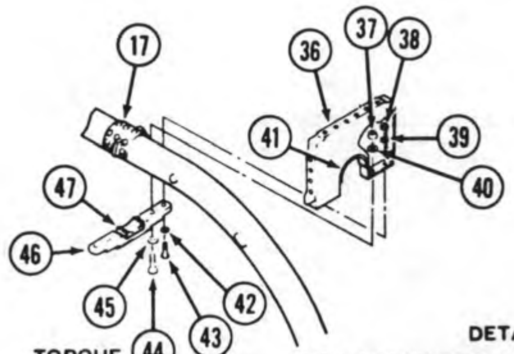
Figure 3-1. Landing Gear and Support Installation (Sheet 1 of 2)



DETAIL A

FORWARD CROSSTUBE SUPPORT, VIEW LOOKING INBOARD
LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE



DETAIL B

AFT CROSSTUBE SUPPORT, VIEW LOOKING INBOARD
LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

25. Forward crosstube support
26. Nutplate
27. Nutplate
28. Washer
29. Bolt
30. Bolt
31. Washer
32. Forward support assembly
33. Rubber bumper
34. Nutplate
35. Spacer
36. Aft crosstube support
37. Nut
38. Nut
39. Washer
40. Washer
41. Spacer
42. Washer
43. Bolt
44. Bolt
45. Washer
46. Aft support assembly
47. Rubber bumper

209050-21-2A

Figure 3-1. Landing Gear and Support Installation (Sheet 2 of 2)

e. Inspect crosstube fairings (21) for damage. Refer to paragraph 3-41 for inspection procedure.

f. Inspect tow rings (14) for damage. Refer to paragraph 3-35 for inspection procedure.

g. Inspect crosstube covers (19) and support assemblies (32 and 46) for damage. Refer to paragraph 3-48 for inspection procedure.

3-5. INSTALLATION — LANDING GEAR ASSEMBLY.

CAUTION

Do not interchange fore and aft crosstubes during installation. Refer to TM 55-1520-236-23P.

a. If not previously accomplished, assemble skid tubes (15, figure 3-1) and crosstubes (7 and 17) as follows:

(1) Apply a thin coat of sealing compound (C106) to mating surfaces of skid tube and crosstube saddle (1).

(2) Align saddle (1) on skid tube carefully to prevent damage to screw and rivnut threads. Maintain position of saddle on skid tube with "C" clamps if necessary.

(3) Using scaling compound (C106), install new screws (3 and 4) and washers (2 and 5).

b. Position landing gear in crosstube supports (25, figure 3-1). Ensure that both front retainers (16) properly engage both front supports (25). Maintain the landing gear in position. Position forward support assembly (32) on support (25). Install bolt (29) and washer (28); snug up to align holes for bolts (30). Install four bolts (30) and washers (31). Tighten bolts, but do not torque at this time.

c. Raise aft end of landing gear and ensure that both aft retainers (8) properly engage aft crosstube support (36). Maintain the landing gear in position. Position aft support assembly (46) on aft crosstube support (36). Install two bolts (44), washers (40 and 45), and nut (37). Install two bolts (43), washers (39 and 42), and nuts (38). Snug nuts, but do not torque at this time. Install opposite support assembly (46) in the same manner. Do not torque nuts at this time.

d. Toruqe bolts (30) **60 TO 80** inch-pounds. No further tightening of bolt (29) is necessary.

NOTE

Check for minimum of 0.020 inch gap betwen support bracket assembly at bolt (30) location and support of aircraft. This is to insure there is no preloaded shear stress on bolts (29).

e. Lower helicopter to ground.

f. Torque bolts (43 and 44) **70 TO 80** inch-pounds.

g. Install forward cover (19) with screws (18 and 20). Install aft cover in the same manner.

h. Align eyebolts (9) for installation of ground handling gear.

3-6. CROSSTUBES.

3-7. DESCRIPTION — CROSSTUBES.

The forward crosstube (17, figure 3-1) and aft crosstube (7) are made of formed aluminum alloy. The crosstubes are attached to the helicopter with two forward support assemblies (32) and two aft support assemblies (46).

3-8. INSPECTION — CROSSTUBES (CROSSTUBES INSTALLED ON HELICOPTER).

NOTE

Perform crosstube deflection inspection after a hard landing or overloading to determine whether crosstubes (7 and 17) have taken a permanent set with excessive spread.

a. Position helicopter on a smooth surface.

b. Raise helicopter off the surface with jacks, removing all weight from the landing gear (paragraph 1-34).

c. Level helicopter (paragraph 1-36).

d. Measure the distance between the crosstube retainers and divide that distance by 2 to determine helicopter centerline (figure 3-2).

e. Drop a plumb line from helicopter center line to ground or floor surface. Measure from

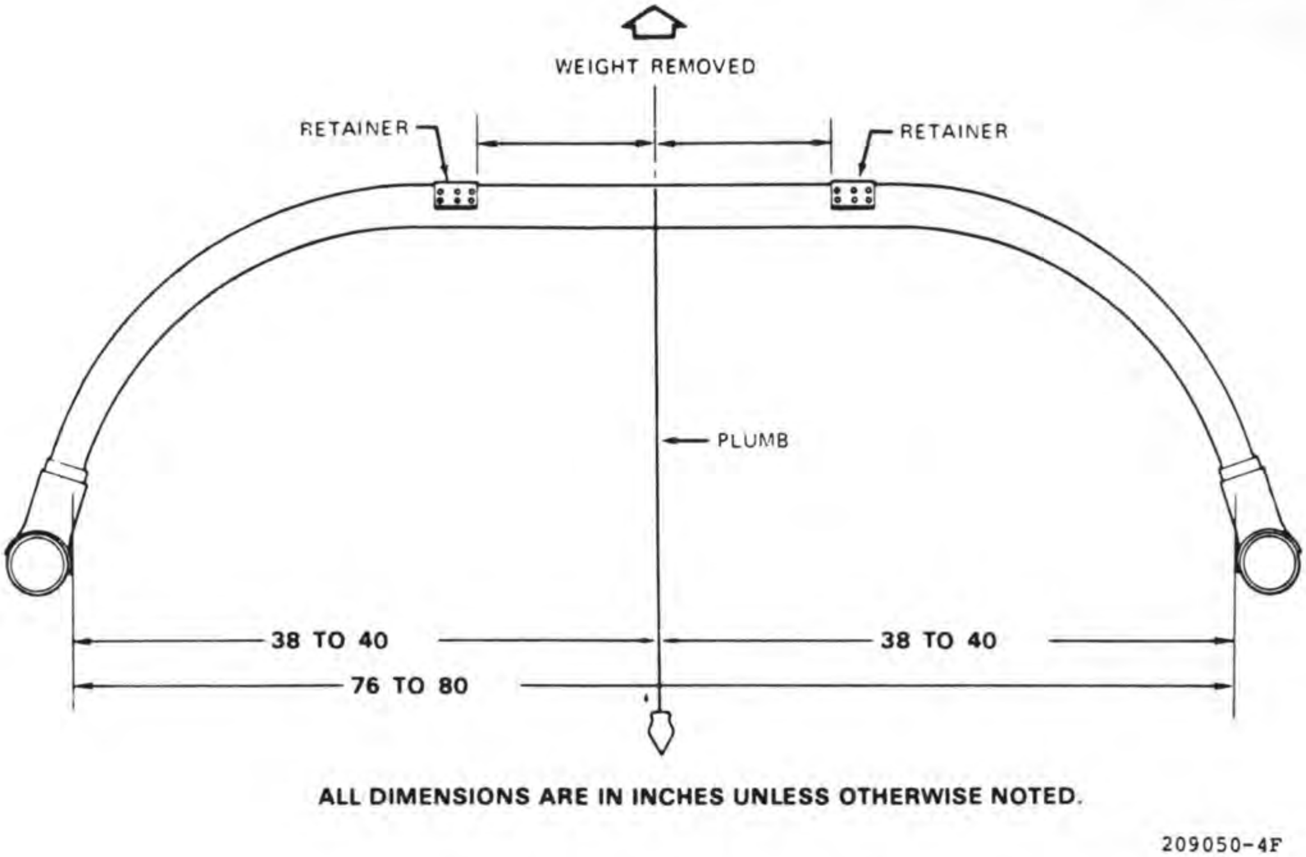


Figure 3-2. Crosstube — Deflection Inspection

plumb line to the inside of each skid tube at crosstube locations. Distance should be **38 TO 40** inches from inside edge of skid tube to plumb line. If distance exceeds **40** inches from the inside edge of either skid tube, replace crosstubes.

f. Lower helicopter to surface and remove jacks.

3-9. REMOVAL — CROSSTUBES.

Refer to paragraph 3-3.

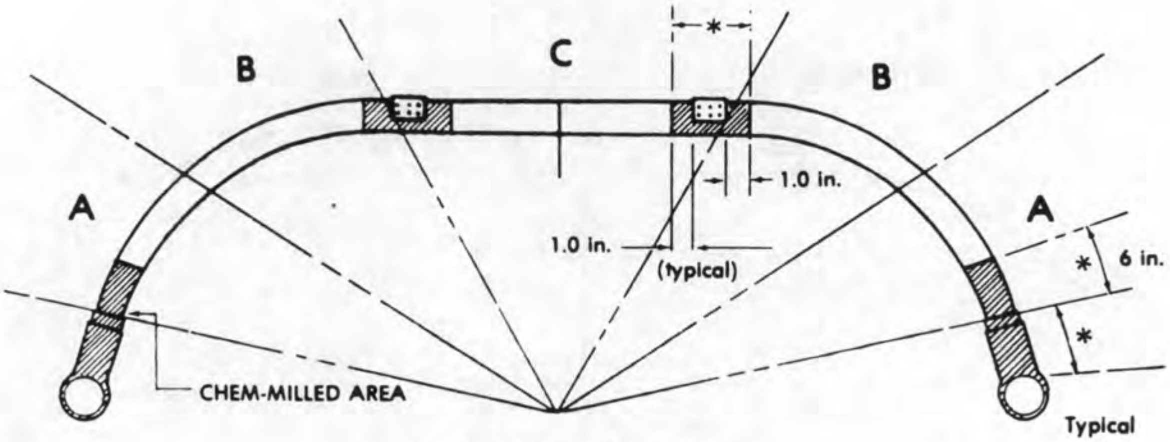
3-10. INSPECTION — CROSSTUBES (CROSSTUBES REMOVED FROM HELICOPTER).

a. Remove crosstube fairings if not previously accomplished (paragraph 3-40).

b. Inspect two aft crosstube retainers (8, figure 3-1) and two forward crosstube retainers (16) for secure installation on crosstubes. Inspect retainers for obvious wear and for cracks. Replace retainers if loose or damaged.

c. Inspect forward and aft crosstubes for scratches, nicks, and dents. Surface nicks and scratches and smooth contour dents within the limits shown on figure 3-3 and less than **0.50** inch in length radially or **2.00** inches in length longitudinally are acceptable if polished out in accordance with paragraph 3-11. The number of repairs is limited to one per cross section cut of the tube. Minimum longitudinal distance between repairs is **2.0** inches. Shot peen the areas around and within **2.0** inches of the fuselage support fittings after making repairs in these areas.

d. If it is suspected that crosstubes are cracked due to a hard landing or other cause, prepare



ALLOWABLE DEPTH OF REPAIR

	AREA A	AREA B	AREA C
Forward Tube	0.016	0.021	0.025
Aft Tube	0.016	0.027	0.037

* CRACK INSPECTION AREAS (INCLUDING ALL FOUR SADDLES.)

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209050-15A

Figure 3-3. Damage Limits — Crosstubes

the crosstubes for inspection and perform same as outlined below. (Figure 3-3 specifies the minimum areas that must be evaluated.)

NOTE

The cross tubes may be inspected by flourescent dye penetrant inspection (TM 43-0103, Chapter 6), ultransonic inspection (TB 55-1520-243-50-2), or radiographic inspection (TM 43-0103, Chapter 5). Replace cross tube or cross tube saddle if any cracks are detected.

e. Remove retainers (8 and 16, figure 3-1). Refer to paragraph 3-11 for procedures. Prepare areas in figure 3-3 for dye penetrant inspection.

NOTE

The success and reliability of penetrant inspection depends upon the thoroughness with which the inspector prepares the part from the precleaning process all the way through to the final interpretation of the indications. All inspections should be with the fluorescent penetrant (Type I, Method C) in strict accordance with TM 43-0103.

WARNING

Prolonged or repeated inhalation of vapors or powders may result in irritation of the mucous membrane areas of the body. Provide adequate ventilation.

Continual exposure to penetrant inspection materials may cause skin irritation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

Injury to eyes and skin may occur when blacklight is not used in accordance with manufacturer's inspections. Unfiltered light sources (if filter is required) may possibly damage the eyes.

WARNING

Temperatures in excess of 120 degree F may cause bursting of pressurized cans and injury to personnel.

Volatile fumes may occur, creating both a fire and health hazard.

NOTE

Paint will not be removed by any mechanical means under any circumstances because it may mask over any potential surface cracks.

f. With a soft hair brush, apply MEK (Metyl- Ethyl-Ketone) (C74), or paint remover (TTR 248B) and remove the paint.

g. Clean the prepared surfaces with a soft cloth.

h. Apply a fluorescent dye penetrant to the prepared surfaces from either a spray can or with a soft hair brush and in strict conformance to the procedure specified in TM 43-0103, Chapter 6.

i. Allow penetrant to dwell for a minimum of 30 minutes.

j. Clean off all excess penetrant in accordance with TM 43-0103, standard procedures. (Check for complete excess penetrant removal from surface by using a blacklight.)

k. Apply applicable developer consistent with Type I, Method C penetrant method in TM 43-0103.

l. Inspect suspected area with blacklight source in subdued white light.

NOTE

Normal manufacturing machining marks may be observed on the tube surfaces. These will not be cause of part rejection.

m. Clean tube with solvent and wipe dry.

n. Refer to paragraph 3-11 for instructions to repaint cross tubes.

3-11. REPAIR OR REPLACEMENT — CROSSTUBES.

a. Replace loose or damaged retainers (8 and 16, figure 3-1) as follows:

(1) Carefully drill out rivets that secure retainer to crosstube and remove retainer.

(2) Remove old sealant from crosstube with 300 grit to 400 grit abrasive cloth (C36). No circumferential sanding or grooves permitted.

(3) Check crosstube surfaces previously covered by retainer (8 or 16) for cracks (paragraph 3-10).

(4) Coat mating surface of new retainer (8 or 16) and crosstube with sealant (C105).

(5) Position retainer (8) on aft crosstube (7). Secure with blind rivets NAS 1399MW5-8. Install rivets while wet with primer (C88 or C91).

(6) Position retainer (16) on forward crosstube (17). Secure with blind rivets NAS 1399MW5-6. Install rivets while wet with primer (C88 or C91).

b. Polish out mechanical damage that is within limits noted in paragraph 3-10. Use 300 grit to 400 grit abrasive cloth (C36). Ensure that limits shown on figure 3-3 are not exceeded. No circumferential sanding or grooves permitted.

c. Touch up or completely repaint crosstube with primer (C88 or C91). Paint crosstube to match original finish (TB746-93-2).

d. Install crosstube fairings (paragraph 3-43).

3-12. INSTALLATION — CROSSTUBES.

Refer to paragraph 3-5.

3-13. SKID TUBES.

3-14. DESCRIPTION — SKID TUBES.

The aluminum skid tubes support the helicopter on the ground. Each skid tube has two steel skid shoes (12, figure 3-1) attached to the skid tube to extend the life of the skid tubes. The skid tubes have provisions for mounting ground handling wheels. When the ground handling wheels are attached and placed in the extended position, the helicopter may be towed with a tow bar attached to towing rings (14).

3-15. REMOVAL — SKID TUBES.

Refer to paragraph 3-3.

3-16. INSPECTION — SKID TUBES.

a. Inspect skid shoes (12, figure 3-1) for damage (paragraph 3-22). If damage is detected, remove skid shoes (paragraph 3-21).

b. Inspect skid tubes (15, figure 3-1) for scratches, nicks, dents, and holes.

(1) Smooth dents, not exceeding **0.25** inch in depth and **1.0 TO 1.2** inches in diameter between the crosstube saddles, are acceptable without repair.

(2) Scratches, dents, and holes in the skid tubes in front of forward crosstube saddle may be repaired at discretion of local maintenance officer.

(3) Scratches and gouges up to **0.03** inch deep and **1.0 TO 1.2** inches long running directly across top of skid tube between crosstube saddles are acceptable if polished out.

(4) Scratches and gouges running directly across top of skid tube that are more than **0.03** inch deep and more than **1.2** inches long but less than **4.0** inches long are reparable by patching if the damage is in area where repairs by patching are authorized. See figure 3-4 for illustration of area where repairs by patching are authorized.

(5) Dents more than **0.25** inch deep and **1.2** inches up to a maximum of **4.0** inches across are reparable by patching if the damage is in area where repairs by patching are authorized. See figure 3-4 for illustration of area where repairs by patching are authorized.

(6) Holes up to **4.0** inches in diameter through one surface of skid tube only are reparable by patching if the damage is in area where repairs by patching are authorized. See figure 3-4 for illustration of area where repairs by patching are authorized.

(7) Dents and holes on either top or bottom side of skid tube that are greater than **4.0** inches across in any direction are repairable by inserting a splice. This type repair is restricted to areas shown on figure 3-4.

(8) Damage in excess of the limits noted in the preceding steps is cause to replace the skid tube.

3-17. REPAIR OR REPLACEMENT — SKID TUBES.

a. Polish out scratches and gouges that are within reparable limits noted in paragraph 3-16.b. (3).

b. Repair damage by patching that is within limits. Refer to paragraphs 3-16.b. (4) through 3-16.b. (6) for limits. Apply patch repairs as follows:

(1) Polish out scratches; trim and smooth rough edges of holes.

(2) Fabricate a patch from 0.100 inch thick aluminum alloy (12, table 2-1) of the required size as shown in figure 3-4 or make a patch from material salvaged from scrap skid tube.

(3) Lay out the rivet hole pattern and form patch to fit contour of skid tube as shown in figure 3-4.

(4) Locate and securely clamp patch to skid tube and drill rivet holes with a No. 10 twist drill.

(5) Rivet patch in place using blind rivets (32, table 2-1).

(6) Touch-up repair area or paint entire skid tube (paragraph 3-72).

c. Repair damage by insertion that is within limits. Refer to paragraph 3-16, b. (7) for limits. Install insert as follows:

(1) Cut out damaged portion of skid tube with hand or powered metal saw.

(2) Fabricate an insert of the required length from tubing 0.095 inch wall thickness (27, table 2-1) or from scrap skid tube, as shown in figure 3-4.

(3) Fabricate splice plates as follows:

(a) Cut four plates to the required dimensions as shown in figure 3-4 from sheet stock 0.100 inch-thick (12, table 2-1) or use material salvaged from scrap skid tube.

(b) Form two plates to fit the outside diameter of skid tube and the other two plates to fit the inside diameter as shown in figure 3-4.

(4) Apply a coat of primer (C88 or C91) to plates and tubes.

(5) Lay out rivet hole pattern on upper splice plates and lower side of tubes as shown in figure 3-4.

(6) Maintain proper alignment and securely clamp splice plates and tubes together.

(7) Drill rivet holes in plates and tubes with No. 10 twist drill. Countersink lower holes with 100 degree countersink. Install protruding head blind rivets (36, table 2-1) in upper half of splice. Install flush head blind rivets (31, table 2-1) in lower half of splice as shown in figure 3-4.

(8) If repair involves removal of skid shoe bolt sleeves, mark sleeve locations using skid shoe as a template and install new sleeves.

d. Install skid shoes (paragraph 3-24).

3-18. INSTALLATION — SKID TUBES.

Refer to paragraph 3-5.

3-19. SKID SHOES.

3-20. DESCRIPTION — SKID SHOES.

The skid shoes are two steel plate assemblies attached with screws to the bottom of each skid tube to minimize abrasive damage to the skid tubes from ground contact.

3-21. REMOVAL — SKID SHOES.

Remove skid shoes (12, figure 3-1) from bottom of skid tubes (15) by removing screws (13) and washers.

3-22. INSPECTION — SKID SHOES.

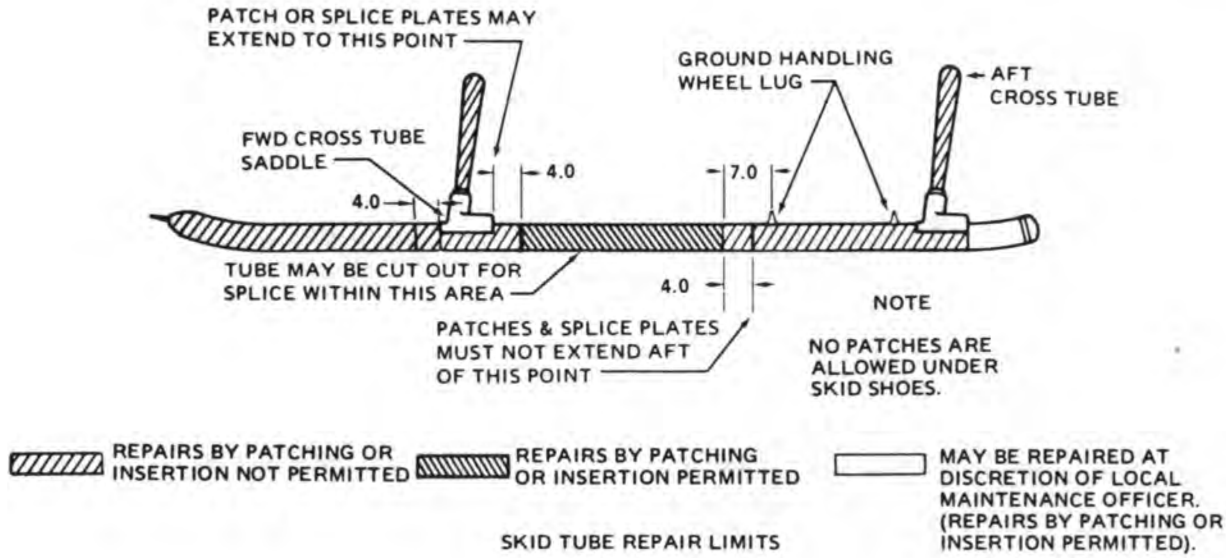
Inspect skid shoes (12, figure 3-1) for damage and wear which is severe enough to affect function. Check for loose or missing fasteners.

3-23. REPAIR OR REPLACEMENT — SKID SHOES.

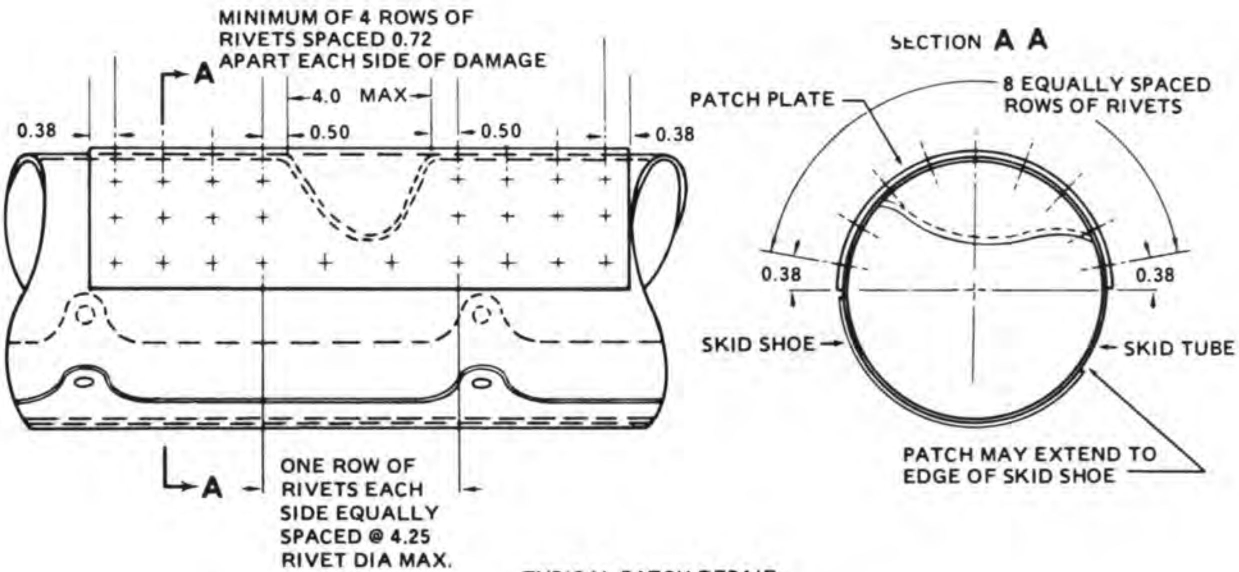
a. Replace skid shoes (12, figure 3-1) if worn too thin to give proper protection to skid tubes.

b. Replace skid shoes if mounting holes are elongated or cracked.

c. Replace missing fasteners.



SKID TUBE REPAIR LIMITS



TYPICAL PATCH REPAIR

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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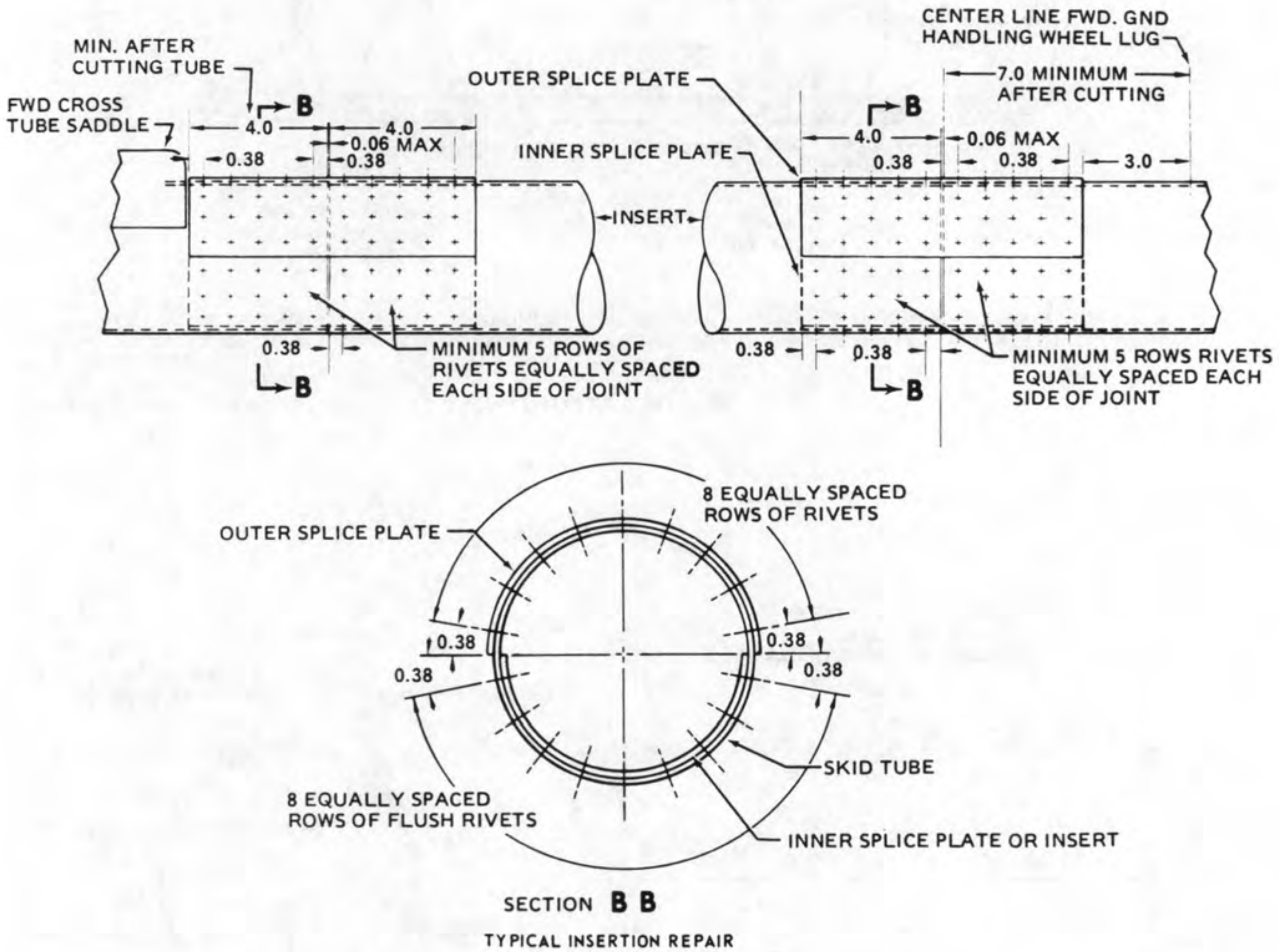
Figure 3-4. Skid Tube — Repairs (Sheet 1 of 2)



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 3-4. Skid Tube — Repairs (Sheet 2 of 2)

3-24. INSTALLATION — SKID SHOES.

Install skid shoes (12, figure 3-1) to bottom of skid tube (15) with screws (13) and washers. Make sure proper length screw is used to prevent bottoming out.

3-25. SKID SADDLES.

3-26. DESCRIPTION — SKID SADDLES.

The skid saddle (1, figure 3-1) is a reinforced aluminum forging that connects the forward and aft crosstubes to the skid tubes.

3-27. REMOVAL — SKID SADDLES.

a. Remove skid tubes (paragraph 3-3).

b. Carefully drill out rivets that secure saddle (1, figure 3-1) to crosstube (7 or 17). Remove saddle from crosstube.

3-28. INSPECTION — SKID SADDLES.

a. Inspect skid saddle for cracks in area of screw and rivet holes, using fluorescent penetrant inspection method (TM 43-0103).

b. If installed, inspect for secure installation of rivets and screws.

c. If removed, inspect for elongated screw and/or rivet holes. Elongation of screw holes at the 1/4 inch screw locations shall not exceed **0.281** inch. Elongation of screw holes at the 5/16 inch screw locations shall not exceed **0.344** inch.

d. Inspect nutplates on lower part of saddle for loose rivets and damaged threads.

3-29. REPAIR OR REPLACEMENT — SKID SADDLES.

Repair is limited to replacement of attaching screws. Rivets (figure 3-1) attaching saddle to crosstube may be replaced or oversize rivets OSB100 T6-3/16 inch huck oversize may be used. (Next size fasteners not permitted.)

3-30. INSTALLATION — SKID SADDLES.

a. Position skid saddle (1, figure 3-1) or crosstube and install rivets.

b. Install skid tube (paragraph 3-5).

3-31. PAINTING — SKID SADDLES.

Refer to paragraph 3-72.

3-32. TOW RINGS.

3-33. DESCRIPTION — TOW RINGS.

The tow ring (14, figure 3-1) is a one-piece casting with eyehole which is riveted to the front end of each skid tube (15) to facilitate ground handling and towing of the helicopter.

3-34. REMOVAL — TOW RINGS.

Drill out rivets and remove tow ring (14, figure 3-1) from front end of skid tube (15).

3-35. INSPECTION — TOW RINGS.

a. Inspect tow ring (14, figure 3-1) and attaching rivets for damage or cracks.

b. Perform magnetic particle inspection (TM 43-0103).

3-36. REPAIR OR REPLACEMENT — TOW RINGS.

a. Repair is limited to replacement of attaching rivets and polishing out minor surface damage with fine india stone (C116).

b. Replace tow rings that exceed repair limits.

3-37. INSTALLATION — TOW RINGS.

a. Insert tow ring (14, figure 3-1) into front end of skid tube (15) with eyehole horizontal and the part number facing up. Install with sealant (C104).

b. Install rivets (CR2538-6-4).

3-38. CROSSTUBE FAIRINGS.

3-39. DESCRIPTION — CROSSTUBE FAIRINGS.

The crosstube fairings (figure 3-5) are plastic coverings designed to lessen the drag on the landing gear. The fairings are attached to the crosstubes with screws.

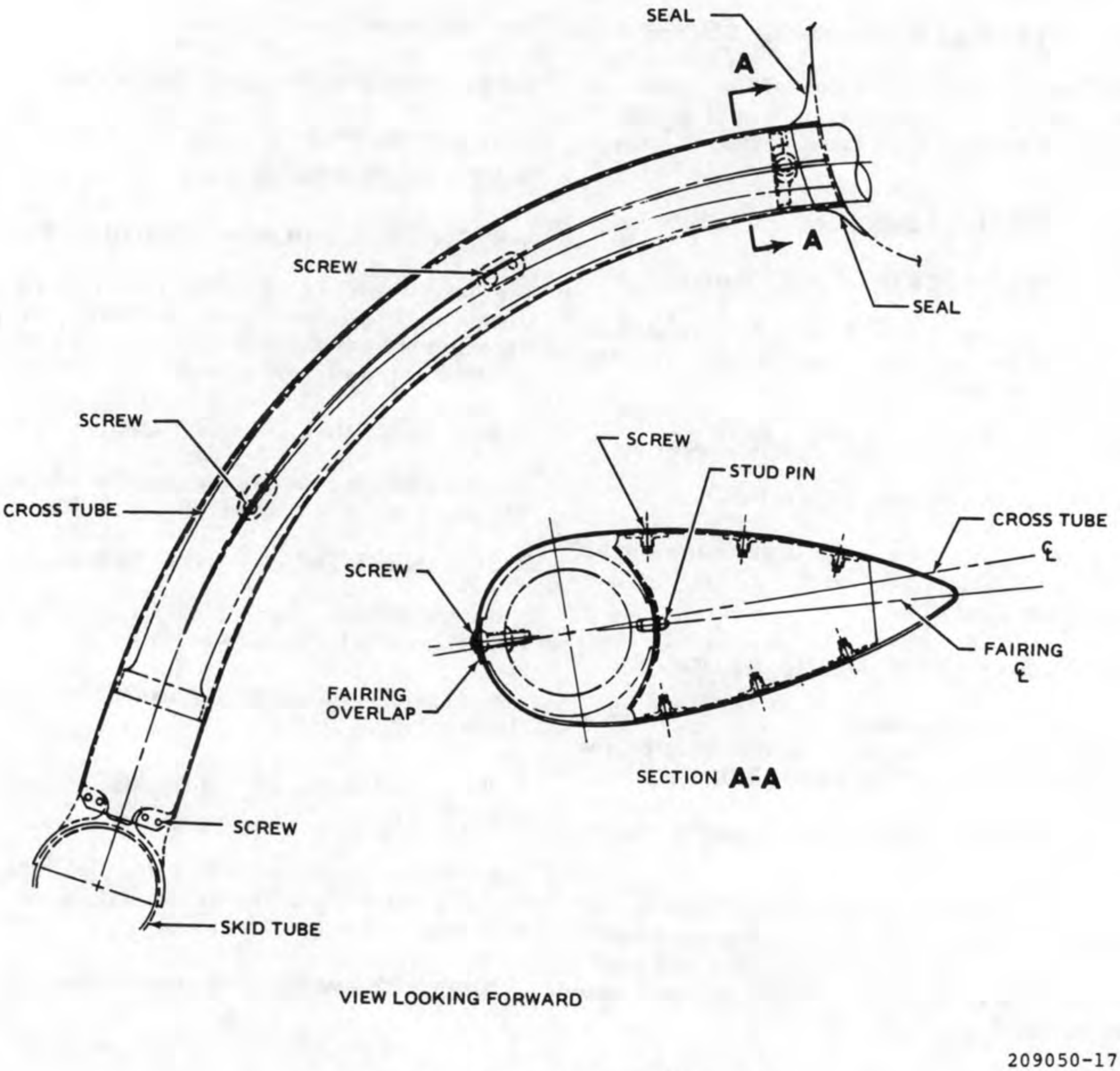


Figure 3-5. Crosstube Fairing Assembly

3-40. REMOVAL — CROSSTUBE FAIRINGS.

a. Remove screws (figure 3-5).

b. Remove fairings from crosstubes.

3-41. INSPECTION — CROSSTUBE FAIRINGS.

a. Inspect plastic fairings for cracks. There is no limit to the number of cracks that may be repaired.

b. Inspect nutplates on fairing for loose rivets or thread damage.

3-42. REPAIR OR REPLACEMENT — CROSSTUBE FAIRINGS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

a. Repair cracks as follows:

(1) Clean area around the crack perimeter using a clean cloth dampened with aliphatic naphtha (C75). Lightly sand area using fine grade of sand paper. Clean the surface as described above with aliphatic naphtha after sanding.

(2) Two layers of fiberglass patches are required. Measure and cut one fiberglass patch from fiberglass cloth (C38) to cover cracks by a minimum of **one** inch around the perimeter. Cut a second patch to overlap the first patch by **one** inch on all sides.

(3) Using a brush, apply a coat of epoxy resin (C98) to the cleaned surface of fairing to match size of patch. Apply fiberglass patch (C38) and brush epoxy resin (C98) to cover patch completely, using brush to work out air bubbles.

(4) Apply another coat of epoxy resin (C98) to cover area for second patch. Apply fiberglass patch (C38) and brush epoxy resin (C98) to completely cover and saturate fiberglass patch. Work out air bubbles.

(5) Allow epoxy resin (C98) to cure for **4** hours at **70** degrees F (**21** degrees C) prior to flying helicopter. The complete cure time for epoxy resin (C98) is **24** hours at **70 TO 80** degrees F (**21 TO 27** degrees C). Refinish repaired area to match surrounding surface.

b. Replace nutplates as required.

3-43. INSTALLATION — CROSSTUBE FAIRINGS.

CAUTION

Crosstube fairings must be installed for flight.

a. Align screw holes in fairing with fasteners and start all screws before tightening.

b. Tighten screws evenly to prevent stress on fairing.

3-44. PAINTING — CROSSTUBE FAIRINGS.

Refer to paragraph 3-72.

3-45. CROSSTUBE COVERS AND SUPPORT ASSEMBLIES.

3-46. DESCRIPTION — CROSSTUBE COVERS AND SUPPORT ASSEMBLIES.

The aluminum alloy crosstube covers (19, figure 3-1) are contoured plates designed to lessen drag. The crosstube covers are secured to the support assemblies (32 and 46) with screws. The support assemblies (32 and 46) secure the crosstubes (7 and 17) to helicopter structure.

3-47. REMOVAL — CROSSTUBE COVERS AND SUPPORT ASSEMBLIES.

Refer to paragraph 3-3.

3-48. INSPECTION — CROSSTUBE COVERS AND SUPPORT ASSEMBLIES.

a. Inspect crosstube covers (19, figure 3-1) for cracks, holes, and corrosion. Damage that can be repaired by standard structural repair procedures is acceptable if repairs are made.

b. Inspect support assemblies (32 and 46) as follows:

(1) Presence of deteriorated, worn, or missing rubber bumpers is cause to replace the support assembly.

(2) Inspect metal portion of the support assemblies for cracks, distortion, and elongated holes. Obvious damage is cause to replace the support assembly.

3-49. REPAIR OR REPLACEMENT — CROSSTUBE COVERS AND SUPPORT ASSEMBLIES.

a. Support assemblies (32 and 46, figure 3-1) are not reparable. Replace support assemblies that fail to pass inspection requirements.

b. Repair crosstube covers in accordance with standard structural repair procedures for stop drilling and patching.

3-50. INSTALLATION — CROSSTUBE COVERS AND SUPPORT ASSEMBLIES.

Refer to paragraph 3-5.

3-51. CROSSTUBE SUPPORT SPACERS.

3-52. DESCRIPTION — CROSSTUBE SUPPORT SPACERS.

The crosstube support spacers (35 and 41, figure 3-1) are fabricated by the investment casting process. They are bonded and riveted to the crosstube supports (25 and 36).

3-53. REMOVAL — CROSSTUBE SUPPORT SPACERS.

a. Remove landing gear (paragraph 3-3).

b. Carefully drill out two rivets which secure each spacer (35 and 41) to crosstube supports (25 and 36).

c. Heat spacer with heat lamp to soften adhesive if necessary and remove spacer from support.

3-54. INSPECTION — CROSSTUBE SUPPORT SPACERS.

NOTE

The spacers can be inspected only when the landing gear crosstubes are removed.

a. Inspect spacers (35 and 41, figure 3-1) for secure installation on supports (25 and 36). Loose installation is cause to replace a spacer.

b. Inspect spacers for cracks and for obvious wear. Cracks and/or obvious wear are cause to replace a spacer.

3-55. INSTALLATION — CROSSTUBE SUPPORT SPACERS.

a. Clean old adhesive from forward crosstube support (25, figure 3-1) or aft crosstube support (36) as applicable. Use 300 grit to 400 grit abrasive cloth (C36) and sharp plastic scrapers.

b. Position new spacer on crosstube support and drill two holes for rivets (figure 3-6).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

c. Clean mating surfaces of crosstube supports (25) and spacers with MEK (C74).

d. Apply a thin coat of adhesive (C14) to mating surfaces of spacer and support (25). Position spacer on support and install two MS20427M4-4 rivets before adhesive cures.

e. Install landing gear (paragraph 3-5).

3-56. PAINTING — LANDING GEAR.

NOTE

Use the procedures in this paragraph to touch-up small areas or to repaint entire landing gear.

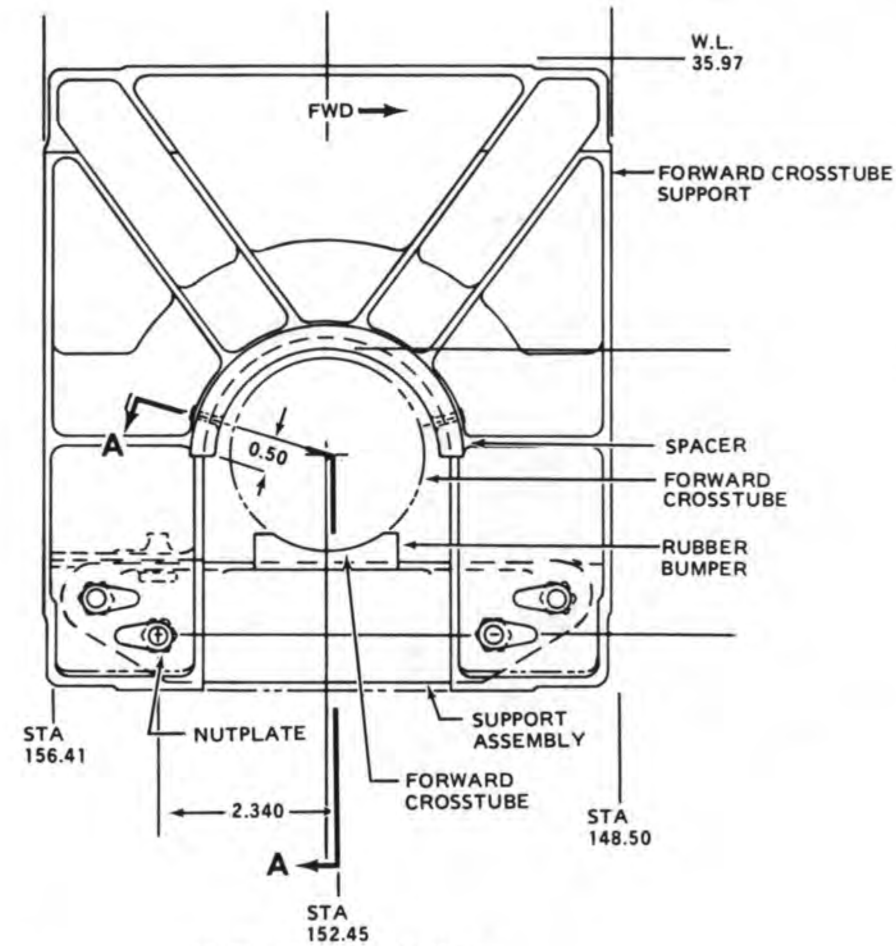
a. Apply coat of primer (C88 or C91) to area to be painted.

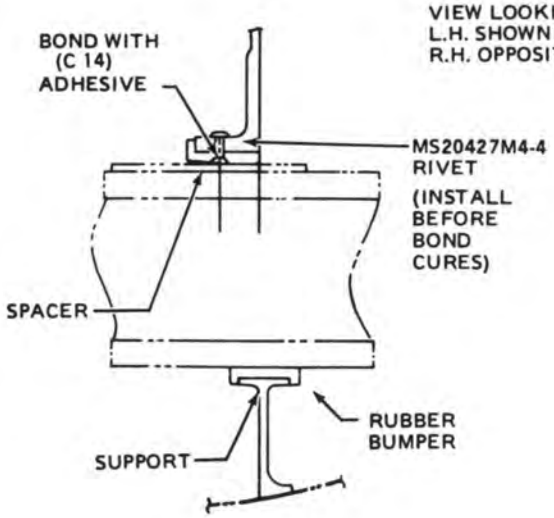
b. Paint primed area to match existing finish.

3-57. GROUND HANDLING GEAR.

3-58. DESCRIPTION — GROUND HANDLING GEAR.

Two ground handling wheel assemblies are provided for quick mounting on landing skids to facilitate moving helicopter on ground. Each assembly consists of two wheels on an offset axle, a supporting cradle, and hand-operated hydraulic jack with two rams which actuate axle to extend or retract wheels. See figure 3-7. The cradle is mounted on eyebolts on landing skid by means of a fixed rear pin and spring-loaded gear front pin.





SECTION **A A**

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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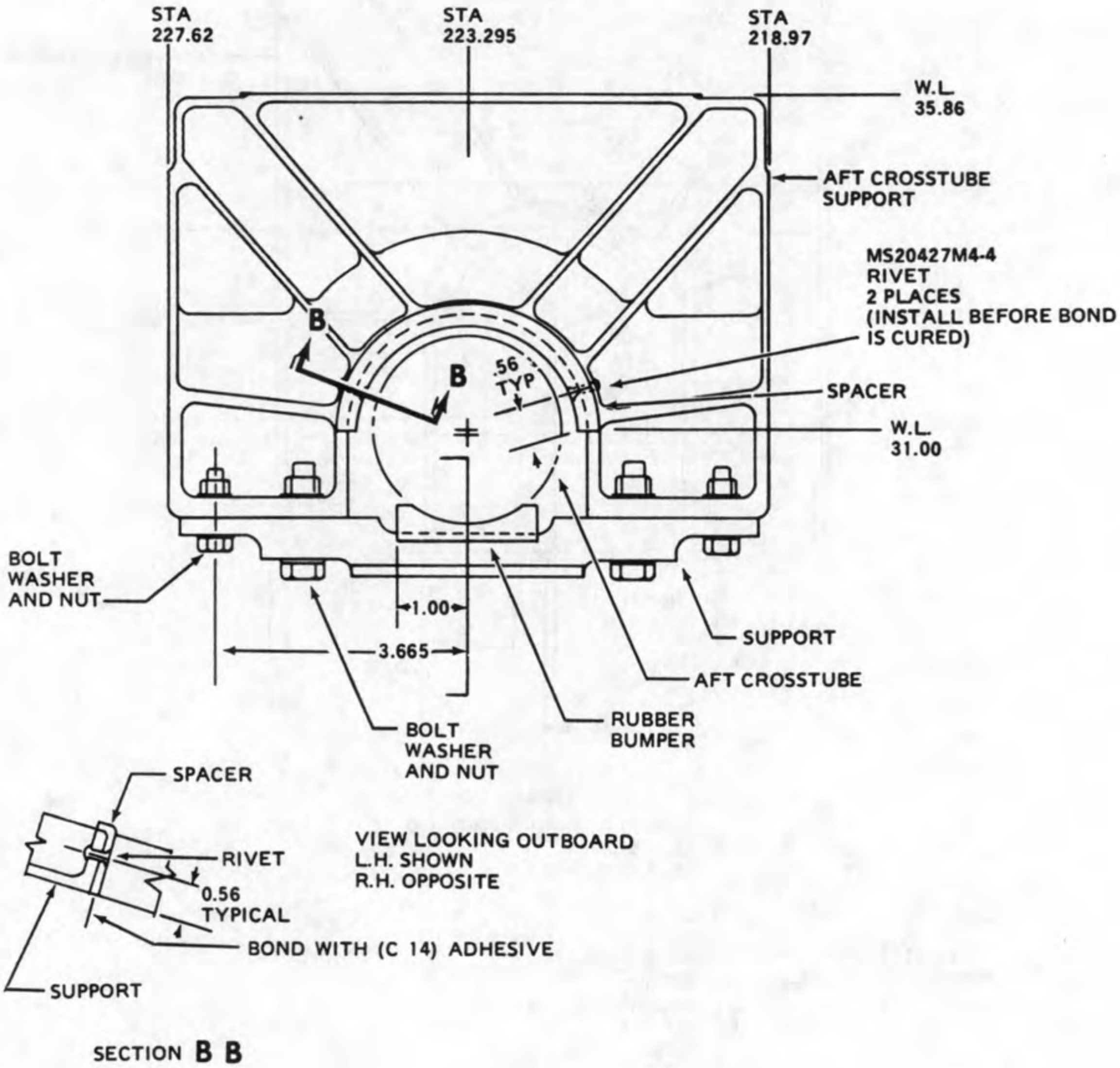
Figure 3-6. Landing Gear Support Spacer Installation (Sheet 1 of 2)



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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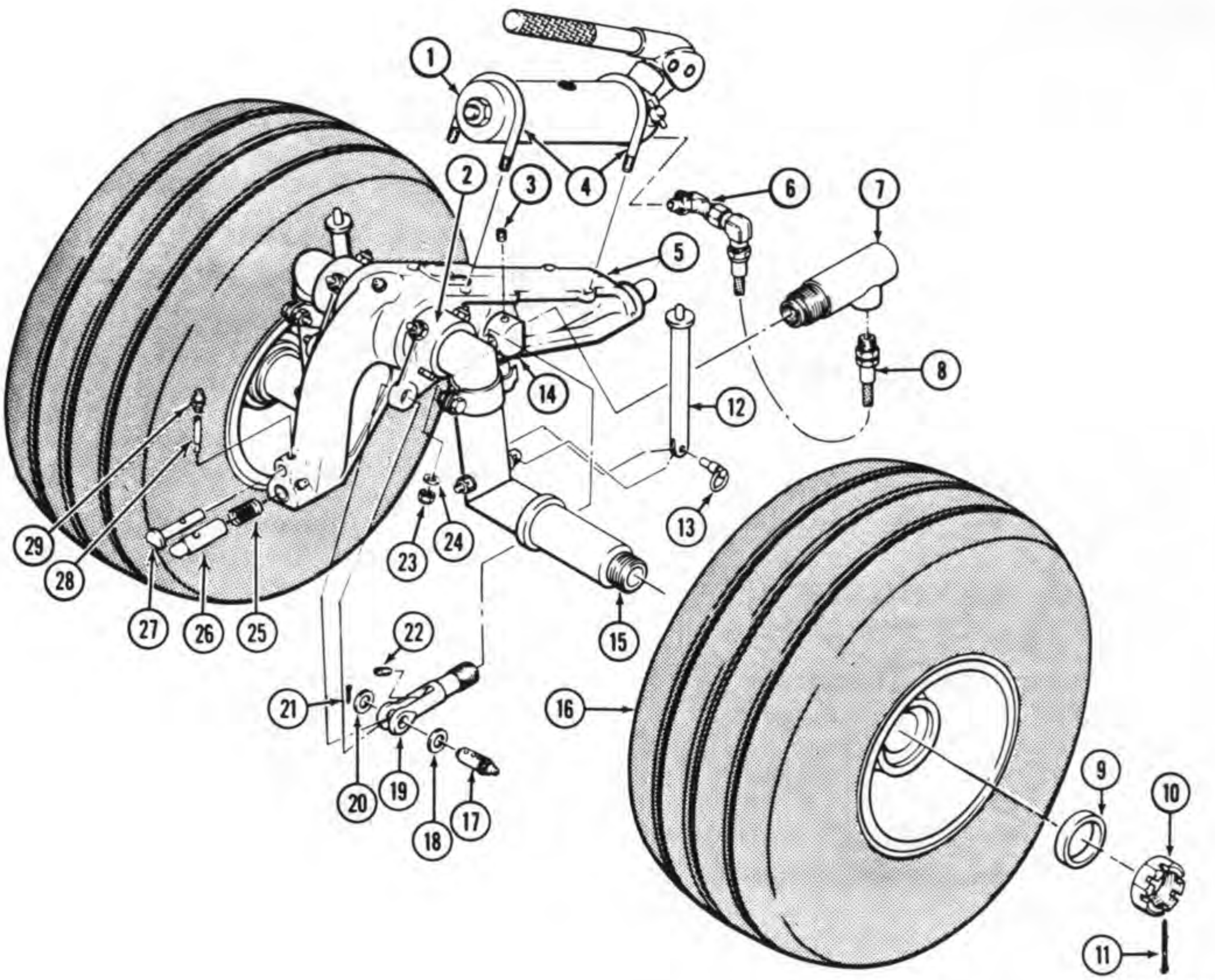
Figure 3-6. Landing Gear Support Spacer Installation (Sheet 2 of 2)



1. Hydraulic pump
2. Ram arm
3. Set screw
4. U-bolts
5. Cradle ssembly
6. Hose fitting
7. Hydraulic ram
8. Hose
9. Retainer
10. Nut
11. Cotter pin
12. Support rod
13. Ball-lock pin
14. Trunnion
15. Axle
16. Wheel assembly
17. Lubrication pin
18. Washer
19. Clevis
20. Washer
21. Cotter pin
22. Set screw
23. Nut
24. Washer
25. Spring
26. Support pin
27. Release pin
28. Connecting pin
29. Lubrication fitting

Figure 3-7. Ground Handling Gear — Assembly

3-59. DISASSEMBLY — GROUND HANDLING GEAR. (AVIM)

Premaintenance Requirements for Ground Handling Gear

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	(T80) (T81) (T84)
Test Equipment	None
Support Equipment	(S2)
Minimum Personnel Required	One
Consumable Materials	(C30) (C37) (C62) (C63) (C112) (C116)
Special Environmental Conditions	Dust Free

WARNING

Deflate tire prior to wheel assembly removal.

a. Remove ball-lock pin (13, figure 3-7) and remove support rod (12) from axle.

b. Remove wheel assembly (16) with tire and tube assembled, by removing cotter pin (11), nut (10), and retainer (9).

c. Disconnect and remove flexible hose (8) from fitting (6) on hydraulic pump (1) and hydraulic ram (7).

d. Remove nuts (23) and washers (24) and lift U-bolts (4) attaching hydraulic pump (1) to cradle assembly (5). Remove hydraulic pump (1).

e. Remove cotter pin (21), washers (18 and 20), and lubrication pin (17) attaching ram arm (2) to clevis (19) of hydraulic ram (7).

f. Back out set screw (3) and remove hydraulic ram (7) from trunnion (14). Using clevis (19) as handle, hold hydraulic ram (7) and separate ram piston (not illustrated) from cylinder of hydraulic ram (7).

NOTE

When connecting pin (28) is removed, support pin (26) can be released and spring (25) will slide from cradle.

g. Remove lubrication fitting (29), unscrew and remove connecting pin (28) and release pin (27).

3-60. DISASSEMBLY — HYDRAULIC PUMP P/N BU0953B. (AVIM)

a. Remove tank filler hole screw (24, figure 3-8) and packing (25) and drain oil from tank (26).

b. Remove retaining rings (1, 2, 6, and 36), fulcrum pins (5 and 37), and separate handle assembly (3) from pump body (15).

c. Pull out piston (7) and remove clip (48) by spreading clip slightly. Unscrew gland nut (8) using adjustable spanner wrench and remove packing support (9), leather packings (10 and 11), rubber packing (12), leather packing (13), and spreader (14).

d. Pry out filter screen (30) from hose hole. Remove retaining screw (31), discharge valve spring (32), 0.3125 inch diameter ball (33), suction valve spring (34), and 0.1875 inch diameter ball (35).

e. Remove screw (42). Lift up on knob (41) to disengage from stem (44); and turn knob clockwise to relieve tension on spring (39). Remove pin (40) from pump body (15). Position knob (41) on stem (44), and install screw (42). Remove knob (41), spring (39), stem (44), spring (45), washer (46), packing (38), and ball (47). Remove screw (43), and remove spring (39) from knob (41).

f. Remove nut (27) and packing (28). Twist tank (26) off pump body (15). Remove seal (16).

g. Remove screw (22) and screen (23). Dispose of screen.

h. Remove overload valve body (19) from tie rod (29). Remove spring (21) and plunger (20) from valve body (19).

3-61. DISASSEMBLY — HYDRAULIC PUMP P/N HP9902-41-10. (AVIM)

a. Remove filler plug (27, figure 3-9) and gasket (26). Drain hydraulic fluid from reservoir (25).

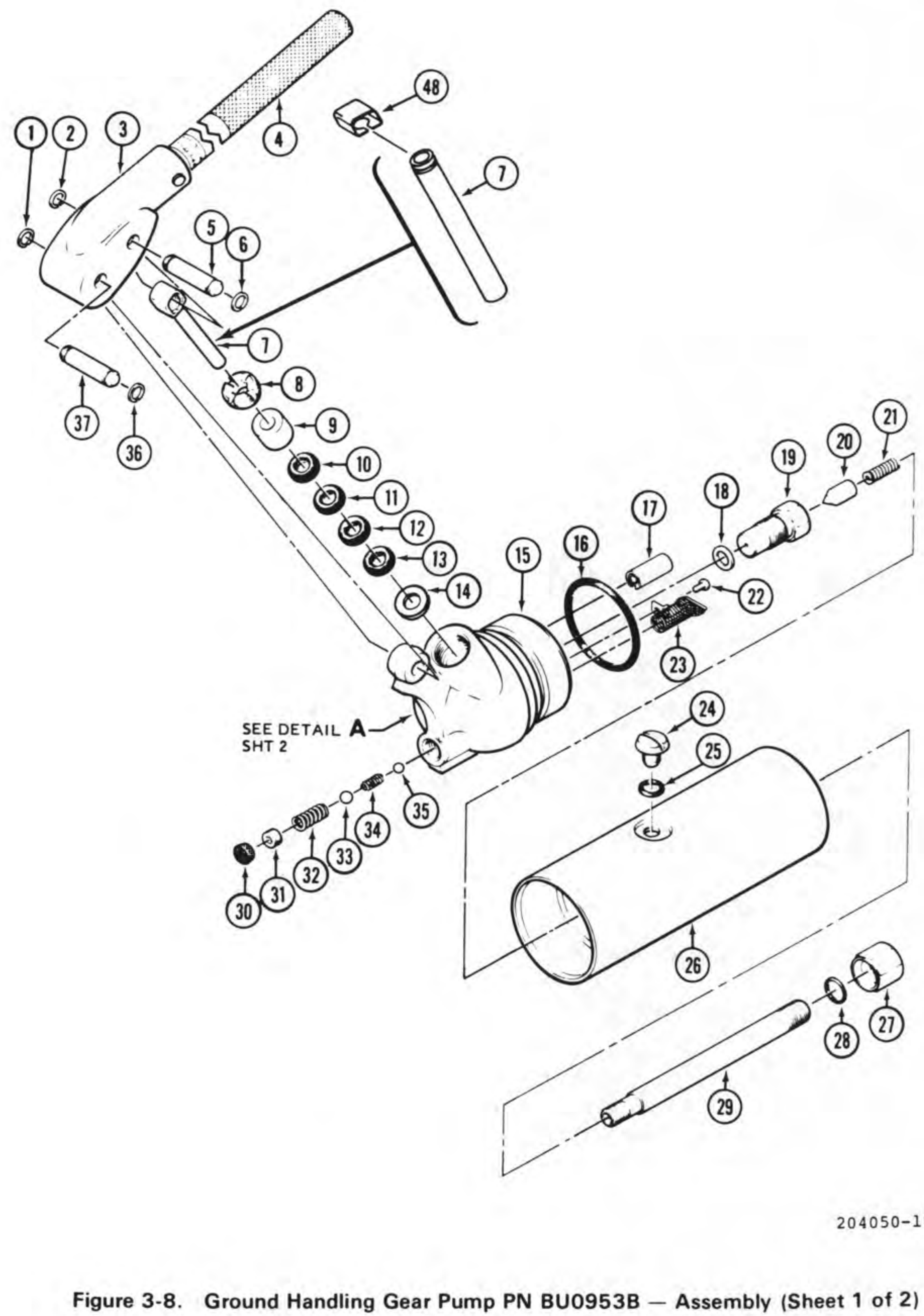


Figure 3-8. Ground Handling Gear Pump PN BU0953B — Assembly (Sheet 1 of 2)

1. Retaining ring
2. Retaining ring
3. Handle assembly
4. Handle
5. Pin
6. Retaining ring
7. Piston
8. Gland nut
9. Support
10. Leather packing
11. Leather packing
12. Rubber packing
13. Leather packing
14. Spreader
15. Pump body
16. Seal
17. Magnet
18. Gasket
19. Valve body
20. Plunger
21. Spring
22. Screw
23. Screen
24. Screw
25. Packing
26. Tank
27. Nut
28. Packing
29. Tie rod
30. Screen
31. Screw
32. Spring
33. Ball (0.3125 in. dia.)
34. Spring
35. Ball (0.1875 in. dia)
36. Retaining ring
37. Pin
38. Packing
39. Spring
40. Pin
41. Knob
42. Screw
43. Screw
44. Stem
45. Spring
46. Washer
47. Ball (0.3125 in. dia)
48. Clip

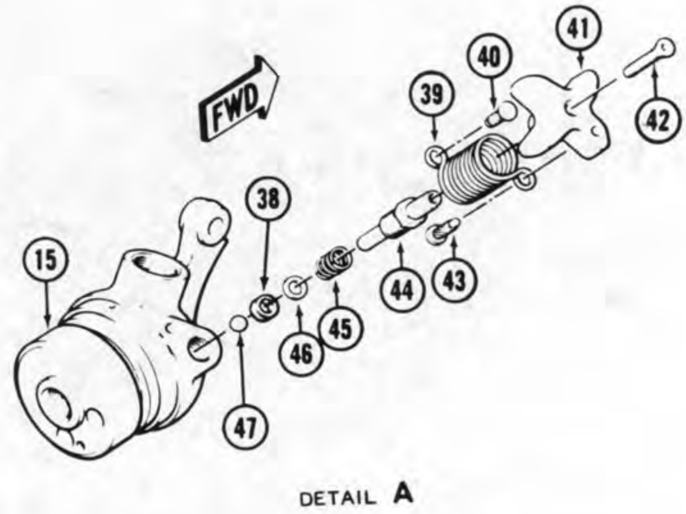


Figure 3-8. Ground Handling Gear Pump PN BU0953B — Assembly (Sheet 2 of 2)

b. Remove handle (1).

c. Remove cotter pin (4 and 31), beam pin (30), and plunger cross pin (3). Separate beam (2) from plunger (5) and base (11).

d. Pull out plunger (5). Use packing nut tool (workaid) (T84) (figure 3-10) to unscrew packing nut (6, figure 3-9). Remove pump cup (9), cup retainer (8), packing (7), and spreader (10).

e. Remove reducer bushing (12).

f. Unhook return spring (15) from handle (17).

g. Remove capscrew (20) and washer (21).

h. Remove screw (19), lockwasher (18), handle (17), and return spring (15).

i. Remove release spindle (16) with release packing (13) and release packing nut (14).

j. Remove release packing (13) and release packing nut (14) from release spindle (16).

k. Remove reservoir (25), reservoir shim washers (28), and shim washer(s) (29).

NOTE

Use of shim washers and reservoir shim washers varies from 0 to a total of 4.

l. Remove screen (22).

m. Remove relief valve (23) and gasket (24).

n. Remove valve plug (35), outlet check spring (34), 0.3125 inch diameter ball (33), and 0.2188 inch diameter ball (32).

3-62. INSPECTION — GROUND HANDLING GEAR (AVIM).

a. Ball-lock pin (13, figure 3-7) for cracks, corrosion, wear, and distortion.

b. Lubrication pin (17) for damage, distortion, and wear.

c. Internal threads of trunnion (14) for damage and set screw (3) and its internal threads in trunnion for damage.

d. Lubrication fitting (29) for serviceability.

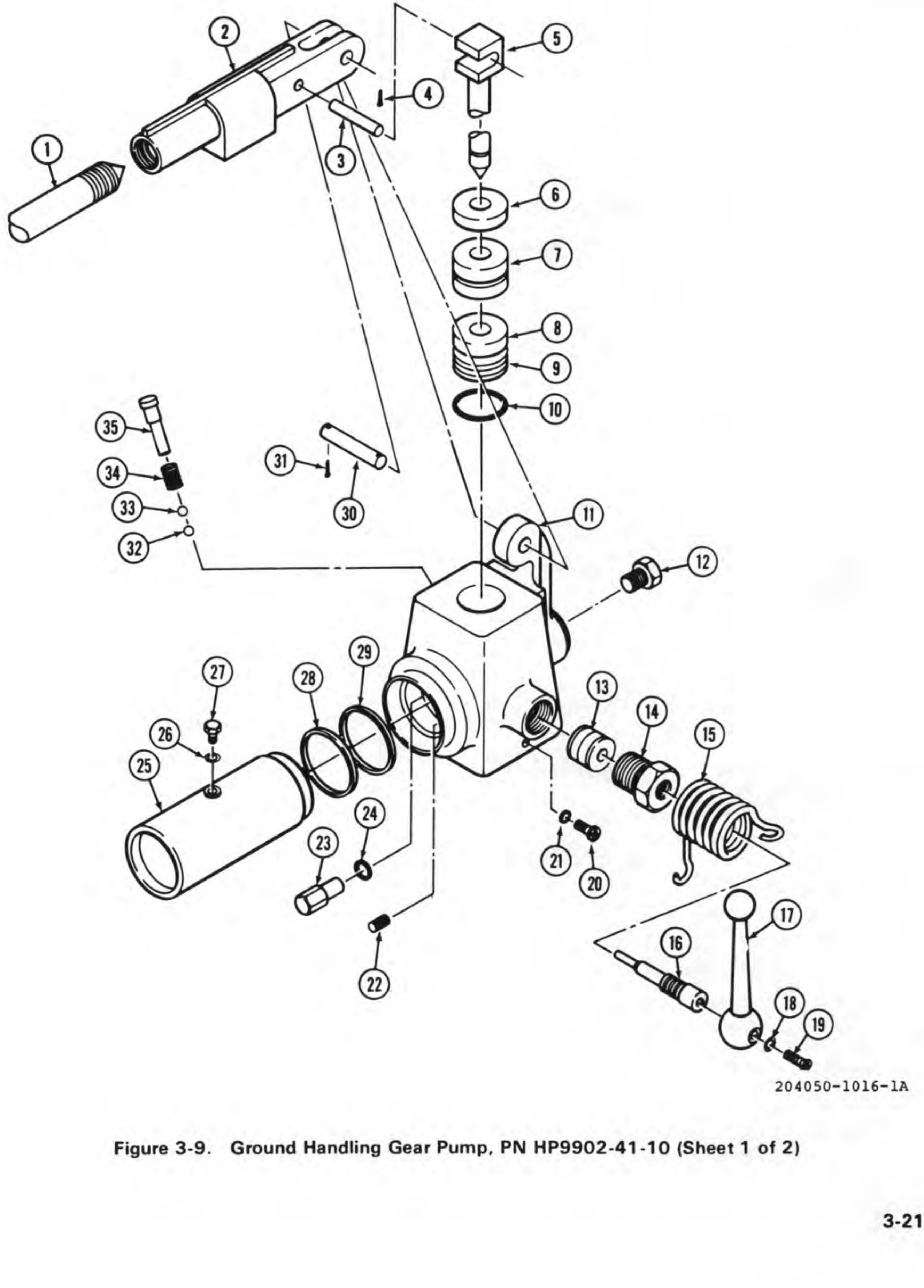


Figure 3-9. Ground Handling Gear Pump, PN HP9902-41-10 (Sheet 1 of 2)

1. Handle	19. Capscrew
2. Beam	20. Capscrew
3. Plunger cross pin	21. Washer
4. Cotter pin	22. Screen
5. Plunger	23. Relief valve
6. Packing nut	24. Gasket (copper)
7. Packing	25. Reservoir
8. Cup retainer	26. Gasket (copper)
9. Pump cup	27. Filler plug
10. Spreader	28. Reservoir shim washer
11. Base	29. Shim washer
12. Reducer bushing	30. Beam pin
13. Release packing	31. Cotter pin
14. Release packing nut	32. Ball (0.2187 inch diameter)
15. Return spring	33. Ball (0.3125 inch diameter)
16. Release spindle	34. Outlet check spring
17. Handle	35. Valve plug
18. Lockwasher	

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Figure 3-9. Ground Handling Gear Pump PN HP9902-41-10 (Sheet 2 of 2)

e. Connecting pin (28) and spring (25) for damage or distortion.

f. Flexible hose (8) for leaks, damage, and serviceability.

g. Axle (15), cradle assembly (5), and sleeve for wear, corrosion damage, and cracks.

h. Hydraulic ram (7) for leaks, security, corrosion, and damage.

3-63. INSPECTION — HYDRAULIC PUMP P/N BU0953B.

a. Prior to inspection of hydraulic pump, P/N BU0953B, clean magnet (17, figure 3-8) with clean cheesecloth (C30).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Clean filter screen hole in pump body (15), inside of overload valve body (19), and passage in end of tie rod (29) with solvent (C112).

c. Inspect pump for leaks, security, corrosion, and damage.

d. Inspect washers, screws, retaining rings, clips, and springs for damage and serviceability.

e. Inspect screen (23) for damage and serviceability.

f. Inspect balls (33 and 35) for corrosion and mechanical damage.

g. Inspect hole in tie rod (29) for clear passage.

3-64. INSPECTION — HYDRAULIC PUMP P/N HP9902-41-10.

a. Inspect pump (25, figure 3-9) for leaks, security, corrosion, and damage.

b. Inspect washers, screws, retaining rings, clips, and springs for damage and serviceability.

c. Inspect screen (22) for damage and serviceability.

d. Inspect balls (32 and 33) for corrosion and mechanical damage.

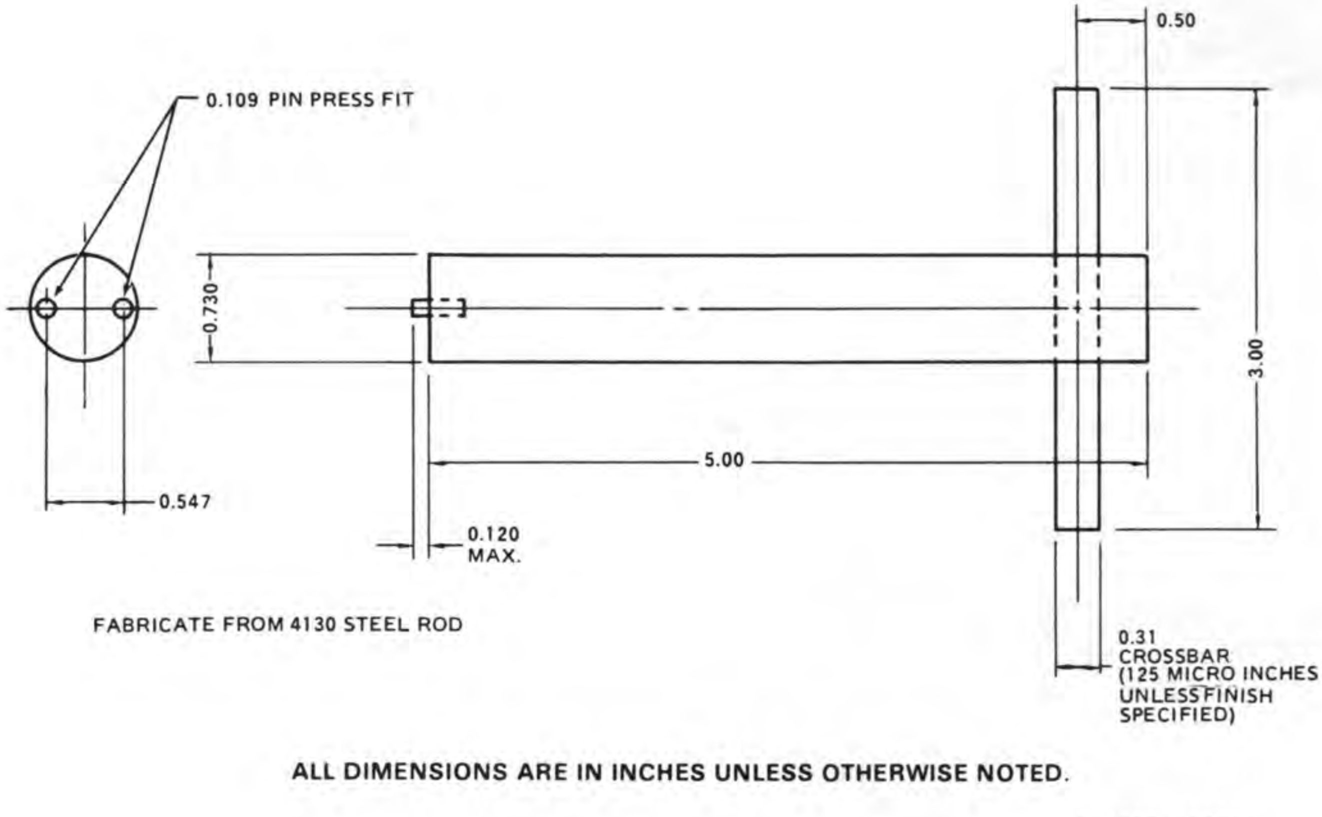

Figure 3-10. Workaid for Packing Nut Removal/Installation — Fabrication Instructions

3-65. REPAIR OR REPLACEMENT — GROUND HANDLING GEAR. (AVIM)

a. Replace ball-lock pin (13, figure 3-7) if unserviceable.

b. Replace lubrication pin (17) if worn or distorted.

c. Replace trunnion (14) if internal threads are damaged.

d. Replace lubrication fitting (29) if damaged.

e. Replace connecting pin (28), support pin (26), and spring (25) if distorted or damaged.

f. Replace flexible hose (8) if leaking or damaged.

g. Replace axle sleeve (15) or cradle assembly (5), if cracked or damaged.

3-66. REPAIR OR REPLACEMENT — HYDRAULIC PUMP P/N BU0953B. (AVIM)

a. Procure a hydraulic pump parts kit, P/N JS953 (TM 55-1520-236-23P).

b. Replace clip (48, figure 3-8), leather packings (10, 11, and 13), and rubber packing (12).

c. Replace filter screen (23), discharge valve spring (21), 0.3125 inch ball (33), suction valve spring (34), and 0.1875 inch ball (35).

d. Replace release valve spring (45), washer (46), packing (38), and 0.3125 inch diameter ball (47).

e. Replace packing (25) and seal (16).

f. Replace screw (22).

3-67. REPAIR OR REPLACEMENT — HYDRAULIC PUMP, P/N HP9902-41-10. (AVIM)

a. Procure a hydraulic pump service kit, P/N KH9000 (TM 55-1520-236-23P).

b. Replace packing (7, figure 3-9), cup retainer (8), pump cup (9), and spreader (10).

c. Replace release packing (13).

d. Replace outlet check spring (34), 0.3125 inch diameter ball (33), and 0.2187 inch diameter ball (32).

e. Replace gaskets (24 and 26).

3-68. REPAIR OR REPLACEMENT — HYDRAULIC RAM. (AVIM)

NOTE

If hydraulic ram (7, figure 3-7) does not have piston P/N 330617, which is machined for packing and back-up ring, requisition new piston P/N 330617.

a. Carefully slip new back-up ring over inboard end of piston P/N 330617 and into packing groove.

b. Carefully slip new packing over inboard end of piston and into packing groove.

NOTE

Ensure each packing is not twisted in groove.

c. Burnish scratches inside hydraulic ram cylinder that are less than **0.005** inch deep, using crocus cloth (C37).

d. Replace hydraulic ram if inside of cylinder has nicks, scratches, or pits deeper than **0.005** inch.

3-69. ASSEMBLY — GROUND HANDLING GEAR. (AVIM)

a. Insert trunnion (14, figure 3-7) in cradle assembly (5) with threaded openings aft.

NOTE

To prepare a new hydraulic pump (1, figure 3-7) and hydraulic ram (7) assembly for installation, remove pipe plug on each and drain hydraulic fluid.

b. Install hydraulic ram (7) on each end of trunnion (14) to bottom out in hole. Back off until hydraulic outlet is directed down. Secure with set screw (3).

c. Position hydraulic ram arm (2) on sleeve, insert axle (15), and secure with bolts, insert sleeve through cradle (5) and install hydraulic ram arm (2) and axle on opposite end. Hydraulic ram must be forward of wheel hub center line **1.98** inches. Refer to figure 3-11.

d. Position hydraulic pump (1, figure 3-7) on cradle (5) and secure with U-bolts (4), washer (24), and nut (23).

e. Install ram clevis (19). With hydraulic ram fully extended, adjust clevis to hold **1.48** inches diameter (figure 3-11).

f. Insert spring (25, figure 3-7) and support pin (26) into lower orifice of cradle (5). At same time insert release pin (27) into upper orifice of cradle (5). Align holes in both pins and install connecting pin (28).

g. Attach support rod (12) to clevis pin on axle and insert ball-lock pin (13).

h. Install tire and wheel assembly (16).

i. Bleed hydraulic pump as follows:

(1) Fill hydraulic pump cylinder (1) with hydraulic fluid (C62).

(2) Operate pump handle for several strokes to build up pressure.

(3) Crack (loosen) hose coupling (8) at tee of hydraulic pump (1).

(4) Operate pump handle until air bubbles no longer show at loose hose coupling (8) and fluid runs smoothly.

(5) Refill hydraulic pump and repeat previous steps to be sure all air is expelled from system.

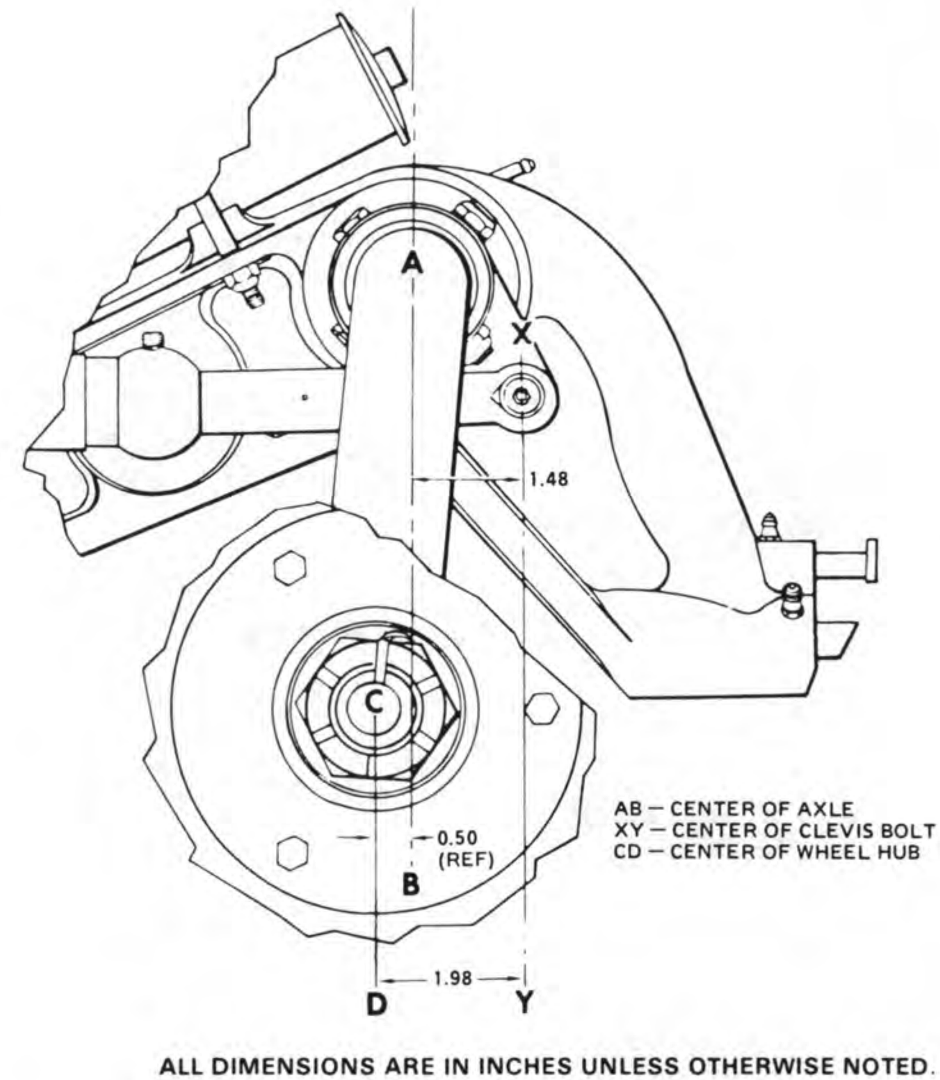

Figure 3-11. Ground Handling Wheels — Adjustment Dimensions

(6) Tighten hose coupling to hydraulic pump and refill cylinder.

j. Test hydraulic pump P/N BU0953B as follows:

(1) Fill the oil tank to proper level with hydraulic fluid (C62).

(2) Connect a 10,000 psi pressure gage to outlet hole.

(3) Operate pump until pressure builds up and overload valve unloads. Proper setting is **8300 TO 8800** PSI. If pressure goes too high, loosen nut (27, figure 3-8) and turn tie rod (29) counterclockwise, using a screwdriver. If pressure is too low, turn the tie rod clockwise. Test and readjust as necessary until proper setting is obtained.

(4) When proper setting is obtained, tighten nut (27).

NOTE

Hold tie rod in position using screwdriver in slot to prevent rod turning with the nut.

k. Test hydraulic ram as follows:

(1) Screw ram (7, figure 3-7) into trunnion (14) and connect ram to hydraulic pump (1).

(2) Pump until overload in pump goes off with ram against trunnion stop.

(3) Check for leaks.

(4) Release pressure and pump ram out halfway. Allow to stand a few minutes.

(5) Check for leaks. Ram is ready for service when no leaks are found.

3-70. ASSEMBLY — HYDRAULIC PUMP P/N BU0953B. (AVIM)

a. Insert brass spreader (14, figure 3-8) into pump body (15) flat side down.

b. Slide packing support (9) onto piston (7).

NOTE

The "V" must face away from groove on piston.

c. Dip two leather packings (10 and 11), one rubber packing (12), and third leather packing (13) into hydraulic fluid (C63), and assemble in that order over bottom end of piston.

NOTE

The "V" on packing must rest on brass spreader (14).

d. Place assembly bushing tool (T80) into top of hole in pump body (15).

e. Insert piston (7) with packings installed into bellmouth of assembly bushing tool (T80).

f. Slip packing seating tool (T81) over piston (7).

g. Drive piston (7) and packing down solid, using medium weight hammer on seating tool (T81).

h. Remove packing seating tool (T81) and assembly bushing tool (T80).

i. Install and tighten gland nut (8) using an adjustable spanner wrench. Install clip (48).

j. Insert 0.1875 inch diameter ball (35), suction valve spring (34), 0.3125 inch diameter ball (33), and discharge valve spring (32). Install screw (31).

k. Install filter screen (30) in hose hole.

l. Insert 0.3125 inch diameter ball (47), rubber packing (38), steel washer (46), and spring (45) into pump body (15).

CAUTION

To prevent damage to ball (47) and seat in pump body (15), do not force knob (41) down tight.

m. Install valve stem (44) in base and turn down against ball by slipping knob (41) onto stem and tightening. Remove knob (41) from stem (44).

n. Position spring (39) on knob (41) and install screw (43). Position knob (41) and spring (39) over stem (44). Install pin (40) through eye of spring (39) and into hole in pump body (15).

NOTE

Do not place knob onto hex of valve stem. Knob and valve stem should work free and valve should close firmly when opened and released.

o. Hold pump body (15) and valve stem (44) firmly and twist knob (41) to the left two faces of the hex. Push knob onto the hex of the valve stem at this position. Insert flat head socket screw (42) and tighten. Try knob action to see if closing is positive. If action is not positive, move knob to the left another face on hex, and recheck closing.

p. Install filter screen (23) in pump body (15) and secure with screw (22).

q. Install plunger (20) and spring (21) in overload valve body (19). Screw tie rod (29) into valve body (19) and position in tank (26).

r. Install gasket (18) and seal (16) and assemble tank (26) to pump body (15).

s. Install packing (28) and nut (27). Tighten nut lightly. Rotate tank so that filler hole is on top and in line with pump handle. Tighten nut (27) and replace tank filler hole screw (24) and packing (25).

t. Position handle assembly (3) to pump body (15) and secure with fulcrum pins (5 and 37) and retaining rings (1, 2, 6, and 36).

3-71. ASSEMBLY — HYDRAULIC PUMP, P/N HP9902-41-10. (AVIM)

a. Insert spreader (10, figure 3-9) into pump base (11) flat side down.

b. Slide packing nut (6) onto plunger (5).

c. Dip packing (7), cup retainer (8), and pump cap (9) into hydraulic fluid (C63) and assemble in that order over bottom end of plunger (5).

NOTE

The "V" on pump cup must rest on spreader.

d. Place assembly bushing tool (T80) into top hole in pump base (11).

e. Insert plunger (5) with packing nut, packing, cup retainer, and pump cup installed into bellmouth of assembly bushing tool (C80).

f. Slip packing seating tool (T81) over plunger.

g. Drive plunger (5) and assembled parts down solid, using medium weight hammer on packing seating tool.

h. Remove packing seating tool (T81) and assembly bushing tool (T80).

i. Tighten packing nut (6) using packing nut tool workaid (T84) (figure 3-10).

j. Insert 0.3125 inch diameter ball (33, figure 3-9), 0.2187 inch diameter ball (32), and outlet check spring (34). Install valve plug (35).

k. Install screen (22) in pump base (11).

l. Install release packing nut (14) on release spindle (16). Check threads on release packing nut (14) and release spindle (16) for free turning. Remove release packing nut (14) from release spindle (16).

NOTE

Touch up threads if damaged or binding.

m. Dip release packing (13), release packing nut (14) and release spindle (16) into hydraulic fluid (C63) and assemble parts in that order. Install release spindle (16) with release packing (13) and release packing nut (14) in pump base (11). Tighten release packing nut (14) until release packing (13) bottoms out in pump base (11). Loosen release packing nut (14) and torque to **20** inch-pounds.

n. Position return spring (15) over release spindle (16). Use capscrew (20) and washer (21) to attach return spring (15) to pump base (11).

o. Hold pump base (11) and release spindle (16) firmly. Place handle (17) on release spindle. Handle shall be vertical with release valve in closed position. Install capscrew (19) and lock washer (18). Hook return spring (15) around handle (17). Try handle action to check for positive closing of release valve.

NOTE

If handle action is not positive, move handle to the left another face on hex shank of release spindle, and check again for positive closing.

p. Install relief valve (23) and gasket (24) in pump base (11).

q. Set relief valve as follows:

(1) Connect hydraulic pump to hydraulic test stand (S2).

(2) Set relief valve to open at **8500** (±**300**) psi.

(3) Release pressure. Then increase pressure to **8000** psi. Observe for **15** seconds. Loss of pressure in excess of **500** psi is cause for rejection.

(4) Open release valve to drop pressure. From a 10 degree open position on handle (17), release quickly, letting return spring (15) close release valve.

NOTE

Do not push on handle.

(5) Increase pressure to **8000** psi. Observe for **14** seconds. Loss of pressure in excess of **500** psi is cause for rejection.

r. Install shim washer (29) and/or reservoir shim washer (28) as required to line up filler plug (27) on reservoir (25) with top of pump within plus or minus 10 degrees. Use of shim washers (29) and reservoir shim washers (28) varies from 0 to a total of 4. Install reservoir (25) in pump base (11). Ensure that filler plug on reservoir (25) lines up with top of pump within plus or minus 10 degrees.

s. Position beam (2) to plunger (5) and pump base (11). Install plunger cross pin (3) and beam pin (30). Secure beam pin (30) with two cotter pins (4 and 31).

t. Connect air line to fill port in reservoir (25). Apply **100** psi air pressure, and check hydraulic pump under water for signs of leakage. Reject hydraulic pump if there are signs of leakage. Remove hydraulic pump from water. Remove air line from reservoir (25). Install gasket (26) and filler plug (27).

3-72. PAINTING — GROUND HANDLING GEAR.

a. Clean components (TM 55-1500-204-25/1).

b. Repaint ground handling gear (TB746-93-2).

3-73. WHEELS, TIRES, AND TUBES — GROUND HANDLING GEAR.

3-74. DESCRIPTION — WHEELS, TIRES, AND TUBES.

The ground handling gear wheel assembly consists of two aluminum alloy wheels, two rubber tubes, and two 7.00-6, 6-ply rating, type III aircraft tires.

3-75. REMOVAL — WHEELS, TIRES, AND TUBES.

WARNING

Deflate tire prior to wheel assembly removal.

a. Remove wheels from axle (15, figure 3-7) by removing cotter pin (11), with nut (10), and retainer (9).

b. Deflate tire and use suitable tools to remove tire and tube from wheel rim.

3-76. INSPECTION — WHEELS, TIRES, AND TUBES.

a. Inspect rim of wheel for deformation, wear, or damage. Deformation is cause for rejection.

b. Inspect tires and tubes for excessive wear or damage.

c. If tire is mounted on wheel, make sure air pressure is **50** PSI.

3-77. REPAIR OR REPLACEMENT — WHEELS, TIRES, AND TUBES.

a. Replace tire if tread is worn excessively or cut to where cord is visible.

b. Repair or replace tires and tube (TM 55-2620-200-24).

c. Repair of wheels is limited to polishing out minor scratches, nicks, or dents with fine India stone (C116).

d. Repaint wheels (TB746-93-2).

3-78. INSTALLATION — WHEELS, TIRES, AND TUBES.

a. Install tube on wheel with tire. Make sure tube is not pinched or rolled under.

b. Inflate tire to **50** PSI with low pressure air source.

c. Place wheel assembly (16, figure 3-7) on axle (15) and secure with retainer (9), nut (10), and cotter pin (11).

3-79. PAINTING — WHEELS, TIRES, AND TUBES.

a. Touch up rim of wheel to match original finish.

b. Repaint rim of wheels (TB746-93-2).

SECTION II. SKIDS/STRUTS

(Not Applicable)

SECTION III. FLOATS

(Not Applicable)

SECTION IV. SKIS

(Not Applicable)

SECTION V. BRAKES

(Not Applicable)

CHAPTER 4

POWER PLANTS

SECTION I. POWER PLANT

4-1. POWER PLANT.

4-2. DESCRIPTION — POWER PLANT.

The power plant consists of a T53-L-703 series shaft turbine engine mounted horizontally on the fuselage behind the main rotor pylon, with adapting parts and connections to the airframe structure and to fuel, oil, electrical, instrument, and engine control systems (figures 4-1 and 4-2). The engine and transmission are enclosed by cowling and fairing. Hinged pylon fairing doors at each side give access to the air induction and driveshaft area ahead of the engine forward firewall. These doors also have engine air inlet scoops. The engine compartment between forward and rear firewalls has hinged side doors equipped with cooling air inlets. Doors also have armor panels to protect the fuel control and compressor section. The exhaust area, behind the rear firewall, is enclosed by removable fairing.

4-3. CLEANING — POWER PLANT.

Refer to TM 55-2840-229-24.

4-4. OPERATIONAL CHECK — POWER PLANT.

Refer to TM 55-1520-236 MTF and TM 55-2840-229-24.

4-5. ENGINE ASSEMBLY.

4-6. DESCRIPTION — ENGINE ASSEMBLY.

The T53-L-703 engine is an improved version of the T53-L-13 series. The engine is a free-type power turbine, turboshaft. The engine incorporates a two stage power turbine and two stage gas producer turbine. Major sections of the engine are the air-inlet, compression, diffuser, combustion and exhaust. The engine is flat rated at 1485 shp, and derated to 1290 shp due to transmission limitations. The engine is cooled by ram and ambient air.

4-7. SERVICING — ENGINE ASSEMBLY.

Refer to chapter 1.

4-8. ADJUSTMENT — ENGINE ASSEMBLY.

Refer to TM 55-2840-229-24.

4-9. VIBRATION TESTING — ENGINE ASSEMBLY.

a. Refer to TM 55-2840-229-24 to detailed instructions to perform engine vibration check.

Premaintenance Requirements For Vibration Test of Engine Assembly

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All T53-L-703 engines
Special Tools	Refer to TM 55-2840-229-24
Test Equipment	Refer to TM 55-2840-229-24
Support Equipment	Refer to TM 55-2840-229-24
Minimum Personnel Required	Two
Consumable Materials	(C24)
Special Environmental Conditions	None

b. Prepare helicopter for vibration testing.

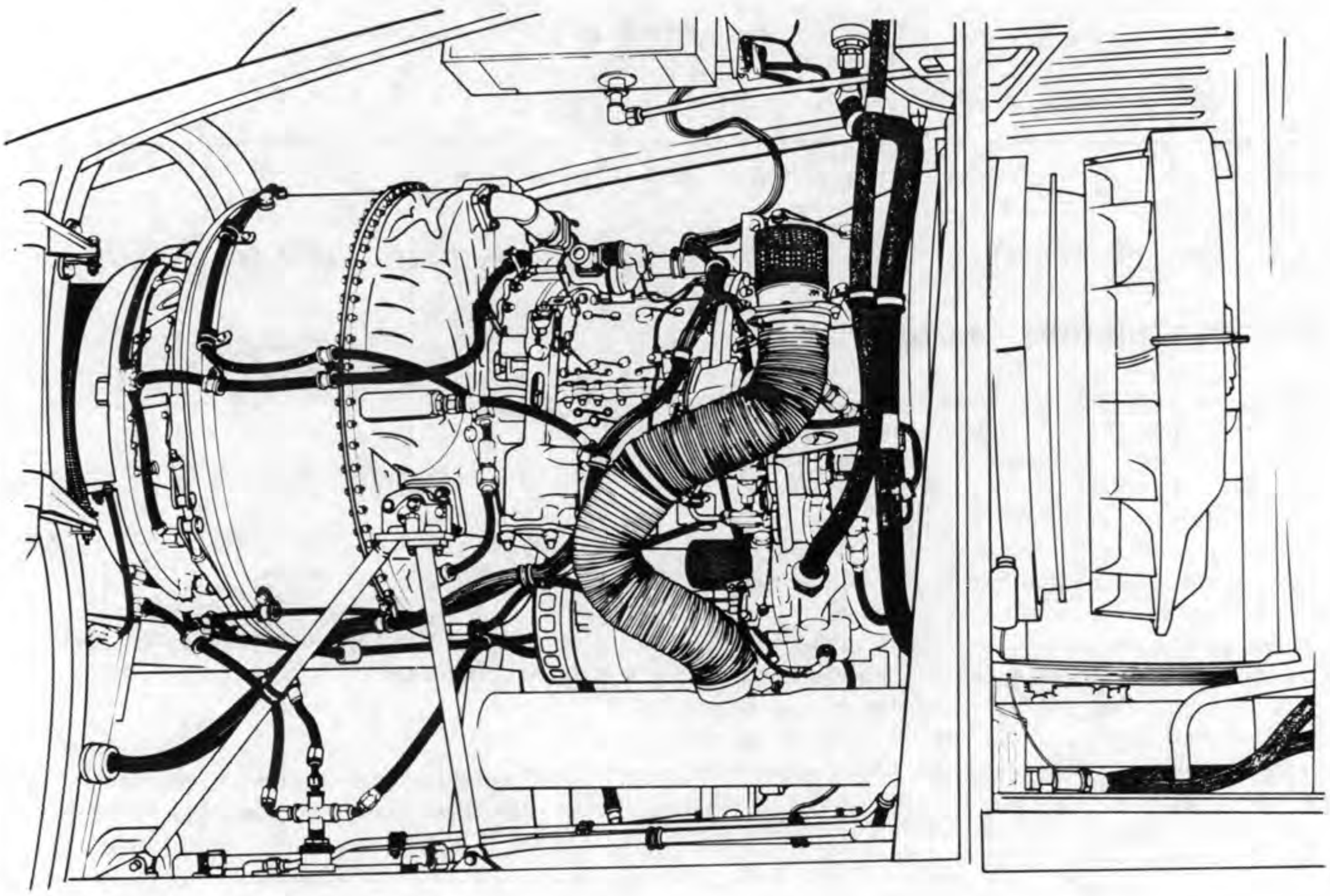

Figure 4-1. Power Plant Installation — Right Side

WARNING

To prevent a possible electrical shock hazard to personnel and damage to equipment, set vibration tester meter power switch to OFF, while breaking or making connections to a source of electrical power.

CAUTION

Leave enough slack in cables to prevent unnecessary strain on pickups and connectors. Avoid conditions that would cause cables to deteriorate from heat or abrasion.

(1) Route vibration cable assemblies aft to one location. Secure to engine bleed air tube, adjacent to ignition exciter box, with cable clamps (figure 4-3).

(2) Route cables out left engine compartment door ventilation opening. Make sure cables are clear of engine throttle control linkages. Close and secure engine compartment door.

(3) Route cable forward over wing, along left side of aircraft to gunner station. Remove four screws at location shown on figure 4-3 where clamps will be installed. Retain screws for later installation.

(4) Secure cable to fuselage with clamps at four points as shown on figure 4-3. Use AN3 bolts to secure clamps to fuselage.

(5) Route cables inboard into gunner compartment.

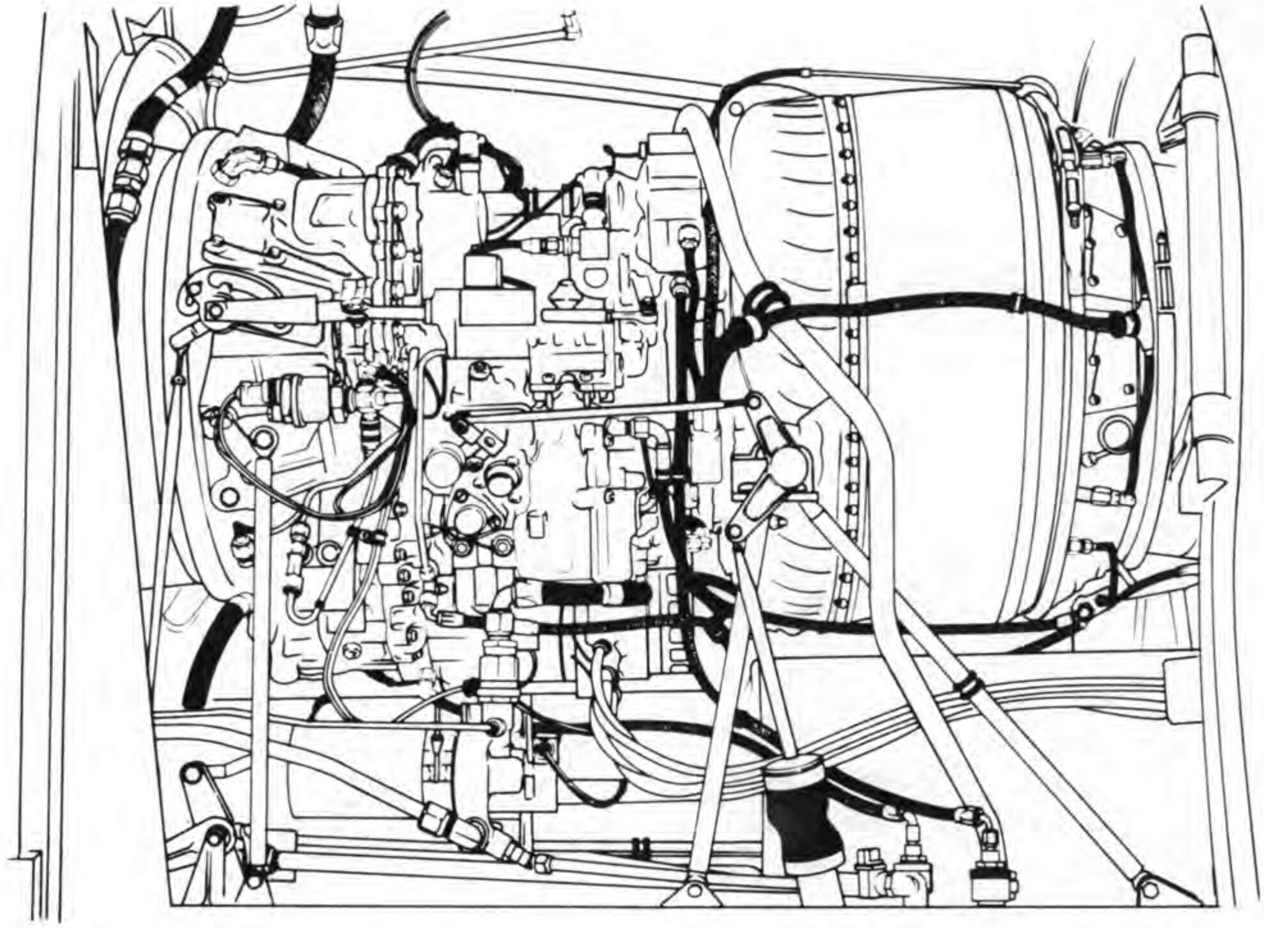

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Figure 4-2. Power Plant Installation — Left Side

NOTE

During test it will be necessary to compress seal on gunner access door under cables to allow closing of the door for flight.

(6) Secure vibration meter with bungee cord (shock cord) (C24) or other suitable means, to a cushioned, protected location in aircraft cabin.

(7) After test, remove all test equipment, cables and clamps. Install four screws that were removed in step (3).

4-10. MAINTENANCE PRECAUTIONS — ENGINE ASSEMBLY.

a. Use extreme caution to prevent dirt and foreign objects from entering the engine. Place temporary covers on all exposed openings. All open hoses and tubing shall be protected with plastic or metal caps. If suitable caps are not available use commercial grade aluminum foil crimped to fit the particular opening.

WARNING

Penetrating oil may cause a skin rash if prolonged contact is allowed. Do not inhale vapors, or allow to come in contact with skin, eyes or clothing.

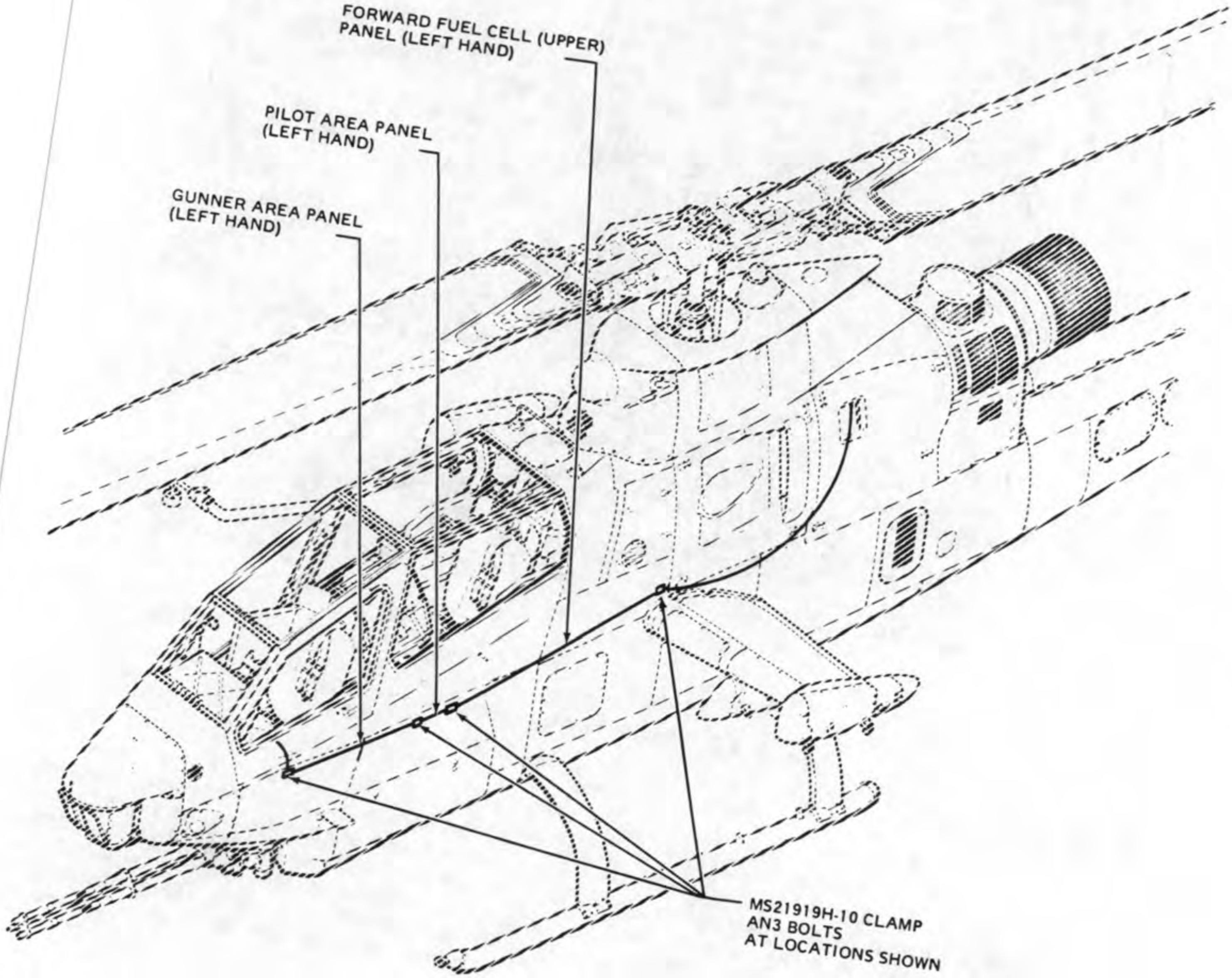


Figure 4-3. Engine Vibration Test Equipment Cabling Tiedown

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

CAUTION

Do not use tape to seal fuel or oil openings. Tape adhesive is soluble in fuel or oil and can cause contamination.

b. Apply penetrating oil (C81) as required to assist in removal of parts during disassembly. On parts to be installed, remove all traces of penetrating oil with solvent (C112).

c. Protect engine from dust and inclement weather. If practical, perform engine maintenance in closed areas.

WARNING

HANDLING IGNITION UNIT

The ignition unit contains a very small amount of radioactive material. (Cesium-Barium 137) and normally requires no handling precautions. However, severely damaged units that have been broken open must be handled with forceps or gloves and disposed of in accordance with AR-755-15 and TB 43-0108.

d. Before removing engine components, disconnect the electric cable assembly at the ignition unit and ground the ignition leads.

e. Discard used lockwire, packings, cotter pins, gaskets, tabwashers, lockpins, keywashers, and lockwashers.

CAUTION

Use care to prevent damage to lockwire holes.

f. When removing hoses and electrical lines, remove clamps from brackets. Leave brackets on the engine unless otherwise stated.

g. When disconnecting electrical connectors, or hose and tubing fittings, remove clamps on brackets as required to gain slack and avoid damage to connectors and fittings.

h. Remove hose assemblies that may be damaged during removal of engine components.

CAUTION

Do not use cadmium-plated tools for any of the disassembly or reassembly procedures given in this manual. Cadmium plating has a tendency to chip. If these chips enter the engine, they will contaminate the lubrication system, possibly clog the filters, and cause magnesium parts to deteriorate.

i. Avoid hanging objects (tools, etc.) on hose assemblies.

j. Care shall be taken to route and clamp hose assemblies securely. Chafing shall be avoided at all times. Proper clamping and chafe pads shall be used at all times.

k. During removal, examine all parts for serviceability. Look for indications of work that was incorrectly performed during previous repairs or overhauls. Report such indications in accordance with current practice.

l. When removing or installing oil, fuel, and air hose assemblies, do not apply torque to the narrow hex nut of the sleeve and nipple. Torque must be applied only to the wide hex nut. Secure the nipple or sleeve to prevent twisting of the hose assembly.

WARNING

Prolonged contact with lubricating oil may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

CAUTION

Lubricating oil may soften paint upon contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

CAUTION

To ensure total seating of packings, remove identifying paint by carefully rubbing or scraping paint with finger or fingernail. Do not use a sharp instrument which could damage the packing.

NOTE

Fittings being tightened to prescribed torque should have dry, clean threads.

m. Remove protective tape, caps, plugs, and covers as necessary for installation.

4-11. TROUBLESHOOTING — ENGINE ASSEMBLY.

Refer to TM 55-2840-229-23.

4-12. REMOVAL — ENGINE ASSEMBLY.

Premaintenance Requirements for Removal of Engine Assembly

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	(T9), (T17), (T18), (T19), (T45)
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Three
Consumable Materials	(C85)
Special Environmental Conditions	None

a. Disconnect battery (paragraph 9-49).

b. Remove all engine cowling (paragraphs 2-79 and 2-80).

c. Remove transmission cowling (paragraph 2-78).

d. Remove particle separator (paragraph 4-28).

e. Remove main driveshaft (paragraph 6-8).

f. Remove exhaust system.

(1) P E Exhaust system (paragraph 4-41).

(2) P E IR Suppression system (paragraph 4-47).

(3) M IR Suppression system (paragraph 4-54).

NOTE

When electrical cables and plugs are disconnected from airframe plugs, secure cables and plugs to engine in a manner that will avoid interference when removing engine assembly.

g. Disconnect electrical cables and plug at airframe location.

(1) Remove two clamps (18 and 19, figure 4-4) securing harness assembly (14) to left side of driveshaft shroud.

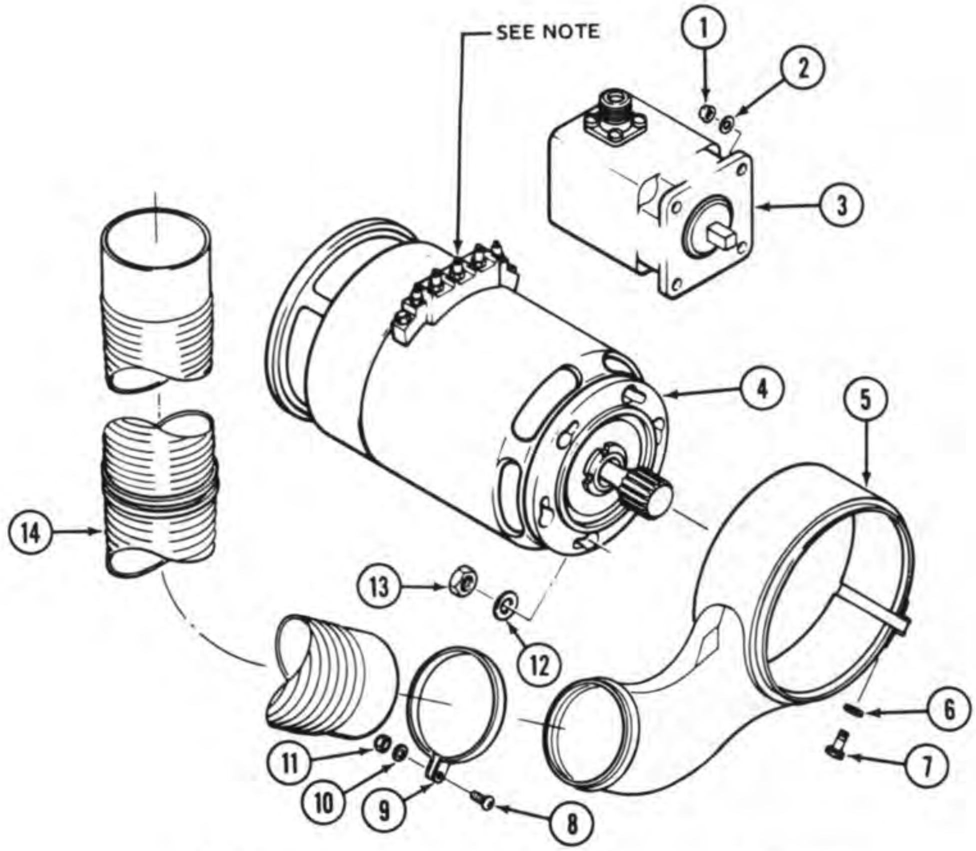
(2) Disconnect plug of harness assembly (14) from aft firewall on left side of engine.

(3) Remove clamp securing cable assembly (21) to fuel filter.

(4) Disconnect plug of cable assembly (21) from fuel filter.

NOTE

Observe position of terminal block prior to removal of starter generator from engine for installation in same location.



1. Nut
2. Washer
3. Gas producer tachometer generator
4. Starter generator
5. Shroud
6. Washer
7. Bolt
8. Screw
9. Clamp
10. Washer
11. Nut
12. Washer
13. Nut
14. Hose assembly

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Figure 4-3.1. Starter-Generator and Gas Producer Tachometer Generator

NOTE

Observe position of terminal block in relation to engine for installation of starter-generator in same location.

(7) Remove inlet shroud (5) from forward end of starter-generator.

d. Remove particle separator (paragraph 4-28).

e. Remove main driveshaft (paragraph 6-8).

f. Remove exhaust system.

(1) P E Exhaust system (paragraph 4-41).

(2) P E IR Suppression system (paragraph 4-47).

(3) M IR Suppression system (paragraph 4-54).

NOTE

When electrical cables and plugs are disconnected from airframe plugs, secure cables and plugs to engine in a manner that will avoid interference when removing engine assembly.

g. Disconnect electrical cables and plug at airframe location.

(1) Remove two clamps (18 and 19, figure 4-4) securing harness assembly (14) to left side of driveshaft shroud.

(2) Disconnect plug of harness assembly (14) from aft firewall on left side of engine.

(3) Remove clamp securing cable assembly (21) to fuel filter.

(4) Disconnect plug of cable assembly (21) from fuel filter.

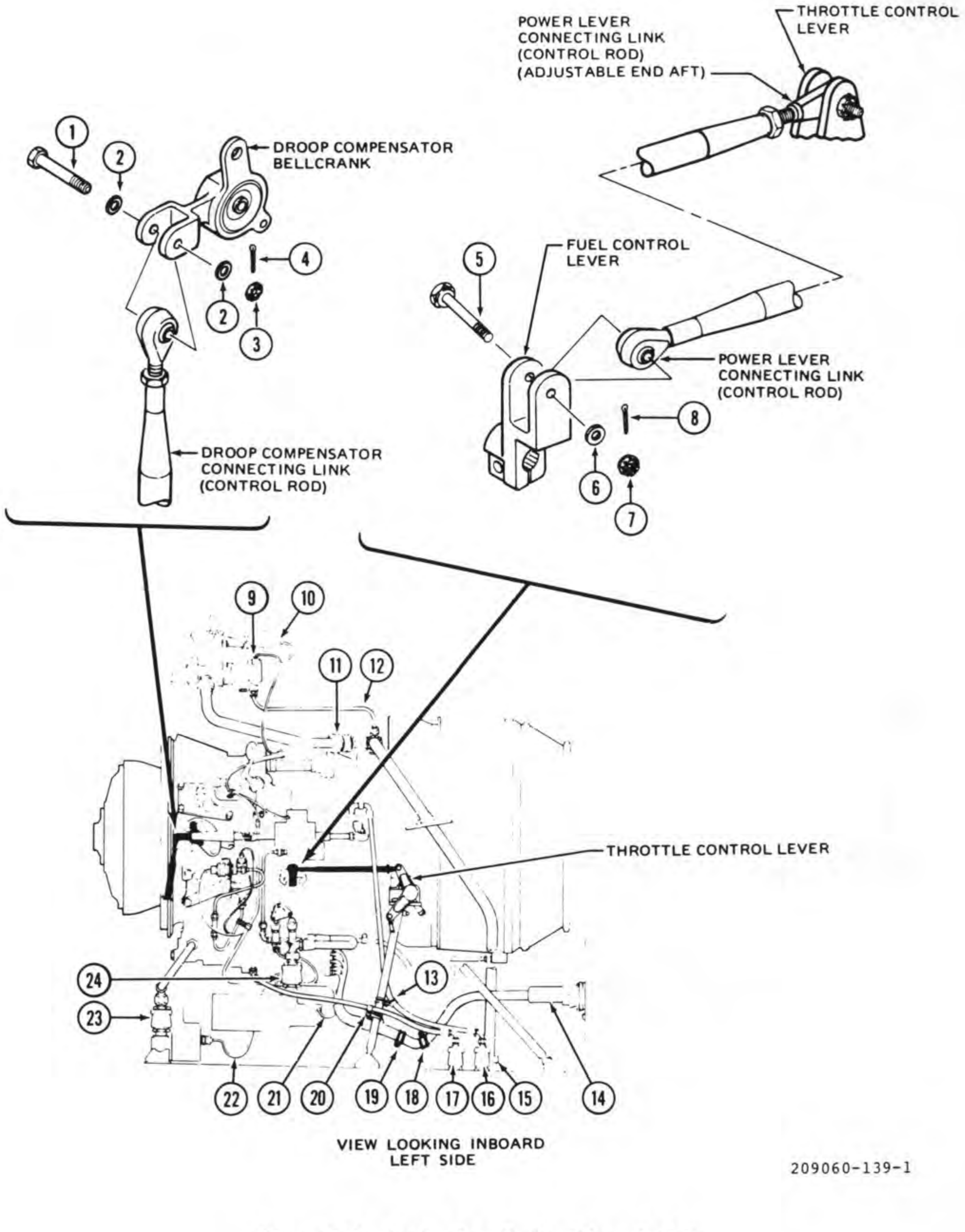
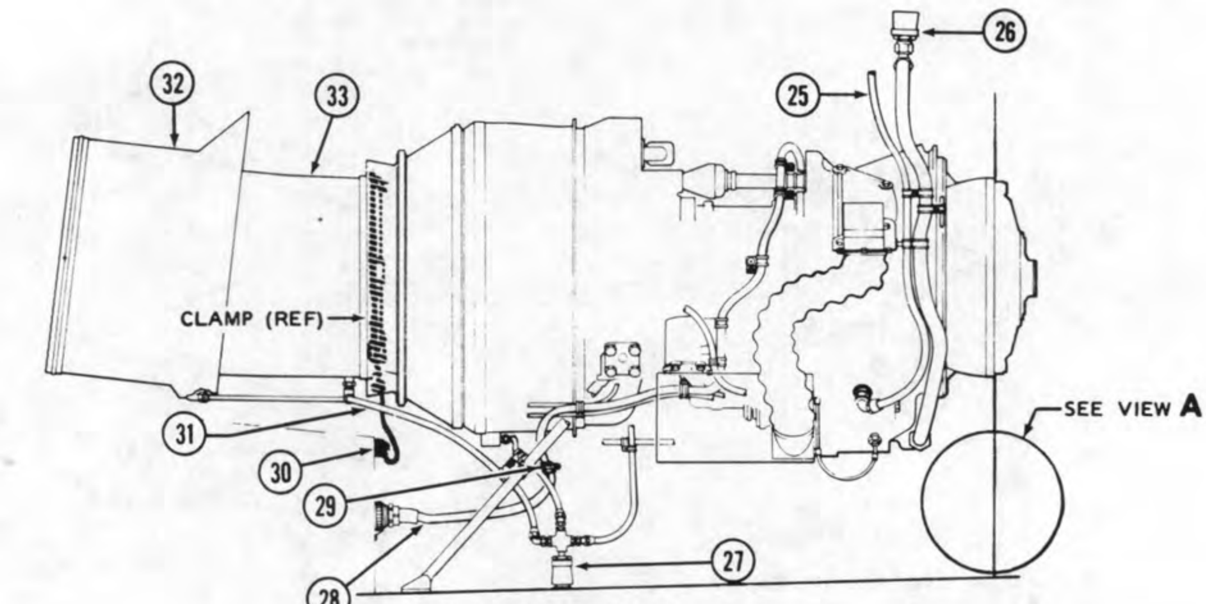


Figure 4-4. Engine Installation (Sheet 1 of 4)



1. Bolt
2. Washer (2 reqd)
3. Nut
4. Cotter pin
5. Bolt
6. Washer
7. Nut
8. Cotter pin
9. Electrical plug (bleed air valve)
10. Electrical plug (oil tank low level switch)
11. Coupling (bleed air)
12. Tube assembly
13. Clamp
14. Electrical harness assembly
15. Coupling bleed air
16. Fuel drain disconnect (governor bleed)
17. Oil drain disconnect (starter seal)
18. Clamp
19. Clamp
20. Clamp
21. Cable assembly (fuel filter)
22. Cable assembly (oil bypass valve)
23. Oil hose disconnect
24. Fuel disconnect (fuel filter to engine)
25. Hose assembly (oil breather)
26. Hose assembly (oil in)
27. Fuel drain disconnect
28. Electrical harness assembly
29. Clamp
30. Exhaust thermocouple cable
31. Fuel drain hose
32. Ejector
33. Tail pipe
34. Hose assembly
35. Tee
36. Transducer (inboard)
37. Bracket
38. Union
39. Hose assembly

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Figure 4-4. Engine Installation (Sheet 2 of 4)

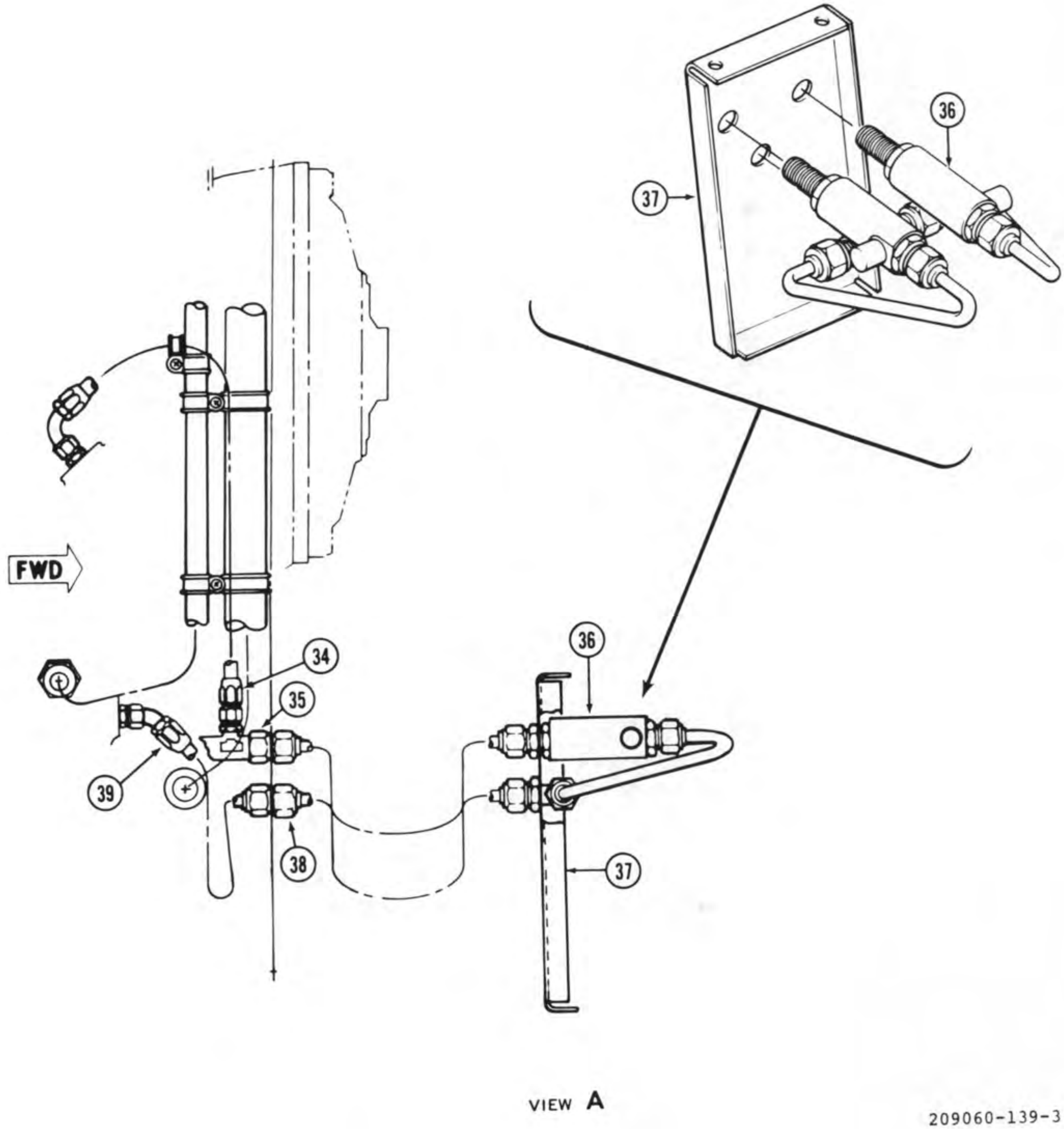
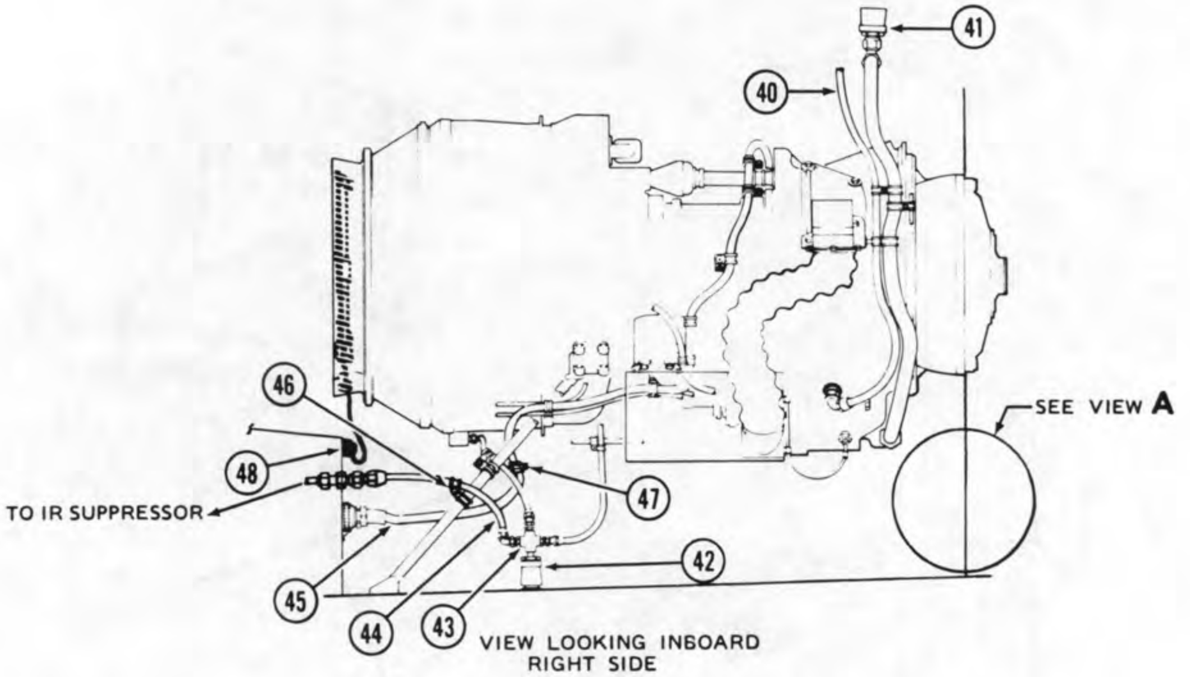


Figure 4-4. Engine Installation (Sheet 3 of 4)



M

40. Hose assembly (oil breather)
41. Hose assembly (oil in)
42. Fuel drain disconnect
43. Tube cross
44. Fuel drain hose
45. Electrical harness assembly
46. Clamp
47. Clamp
48. Exhaust thermocouple cable

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Figure 4-4. Engine Installation (Sheet 4 of 4)

(5) Disconnect plug of cable assembly (22) from engine oil bypass valve.

(6) Remove harness clamp.

(a) P E Remove clamp (29) securing harness assembly (28) to right side of driveshaft shroud.

(b) M Remove clamp (47) securing harness assembly (45) to right side of driveshaft shroud.

(7) Disconnect harness plug.

(a) P E Disconnect plug of harness assembly (28) from aft right side of firewall.

(b) M Disconnect plug of harness assembly (45) from aft right side of firewall.

(8) Disconnect exhaust thermocouple.

(a) P E Disconnect exhaust thermocouple (30) from aft right side firewall.

(b) M Disconnect exhaust thermocouple (48) from aft right side firewall.

(9) Disconnect electrical plug (9) at bleed air valve.

(10) Disconnect oil tank low level switch electrical plug (10) at airframe plug.

h. Disconnect fuel, oil, and bleed air hoses, lines, and tubes as follows:

NOTE

When removing fuel and oil hoses, lines, fittings, ensure residual fluids have been drained. Cap all open ports. Inspect all removed parts for serviceability.

(1) P E Disconnect hose assembly (26) at oil tank disconnect fitting.

(2) P E Disconnect hose assembly (25) at oil tank disconnect.

(3) P E Disconnect fuel drain disconnect (27) from right side engine deck fitting.

(4) M Disconnect hose assembly (41) at oil tank disconnect fitting.

(5) M Disconnect hose assembly (40) at oil tank disconnect.

(6) M Disconnect fuel drain hose (44) at tube cross (43).

(7) M Disconnect fuel drain disconnect (42) from right side engine deck fitting.

(8) Disconnect oil bypass valve hose (23) at engine deck fitting on left forward side of engine.

(9) Disconnect fuel filter hose (24) at engine deck disconnect fitting.

(10) Disconnect starter seal drain hose disconnect (17) at engine deck.

(11) Disconnect governor and filter bleed hose disconnect (16) at engine deck.

(12) Disconnect bleed air line coupling (15) at engine deck coupling.

(13) Disconnect tube assembly (12) from top of engine. Disconnect opposite end at bleed air valve and remove tube assembly (12).

(14) Disconnect bleed air tube coupling (11) at top of engine. Disconnect opposite end and remove bleed air tube.

(15) Remove cotter pin (4), nut (3), washers (2) and bolt (1). Disconnect connecting link (control tube) from droop compensator bellcrank.

(16) Remove cotter pin (8), nut (7), washer (6) and bolt (5). Disconnect power lever connecting link (control rod) from fuel control lever.

(17) Disconnect hose assembly (34) from tee (35).

(18) Disconnect hose assembly (39) from union (38).

i. Attach engine lifting sling (T9) to engine assembly. Attach a hoist (T45) to sling. Take slack out of hoist and sling.

j. Loosen nuts (19, figure 4-5) from left and right side pillow blocks. Open pillow blocks.

k. Remove bolt (8), from forward engine mount trunnion (paragraph 4-18).

l. Slowly hoist engine from helicopter structure ensuring all hoses, tubing, and electrical cables are clear of airframe.

m. Install engine in engine and transmission stand (T19) on transportation trailer.

4-13. INSPECTION — ENGINE ASSEMBLY.

a. Inspect external hoses, tubing, and electrical cables on engine assembly for damage and serviceability before engine assembly is reinstalled in helicopter airframe.

b. If engine assembly is to be reinstalled, inspect engine assembly in accordance with TM 55-2840-229-24.

4-14. REPAIR OR REPLACEMENT — ENGINE ASSEMBLY.

a. Refer to TM 55-2840-229-24 for repair of engine and engine furnished components.

b. Refer to paragraph 4-118 for buildup of adapting parts on replacement engine.

4-15. INSTALLATION — ENGINE ASSEMBLY.

a. Attach engine lifting sling (T9) to engine assembly.

b. Attach lifting sling (T9) to hoist (T45). Take up slack in hoist and remove hardware securing engine to engine and transmission stand (T19) or transportation trailer.

c. Hoist engine to clear airframe engine mounts. Ensure airframe pillow blocks are open amd slowly lower engine assembly aligning engine trunnion bearings over engine mount pillow blocks.

d. Align forward trunnion (1, figure 4-5) with rod end bearing (12) of forward engine mount tube (10). Install bolt (8) through rod end bearing (12) and trunnion (1). Tighten bolt (8). Lockwire (C137) bolt (8) to upper bolt (6), then to lower bolt (6).

e. Close pillow block (17, figure 4-5) over left aft trunnion bearing (14). Ensure that correct special washer (22) is installed and tighten ring base nut (19). Install pillow block on right aft trunnion bearing in same manner.

f. Connect electrical cable harness and cable assemblies as follows:

(1) Connect plug of harness assembly.

(a) P E Connect plug of harness assembly (28, figure 4-4) to a plug on right side of aft firewall. Attach harness assembly (28) to right side of driveshaft shroud with clamp (29).

(b) M Connect plug of harness assembly (45, figure 4-4) to plug on right side of aft firewall. Attach harness assembly (45) to right side of driveshaft shroud with clamp (47).

(2) Connect plug of harness assembly (14) to plug on left side of aft firewall.

(3) Connect plug of cable assembly (21) to fuel filter plug.

(4) Connect plug of cable assembly (22) to oil bypass valve.

(5) Attach clamps (18 and 19) to left side of driveshaft shroud.

(6) Secure cable assembly (21) to fuel filter using existing clamp on fuel filter.

(7) Connect electrical plug (9) to bleed air valve plug.

(8) Connect electrical plug (10) to airframe mounted plug for oil tank low lever switch.

g. Connect engine fuel, oil and bleed air hoses, and tubing as follows:

(1) Connect fuel drain hoses.

(a) P E Connect fuel drain disconnect (27) to engine deck fitting.

(b) M Connect fuel drain disconnect (42) to engine deck fitting.

(c) M Connect fuel drain hose (44) to tube cross (43).

(2) Connect fuel disconnect (24) to fuel filter.

(3) Connect oil hose disconnect (23) to oil bypass valve.

(4) Connect oil drain disconnect (17) to engine deck fitting.

(5) Connect fuel drain disconnect (16) to engine deck fitting.

(6) Connect engine bleed air tube coupling (15) to engine deck fitting.

(7) P E Connect oil hoses.

(a) P E Connect coupling of oil breather hose assembly (25) to engine oil tank.

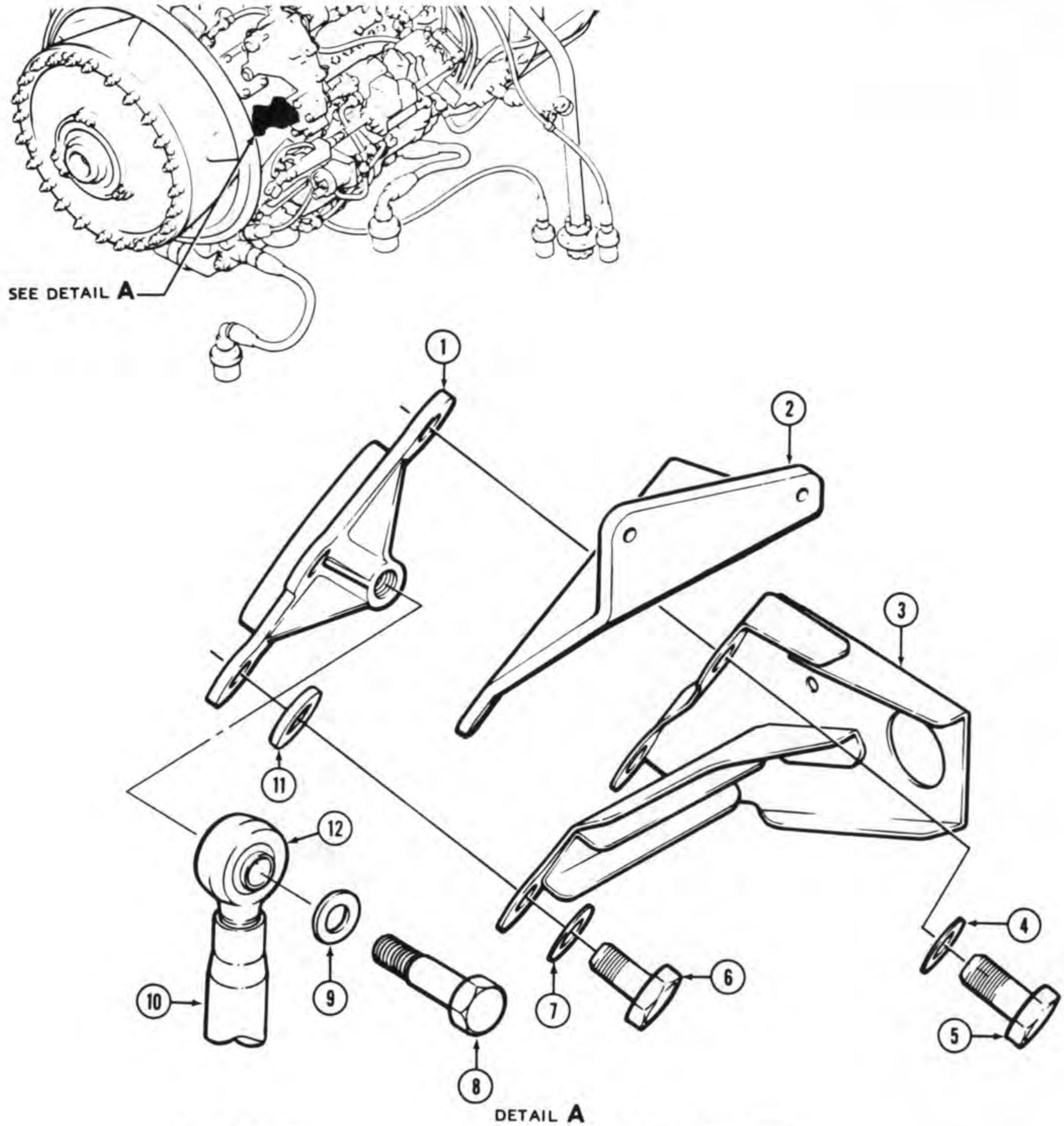
(b) P E Connect coupling of hose assembly (26) to engine oil tank.

(8) M Connect oil hoses.

(a) M Connect coupling of oil breather hose assembly (40) to engine oil tank.

(b) M Connect coupling of hose assembly (41) to engine oil tank.

(9) Install tube assembly (12) between bleed air valve and bleed air fitting on top of engine.



1. Trunnion
2. Cambox assembly bracket
3. Transducer bracket
4. Thin steel washer
5. Bolt
6. Bolt
7. Thin steel washer
8. Special bolt
9. Thin steel washer
10. Engine mount forward
11. Steel washer
12. Rod end bearing

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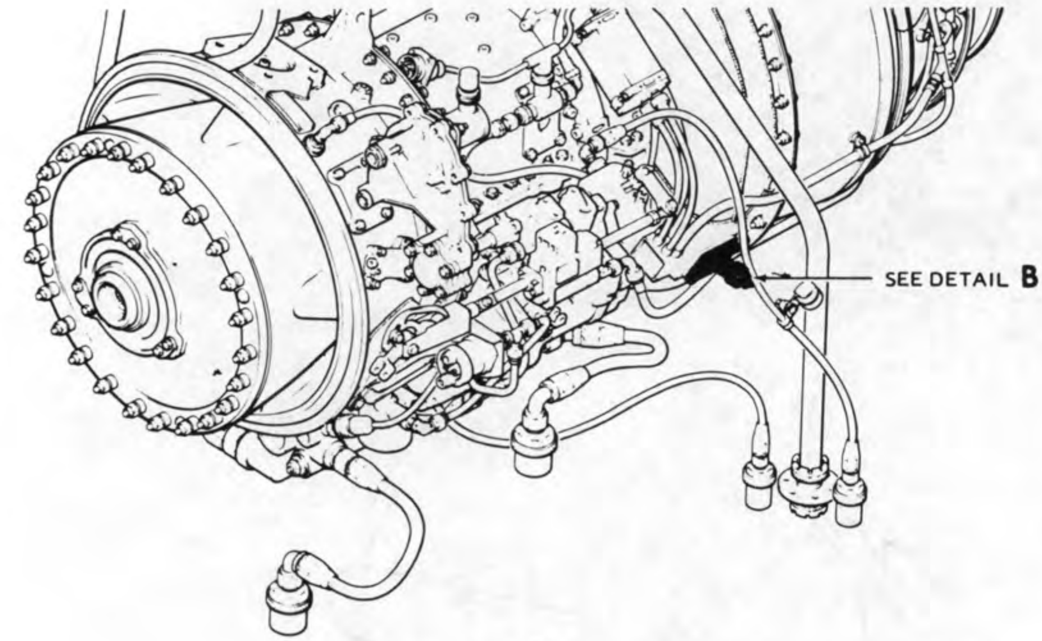
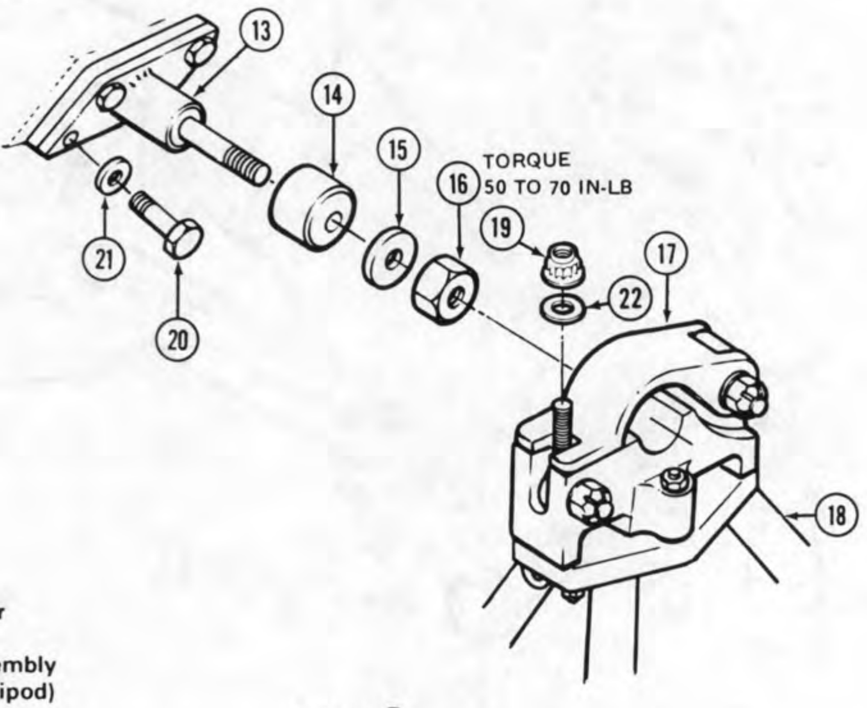
Figure 4-5. Engine Mount Fittings (Trunnions) Installation (Sheet 1 of 2)





13. Trunnion
14. Bearing
15. Thin steel washer
16. Nut
17. Pillow block assembly
18. Engine mount (tripod)
19. Ring base nut
20. Bolt
21. Thin steel washer
22. Special Washer

DETAIL B

209060-121-2A

Figure 4-5. Engine Mount Fittings (Trunnions) Installation (Sheet 2 of 2)

(10) Install bleed air tube and coupling (11) between bleed air line and fitting.

(11) Install hose assembly (34) on tee (35).

(12) Install hose assembly (34) on union (38).

h. Position droop compensator control rod on droop compensator bellcrank (3) and install bolt (1), two washers (2), nut (3), and cotter pin (4).

i. Position power lever connecting link on fuel control lever and install bolt (5), washer (6), nut (7), and cotter pin (8).

j. Check rigging on power lever and droop compensator (paragraphs 4-105 and 4-113).

k. Install exhaust system.

(1) P F Exhaust system (paragraph 4-44).

(2) P F IR Suppression system (paragraph 4-51).

(3) M IR Suppression system (paragraph 4-58).

4-16. ENGINE MOUNT FITTINGS (TRUNNIONS).

4-17. DESCRIPTION — ENGINE MOUNT FITTINGS (TRUNNIONS).

Engine mount fittings (trunnions) are the part of the engine mounts that are installed on the engine. The forward fitting (trunnion) is bolted to the forward left side mount pad. The two aft fittings (trunnions) are bolted to the rear mounting pads, one left and one right.

4-18. REMOVAL — FORWARD ENGINE MOUNT FITTING (TRUNNION).

a. Attach engine lifting sling (T9) to engine assembly. Attach hoist (T45) to sling. Take up slack between hoist and sling.

b. Cut lockwire attached to bolt (8, figure 4-5). Remove lockwire.

c. Remove bolt (8) and washer (9) from trunnion (1).

d. Cut lockwire attached to bolts (5 and 6). Remove lockwire.

e. Remove bolts (5 and 6), washers (4, 7, and 11).

f. Remove cambox assembly bracket (2) and transducer bracket (3).

g. Remove trunnion (1).

4-19. REMOVAL — AFT ENGINE MOUNT FITTINGS (TRUNNIONS).

a. Attach engine sling (T9) to engine assembly. Attach hoist (T45) to sling. Take up slack in hoist cable to relieve weight from engine mount.

b. Remove left aft fitting (trunnion) (13, figure 4-5) as follows:

CAUTION

Ensure that engine is supported by hoist and sling prior to removal of pillow block.

(1) Remove left pillow block assembly (17) by procedure outlined in paragraph 2-203.

(2) Remove self-locking nut (16), washer (15), and bearing (14) from trunnion on left side of engine.

(3) Remove lockwire from four bolts (20). Remove bolts (20) and washers (21).

(4) Remove trunnion (13).

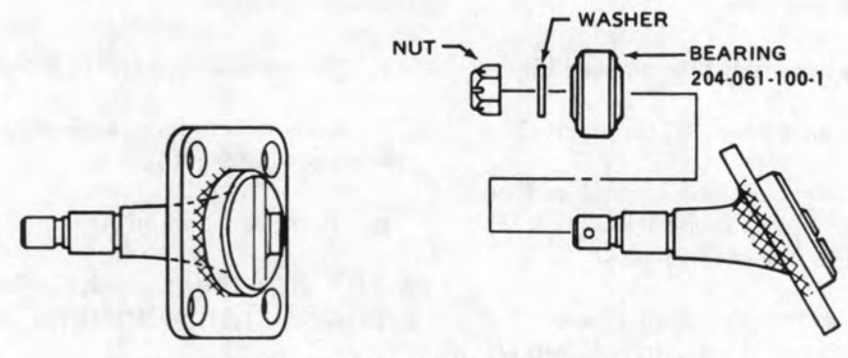
d. Remove aft right engine mount fitting (trunnion) by same procedure outlined in step b.

4-20. INSPECTION — ENGINE MOUNT FITTINGS (TRUNNIONS).

a. Inspect aft engine mount fittings (trunnions) for damage in excess of limits shown in figure 4-6.

b. Inspect bearings on aft engine mount fittings (trunnions) for damage and wear (looseness) in excess of limits shown in figure 4-6.

c. Inspect forward engine mount fitting (trunnion) (1, figure 4-5) for nicks, scratches, cracks and thread damage. No cracks, thread damage or severe mechanical damage is acceptable.



ENGINE MOUNT FITTING (TRUNNION) 204-060-152-1

DAMAGE LOCATION SYMBOLS

TYPE OF DAMAGE	MAXIMUM DEPTH AND REPAIR AREAS ALLOWED	
CRACKS	None	None
NICKS, SCRATCHES, DENTS AND CORROSION	0.010	0.020
MAXIMUM AREA PER FULL DEPTH REPAIR	Not critical	Not critical
NUMBER OF REPAIR AREAS	Not critical	Not critical
EDGE CHAMFER	0.010	0.020
BORE DAMAGE	0.002 for 1/4 Circumference	
THREAD DAMAGE ON FITTING AND NUT	None acceptable	
BEARING WEAR (LOOSENESS)		
Radial	0.006	
Axial	0.012	

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204060-1054

Figure 4-6. Damage Limits — Aft Engine Mount Fittings (Trunnions) and Bearings

4-21. REPAIR OR REPLACEMENT — ENGINE MOUNT FITTINGS (TRUNNIONS).

a. Replace bearings if damaged or worn in excess of limits (paragraph 4-20).

(1) Remove nut (16, figure 4-5), washer (15) and bearing (14).

(2) Position serviceable bearing (14) on fitting (trunnion). Install thin steel washer (15) and self-locking nut (15). Torque **50 TO 70** inch-pounds.

b. Replace engine mount fittings (trunnions) if damaged in excess of limits (paragraph 4-20).

c. Polish out mechanical and corrosion damage that is within limits shown on figure 4-6 with fine India stone (C116). Touch up repair area with primer (C88 or C91).

4-22. INSTALLATION — FORWARD ENGINE MOUNT FITTING (TRUNNION).

NOTE

If trunnion was removed from an installed engine, the engine should be supported by a hoist (paragraph 4-18).

a. Position trunnion (1, figure 4-5) on engine forward left mount pad.

b. Position cambox assembly bracket (2), and transducer bracket (3) on lower portion of trunnion (1) with washer (11) between bracket and trunnion.

c. Install two thin steel washers (4) and bolts (5). Do not tighten bolts. If required, add a maximum of three AN960C816 and/or AN960C816L washers (paragraph 4-120) to obtain a flush fit between transducer bracket (3) and trunnion (1).

d. Install two bolts (6) and thin steel washers (7). Tighten bolts (5) and bolts (7) evenly.

e. Position forward engine mount (10) on trunnion (1) and install special bolt (8) and thin steel washer (9).

f. Lockwire (C137) bolts (5, 6, and 8).

g. Remove hoist and engine sling if applicable.

4-23. INSTALLATION — AFT ENGINE MOUNT FITTINGS (TRUNNIONS).

NOTE

If trunnions were removed from an installed engine, the engine should be supported by a hoist (paragraph 4-19).

a. Install left aft trunnion (13, figure 4-5) as follows:

(1) Position trunnion (13) on engine left aft mount pad.

(2) Install four bolts (20) and thin steel washers (21). Lockwire (C137) bolts in pairs.

b. Install right aft trunnion in same manner outlined in step a.

c. Remove hoist and engine sling if applicable.

d. Install main driveshaft (paragraph 6-13).

e. Install particle separator (paragraph 4-32).

f. Install engine cowling and transmission cowling (chapter 2).

g. Connect battery.

h. Perform runup and maintenance test flight.

SECTION II. COOLING SYSTEM

(Not Applicable)

SECTION III. AIR INDUCTION SYSTEM

4-24. AIR INDUCTION SYSTEM.

4-25. DESCRIPTION — AIR INDUCTION SYSTEM.

Engine intake air passes through large vertical scoops on both transmission cowling doors, into a chamber enclosed by induction baffles and the forward firewall. From this chamber, air is drawn into the engine air inlet through a particle separator which removes particles of foreign matter.

4-26. PARTICLE SEPARATOR.

4-27. DESCRIPTION — PARTICLE SEPARATOR.

The particle separator is a self-purging, inertial type separator. Engine inlet air entering the particle separator must first pass through the foreign object damage screens (13 and 33, figure 4-7). Refer to paragraph 4-34 for description of foreign object damage screen. Foreign particles which pass through the foreign object screen enter the air filter upper half (14) and air filter lower half (32) with engine inlet air. The particles are separated by inertial action as illustrated in figure 4-8. The air filter halves consist of curved, annular, radial flow bell mouths. When engine inlet air flows through the bellmouths, foreign particles separate as the air passes around the curve. The particles are forced into the concave inner flow wall and caught by a protruding lip. Clean air continues into the engine inlet. The foreign particle contaminated air is drawn through a second turn which results in further separation of foreign particles. The clean air passing through the second turn is returned to the engine inlet area. Foreign particle laden air flows into the air cleaner mounted on the front of the air filter lower half. The engine compressor discharges (P3) bleed air from a fitting mounted on the engine diffuser. The bleed air is routed through hose (8, figure 4-7) to ejector unit (5). Venturi effect within the ejector carries the foreign particles overboard through hose (3).

Premaintenance Requirements for Particle Separator

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C12), (C13), (C14), (C28), (C74), (C100), (C102), (C112), (C118), (C132)
Special Environmental Conditions	None

4-28. REMOVAL — PARTICLE SEPARATOR.

a. Remove baffles (paragraph 2-123).

b. Remove top half of FOD screen (13, figure 4-7), (paragraph 4-35).

c. Release air filter latches (42 and 45) by simultaneously pressing the safety latch up and lifting up on the release catch.

d. Release air filter latches (40 and 47).

e. Release air filter latch (15).

f. Remove air filter upper half (14).

g. Remove gasket assemblies (37 and 38).

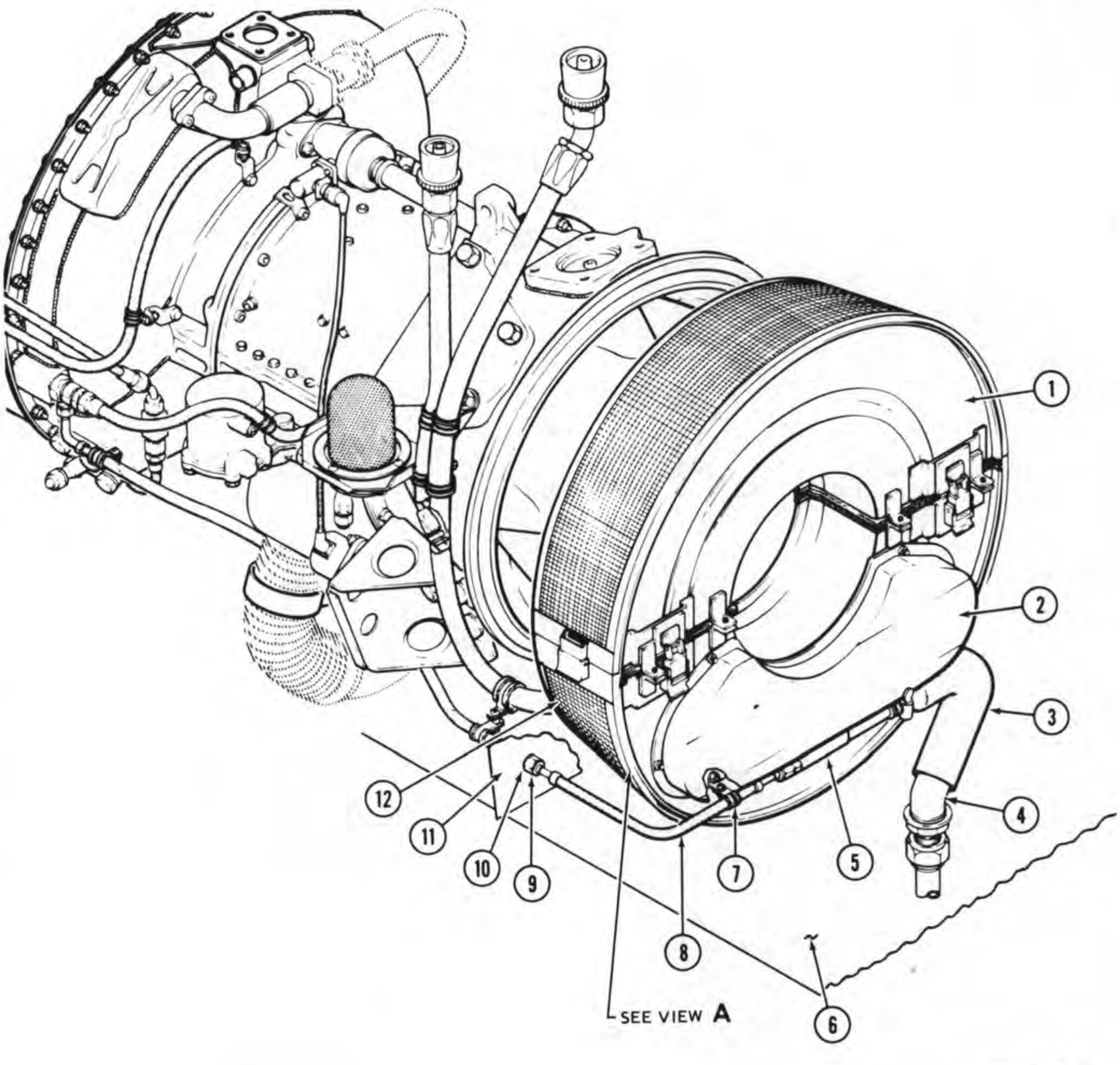
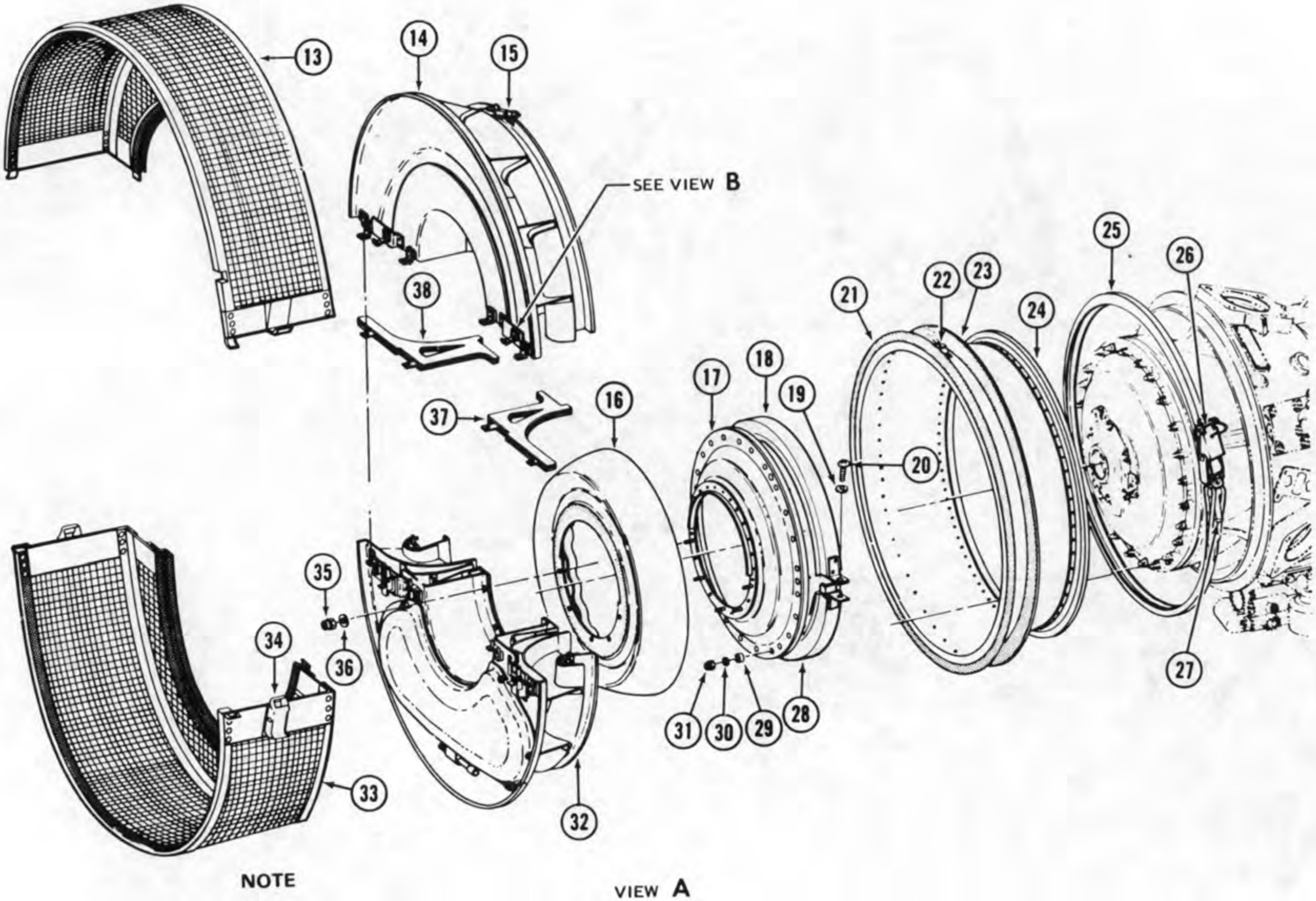


Figure 4-7. Particle Separator and FOD Screen Installation (Sheet 1 of 4)



NOTE

Do not install nut (35) and washer (36) at 6 o'clock position.

Figure 4-7. Particle Separator and FOD Screen Installation (Sheet 2 of 4)

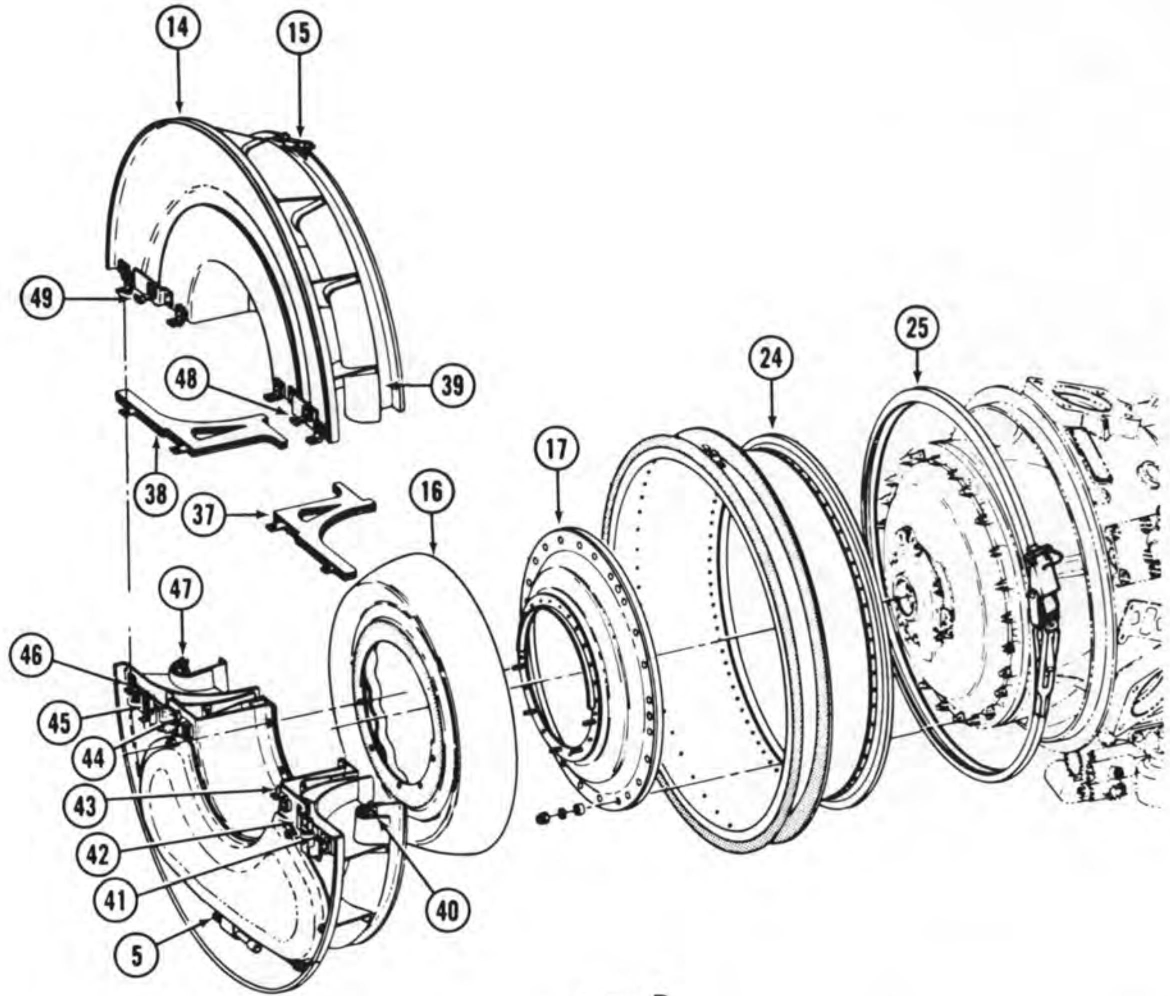


Figure 4-7. Particle Separator and FOD Screen Installation (Sheet 3 of 4)

1. Particle separator assembly
2. Air cleaner
3. Hose
4. Elbow
5. Ejector unit
6. Service deck
7. Clamp
8. Hose assembly
9. Nut
10. Fitting
11. Forward firewall
12. FOD screen assembly
13. FOD screen upper half
14. Air filter upper half
15. Air filter latch
16. Deflector assembly
17. Ring assembly
18. Former assembly upper half
19. Thin steel washer
20. Screw
21. Rubber seal
22. Mounting bracket (hook)
23. Gasket
24. Flange assembly
25. V band clamp assembly
26. Clamp latch
27. Nut
28. Former assembly lower half
29. Sleeve spacer
30. Thin steel washer
31. Extended base nut
32. Air filter lower half
33. FOD screen lower half
34. FOD screen latch
35. Extended base nut
36. Steel washer
37. Gasket assembly
38. Gasket assembly
39. Hook (rear curl of air cleaner)
40. Air filter latch
41. Positioning pin
42. Air filter latch
43. Positioning pin
44. Positioning pin
45. Air filter latch
46. Positioning pin
47. Air filter latch
48. Strike catch (hook)
49. Strike catch (hook)

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Figure 4-7. Particle Separator and FOD Screen Installation (Sheet 4 of 4)

NOTE

It is not necessary to further disassemble the separator unless the inspection procedures indicate that gaskets and seals may be damaged. If further inspection is required, proceed with the following steps.

h. Remove the lower half of the FOD screen, (paragraph 4-35).

i. Remove main driveshaft and curvic coupling adapter from engine output shaft (paragraph 6-16).

j. Remove hose (3).

k. Disconnect nut (9) from fitting (10).

l. Remove six nuts (35) and washers (36). Remove air filter lower half (32) and deflector assembly (16).

m. Remove two screws (20) and washers (19). Remove filter assembly upper half (18) and lower half (28).

n. Cut and remove lockwire from clamp latch (26). Loosen nut (27). Release clamp latch (26). Remove flange assembly (24) and V-band clamp assembly (25).

o. Remove twenty-four nuts (31), washers (30), and sleeve spacers (29). Remove ring assembly (17). Install sleeve spacers (29), washers (30), and nuts (31) on studs from which they were removed, do not torque nuts.

4-29. CLEANING — PARTICLE SEPARATOR.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

Clean parts only as required to facilitate inspection using solvent (C112).

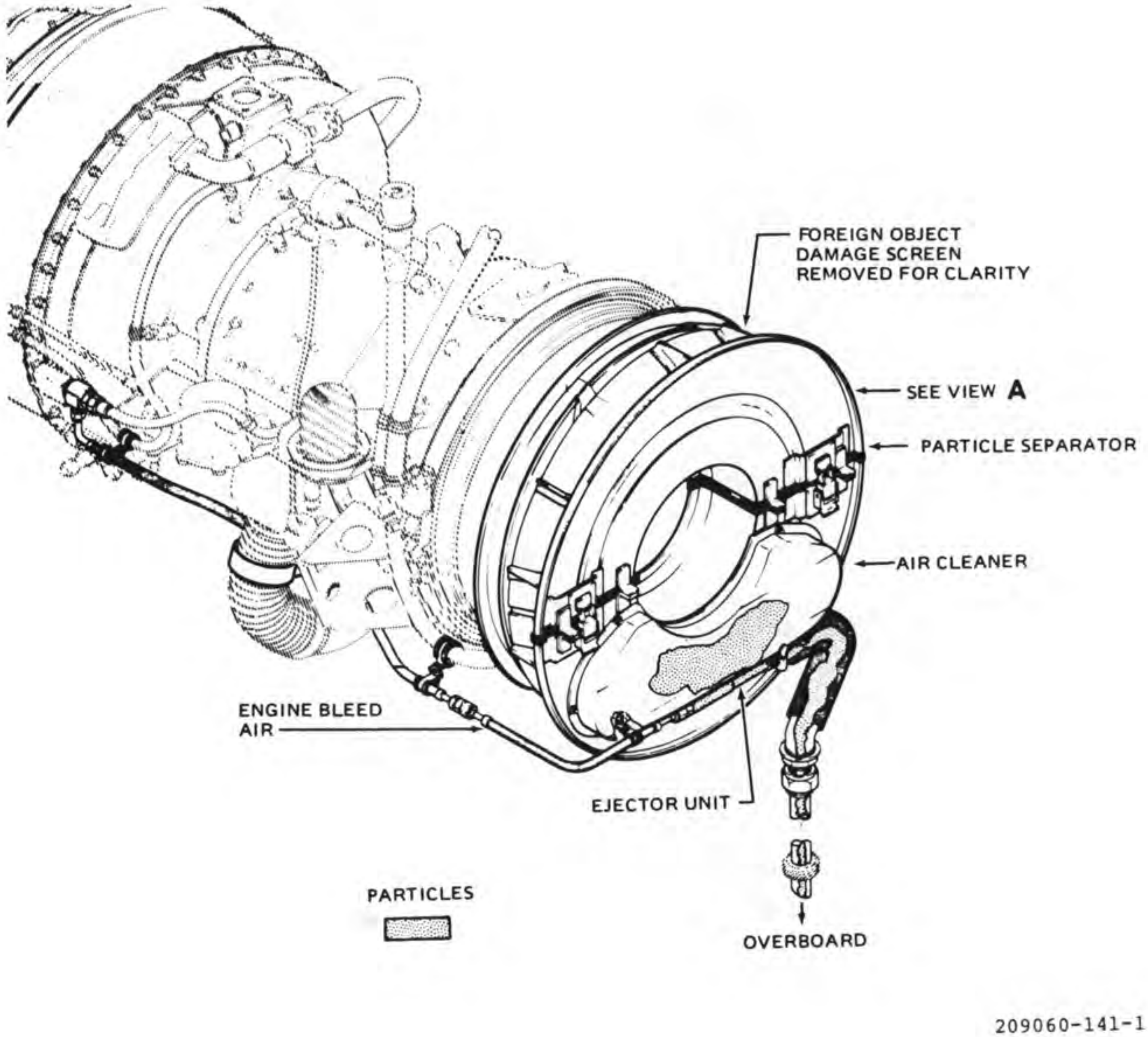
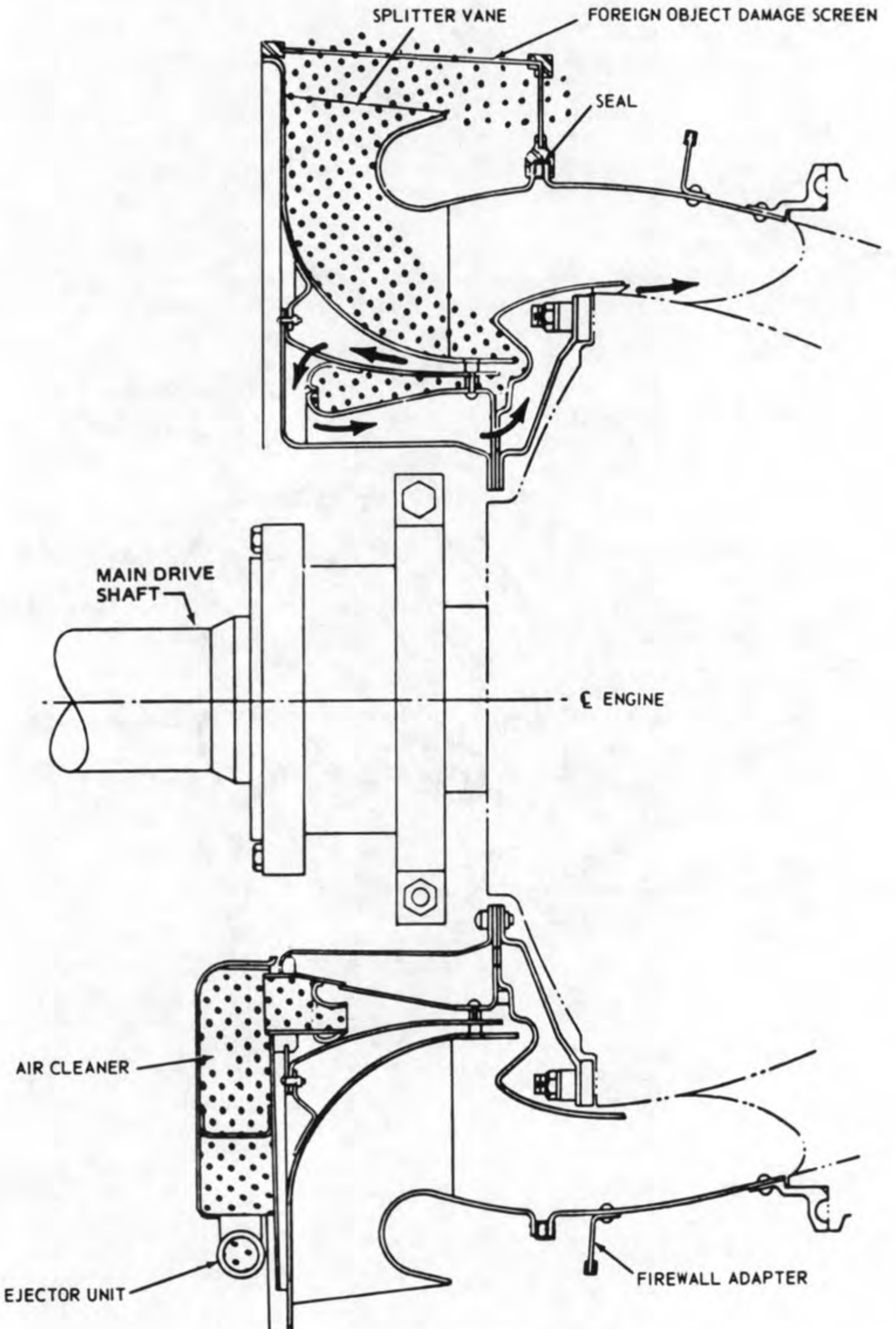


Figure 4-8. Particle Separator — Air Flow Diagram (Sheet 1 of 2)



SECTIONAL VIEW OF PARTICLE SEPARATOR
VIEW **A**

209060-141-2

Figure 4-8. Particle Separator — Air Flow Diagram (Sheet 2 of 2)

4-30. INSPECTION — PARTICLE SEPARATOR.

a. Inspect seal (5, figure 4-9) on flange assembly (7) for tearing and/or ripping at the edges and for lack of adhesion.

b. Inspect gasket (9) on each side of flange assembly (7) for lack of adhesion.

c. Inspect gasket assemblies (24 and 25) for a permanent set and lack of adhesion.

d. Inspect all metal surfaces for cracks or other damage.

e. Inspect for loose or missing rivets. If rivets are loose or missing in upper or lower air filter half (2 or 12) perform FOD inspection. Replace the air filter half or repair in accordance with paragraph 4-31.

f. Inspect for weld cracks or weld separation, particularly in the area of the inlet vanes in both upper and lower air filter halves. If cracks or separation is evident, replace affected air filter half or repair in accordance with paragraph 4-31.

g. Inspect for damaged or inoperable air filter latches (1, 13, 14, 21 and 22), damaged positioning pins (19), and angle brackets (27). If damage is evident replace the affected air filter half or repair in accordance with paragraph 4-31.

h. Inspect air cleaner (17) for evidence of erosion.

i. Inspect all other parts for evidence of erosion. Replace damaged parts.

4-31. REPAIR OR REPLACEMENT — PARTICLE SEPARATOR.

a. Repair loose seal and gaskets as follows:

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(1) Repair loose gasket (9, figure 4-9) by recementing gasket to mounting flange assembly with cement (C14). Clean mating surfaces with MEK (C74).

(2) Repair loose gaskets (11, 24 and 25, figure 4-9) by recementing gaskets to mating surface with adhesive (C12). Clean mating surfaces with MEK (C74). Adhesive should be cured at a temperature of 75 degrees F (24 degrees C) or higher. If temperature is below 75 degrees F (24 degrees C) double the amount of cure time to each 12 degrees F (7 degrees C) below 75 degrees F (24 degrees C). Do not attempt to cure adhesive at temperatures below 50 degrees F (10 degrees C).

TYPICAL:

Temperature Degrees F	Temperature Degrees C	Cure Time Hours
75	24	4
63	17	8
51	11	16

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(3) Repair loose seal (5, figure 4-9) by recementing seal to mating surface, using adhesive (C13). Clean mating surfaces with trichloroethylene (C132) and then with MEK (C74).

b. Replace damaged gaskets (11) as follows:

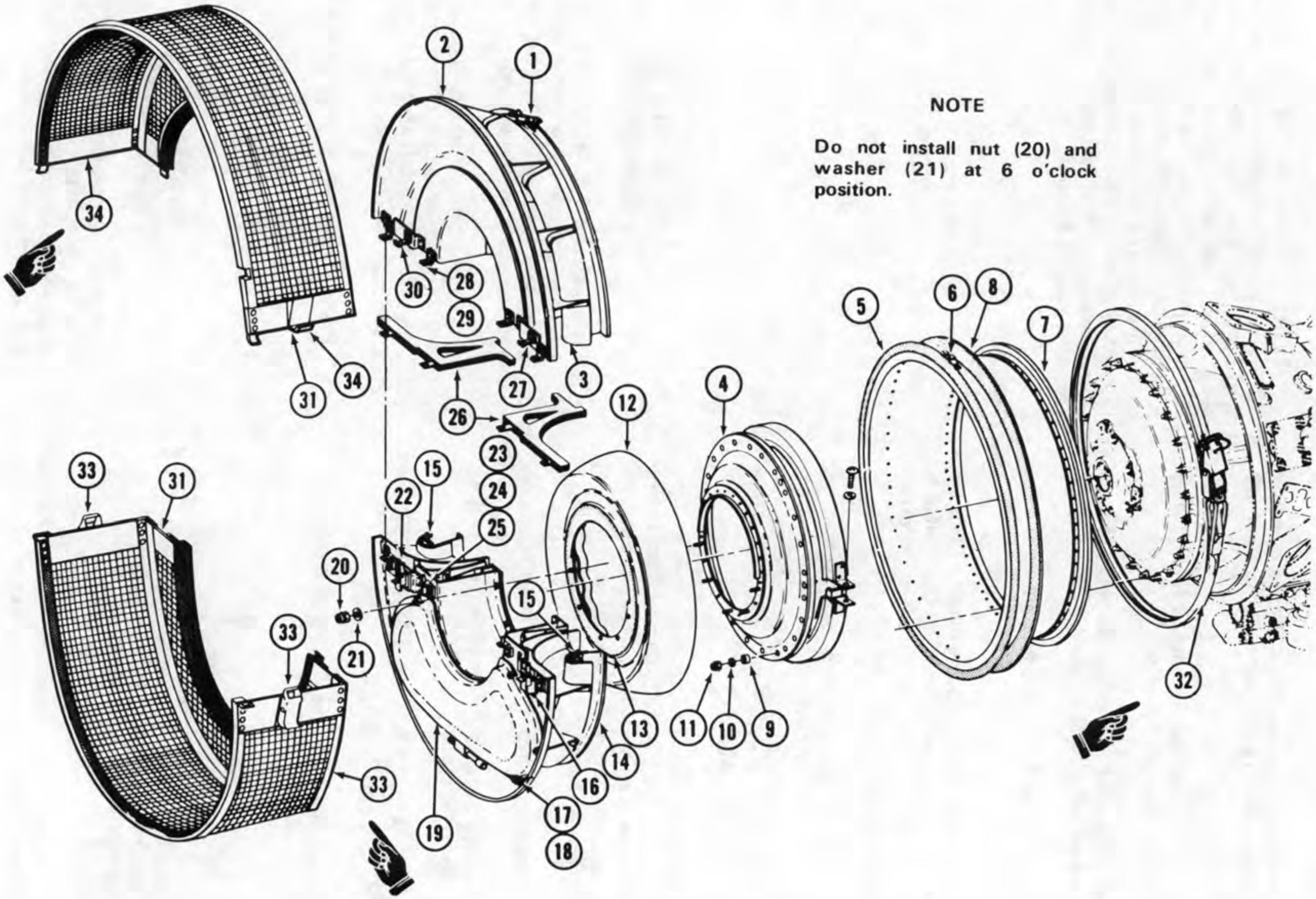
(1) Remove defective gasket (11) and old adhesive from deflector assembly (10).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

NOTE

Do not install nut (20) and washer (21) at 6 o'clock position.



209900-857-1A

Figure 4-9. Particle Separator — Exploded View (Sheet 1 of 2)

1. Latch
2. Upper assembly half
3. Hook
4. Mounting ring assembly
5. Seal
6. Hook assembly
7. Mounting flange assembly
8. Gasket
9. Sleeve spacer
10. Washer
11. Nut
12. Deflector assembly
13. Gasket
14. Lower assembly half
15. Latch
16. Latch assembly (RH)
17. Nut
18. Washer
19. Air cleaner
20. Nut
21. Washer
22. Latch assembly (LH)
23. Positioning pin
24. Angle bracket
25. Spacer
26. Gasket assembly
27. Hook assembly
28. Angle bracket
29. Spacer
30. Hook assembly
31. FOD screen
32. V band clamp
33. Latch
34. Hook

209900-857-2A

Figure 4-9. Particle Separator — Exploded View (Sheet 2 of 2)

(2) Wipe all metal surfaces to be bonded with cheesecloth (C30) moistened (not dripping) with MEK (C74). Continue wiping surface changing cheesecloth (C30) frequently, until cheesecloth (C30) remains clean.

NOTE

All grease, oil, or other surface contaminants must be removed from the bonding surface.

(3) Using clean, stiff brush, remove contaminants from surface of new gasket. Porous surfaces which have been contaminated with oil or grease cannot be satisfactorily cleaned to ensure proper bonding. Discard oil or grease contaminated gaskets.

(4) Using clean applicator, apply a continuous film of adhesive (C12) to surfaces to be bonded.

(5) Allow adhesive to air-dry for **10 TO 15** minutes at **75** degrees F (**24** degrees C) or above. Check adhesive by touching with finger. When adhesive will adhere to finger but not transfer, apply a second uniform, continuous film of adhesive to air-dry to the same degree as the first coat.

(6) When second coat of adhesive has air-dried until tacky, install gasket on deflector assembly (12, figure 4-9). Align surfaces to be bonded to obtain contact over entire surface. Press down on gasket to ensure that all air is expelled and that the gasket is in full contact with the metal.

(7) Apply light pressure load to surfaces being bonded. Allow adhesive to cure under this pressure for a minimum of 4 hours at **75** degrees F (**24** degrees C) or above. If temperature is below **75** degrees F (**24** degrees C) double the amount of cure time for each **12** degrees F (**7** degrees C) below **75** degrees F (**24** degrees C). Do not attempt to cure adhesive at temperatures below **50** degrees F (**10** degrees C).

TYPICAL:

Temperature		Cure Time
Degrees F	Degrees C	Hours
75	24	4
63	17	8
51	11	16

c. Replace damaged seal (5, figure 4-9) on flange assembly (7) as follows:

(1) Remove defective seal. Remove old adhesive film from metal surfaces with a knife blade. Then use a wire brush or sandpaper (C102).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(2) Wipe metal surfaces to be bonded with cheesecloth (C30), moistened (not dripping) with trichloroethylene (C132) followed by MEK (C74). Continue wiping, changing cheesecloth frequently, until cheesecloth remains clean.

CAUTION

To ensure proper bonding of seal, ensure that all grease, oil, or other surface contaminants are removed.

NOTE

Determine whether new seal (5) is proper size by fitting it to metal mating flange of flange assembly. Do not stretch seal when installing it for fit. If the seal is too large, it may have developed an oversize set during shipment. If so, cut the seal (5) to the required circumferential length and adhere as a strip with the "butt joint" located at either the 6-or 12-o'clock position.

(3) Using sandpaper (C102), roughen seal surfaces to be bonded.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(4) Using cheesecloth (C30), thoroughly clean all surfaces to be bonded with trochloroethylene (C132).

(5) Apply a uniform layer (**0.01 TO 0.03** inch thick) of adhesive (C13) to surfaces to be bonded.

(6) Fit seal (5) to flange of the flange assembly and press surfaces together.

NOTE

Use only enough pressure to displace air but not so much that the adhesive is forced out of the joint.

(7) Allow adhesive to cure undisturbed.

NOTE

Under light pressure, the adhesive will take 24 hours to cure. Under warm, damp conditions the adhesive may cure sufficiently in 4 hours to permit reinstallation of flange assembly (7).

d. Replace damaged gasket (8, figure 4-9) on each side of support of flange assembly (7) as follows:

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(1) Remove gasket material.

(2) Wipe metal surfaces to be bonded with cheesecloth (C30) moistened (not dripping) with MEK (C74). Continue wiping and changing cheesecloth frequently, until cheesecloth remains clean.

CAUTION

For proper bonding of gasket, ensure that all grease, oil, and other surface contaminants are removed.

(3) Fit new 0.047 inch thick gasket (8) to flange assembly (7).

(4) Using sandpaper (C102) roughen surface of gasket to be bonded.

(5) Wipe all gasket surfaces to be bonded with cheesecloth (C30) moistened (not dripping) with MEK (C74) to remove all powder and surface contaminants. Allow gasket (8) to dry for **15** minutes.

(6) Apply a continuous uniform film of cement (C28) to both metal and rubber surfaces to be bonded. Allow approximately **2 TO 3** hours drying time.

(7) Wipe the surface of one adhesive film with cheesecloth (C30) moistened with MEK (C74), one section at a time. The reactive surface should immediately become tacky.

(8) Align mating surfaces, one section at a time to obtain contact over entire surface, and press tacky surface to dry surface. Allow adhesive to cure under light pressure for a minimum of **4** hours.

e. Replace air cleaner (19, figure 4-9) as follows:

(1) Remove six nuts (20) and six washers (21). Remove air cleaner (19) from lower air filter half (14).

(2) Position new air cleaner (19) on lower air filter half and secure with six washers (21) and six nuts (20).

f. Repair nonconverging cracks by stopdrilling crack ends. Where necessary to prevent air leakage, seal with tape or silicone rubber, RTV (C100).

g. Use rivets or tack welds to patch-repair converging cracks. Follow standard airframe sheet metal repair procedures.

NOTE

Any standard aluminum aircraft rivets, including Huck, Cherry, etc., of proper size may be used for all rivet repairs.

h. Patch-repair punctures too large to repair with silicone rubber. Follow standard airframe sheet metal repair procedures. Secure patches with rivets or tack welds.

i. Repair torn tack and spot welds with tack, interrupted, or plug weld repairs; use doublers as needed (figure 4-10). Rivet repairs, using doublers as needed, are acceptable.

j. Repair serious erosion damage by replacing damaged parts or using doublers.

k. Reshape deformed parts if feasible. If reasonable conformity cannot be achieved, particularly at mating edges, sealing surfaces, etc., replace part.

l. Replace damaged latches (15, 16, and 22, figure 4-9) on lower air filter half (14) as follows:

NOTE

The tape (C118) between hardware items and air filter half must be replaced if damaged during removal of hardware.

(1) Remove two rivets and remove latch.

(2) Assemble upper and lower air filter halves (2 and 14) without gaskets (26) installed between halves.

(3) Position latch on lower assembly half in line with hook or upper assembly half. Mark lines to position latch.

(4) Separate assembly halves.

(5) Position latch on lower air filter half (14) within marked lines, and drill **0.128 TO 0.133** inch holes for rivets.

NOTE

If rivet holes are elongated during drilling or if new holes are drilled, back up sheet metal with doubler before riveting.

(6) Secure latch with two rivets.

m. Replace damaged positioning pins (23) or angle brackets (28) on lower air filter half as follows:

(1) Remove rivets, bracket (28), and spacer (29).

(2) Assemble upper and lower air filter halves without gaskets.

(3) Position spacer and bracket on lower assembly half in line with bracket on upper air filter half. Top of bracket will be slightly higher than the edge of the air filter half. Mark lines to position spacer (29) and bracket (28).

(4) Separate assembly halves.

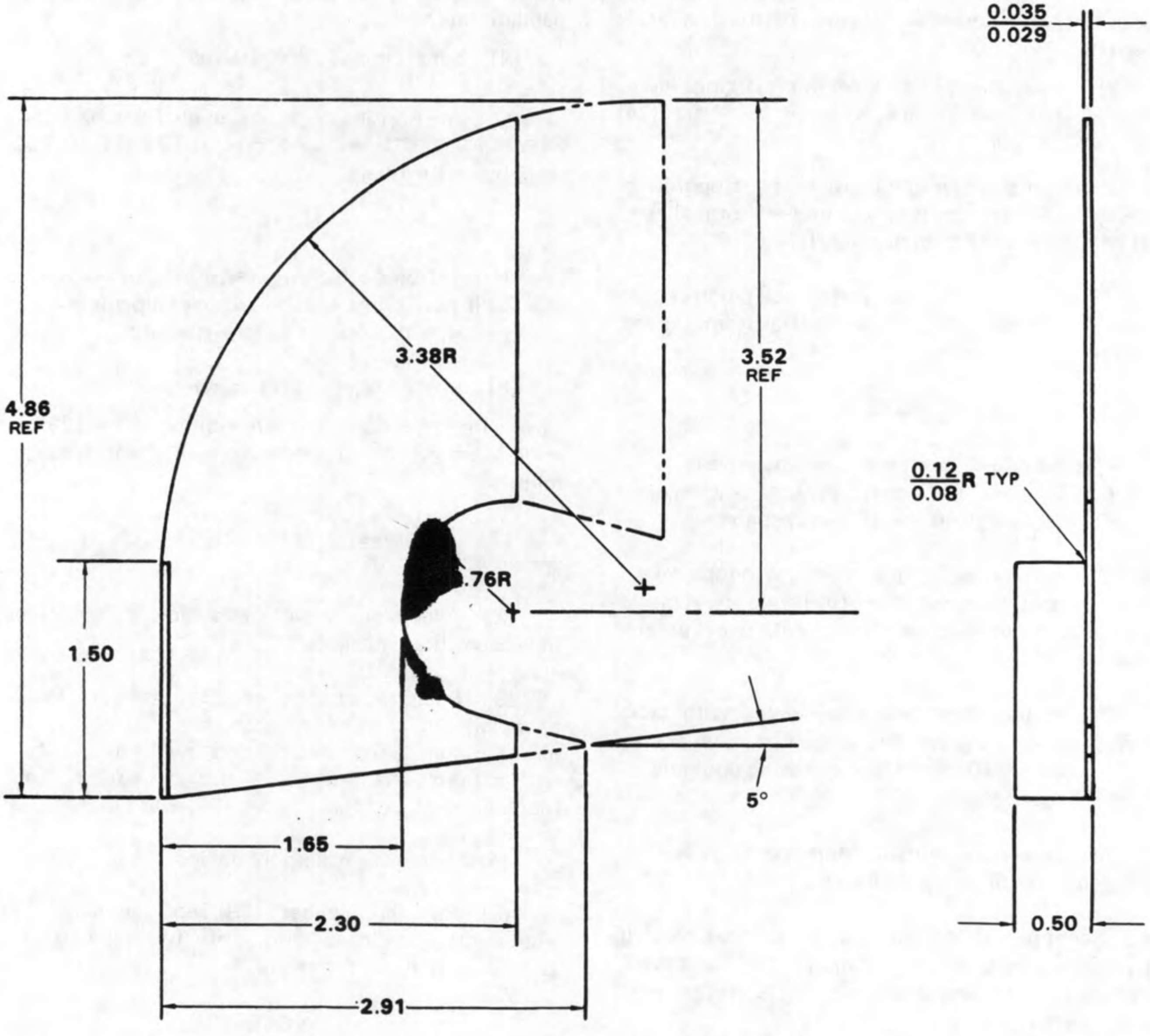
(5) Position spacer (29) and bracket (28) within marked lines and drill two **0.128 TO 0.133** inch holes for rivets.

NOTE

Use teflon tape (C118) between spacer (29) and bracket (28).

(6) Secure bracket (28) to spacer (29) with two rivets.

(7) Align assembly halves and identify center of bracket in line with hole of bracket on upper air filter half (2).



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

MATERIAL: 6061-T6 ALUM (ITEM 17, TABLE 2-2)

209900-474B

Figure 4-10. Inlet Vane Reinforcement Doubler — Fabrication

(8) Drill a **0.250 TO 0.252** inch hole through bracket.

(9) (AVIM) Install new pin in bracket, and tack weld in two places, **180** degrees apart.

n. (AVIM) Replace new pin in bracket, and tack assembly half as follows:

(1) Remove rivets, and remove hook.

(2) Assemble upper and lower air filter halves (2 and 14, figure 4-9) without gasket (26) assemblies.

(3) Position hook (30) on upper air filter half (2) in line with latch (22) on lower air filter half (14). Mark lines to position.

(4) Separate assembly halves.

(5) Position latch (22) within marked lines and drill **0.128 TO 0.133** inch holes for rivets.

NOTE

Use Teflon tape (C118) between hook (30) and mounting surface.

NOTE

If rivet holes are elongated during drilling or if new holes are drilled, back up sheet metal with doubler before riveting.

(6) Secure hook (27) with two rivets.

4-32. INSTALLATION — PARTICLE SEPARATOR.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

a. Wipe engine inlet housing clean with clean cloth moistened with dry cleaning solvent (C112).

b. Remove nuts (11, figure 4-9), washers (10), and sleeve spacers (9). Install ring assembly (4) with five studs of ring assembly positioned at the bottom, and with the center stud located at the 6 o'clock position.

c. Secure ring assembly (4), with twenty-four sleeve spacers (9), washers (10), and nuts (11). Torque nuts **70 TO 80** inch-pounds.

NOTE

Leave flange assembly (7) loose enough to be rotated.

d. Position flange assembly (7) in front of airframe firewall and on engine inlet housing. Retain flange assembly loosely with V-band clamp assembly (32) and on firewall with former assemblies.

e. Position deflector assembly (12) over locating pins and studs on ring assembly (4) and press in until firmly seated.

f. Secure hose assembly (3, figure 4-7) to ejector unit inlet with clamp before installing lower air filter half (14, figure 4-9) and push hose onto discharge port of air cleaner.

NOTE

Washer (21) and nut (20), may be omitted from 6 o'clock position of ring assembly (4) to eliminate having to remove main driveshaft at next particle separator removal.

g. Position lower air filter half (14) on locating pins and studs on ring assembly (4). Secure with washers (21) and nuts (20). Torque **30 TO 35** inch-pounds.

h. Connect nut of hose assembly to fitting on forward firewall and connect hose to elbow on lower baffle.

i. Install curvic coupling in output shaft of engine and install main driveshaft (paragraph 6-16).

j. Install lower half FOD (foreign object damage) screen (31). Refer to paragraph 4-38.

k. Position gasket assembly (26) over positioning pins (23) (R/H and L/H) side of lower air filter half (14).

l. Position upper air filter half (2) on lower half (14).

m. Rotate flange assembly (7) on engine inlet housing to align mounting bracket (hook) (6) with latch (1) on upper air filter half (2).

NOTE

Install V-band clamp assembly (32) with clamp latch on left side of engine and gap (drain) at the 6 o'clock position.

n. Secure flange assembly (7) with V-band clamp (32). Tap around V-band clamp from middle toward each end with a soft-faced mallet to seat properly. Torque V-band clamp nut **40 TO 50** inch-pounds. Lockwire V-band clamp latch.

CAUTION

Ensure that safety catch on latches is engaged by exerting a slight pull on release catch. Catch should not open.

o. Secure air filter latches (1, 15, 16, and 22).

p. Check for proper seating of seals by appearance. Approximately 1/8 inch of rubber on gaskets (26) will be uniformly exposed. Seal (5) on flange assembly will be approximately half way compressed.

q. Install upper FOD screen (31). Refer to paragraph 4–38. Secure upper and lower FOD screens with latches (33).

r. Install baffle panels forward of firewall (paragraph 2-128).

4-33. FOREIGN OBJECT DAMAGE SCREEN.

4-34. DESCRIPTION — FOD SCREEN.

The FOD screen is mounted on the forward side of the particle separator and prevents large foreign objects from entering particle separator.

4-35. REMOVAL — FOD SCREEN.

a. Remove top half of FOD screen (31, figure 4-9) from the particle separator as follows:

(1) Unlock both latches (33).

(2) Disengage hook (34) portions.

(3) Lift screen free of the particle separator.

b. If required, remove upper air filter half of particle separator (paragraph 4-28).

c. Remove bottom half of FOD screen (31) from the particle separator as follows:

(1) Lift forward split portion of the butt molding (figure 4-11) free of the vane and hold in that position.

(2) Repeat preceding steps (1) and (2) for opposite side.

(3) Withdraw bottom half of FOD screen (31) from under the particle separator.

4-36. INSPECTION — FOD SCREEN.

a. Inspect FOD screens (31, figure 4-9) for damage.

b. Inspect hook assemblies (34) on FOD screens for distortion and for secure installation.

c. Inspect latch assemblies (33) on FOD screens for damage as follows:

(1) Erosion or damage that may cause tightness or binding.

(2) Cracks.

(3) Loose or missing rivets.

d. Inspect aft molding (figure 4-11) for cuts or other damages.

4-37. REPAIR — FOD SCREEN.

a. Replace components that fail to meet inspection requirements of paragraph 4-36.

b. Reshape deformed parts, if feasible. If reasonable conformity cannot be obtained, replace either half or both as required.

c. Replace FOD small mesh screen.

(1) Cut screen (1560-AH-1-080-3) in half lengthwise (figure D–185).

CAUTION

Maximum allowable overlay is two mesh openings and 0.070 inch gap.

NOTE

To prevent overlaping of screen on back edges of FOD screen some wedge cuts in screen will be necessary.

(2) Line screen (1560-AH-1-080-3) along leading edge of FOD screen. Form screen to existing FOD screen.

(3) Using lockwire (C-137), secure one end and single wire lace every fifth opening along outer perimeter of screen (1560-AH-1-080-3) to existing FOD screen.

(4) Repeat steps (2) and (3) for other half of FOD screen.

d. (AVIM) Replace damaged hooks (34, figure 4-9) on upper screen (31) as follows:

(1) Remove rivets and remove hook (34).

(2) Assemble upper and lower screens and position hook (34) in line with latch (33) on lower screen (31).

(3) Mark lines to position hook (34).

(4) Separate assembly halves.

(5) Position latch (33) within marked lines and drill **0.128 TO 0.133** inch holes for rivets.

NOTE

If rivet holes are elongated during drilling, or if new holes are drilled, back up sheet metal with doubler before riveting.

(6) Secure hook (34) with two rivets.

e. (AVIM) Replace damaged latches (33, figure 4-9) on lower screen (31) as follows:

(1) Remove rivets and latch (33).

(2) Assemble upper and lower screens and position latch (33) on lower screen (31) in line with hook (34) on upper screen.

(3) Mark lines to position latch (33).

(4) Separate assembly halves.

(5) Position latch (33) within marked lines and drill **0.128 TO 0.133** inch holes for rivets.

NOTE

If rivet holes are elongated during drilling or if new holes are drilled, back up sheet metal with a doubler before riveting.

(6) Secure latch (33) with two rivets.

4-38. INSTALLATION — FOD SCREEN.

CAUTION

Ensure integrity of repairs. Materials used to make repairs may be ingested by engine if not properly secured.

a. Position bottom half of the foreign object damage screen (31, figure 4-9), aft molding side toward engine inlet, under the particle separator so butt molding (figure 4-11) is approximately **2.25** inches below horizontal centerline, and aft molding is seated over the particle separator split flange.

CAUTION

Improper seating of the aft molding over the separator split flange can result in cuts or other damage to the molding as well as placing excessive stress on all positions of the screen and latches.

b. Check for proper seating by running hand along the lower split flange to ensure that the molded channel is properly fitted over both sides of the split flange (figure 4-11).

c. Insert aft molding while holding butt molding away from the vane in the separator (steps I and II, figure 4-11).

d. Line up the slot in forward portion of butt molding with the vane over which it is to be fitted and press into place. (step III, figure 4-11).

NOTE

When properly installed, the notched area of the butt molding should be positioned behind the particle separator inlet curl. The forward portion of the molding should have one part of the split on the top of the vane and one part underneath the vane as shown in figure 4-11.

e. If removed, install top half of the particle separator (paragraph 4-32).

f. Position top half of the FOD screen (31, figure 4-9) so as to engage the aft screen molding slot over the separator split flange. Position the screen cut out over the latch (1) at the **12**-o'clock position of the separator.

NOTE

Both latches (33) must be engaged with the mating hooks (34) before closing either latch to a locked position.

g. Secure top half to the bottom by engaging and locking both latches (33).

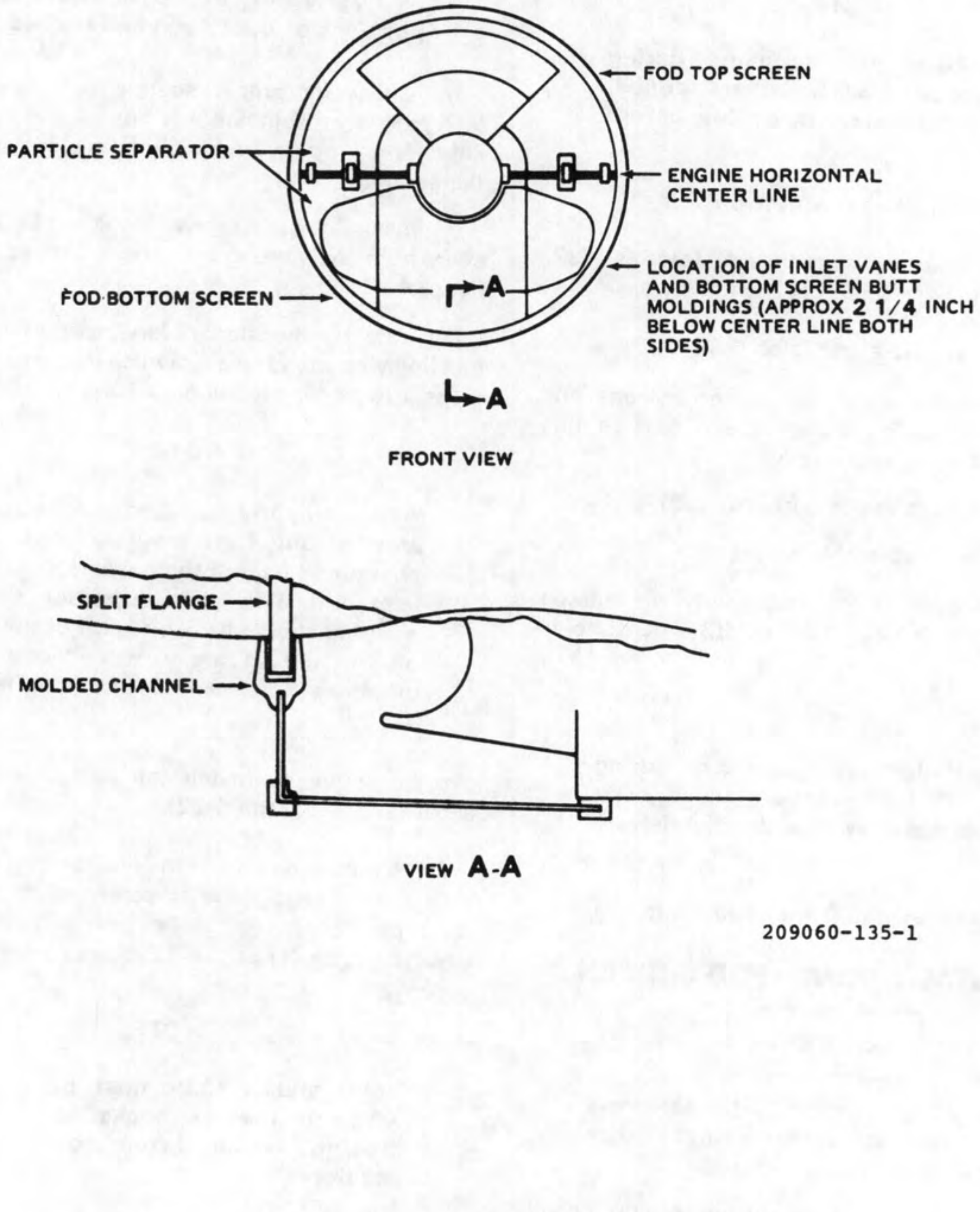


Figure 4-11. FOD (Foreign Object Damage) Screen Installation (Sheet 1 of 2)

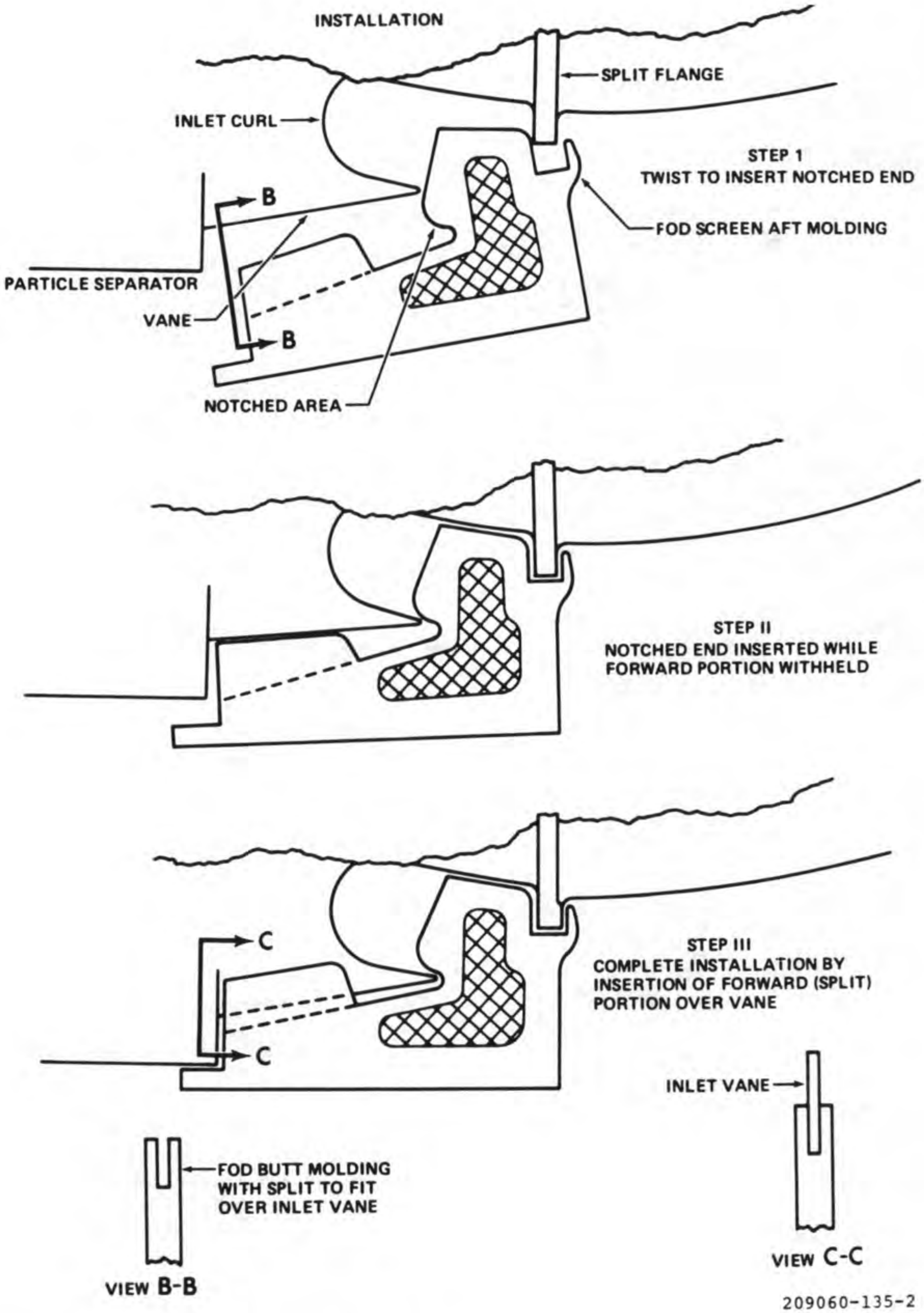


Figure 4-11. FOD (Foreign Object Damage) Screen Installation (Sheet 2 of 2)

SECTION IV. EXHAUST SYSTEM.

4-39. P E EXHAUST SYSTEM.

4-40. P E DESCRIPTION — EXHAUST SYSTEM.

The exhaust diffuser section on rear of the engine provides passage for gas flow from the combustion chamber. The exhaust passage is extended aft and slightly upward by a tailpipe and ejector assembly. A thermocouple assembly, mounted on the diffuser has probes in the exhaust stream to provide continuous indication through the exhaust temperature gage system. To aid in engine compartment cooling, a heat shield is mounted around the end of the diffuser, the tailpipe is covered by an insulation blanket, and the ejector surrounds the exhaust gas flow with a cooling air stream. The exhaust tailpipe and heat shield are mounted on flanges of the engine exhaust diffuser by V-band clamps (figure 4-12).

4-41. P E REMOVAL — EXHAUST SYSTEM.

Premaintenance Requirements for Removal of Exhaust System

Condition	Requirements
Model	AH-1S P E
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C105), (C137)
Special Environmental Conditions	None

a. Disconnect drain lines from fittings on tailpipe and ejector.

b. Remove ejector and tailpipe fairing as follows:

(1) If ejector is attached to tailpipe, remove screws and washers at five sets of brackets to detach and remove ejector. Release fasteners along lower edge of fairing. Lift fairing rearward to remove.

(2) If ejector is attached to fairing, release fasteners and remove fairing with ejector attached. Detach ejector from fairing by removing screws and nuts at three mounting clips.

c. Loosen nuts to open V-band clamp which secures tailpipe to engine diffuser flange. Pull aft to disengage locating pins. Remove tailpipe.

d. Remove lockwire and unwrap insulation blanket from tailpipe.

e. Remove V-band clamp and heatshield from flange of diffuser support cone.

4-42. P E INSPECTION — EXHAUST SYSTEM.

a. Inspect tailpipe and ejector for cracks, dents, and burned out or buckled areas.

b. Inspect insulation blanket for visible damage.

c. Inspect heatshield for cracks and distortion.

4-43. P E REPAIR — EXHAUST SYSTEM.

a. Ejector (figure 4-12).

(1) Shallow dents and scratches may be disregarded.

(2) Cracks **3.0** inches or less in length may be welded. Welds must be ground down as smooth as possible to match contour of ejector.

(3) Cracks in excess of **3.0** inches, tears or small bullet holes in any area of the ejector may be repaired by stop-drilling ends of each crack or tear and welding a patch of titanium, MIL-T-9046, Type 1, Composition C, over the crack or tear on both inside and outside of the ejector. Patch edge distance to be a minimum of **0.5** inch beyond stop-drill.

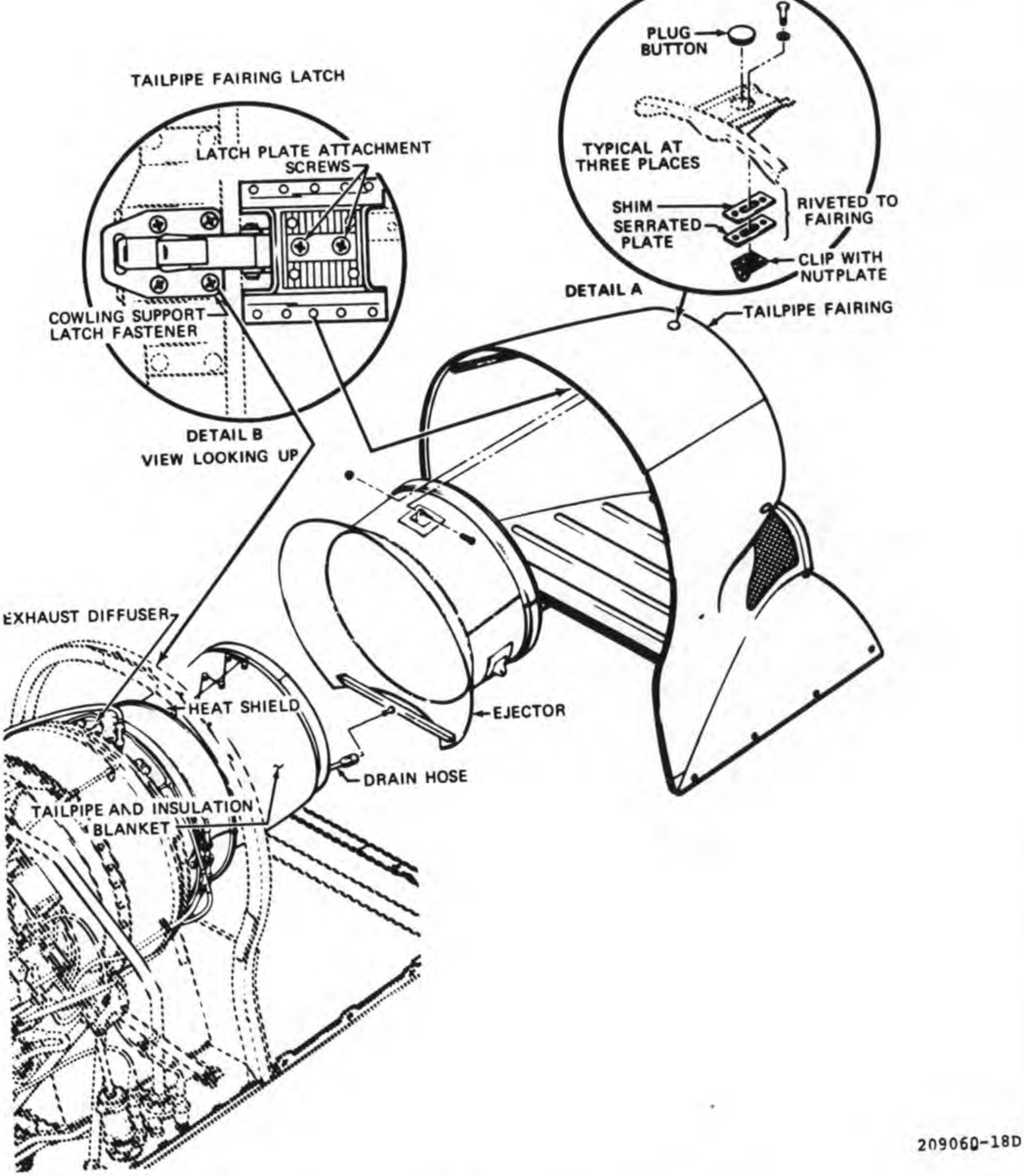


Figure 4-12. P E Exhaust System Components

(4) Cracks in the bellmouth-to-tube weld joint at angle bracket may be repaired and future cracking eliminated as follows:

(a) Remove angle bracket and spot-welded doubler. Fabricate a new doubler from titanium of same width but **0.5** inch longer than removed doubler. Position doubler so that it extends past cracked weld joint up onto bellmouth **0.5** inch. Form doubler to fit contour.

(b) Clean and reweld cracked joint. Grind weld smooth. Place new doubler in position and weld to assembly.

(c) Attach angle bracket per step (5) below, using rivet holes in ejector as a guide to drill through doubler.

(5) Replace brackets as follows:

(a) Drill out six rivets which attach angle to be repaired. Use rivet holes in ejector as a guide to align new angle, mark locations and drill six Number 30 (**0.128**) holes in angle.

NOTE

Prior to riveting new angle to ejector to tailpipe, align flange of new angle with flange of angle to tailpipe. Mark location for attachment bolt hole in new angle using mating hole in tailpipe angle as a guide. Maintain flat plane between the two angles within 0.020 inch TIR.

(b) Drill a number 1 (**0.288**) hole in angle flange at location determined in note above. Attach new angle to ejector with six rivets.

(6) Burned out parts or dents which cannot be smoothed out to original contour are cause for replacement.

b. Tailpipe.

(1) Scratches and shallow dents may be ignored.

(2) Cracks or tears in any area of the tailpipe may be repaired by stop-drilling ends of each crack and welding a patch of titanium over the crack or tear. The outside patch must have a **0.75** inch overlap of any damaged area. The inside patch must be approximately **0.50** inch larger than the outside patch in all dimensions (figure 4-13). The patch shall be welded on both inside and outside of the tailpipe. If the tailpipe ring is welded, care must be taken that the flange is filed or machined to a flat surface after welding to provide a flat seat against the attachment point on the engine.

(3) Burned out parts or damage greater than that which is repairable by patching is cause for replacement.

(4) Replace insulation blanket, if damaged.

c. Heat shield.

(1) Replace heat shield if cracks or distortion cannot be repaired or straightened.

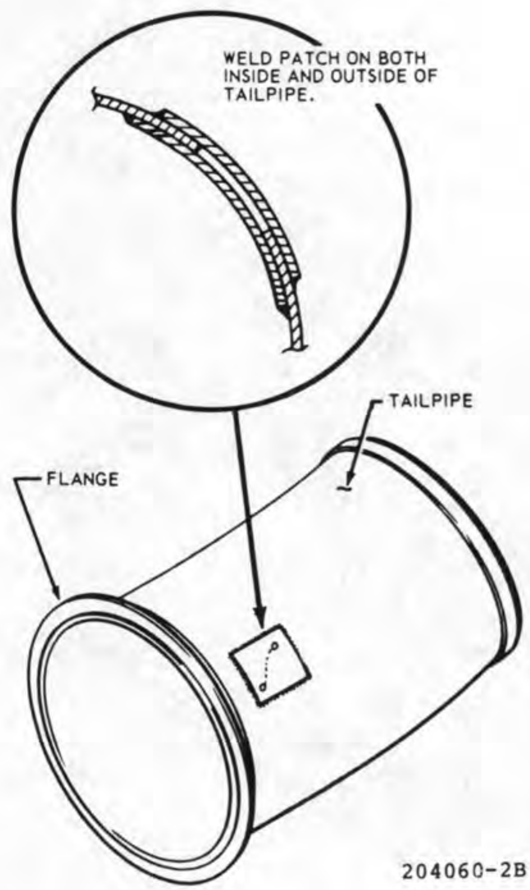


Figure 4-13. P E Engine Tailpipe Repair

4-44. P E INSTALLATION — EXHAUST SYSTEM.

a. Remove protective cover from engine exhaust diffuser.

b. Position tailpipe, with drain fitting down, on flange of exhaust diffuser. Make sure locating dowels are engaged, and that inside of pipe aligns with diffuser. Secure with V-band clamp around mating flanges.

(1) Seat clamp by tapping with soft mallet from middle toward ends. Torque nuts **100 TO 130** inch-pounds.

(2) Check torque again after first ground run-up.

c. If removed, install insulation blanket around tailpipe with joint at top. Secure with lockwire (C137) installed in zig-zag pattern (figure 4-12).

d. Position heat shield against flange of diffuser support cone. Secure with V-band clamp around matching flanges. Torque clamp nuts **100 TO 130** inch-pounds.

e. Install ejector and tailpipe fairing as follows:

CAUTION

Adjustment of latch mating fitting may be necessary to ensure proper closing of latch. Do not force latch closed. Slight tension shall remain on latch in the closed position.

(1) Place ejector into fairing, align clips and secure at three locations with screws and nuts. If necessary, remove plug buttons (detail A, figure 4-12) and loosen bolts to realign clips on serrated plates, tighten bolts, and reinstall plug buttons. Install fairing with attached ejector.

(2) Measure gap between tailpipe fairing engine cowl doors and pylon fairing. Inspect for a gap of **0.040** inch at the lower extremities of cowl components to a maximum of **0.190** inch at the top. If adjustment is necessary, proceed as follows:

(a) Loosen two attachment screws securing latch plate to tailpipe fairing bracket (detail B, figure 4-11). Latch shall remain fastened during adjustment.

(b) Adjust fairing to proper clearance, allowing serrated plate to self-adjust.

(c) After proper clearance is obtained, tighten two attachment screws.

f. Connect drain lines to fittings on tailpipe and ejector.

g. Seal all open areas between base of forward and/or aft firewall and engine deck (figure 4-14). Use sealant (C105).

4-45. P E INFRARED (IR) SUPPRESSION SYSTEM.

4-46. P E DESCRIPTION — IR SUPPRESSION SYSTEM.

Some helicopters are equipped with an IR suppression system. This system includes an upturned, insulated exhaust duct assembly, an exhaust extension, and a forward duct assembly. For helicopters which do not have the system installed refer to paragraph 4-40.

Premaintenance Requirements For IR Suppression System

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C14), (C74), (C112), (C97)
Special Environmental Conditions	None

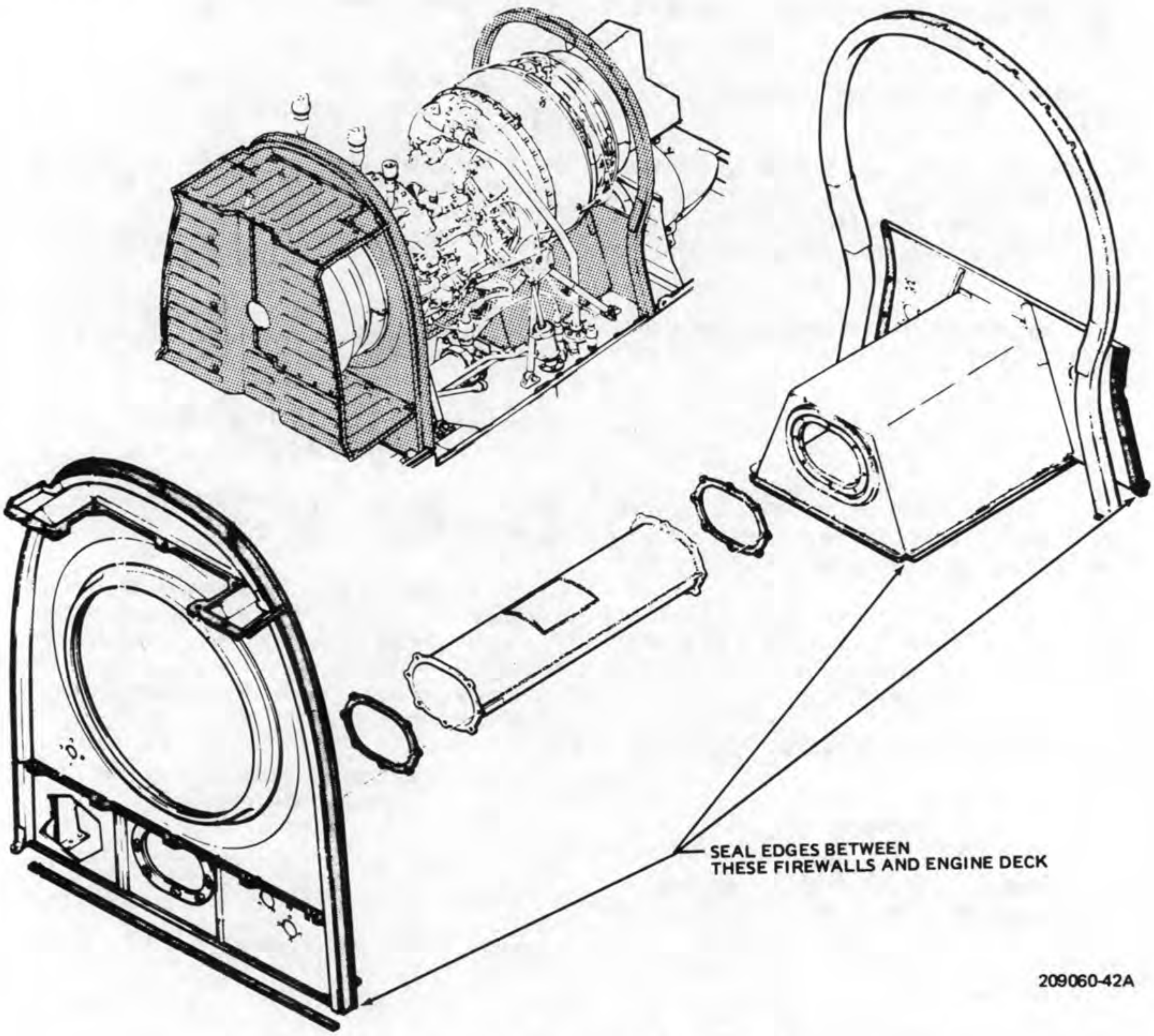


Figure 4-14. Engine Deck and Firewall Sealing

4-47. P E REMOVAL — IR SUPPRESSION SYSTEM.

a. Disconnect drain line (6, figure 4-15) from fitting on tailpipe (1).

b. Release fasteners on fairing (4) and remove fairing, duct assemblies (2 and 5), and extension (3) as an assembly.

c. Detach forward duct assembly (2) from exhaust extension (3) by removing bolts (13) and washers (12) from extension (3).

d. Detach exhaust extension (3) from aft duct assembly (5) by removing nuts (14) and washers (15) from lockpins (20).

e. Remove fairing assembly (7) from aft duct assembly (5) and fairing (4) by removing screws (16) and washers (17).

f. Detach aft duct assembly (5) from cowling (4) by removing 12 screws (18) and washers (19).

WITH IR SUPPRESSOR

1. Exhaust tailpipe
2. Duct assembly (forward)
3. Exhaust extension
4. Tailpipe fairing
5. Duct assembly (aft)
6. Drain line
7. Fairing assembly
8. V-band clamp
9. Engine diffuser
10. Insulation blanket
11. Lockwire
12. Washer
13. Bolt
14. Nut
15. Washer
16. Bolt
17. Washer
18. Washer
19. Bolt
20. Lockpin

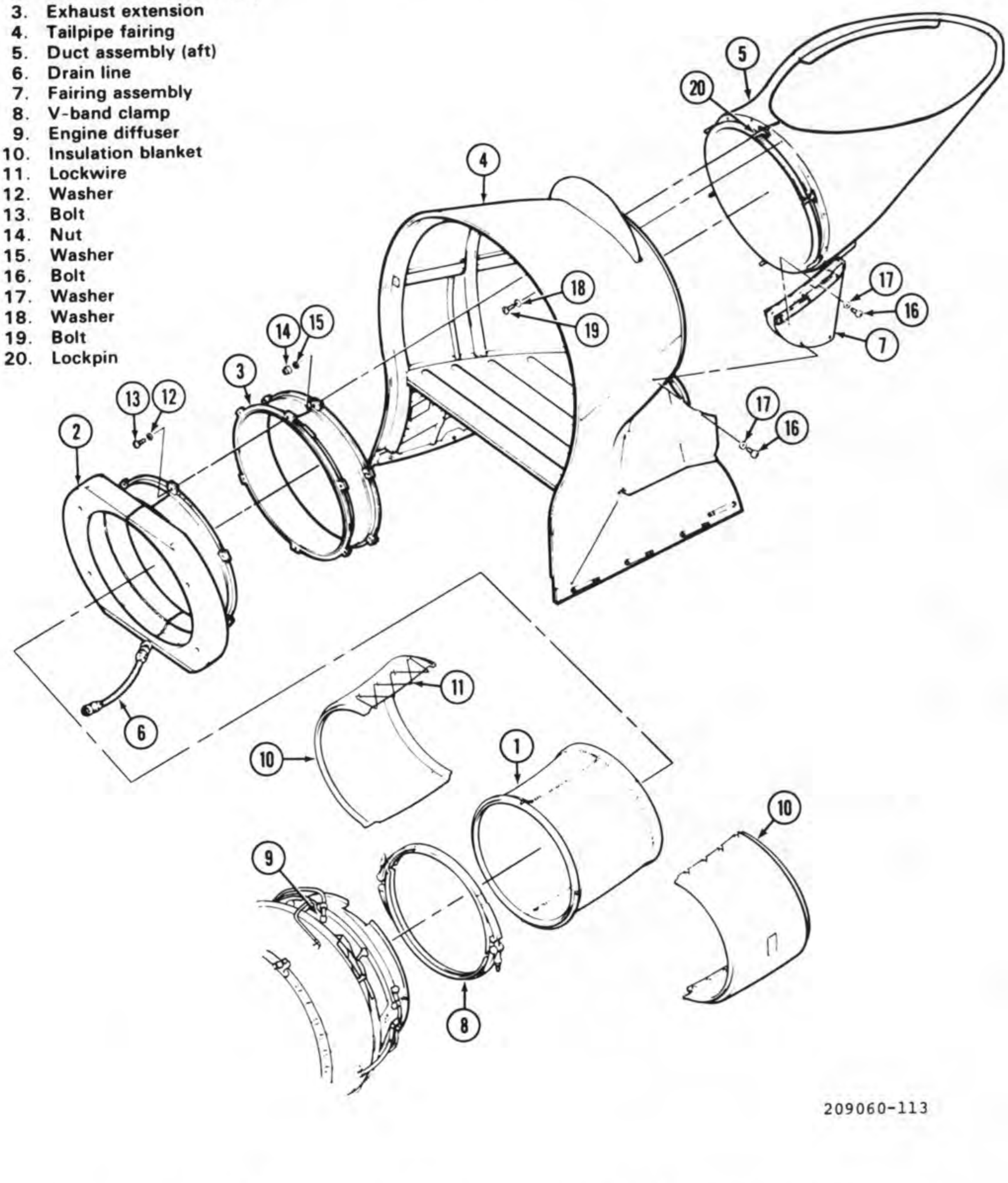


Figure 4-15. P E Exhaust System Components with IR Suppression — Installation

4-48. P E CLEANING — IR SUPPRESSION SYSTEM.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

CAUTION

Do not allow solvents to come in contact with insulation blanket.

Clean duct assemblies (2 and 5) and exhaust extension (3) with a wire brush and solvent (C112) when necessary. Clean clamps and heat shield with solvent (C112). Do not used solvent on insulation blanket.

4-49. P E INSPECTION — IR SUPPRESSION SYSTEM.

a. Inspect ducts for cracks, dents, and overheating.

(1) Cracks and holes in surface of duct should not exceed **3.0** inches in diameter after cleanup. Adjacent pair areas must allow a minimum of **2.0** inches of parent metal between patches.

(2) Aft exhaust cracks and holes in exterior surface of duct shall not exceed **4.0** inches in diameter after cleanup. Adjacent repair areas must allow a minimum of **2.0** inches of parent metal between patches.

(3) Damage which penetrates the aft exhaust duct (5) tempmat insulation between interior and exterior surfaces of duct shall not exceed **4.0** inches in diameter after cleanup.

(4) Dents in surface of duct are permissible provided surface is not broken and there are no sharp creases or projections into exhaust stream.

(5) Heating as evidenced merely by discoloration of the metal is permissible. However, if the condition becomes progressive, indicating a possible burnthrough, the part should be replaced.

b. Inspect ducts for exterior damage.

(1) Damage to circumferential mounting frames of duct assembly (2) and exhaust extension (3) shall be evaluated locally as to feasibility to repair or need for replacement. It is deemed not feasible to replace the frame on duct.

(2) Damage to mounting flange and outlet rim of the aft exhaust duct (5) shall be evaluated locally as to feasibility to repair or need for replacement.

(3) Ensure that all attaching screws are secure.

(4) Check aft exhaust duct (5) and fairing (4) for security of mounting and for loose or missing rivets.

(5) Check that drain hose on forward exhaust duct is intact and securely attached.

4-50. P E REPAIR OR REPLACEMENT — IR SUPPRESSION SYSTEM (AVIM).

A repair kit (C97) is available for use in repairing damaged components. The kit contains the following materials.

QUANTITY	PART NUMBER	NOMENCLATURE
1	205-706-083-3	Patch
1	205-076-083-5	Patch
1	205-076-083-7	Patch
1 (16 oz. kit)	No. 19 (FSCM 80703)	Adhesive

a. Dents.

(1) Minor dents in exterior surfaces require no rework if surface is not broken, or if no sharp crease or projection exists in the interior surface.

(2) Work out minor dents having sharp projections into the interior of duct, by restoring to original contour and smoothing off any sharp projections with fine abrasive paper.

(3) Large dents (surface impressions) shall be worked out by restoring the surface to original contour.

b. Cracks.

(1) All cracks shall be stop-drilled to prevent continuation.

(2) Cracks which penetrate interior surfaces of the forward exhaust duct or exhaust extension shall be repaired using method I. See table 4-1 and figure 4-16, detail A.

(3) Cracks in interior surface of aft exhaust duct shall be repaired using method II. See table 4-1 and figure 4-16, detail B.

(4) Cracks in exterior of aft duct shall be repaired using method III. See table 4-1.

(5) Two or more adjacent cracks, or two or more converging cracks, shall be treated as a single repair area.

c. Holes.

(1) Holes in the forward exhaust duct, or in exhaust extension, shall be repaired using method I. See table 4-1.

(2) Holes in the interior surface only of aft exhaust duct shall be repaired using method II. See table 4-1.

(3) Holes which penetrate only the outer surface of the exhaust duct shall be repaired using method III. See table 4-1.

(4) Holes which penetrate completely through exterior and interior surfaces of aft exhaust duct shall be repaired using method II. See table 4-1.

Table 4-1. Repair Methods — IR Suppression System (AVIM)

METHOD I. P E See figure 4-16.

a. Stop drill crack at both ends.

b. If two or more cracks converge, cut out area encompassed by cracks and smooth out edges to form a hole, not to exceed 3.0 inches.

c. Trim patch, 205-706-083-3, as necessary, to provide a minimum of 0.25 inch edge distance between rivets and hole in parent metal, and between rivets and edge of patch.

d. Position patch and layout rivet hole locations.

e. Drill rivet holes and install rivets, with heads on interior of duct.

METHOD II. P E See figure 4-16.

a. Cut hole through outer surface of duct to encompass damaged area, not to exceed 4.0 inches in diameter.

b. Cut out and remove insulation material (tempmat) not to exceed 4.0 inches.

c. Cut out damaged area of interior surface of duct, not to exceed 3.0 inches in diameter.

d. Trim patch, 205-706-083-3, as necessary to provide a minimum of 0.25 inch edge distance between rivets and hole, and between rivets and edge of patch.

e. Position patch on outside of interior surface and layout rivet hole locations.

f. Drill rivet holes and install rivets with heads on interior of duct.

Table 4-1. Repair Methods — IR Suppression System (AVIM) (Cont)

g. Cut patch, 205-706-083-5, to fit insulating core area.

h. Apply adhesive from repair kit and install patch.

i. Trim patch, 205-706-083-7, to provide a minimum of **0.50** inch overlap on outer surface of duct.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

j. Lightly abrade area **0.60** inch wide around hole in outer surface. Clean areas with MEK (C74).

k. Apply adhesive (C14) to area around hole.

l. Remove backing and apply patch over hole. Press smoothly into place.

m. Allow adhesive to cure.

NOTE

Preferred cure time is 24 hours at 70 degrees F (21 degrees C). Cure time may be reduced by applying heat not to exceed 175 degrees F (80 degrees C) for one hour.

METHOD III. P E See figure 4-16.

a. Cut out damaged area of outer skin, not to exceed **4.0** inches in diameter.

b. Trim patch 205-706-083-7, to provide a minimum of **0.50** inch overlap on outer surface of duct.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

c. Lightly abrade area **0.60** inch wide around hole. Clean area with MEK (C74).

d. Apply adhesive (C14) to area around hole.

e. Remove backing from patch, and apply patch over hole. Press smoothly into place.

f. Allow adhesive to cure. See note in Method II.

Figure 4-1. Repair Methods — IR Suppressor System (AVIM) (Cont)

METHOD IV. M See Tables 4-1.1 and 4-1.2, and Figures 4.17 and 4.17.1.

a. Remove paint and generally clean around area to be repaired using a powered wire wheel.

b. Stop drill crack.

c. Repair crack using TIG Welder and Type 347 CRES filler rod. Maintain original separation of strut and inner body with use of a thin copper strip between affected parts of the weld to prevent their joining during welding. Argon as a backup gas is desirable.

d. Do not attempt to weld into a joint or any closer than **0.25** inch to braze alloy coating. Satisfactory braze repair methods are not available.

METHOD V. M See Tables 4-1.1 and 4-1.2, and Figures 4.17 and 4.17.1.

a. Remove paint and generally clean around area to be repaired using a powered wire wheel.

b. If cracked, stop drill.

c. Prepare **0.50** inch oversize patch or doubler for repair area. For stainless steel areas the use of a patch or doubler made of **0.032** inch thick CRES 347 is recommended. The patch may be welded or riveted.

WELD PROCEDURE

Bring both sides of the crack to the same level and tack weld to assist in maintaining position during installation of patch or doubler. Use of Argon as a backup gas is desirable.

Do not attempt to weld into a joint or any closer than **0.25** inch to braze alloy coating. Satisfactory braze repair methods are not available.

RIVET PROCEDURE

Trim patch as necessary to provide a minimum of **0.25** inch edge distance between rivets and hole in parent material, and between rivets and edge of patch.

Position patch and layout rivet hold locations.

Drill rivet holes and install rivets.

METHOD VI. M See Tables 4-1.1 and 4-1.2, and Figures 4.17 and 4.17.1.

a. Cut each end of the damage area just beyond last fracture noted with needle point shears.

b. Cut should be made beginning at fin edge and cutting at approximately 30° off vertical.

c. The fin section, isolated by these cuts, may be removed by flexing until completely breaking at the base.

d. Exposed bare aluminum surfaces should be covered with chemical film treatment per MIL-C-5541.

METHOD VII. M See Tables 4-1.1 and 4-1.2, and Figures 4.17 and 4.17.1.

a. Remove paint and generally clean around area to be repaired using wire wheel.

b. Weld both ends of crack and also at spots along the crack at **one** inch intervals using a Hastelloy W rod. Use of Argon as a backup gas is desirable.

Table 4-1.1. IR Suppressor Damage and Repair Limits (Non Structural Area)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
1. Unfinned areas of suppressor assembly.	a. Cracked	a. Cracks in sheet metal surfaces not exceeding **1** inch and non-branching.	a. Branching or cracks **1** to **2.5** inches in length - stop drill. a. Cracks greater than **2.5** inches in length - patch. See Table 4-1, Method VII. See Note 1.	a. **3** cracks each greater than **2.5** inches.
	b. Holes	b. No more than **3** holes each less than **0.312** inch diameter.	b. More than **3** holes or when holes have a diameter greater than **0.312** inch but less than **2** inches, must be patched. See Table 4-1, Method V. See Note 1.	b. Holes greater than **2** inch diameter.
	c. Skin Dents	c. Dents with no cracks or gouges: Depth **0.250;** maximum diameter **3.0** inch.	c. Dents in excess of serviceable limits that can be straightened, or cut and patched. See Table 4-1, Method V.	c. Dents that cannot be restored to serviceable limits.
2. Externally finned aluminum section of suppressor assembly.	a. Loose Rivets	a. **Three** loose/missing rivets. No more than **2** adjacent.	a. If more than **3** remove and replace loose rivets and replace missing rivets.	a. N/A
	b. Skin Dents	b. Dents with no cracks or gouges: Depth **0.250** inch; Diameter **3.0** inch.	b. Dents in excess of serviceable limits that can be straightened.	b. Dents that cannot be restored to serviceable limits.
	c. Skin Cracks	c. Cracks not exceeding **1** inch in length and non-branching.	c. Branching cracks and cracks less than **4** inches in length that can be contained by stop drilling at each end.	c. Damage exceeds repairable limits.
	d. Bent Fins	d. Fins bent or crushed so as to impede air flow between fin rows less than **60** linear inches per quadrant. See Note 3.	d. See Note 4.	d. Bent fins in excess of negligible limits.
	e. Loose or missing fin sections.	e. Missing fin sections covering a total linear length of less than **60** inches per quadrant. See Note 3.	e. Fins separated from duct skin for more than **1** inch may be cut to the maximum serviceable limits. See Table 4-1, Method VI.	e. Missing fin sections in excess of serviceable limits.

Table 4-1.1. IR Suppressor Damage and Repair Limits (Non Structural Area) (Con't)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
	f. Cracked fins	f. Any vertical crack. Horizontal cracks are treated as loose fins.	f. Same as loose fins.	f. Same as loose fins.
3. Internally finned panel sections suppressor assembly.	a. Cracked	a. Cracks not exceeding **1** inch.	a. Cracks **1** to **3** inches in length - stop drill (unlimited). Cracks greater than **3** inches in length - patch. See Table 4-1, Method V. See Note 2.	a. Limit of **3** weld repairs per panel.
	b. Crushed finned panel inlets or outlets (Per Panel).	b. Crushed length less than **2** inches.	b. Crushed length greater than **2** inches - straighten with common hand tools.	b. Areas which cannot be straightened to serviceable limits.
	c. Holes	c. No more than **3** holes each less than **0.312** inch diameter.	c. Less than **5** holes total each less than **1** inch diameter - patch. See Table 4-1, Method V.	c. Holes greater than **1** inch diameter or in excess of **5** holes.
	d. Crushed finned area other than inlets or outlets (Per Panel).	d. Crushed area depth **0.250** inch; Diameter **3.0** inch.	d. N/A	d. Areas greater than negligible limits.
	e. Braze Voids	e. No limits.	e. N/A	e. N/A

NOTES:

1. Cracks in inner plug in the area from **1** inch forward of the doubler to **1** inch aft of doubler to ported opening around strut are to be stop drilled only, not stop drilled and welded. Welds in this area do not hold and tend to lose material causing openings in the surface. Small openings in this region postage stamp size or smaller (**3/4 x 1** inch) are not to be patched. These are not detrimental to unit operation or performance.

2. Any crack in inner skin of the internally finned outer body panel underneath the mount ring which are in line (aft) with a strut and run fore and aft, are not to be stop drilled or welded or patched. This type of crack is nonstructural and causes negligible cooling air leakage which is not detrimental to operation or performance of unit.

3. Fin lengths are measured straight line point to point ignoring convolutions.

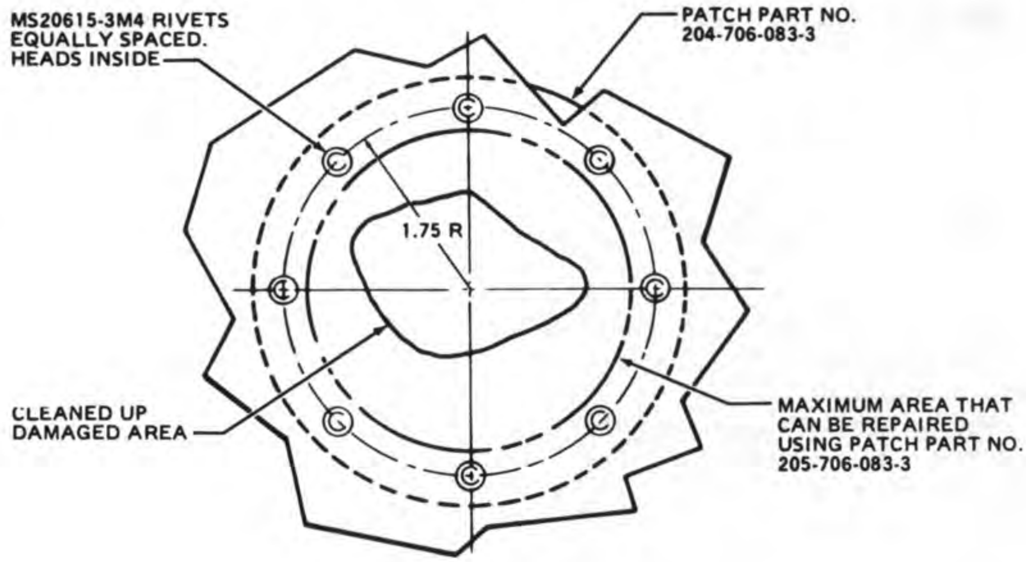
4. Repair of localized straightening of bent fins is permissable but repeated straightening will lead to metal fatigue and cracking.

Table 4-1.2 IR Suppressor Damage and Repair Limits (Major Structural Elements Only) (See Figure 4-17.1)

ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
1. Plug-Strut Clip (Outer)	a. Cracks in plug strut clip from braze relief hole to outboard edge of clip.	a. **One** clip per strut may be cracked (maximum **4** clips cracked). **One** strut may have cracks in both clips while any other strut may have **1** clip cracked (maximum **3** clips cracked).	a. Cracks in excess of negligible damage limit must be weld repaired prior to next flight. See Table 4-1, Method IV.	a. N/A
	b. Cracks in plug-strut clip from inboard edge, thru the braze relief hole and continuing to the outboard edge of clip.	b. A maximum of **2** non-adjacent clips may be cracked.	b. Cracks in excess of negligible damage limit must be weld repaired prior to next flight. See Table 4-1, Method IV.	b. N/A
	c. Crack in plug-strut clip to plug compound contour panel joint.	c. A maximum of **2** non-adjacent joints may be effectively cut.	c. Not repairable.	c. Damage in excess of the negligible damage limit.
2. Channel & Clips	a. Cracks in channel from braze relief hole to outboard cap.	a. **One** channel per strut may be cracked (maximum of **4** channels cracked). **One** strut may have both channels cracked while any **2** of the remaining (non-adjacent) channels may be cracked (maximum of **4** channels cracked).	a. Damage in excess of the negligible damage limit must be weld repaired prior to the next flight. See Table 4-1, Method IV.	a. N/A
	b. Cracks in channel from inboard edge thru braze relief hole and continuing to the outboard cap.	**b.** A maximum of **2** non-adjacent channels may be cracked.	b. Damage in excess of the negligible damage limit must be weld repaired prior to the next flight. See Table 4-1, Method IV.	b. N/A

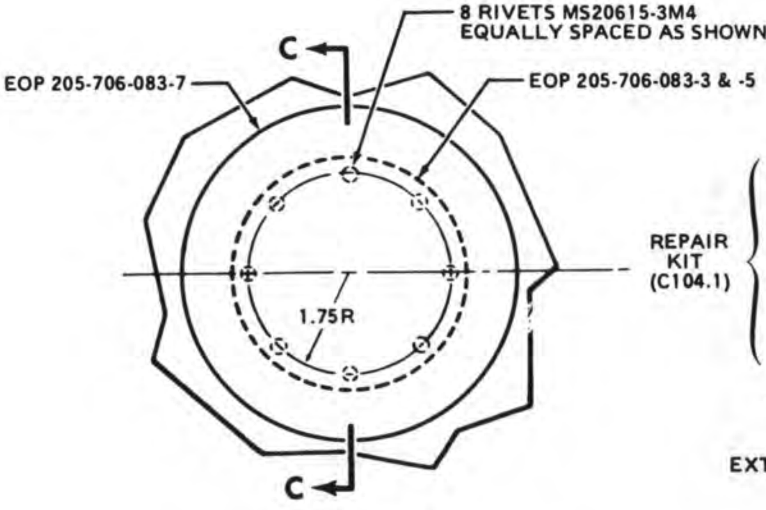
Table 4-1.2. IR Suppressor Damage and Repair Limits (Major Structural Elements Only) (Con't)
(See Figure 4-17.1)

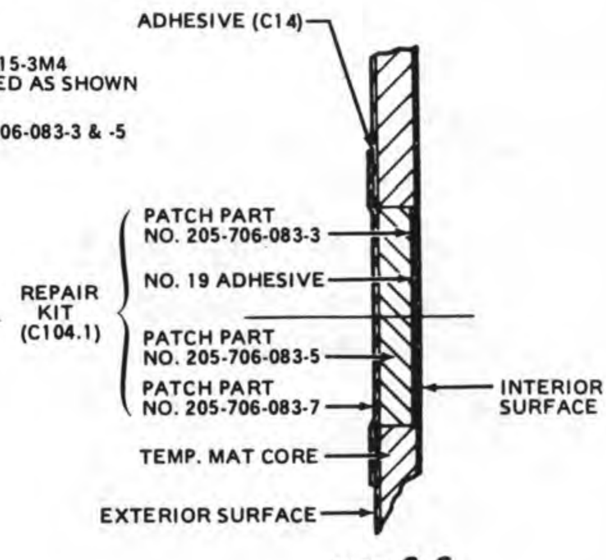
ITEM	DEFECT	NEGLIGIBLE DAMAGE LIMITS	REPAIRABLE DAMAGE LIMITS	DAMAGE REQUIRING REPLACEMENT
	c. Cracks along the junction of the channels and the main mount ring.	c. A maximum of **2** non-adjacent channel junctures may be cracked.	c. Damage in excess of the negligible damage limit must be weld repaired prior to the next flight. See Table 4-1, Method IV.	c. N/A
3. Struts (Aft Portion)	a. Cracks in the inner or outer skins of the strut internally finned aft portion.	a. Cracks not exceeding **1** inch and non-branching in any **1** or all skin surfaces.	a. Branching or cracks **1** to **3** inches in length in not more than **1** skin per strut, not more than **2** struts, must be stop drilled prior to next flight.	a. Damage in excess of repairable damage limit.
4. Main Mount Ring & Bracket	a. Cracks	a. Cracks which effectively eliminate any one fastener.	a. Cracks which effectively eliminate more than **1** fastener must be patched and weld repaired prior to next flight. See Table 4-1, Method V.	a. N/A
5. Plug-Strut Clip (Inner)	a. Cracks	a. A maximum of **2** non-adjacent clips may be cracked through. A maximum of **4** clips may be partially cracked.	a. Damage in excess of negligible limits shall be weld repaired. See Table 4-1, Method IV.	a. N/A
6. Braze Joint	a. Crack in the braze alloy joining two surfaces.	a. Up to **50%** of perimeter of joint.	a. Greater than **50%** of perimeter of joint, weld repair. See Table 4-1, Method VII. See Note 1.	a. N/A



DETAIL **A**

VIEW OF INSIDE SURFACE
OF 205-060-303-502
209-060-306-1





VIEW **C-C**

DETAIL **B**

VIEW ON EXTERIOR SURFACE OF EXHAUST DUCT

ALL DIMENSIONS ARE IN INCHES
UNLESS OTHERWISE NOTED.

NOTE

Sheet metal patches should have at least 2.0 inches of parent metal spacing between patch edges. No limit on number of patches.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

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Figure 4-16. Repair Procedures — Infrared Suppression System

4-51. P E INSTALLATION — IR SUPPRESSION SYSTEM.

CAUTION

Use extreme care in positioning the aft duct assembly (5, figure 4-15). Failure to do so will damage gasket.

a. Position aft duct assembly (5) on rear flange of fairing (4) with lower external supports extending over external supports mounted on the fairing transition section. Support aft duct assembly with 12 bolts and washers (18 and 19). Position fairing assembly (7) in place and secure to aft duct (5) and fairing (4) with 10 bolts and washers (16 and 17).

b. Position exhaust extension (3) inside fairing and mount to forward section of duct assembly (5) with nuts (14) and washers (15) on lockpins (20).

c. Install forward duct assembly (2) on forward section of exhaust extension (3) and install bolts (13) and washers (12).

d. Place fairing (4) with extension (3) and duct assemblies (2 and 5) installed, in place and over tailpipe (1). Engage fasteners around tailpipe fairing.

e. Connect drain line (6) to fitting on tailpipe.

4-52. M INFRARED (IR) SUPPRESSION SYSTEM.

4-53. M DESCRIPTION — IR SUPPRESSION SYSTEM.

The exhaust system on M coded (modernized) helicopters is an infrared suppression system comprised of the following major components: infrared suppressor, engine exhaust duct assembly, and infrared suppressor cowling (figure 4-17). The engine exhaust diffuser on the rear of the engine directs the engine exhaust gases into the exhaust duct and IR suppressor. To aid in exhaust compartment cooling, a heat shield is mounted around the end of the diffuser. The exhaust duct is covered with a Hi-temp insulating blanket. The IR suppressor and exhaust duct act as an ejector, mixing ambient air with exhaust gases. The exhaust duct and heat shield are mounted on flanges of the diffuser with V-band clamps. A countermeasures set is incorporated into the system (TM 11-1520-236-20).

Premaintenance Requirements for IR Suppression System

Condition	Requirements
Model	AH-1S M
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C14), (C33), (C74), (C97)
Special Environmental Conditions	None

4-54. M REMOVAL — IR SUPPRESSION SYSTEM.

a. Remove both panels from IR suppressor cowling (7, figure 4-17).

b. Disconnect drain lines (10).

c. Disconnect countermeasures set (1) electrical cable connectors located on aft firewall.

CAUTION

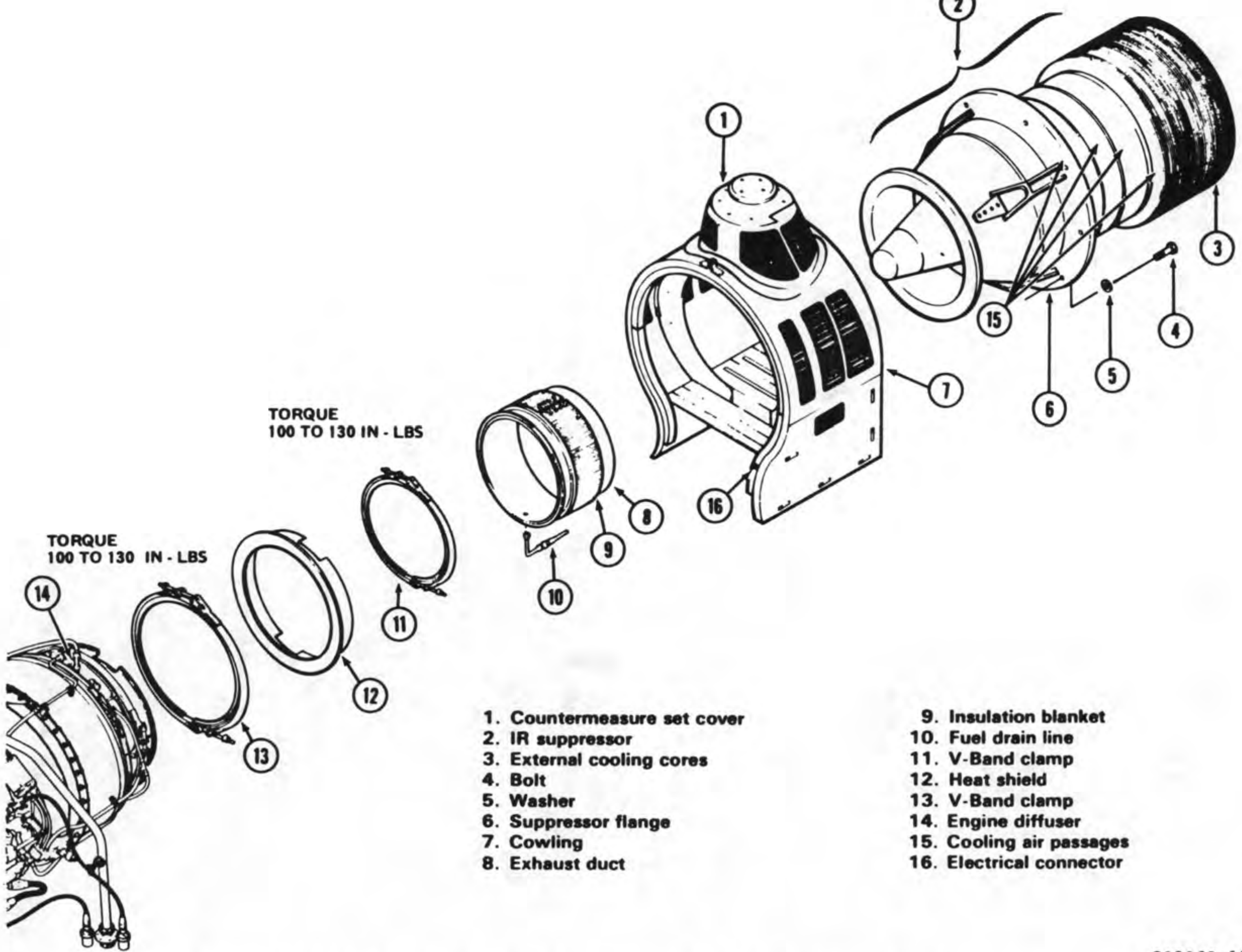
Support suppressor (2, figure 4-17) during removal. Improper handling can damage external cooling cores.

d. Remove eight bolts (4) and washers (5).

e. Remove suppressor (2) from cowling (7).

f. Remove cotter pins, washers and clevis pins from cowling (7) mounts. Remove bolts and washers that attach lower forward section of cowling frame (chapter 2).

g. Release top cowling latch and turnlock fasteners.



1. Countermeasure set cover
2. IR suppressor
3. External cooling cores
4. Bolt
5. Washer
6. Suppressor flange
7. Cowling
8. Exhaust duct
9. Insulation blanket
10. Fuel drain line
11. V-Band clamp
12. Heat shield
13. V-Band clamp
14. Engine diffuser
15. Cooling air passages
16. Electrical connector

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Figure 4-17. M Exhaust System Components With IR Suppression — Installation

h. Remove cowling.

i. Loosen nuts to open V-band clamp (13). Remove heat shield (12) from diffuser.

j. Loosen nuts to open V-band clamp (11). Pull aft to disengage exhaust duct locating pins, and remove duct (8).

k. Place protective cover over diffuser opening.

NOTE

A straight pipe duct assembly exhaust ejector is installed on some AH-1S P M. The straight pipe is removed in the same manner, removing the same hardware as the IR Suppressor.

4-55. M CLEANING — IR SUPPRESSION SYSTEM.

a. Exhaust gas soot deposits should not be removed from internal parts of exhaust duct, heat shield and IR Suppressor except locally as necessary for close examinations and repairs.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation, avoid prolonged breathing of solvent vapors and contact with skin or eyes.

b. Clean clamps (11 and 13) with solvent (C112) and wire brush.

WARNING

Use safety glasses for eye protection when using compressed air.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation, avoid prolonged breathing of solvent vapors and contact with skin or eyes.

CAUTION

See paragraph 4-57.1 for special handling instructions.

c. Clean blocked IR suppressor cooling passages (15) by blowing compressed air (**0 TO 30** psi) through passages. If blocked with mud or other organic material, flush with one part cleaning compound (C33) and nine parts water by volume. If blockage is oil based, flush with solvent (C112).

CAUTION

Do not allow solvent to come in contact with countermeasures set cover.

NOTE

Paint discoloration in area other than aft of struts on the IR suppressor may indicate plugged cooling passages (15).

d. Install protective covering on countermeasures set cover (1) openings.

e. Clean IR suppressor cowling (7) with one part cleaning compound (C33) and nine parts water by volume and soft bristle brush.

4-56. M INSPECTION — IR SUPPRESSION SYSTEM.

a. Inspect clamps (11 and 13, fig. 4-17) heatshield (12), exhaust duct (8) and IR Suppressor (2) for cracks, dents, burned out, buckled areas or distortion. See tables 4-1.1 and 4-1.2 for damage and repair limits.

b. Inspect insulation blanket (9) and attaching fasteners for cuts, tears, distortion or other visible damage. Damaged fasteners are cause for rejection.

c. Inspect IR suppressor cowling (7) for cracks, tears, holes, and missing or broken hardware.

d. Inspect countermeasures set (1) for obvious damage.

e. Inspect IR suppressor (2) cooling passages for blockage. Paint discoloration in areas other than aft of struts may indicate blocked cooling passages.

f. Inspect IR suppressor (2) for damage.

g. Inspect V-band clamps (11 and 13) for serviceability.

h. Inspect bolts and nuts on V-band clamps (11 and 13) for thread damage or distortion.

4-57. M REPAIR — IR SUPPRESSION SYSTEM. (AVIM)

a. Replace exhaust system V-band clamps (11 and 13, figure 4-17) if damaged.

b. Replace damaged insulation blanket (9).

c. Replace heatshield (12) if cracks, holes, or dents cannot be repaired.

d. Exhaust duct.

(1) Shallow dents and scratches are acceptable. Deep dents must be repaired by same method as outlined for holes.

(2) Repair cracks **three** inches long or less by welding. Grind weld as smooth as possible to match contour of duct.

(3) Cracks in excess of **three** inches, tears, small holes, and deep dents are acceptable if repaired by welding on patches.

(4) Replace duct if damaged beyond repair limitations.

e. IR suppressor.

(1) Refer to table 4-1 for repair method. Fabricate patches for repair of unfinned suppressor area from **0.040** stainless steel (MIL-S-6721 Comp 347). Patch internal finned panel section with **0.020** stainless steel (MIL-S-6721 Comp 347).

(2) Repaint discolored painted areas, other than area aft of struts, after cleaning blocked cooling passages (TB 746-93-2).

4-57.1. HANDLING INSTRUCTIONS.

NOTE

The finned surfaces of tailpipe assembly are susceptible to physical damage and require careful handling.

a. Removal of suppressor from the carton should be done by two people. After top of carton has been opened and tailpipe packing plug removed, lift outer carton vertically until the suppressor has been cleared.

b. Before removing suppressor from lower carton, a provision should be made for a suppressor support to receive the nose cone and allow the suppressor to stand fully supported in a vertical position, or for a protective support blanket on which to lay the suppressor in a horizontal position.

c. After first carton has been opened, the foam base used in shipping carton to support suppressor may be used as a support base. The cardboard liner surrounding the suppressor has no bottom and may be removed by lifting vertically in the same manner as the outer carton. This will leave the suppressor exposed from the mounting ring aft.

d. Using mounting that rests on four cardboard supports, lift suppressor from carton by placing hand inside of duct and thumb on lip of duct.

e. Suppressor should be rotated by two people, lifting it clear of its support. Do not roll suppressor in the horizontal position or along the aft edge of tailpipe.

f. Suppressor may be placed in upright position for inspection using care not to damage aft fins on tailpipe.

g. When installing suppressor on aircraft, the support sling should not be placed on tailpipe.

h. Tailpipe cover should be removed and installed with care to prevent snagging of fins.

i. For inspection refer to tables 4-1.1 and 4-1.2.

4-58. M INSTALLATION — IR SUPPRESSION SYSTEM.

a. Seal all open areas between base of forward and aft firewall and engine deck (figure 4-14). Use sealant (C105).

b. Remove protective cover from engine diffuser.

c. Install insulation blanket (9, figure 4-17). Lace blanket on top side of exhaust duct (8) using zig-zag pattern.

d. Position exhaust duct (8) on flange of diffuser (9, figure 4-15) with drain fitting (10, figure 4-17) pointed down.

e. Engage exhaust duct (8) locating dowels with diffuser.

f. Secure mating flange with V-band clamp (13). Seat clamp by tapping with soft mallet. Tap from center of clamp to ends. Torque clamp nuts **100 TO 130** inch-pounds.

NOTE

Torque on V-band clamps (11 and 13) must be rechecked after first engine run.

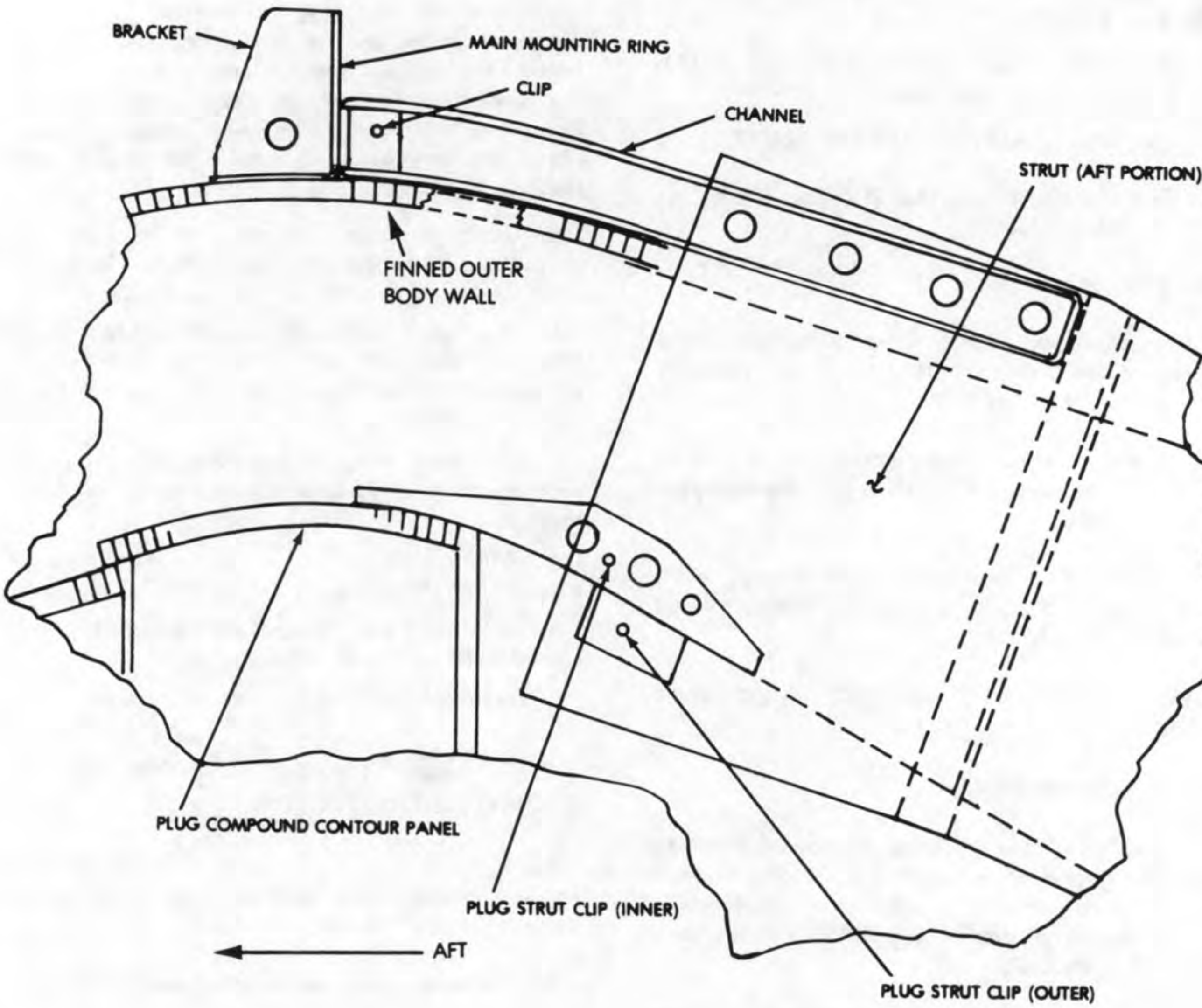


Figure 4-17.1. AH-1S Suppressor Major Structural Elements

g. Position heat shield (12) on diffuser support cone.

h. Secure V-band clamp (11). Seat clamp by tapping with soft mallet. Tap from center to ends while torquing bolts **100 TO 130** inch-pounds.

i. Position IR suppressor cowling (7) on helicopter and secure (paragraph 2-89).

j. Install IR suppressor (2, figure 4-17) on cowling (7) with drain fitting (10) pointed down. Secure with eight bolts (4) and washers (5). Torque bolts **70** inch-pounds.

k. Connect countermeasures set electrical cable connection located on aft engine firewall.

l. Connect fuel drain lines (10) located on engine exhaust duct (8), and IR suppressor (2).

m. Install cowling fairing and secure with fasteners.

NOTE

A "straight pipe" duct assembly exhaust ejector is installed on some AH-1S (MC). The straight pipe is installed in the same manner using the same hardware as the IR Suppressor. Inspection and repair can be made in accordance with exhaust duct criteria.

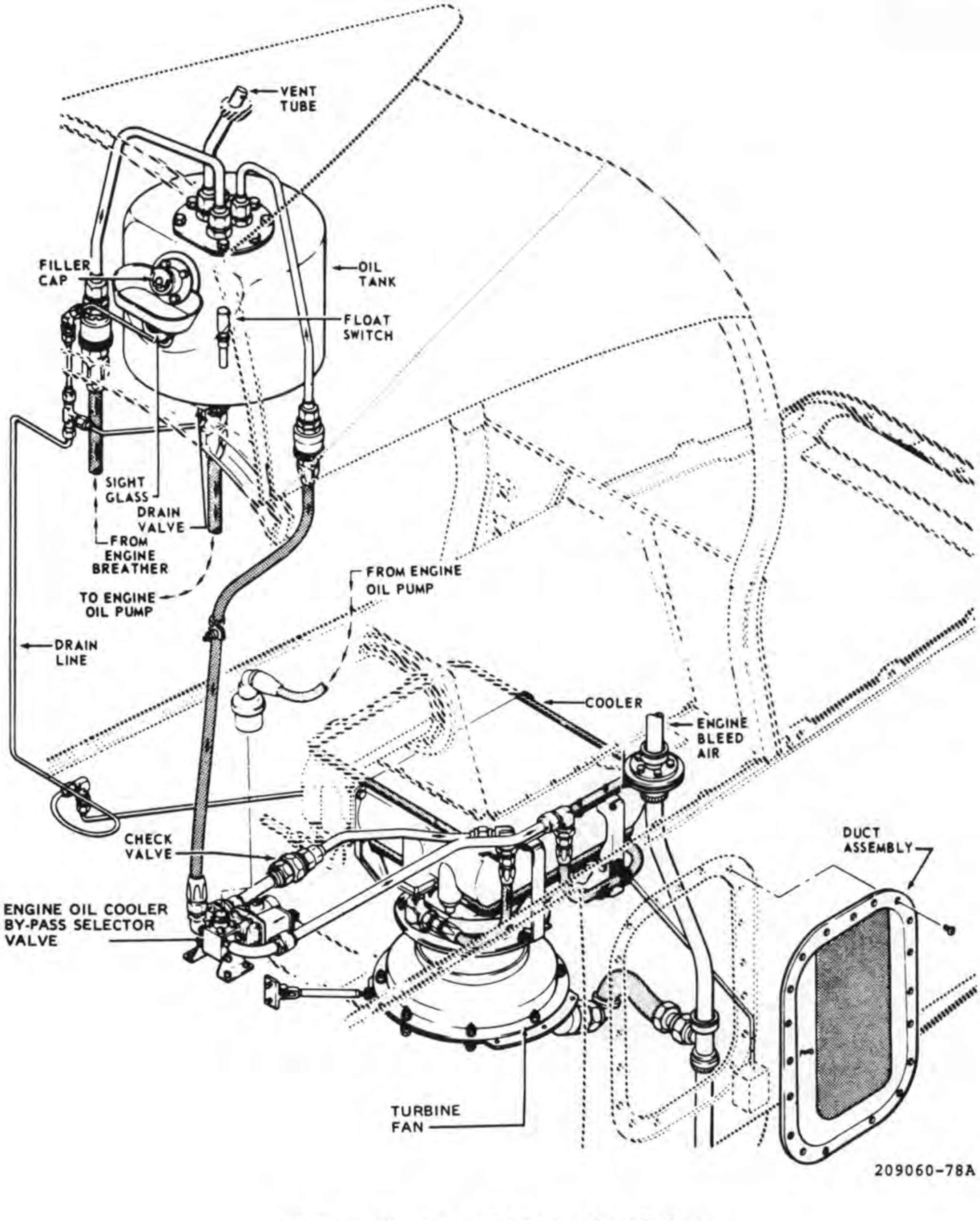


Figure 4-18. Engine Oil System Installation

SECTION V. OIL SYSTEM

4-59. OIL SYSTEM.

4-60. DESCRIPTION — OIL SYSTEM.

Oil is supplied to the engine from a self-sealing tank mounted in the aft fairing above the engine (figure 4-18). After passing through the engine, oil is delivered from the scavenge side of the engine oil pump to a bypass mounted on the engine compartment deck at left side. In normal operation, oil passes through the oil cooler and then returns to the tank. The cooler is mounted below an engine deck opening, under a metal plenum. Cooling air is drawn in through a screened duct on left side of the fuselage up through the cooler, then aft to pass out through screened openings of the tailpipe fairing. A turbine fan driven by engine bleed air is mounted under the cooler. The engine oil cooler bypass selector valve (figure 4-18) is controlled by a float switch in the oil tank and the ENG OIL BYP switch on the pilot console. If oil level in the tank becomes low enough to operate the float switch, (3.8 quarts low from spill over) the ENG OIL BYPASS caution panel segment will light, and the valve will automatically shut off flow to the cooler and return engine oil directly to the tank. The pilot can use his switch to reopen the valve and use oil cooling when conditions warrant such action. The engine oil cooler temperature regulating valve, mounted in the oil cooler, automatically bypasses the oil cooler core when oil is cold.

4-61. TROUBLESHOOTING — OIL SYSTEM.

Use troubleshooting chart (table 4-2) in conjunction with oil system schematic (figure 4-19) to locate and correct malfunctions in the engine oil system.

NOTE

Before using this table, be sure all normal operational checks have been performed. In event of a malfunction which is not listed in this table, notify the next higher level of maintenance.

Table 4-2. Troubleshooting Engine Oil System

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

CAUTION

Do not operate engine until it is determined that oil pump failure or oil starvation has not occurred.

1. No engine oil pressure.

STEP 1. Ensure that tank is filled to proper level. Fill tank to proper level if required (paragraph 1-4).

STEP 2. Check for loose connection and/or clogged hose. Inspect entire lubrication system for leaks and obstruction. Pay particular attention to quick disconnect fittings (figure 4-20).

STEP 3. Check for proper operation of oil pressure transmitting system.

Check system using pressure source at pressure tap. Replace oil pressure transducer if faulty. Replace oil pressure indicator if faulty. Check continuity of wiring circuit between transducer and indicator (paragraph 9-229).

STEP 4. Check that oil pump coupling is not sheared and female spline on oil pump dirveshaft gear is not worn.

Table 4-2. Troubleshooting Engine Oil System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

Replace oil pump for sheared coupling. Inspect for worn spline on shaft gear. Refer to TM 55-2840-229-24 for removal and inspection procedures.

2. Fluctuating Oil Pressure.

STEP 1. Check oil quantity in tank.

Fill tank to proper level (paragraph 1-4).

STEP 2. Check for dirty piston in oil pump pressure regulating valve.

Remove, clean, and reinstall piston (TM 55-2840-229-24).

STEP 3. Check oil pump and/or oil pump driveshaft gear for failure.

Remove and replace oil pump or oil pump driveshaft gear (TM 55-2840-229-24).

STEP 4. Check for faulty transducer or circuit to indicator.

Perform continuity check and replace components as necessary (paragraphs 9-229 and 4-66).

3. Low engine oil pressure.

STEP 1. Check oil pressure transducer for faulty operation (paragraph 4-64).

Remove and replace faulty transducer (paragraphs 4-65 and 4-67).

STEP 2. Check for clogged oil filter.

Clean oil filter (paragraph 7-47).

STEP 3. Check for low quantity in tank.

Fill tank to proper level (paragraph 1-4).

STEP 4. Check oil pump pressure regulating valve for proper adjustment

Adjust regulating valve (TM 55-2840-229-24).

STEP 5. Check oil pump for faulty operation.

Remove and replace faulty oil pump (TM 55-2840-229-24).

4. High engine oil pressure.

STEP 1. Check for restrictions in oil flow lines.

Table 4-2. Troubleshooting Engine Oil System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

Check quick disconnect couplings for proper connections.

Clear oil lines of restrictions (figure 4-20).

STEP 2. Check oil pump pressure regulating valve for proper adjustment

Adjust regulating valve. (TM 55-2840-229-24).

STEP 3. Check oil pressure transducer for faulty operation (paragraph 4-64).

Remove and replace faulty oil pressure transducer (paragraphs 4-65 and 4-67).

NOTE

High engine oil pressure may be due to cold oil on start. Allow engine to reach operating temperature by operating engine at idle.

5. High engine oil temperature.

STEP 1. Ensure that cooling air inlet is not blocked.

Inspect screened inlet and remove all grass, leaves, and other foreign material. Also, check cooler core air passage and remove any grass, dirt or other foreign material (paragraph 4-79).

STEP 2. Ensure that oil cooler blower is operating correctly.

Check for proper blower operation. Repair and replace as necessary (paragraph 4-89).

STEP 3. Check that temperature regulating valve (20, figure 4-21) is not stuck in bypass position (paragraphs 4-79 and 4-80).

If valve is stuck in bypass position, remove and replace valve or oil cooler (paragraph 4-81).

STEP 4. Check that emergency bypass is not stuck in bypass position.

If valve is stuck in bypass position, remove and replace valve (paragraphs 4-94 and 4-97).

STEP 5. Check engine oil level.

Fill tank to proper level (paragraph 1-4).

STEP 6. Ensure that temperature indicating system is operating correctly.

Check operation of oil temperature indicator, resistance bulb and related circuitry. Replace faulty components (paragraph 8-57).

STEP 7. Check for bleed air leak between engine and oil cooler turbine fan.

Isolate and correct any leaks (figure 4-18).

Table 4-2. Troubleshooting Engine Oil System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

STEP 8. Check operation of low level emergency system float switch in oil tank (paragraph 4-70).

Replace faulty float switch in oil tank (paragraph 4-71).

6. Low oil temperature.

STEP 1. Check operation of temperature indicating system.

Check operation of oil temperature indicator, resistance bulb, and related circuitry. Replace faulty components (paragraph 8-57).

STEP 2. Check that engine oil cooler bypass selector valve (figure 4-18) is not stuck in bypass position.

Replace oil cooler (paragraph 4-81).

7. No oil temperature.

STEP 1. Check operation of temperature indicating system.

Check operation of oil temperature indicator, resistance bulb, and related circuitry. Replace faulty components (paragraph 8-57).

8. Excessive engine oil consumption.

STEP 1. Check for leakage at fittings and hose connection.

Tighten or replace fittings or hose assemblies.

NOTE

Refer to TM 55-2840-229-24 for additional excessive engine oil consumption troubleshooting procedures.

4-62. OIL PRESSURE TRANSDUCER.

4-63. DESCRIPTION — OIL PRESSURE TRANSDUCER.

An oil pressure transducer is located on left forward side of engine. The oil pressure transducer transmits actual oil pressure to oil pressure gages on pilot and gunner instrument panel.

4-64. INSPECTION — OIL PRESSURE TRANSDUCER.

a. Inspect pressure transducer for leakage, proper operation, general condition and security.

b. Inspect pressure transducer for proper operation (paragraph 8-61).

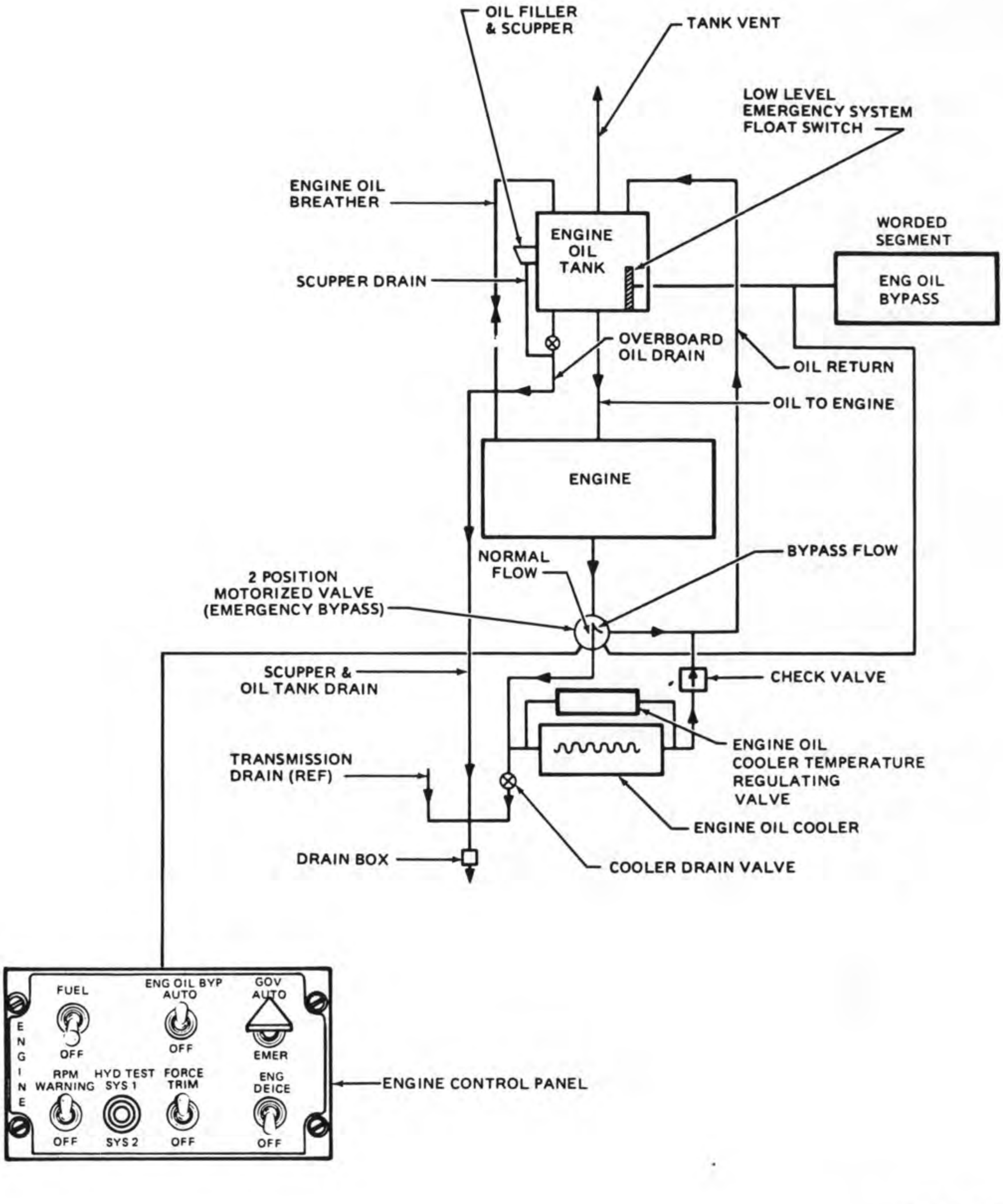


Figure 4-19. Engine Oil System Schematic

4-65. REMOVAL — OIL PRESSURE TRANSDUCER.

a. Disconnect oil line at transducer.

b. Disconnect electrical connector from transducer.

c. Break lockwire and remove nut. Remove transducer from bracket.

4-66. REPAIR OR REPLACEMENT — OIL PRESSURE TRANSDUCER.

a. Replace transducer if inspection requirements are not met (paragraph 4-64).

4-67. INSTALLATION — OIL PRESSURE TRANSDUCER.

a. Install transducer to mounting bracket. Secure nut with lockwire (C136).

b. Connect oil line to transducer.

c. Connect electrical plug to transducer.

4-68. OIL TANK.

4-69. DESCRIPTION — OIL TANK.

The engine oil system tank is a self-sealing cell equipped with a filler cap, an oil level sight glass, and a scupper with drain line (figure 4-20). The tank is located in the aft fairing, secured by bolts on a horizontal firewall above the engine, and accessible for service through right side of transmission cowling. Bosses on bottom of the tank provide mounting for an outlet coupling, a drain valve (14), and a float switch assembly (25). A plate on top of the tank provides connections for a vent tube (1), and for oil return and engine breather line tubes.

4-70. INSPECTION — OIL TANK.

a. Inspect oil tank (7, figure 4-20) for evidence of leakage and general condition. If oil tank is damaged, send to depot maintenance for evaluation.

b. Inspect sight glass (21) for cracks, clear condition, and security.

c. Inspect filler cap and adapter (27) for correct locking action.

d. Inspect all detail parts of oil tank assembly for damage and corrosion.

e. Inspect oil tank float switch assembly (25) for proper operation as follows:

(1) Fill oil tank to overfill (spillover) condition.

(2) Apply electrical power to helicopter.

(3) Using drain valve, remove oil from tank assembly. If low level warning switch is operating correctly and electrical circuit is intact, ENG OIL BYPASS caution panel segment should illuminate when 4.8 to 6.0 quarts of oil are removed.

4-71. REMOVAL — OIL TANK.

a. Open engine compartment cowling. Remove center fairing to allow access through front of aft fairing.

WARNING

Prolonged contact with lubricating oil may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

b. Place a suitable vessel under drain line. Drain oil tank by opening valve.

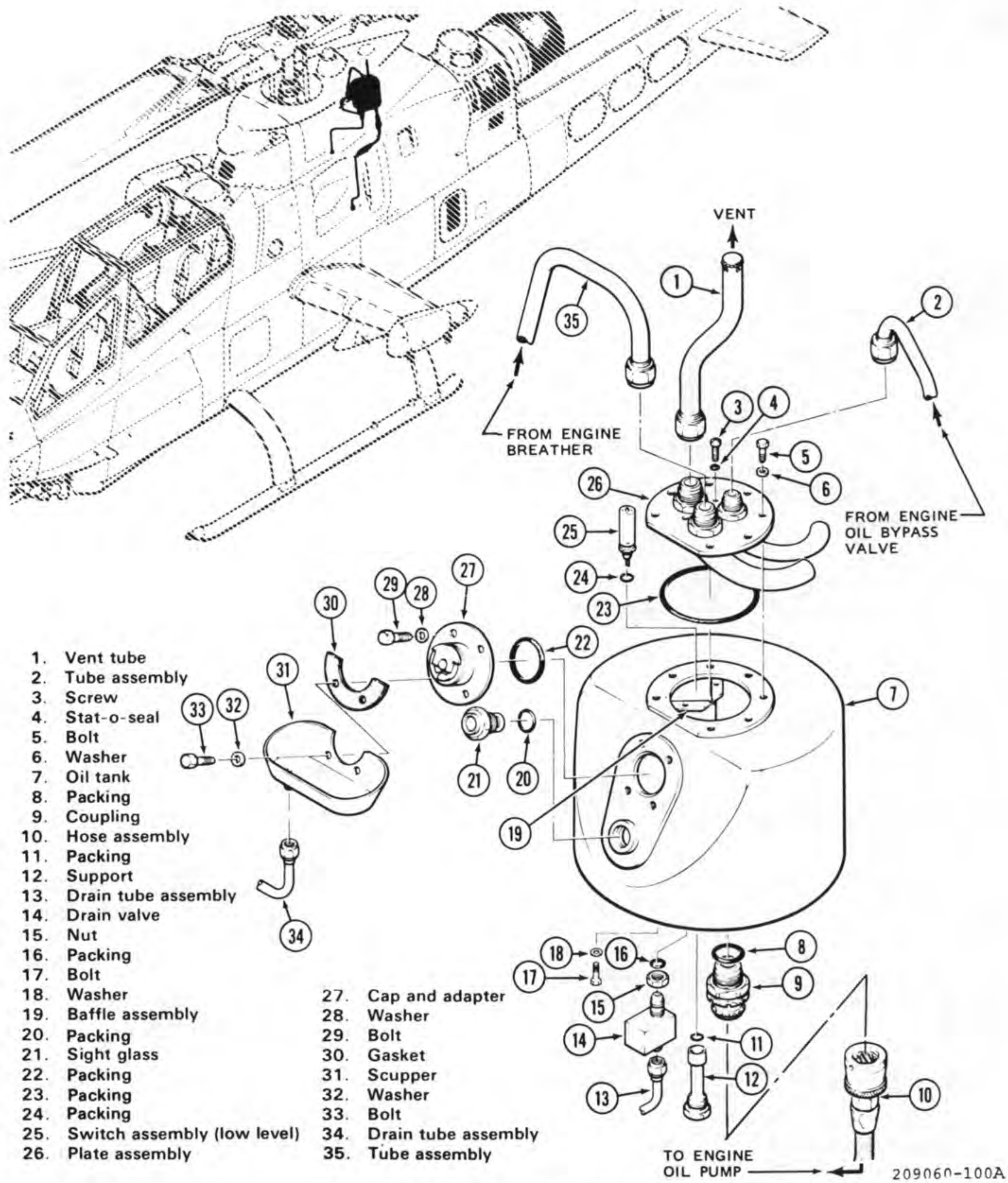
c. Disconnect hose assembly (10, figure 4-20) from coupling (9).

d. Disconnect drain tube assembly (13) from drain valve (14).

e. Disconnect drain tube assembly (34) from scupper (31).

f. Loosen nut (15) and remove drain valve (14), nut (15) and packing (16) from oil tank.

g. Remove coupling (9) and attached packing (8).



1. Vent tube
2. Tube assembly
3. Screw
4. Stat-o-seal
5. Bolt
6. Washer
7. Oil tank
8. Packing
9. Coupling
10. Hose assembly
11. Packing
12. Support
13. Drain tube assembly
14. Drain valve
15. Nut
16. Packing
17. Bolt
18. Washer
19. Baffle assembly
20. Packing
21. Sight glass
22. Packing
23. Packing
24. Packing
25. Switch assembly (low level)
26. Plate assembly
27. Cap and adapter
28. Washer
29. Bolt
30. Gasket
31. Scupper
32. Washer
33. Bolt
34. Drain tube assembly
35. Tube assembly

Figure 4-20. Oil Tank Installation

h. Disconnect engine breather tube assembly (35), vent tube (1), and engine oil bypass valve tube assembly (2) from oil tank plate assembly (26).

i. Disconnect electrical leads of float switch assembly (25) from relay on airframe. Remove support (12) and switch from tank.

j. Remove three bolts (17) and three washers (18). Remove oil tank assembly.

k. Disassemble detail parts of tank assembly as required to replace detail parts or replace oil tank (7).

4-72. CLEANING — OIL TANK.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

a. Clean oil tank (7, figure 4-20) externally and oil tank detail parts using dry cleaning solvent (C112). Drain off solvent and dry with filtered compressed air.

b. Clean minor corrosion from metal parts using sandpaper (C102).

4-73. REPAIR OR REPLACEMENT — OIL TANK.

a. Replace packings or gaskets under oil tank (7, figure 4-20) parts if leakage exists.

b. Replace oil tank (7, figure 4-20) and/or damaged fittings or detail parts that fail to meet inspection requirements (paragraph 4-70).

c. Replace tank (7) if punctured, cut or otherwise damaged. Send tank to depot maintenance for evaluation.

4-74. INSTALLATION — OIL TANK.

a. Ensure that filler cap and adapter (27, figure 4-20), scupper (31), sight glass (21), and plate assembly (26) are installed on tank.

b. Place tank (7) in position on horizontal firewall of aft fairing, with filler cap (27) forward. Align holes and install three bolts (17), with washer (18), through firewall into threaded inserts of tank.

c. Install coupling (9) with packing (8) in lower boss of oil tank. Connect hose assembly (10) to coupling (9).

d. Assemble nut (15) and packing (16) to drain valve (14). Install valve in drain port of tank and tighten nut (15). Connect drain tube assembly (13) to drain valve.

e. Install support (12) with packing (11) in tank assembly.

f. Assemble packing (24) to float switch assembly (25). Route wires of float switch through support (12) and secure float switch to support. Connect electrical leads to relay on airframe.

g. Connect tube assemblies (35), (2) and vent (1) to plate assembly (26).

4-75. SERVICING — OIL TANK.

Service oil tank in accordance with instructions contained in paragraph 1-4.

4-75. OIL COOLER.

4-77. DESCRIPTION — OIL COOLER.

The engine oil cooler is mounted on underside of the engine compartment deck. Its inboard side is attached to mating flanges of the transmission oil cooler, but there is no oil connection between the two oil coolers. The oil cooler is equipped with an integral bypass valve.

WARNING

Oil cooling turbine fan does not incorporate a protective fan screen. Do not attempt oil cooler or oil cooling turbine fan maintenance with engine operating. Disconnect bleed air hose prior to maintenance.

4-78. REMOVAL — OIL COOLER.

CAUTION

If oil cooler is known to have been contaminated with metal particles, replace cooler and tag removed cooler as being contaminated. Forward to depot. Refer to TM 55-1500-204-25/1 for detailed procedures.

CAUTION

Use back-up wrenches when removing and installing oil cooler drain fittings, valves and lines.

Premaintenance Requirements for Engine Oil Cooler

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C35), (C76), (C100), (C101), (C112)
Special Environmental Conditions	Dust Free

a. Remove oil cooling duct from left side and access door from right side of fuselage. Remove turbine fan and duct (paragraph 4-85).

b. Drain trapped oil from cooler.

c. Disconnect inlet and outlet oil lines from cooler fittings. Cap open lines.

WARNING

Prolonged contact with lubricating oil may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

d. Remove bolts (27, figure 4-21), nuts (29), and washers (28) that attach engine oil cooler to transmission oil cooler.

e. Remove bolts (1) and washers (2) around mounting flange of engine oil cooler. Remove cooler from fuselage.

f. If cooler is being replaced, remove inlet and outlet fittings and hardware for use on replacement assembly.

4-79. CLEANING — OIL COOLER (AVIM).

CAUTION

When using steam and compressed air, be careful not to damage air fins by high pressures.

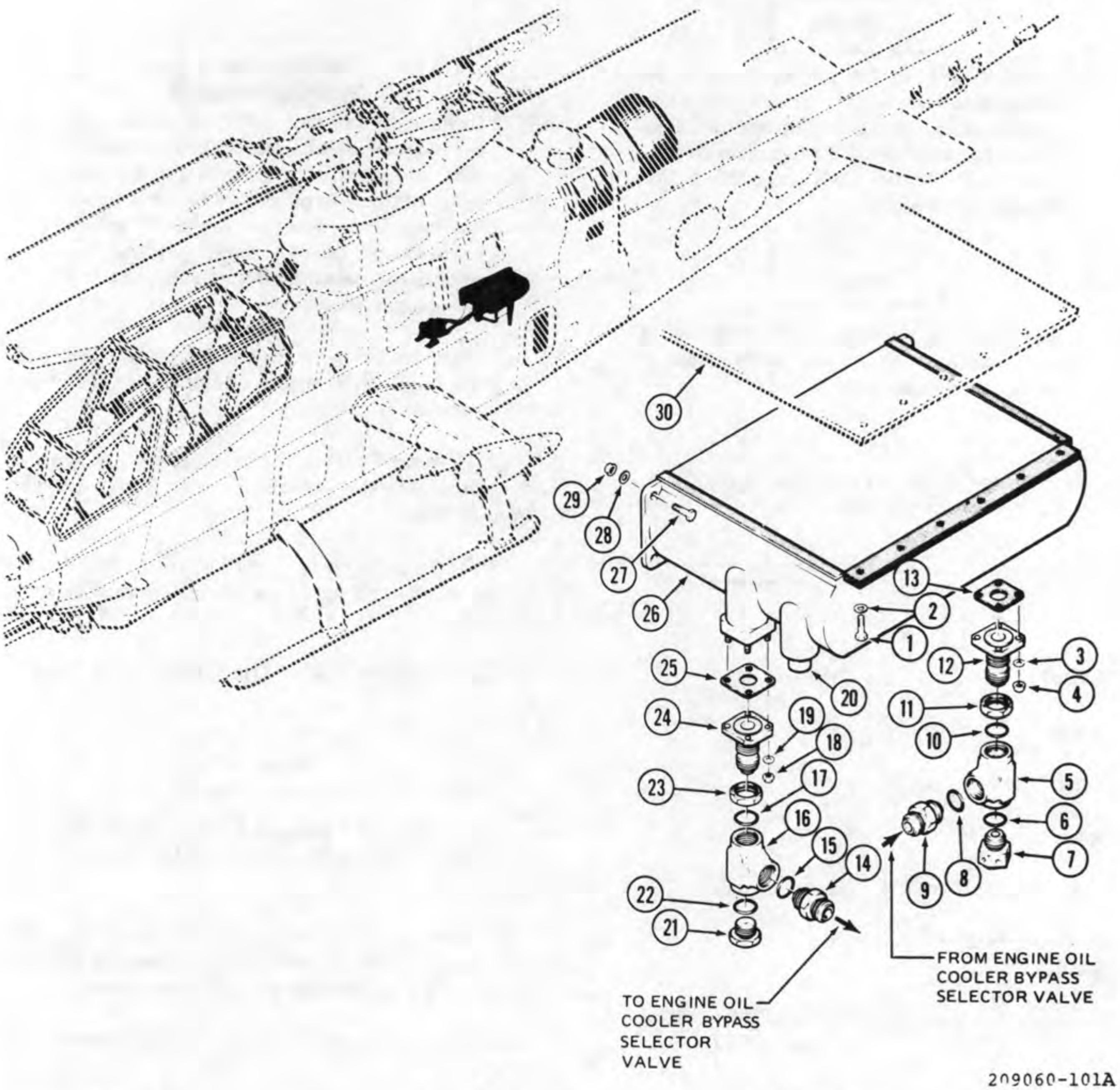
a. Steam clean the exterior surfaces and corrugated air fins of each core. Remove obstructions from air fins with a pick and compressed air.

b. Prepare oil cooler for internal cleaning as follows:

(1) Remove lockwire and unscrew oil cooler bypass valve body (20, figure 4-21) from valve housing in cooler.

(2) Press a rubber plug into the bypass opening in the valve housing.

(3) Reinstall temperature regulating valve (20) into valve housing so valve body bears up against the rubber plug.



1. Bolt	11. Nut	21. Plug
2. Washer	12. Fitting	22. Packing
3. Washer	13. Gasket	23. Nut
4. Nut	14. Union	24. Fitting
5. Tee	15. Packing	25. Gasket
6. Packing	16. Tee	26. Oil cooler
7. Plug	17. Packing	27. Bolt
8. Packing	18. Nut	28. Washer
9. Union	19. Washer	29. Nut
10. Packing	20. Temperature regulating valve	30. Airframe structure (Ref)

Figure 4-21. Engine Oil Cooler Installation

c. Connect oil cooler in line with cleaning equipment in reverse of normal flow for first flush (figure 4-22). Refer to TM 1-7R1-3-1-1.

NOTE

Centrifugal pump in cleaning equipment must be capable of supplying fluid at approximately 40 gpm while maintaining pressure of 75 psi.

d. To remove oil and loose sludge and to reduce contamination of cleaning solutions during following operations, pre-clean cooler interior as follows:

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(1) Flush core, in reverse direction, with solvent (C112) for **30** minutes or until solvent appears clean.

(2) Reverse lines to cooler and flush core in direction of normal flow for approximately **15** minutes.

(3) Remove oil cooler from cleaning equipment and drain all fluid from cooler.

e. Remove dirt, carbon deposits, oil gum, lead deposits, and other contaminants by connecting oil cooler to cleaning equipment (figure 4-22). Use cleaning compound (C35).

(1) Flush core **30 TO 60** minutes in direction opposite to normal flow.

(2) Reverse lines and flush core in normal direction for **15** minutes.

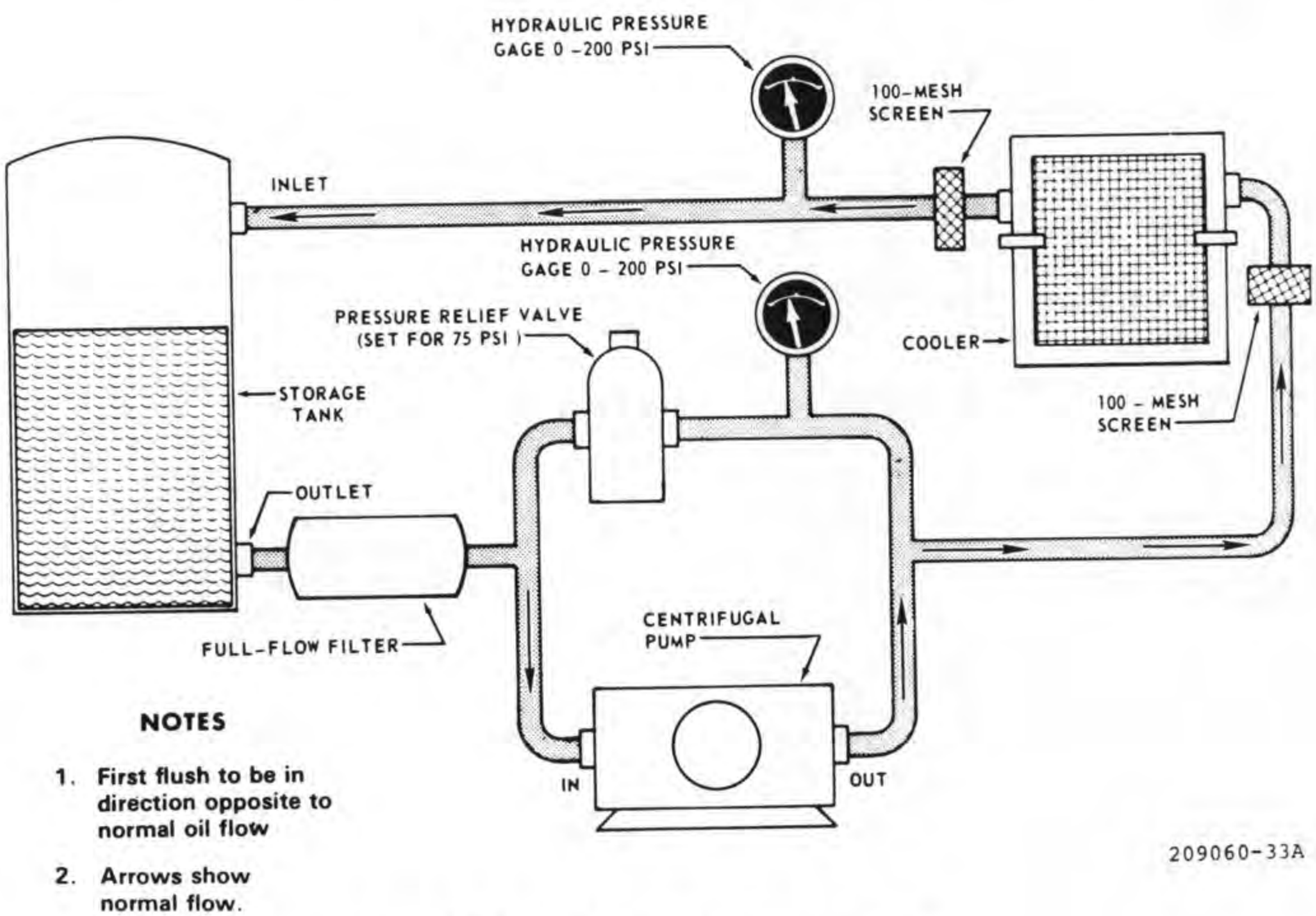


Figure 4-22. Oil Cooler Cleaning Schematic

(3) Remove plug installed in bypass opening of valve housing and insert plug in cooling section opening. Reinstall temperature regulating valve (20, figure 4-21).

(4) Flush oil cooler in normal direction for **15** minutes to clean bypass passage.

(5) Remove plug from cooling section opening in valve housing and install into bypass opening. Reinstall temperature regulating valve (20).

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

f. Connect oil cooler to cleaning equipment containing cleaning compound (C35). Install 100-mesh screen at inlet and outlet ports of oil cooler.

(1) Flush core for **10** minutes in each direction.

(2) Check 100-mesh screens between each flush.

(3) If screens are not clear, reflush core for **5** minutes in each direction, repeat until screens are clear.

g. Remove rubber plug from bypass valve housing in oil cooler.

4-80. INSPECTION — OIL COOLER.

a. Inspect air fins and air passages for distortion and foreign particles that may obstruct air flow.

b. Inspect cooler for damaged or bulged plates, cracked castings and flanges and broken welds. Inspect studs for stripped threads and cracked or ineffective lock rings.

c. Inspect all openings in oil cooler for evidence of foreign matter inside of the cooler.

d. Inspect rubber gaskets on top of cooler for security, rips, tears, or scores, and missing sections that may prevent gaskets from sealing.

e. Inspect temperature regulating valve (20, figure 4-21) and valve housing for stripped threads and distortion, scoring, or wear of the seal surfaces. Check functioning of bypass control valve as follows:

(1) Submerge valve in water heated to **150 TO 155** degrees F. (**66 TO 68** degrees C) for **five** minutes. Valve should open.

(2) Remove valve from water and measure length and record.

(3) Submerge valve in water heated to **176 TO 180** degrees F. (**80 TO 82** degrees C) for **five** minutes. Valve should open.

(4) Remove valve from water and measure length. Minimum acceptable increase in valve length from dimension recorded in step (2) is **0.090** inch.

f. With temperature regulating valve installed, pressure-check oil cooler.

(1) Make preliminary check of oil cooler for air leaks as follows:

(a) Plug outlet port and connect an air line to inlet port.

(b) Connect other end of air line to an adjustable air pressure source and adjust pressure to **12** psig.

(c) Submerge cooler in water at approximately **140** degrees F (**60** degrees C). Gradually heat water to **180** degrees F (**82** degrees C) and check for leaks.

WARNING

Increase air pressure gradually to avoid burns from leakage and hot water.

(d) After **5** minutes of submersion, gradually increase air pressure to **100** psig. Inspect cooler for leaks as evidenced by presence of air bubbles.

(e) Remove cooler from water and relieve air pressure.

(2) Make final check of oil cooler as follows:

(a) Dry oil cooler externally using compressed air.

(b) Plug outlet port and apply room temperature water at **400** psig to the other (inlet) port.

(c) Lock liquid in oil cooler for **10** minutes.

(d) Inspect cooler for visible leaks, blown or bulged plates.

(e) Release pressure and drain cooler.

4-81. REPAIR OR REPLACEMENT — OIL COOLER.

a. Replace oil cooler if damaged, other than minor distortion to air fins, is defective or if cooler fails to meet inspection requirements (paragraph 4-80).

b. Repair minor bends or distortion of accessible air fins with flat duckbill pliers.

c. Replace missing, torn, ripped, and scored gaskets with rubber (C101). Attach gaskets to oil cooler surface with rubber adhesive (C100). Replace engine oil cooler bypass selector valve seal.

d. Replace damaged or faulty engine oil cooler bypass selector valve or replace oil cooler.

e. If oil cooler is unserviceable, flush thoroughly with corrosion preventive oil (C76) as follows:

NOTE

The interior of the cooler should be completely dry before final flush with corrosion preventive oil to prevent fouling of the mixture.

(1) Connect cooler to cleaning equipment containing corrosion preventive oil and 100-mesh screens.

(2) Flush oil through cooler in each direction for **10** minutes.

(3) Check 100-mesh screens between each flush to ensure that no metal particles have appeared.

(4) Drain cooler and install plugs in both inlet and outlet ports. Secure bypass control valve with lockwire.

f. Prepare oil cooler for storage or shipment as follows:

(1) Flush oil cooler thoroughly with corrosion preventive oil (C76).

(2) Store cooler in container which will prevent damage during shipment or storage.

4-82. INSTALLATION — OIL COOLER.

a. If replacing cooler, install inlet and outlet fittings with new gaskets.

b. Position cooler on underside of support, below engine deck and secure to airframe with bolts (1, figure 4-21) and washers (2). Install bolts (27) through mating flanges of engine and transmission oil coolers, and secure with nuts (29) and washers (28).

c. Install trubine fan (paragraph 4-91).

CAUTION

Check proper alignment of flared ends of tubing to valves and fittings. Do not allow preloading or stresses due to misalignment or improper fit.

d. Align and connect oil lines to cooler fittings.

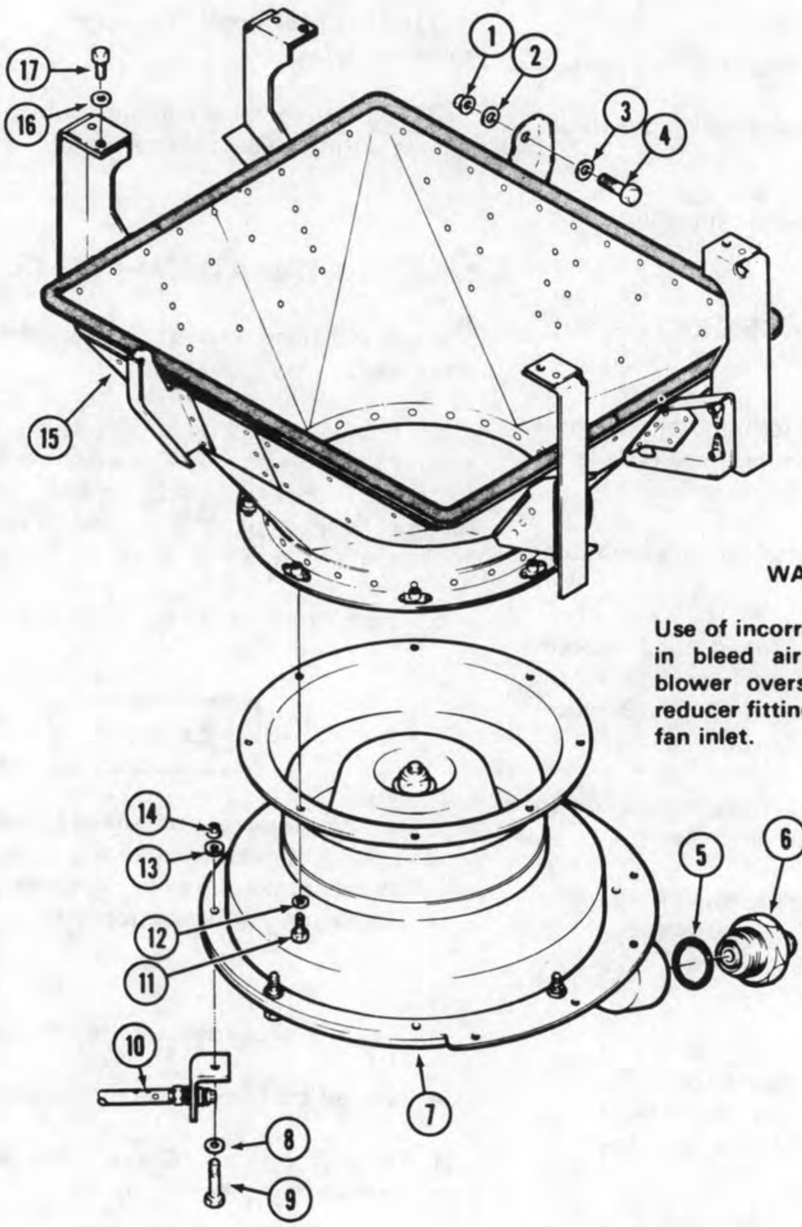
e. Install cooling duct and access door.

f. Service oil tank. Check for leaks and proper operation at next ground run.

4-83. OIL COOLING TURBINE FAN.

4-84. DESCRIPTION — OIL COOLING TURBINE FAN.

a. A turbine fan (7, figure 4-23) driven by engine bleed air is used to blow air through the engine and transmission oil coolers. A fan is suspended on an adapting duct under the coolers, in the fuselage compartment below the engine deck.



WARNING

Use of incorrect reducer fitting in bleed air line may cause blower overspeed. Make sure reducer fitting (6) is installed at fan inlet.

1. Nut
2. Washer
3. Washer
4. Bolt
5. Preformed packing
6. Reducer
7. Turbine fan
8. Washer
9. Bolt
10. Brace
11. Bolt
12. Washer
13. Washer
14. Nut
15. Duct assembly
16. Washer
17. Bolt

Figure 4-23. Engine Oil Cooler Turbine Fan

Premaintenance Requirements For Removal of Oil Cooling Turbine Fan

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C31), (C37), (C88 or C91), (C112), (C137)
Special Environmental Conditions	None

WARNING

Oil cooling turbine fan does not incorporate a protective fan screen. Do not attempt oil cooler or oil cooling turbine fan maintenance with engine operating. Disconnect bleed air hose prior to maintenance.

4-85. REMOVAL — OIL COOLING TURBINE FAN.

a. Remove oil cooling inlet air duct from left side of fuselage (figure 4-18). Remove access door from right side fuselage.

b. Disconnect bleed air hose from inlet reducer (6, figure 4-22).

c. Remove two nuts (14), two washers (13), two washers (8), and two bolts (9). Disconnect braces (10) and attached brackets from turbine fan (7).

d. If access to engine oil cooler is required, proceed as follows:

(1) Remove nut (1), bolt (4), and washers (2 and 3) attaching duct assembly (15) to each side of oil cooler.

(2) Remove four bolts (17) and four washers (16). Remove turbine fan (7) and duct assembly (15) as an assembly.

e. If removal of oil cooler is not required, remove eight bolts (11) and eight washers (12). Remove turbine fan (7).

4-86. DISASSEMBLY — OIL COOLING TURBINE FAN. (AVIM).

Disassemble turbine fan as follows (figure 4-24):

(1) Remove nuts (3), washers (4), and bolts (2) and remove cover and bellmouth assembly (1) from housing (16).

(2) Remove nut (14) and washer (15) from end of shaft (10).

(3) Remove nut (6) and washer (7) from shaft (10), then remove fan turbine assembly (5) and Woodruff key (11) from shaft.

(4) Cut lockwire and remove four screws (9) and retainer (8) from housing.

(5) Carefully pull shaft (10) with bearing (12) from housing as a unit.

NOTE

Do not remove identification plate (17) or rotation directional arrows from housing unless damaged.

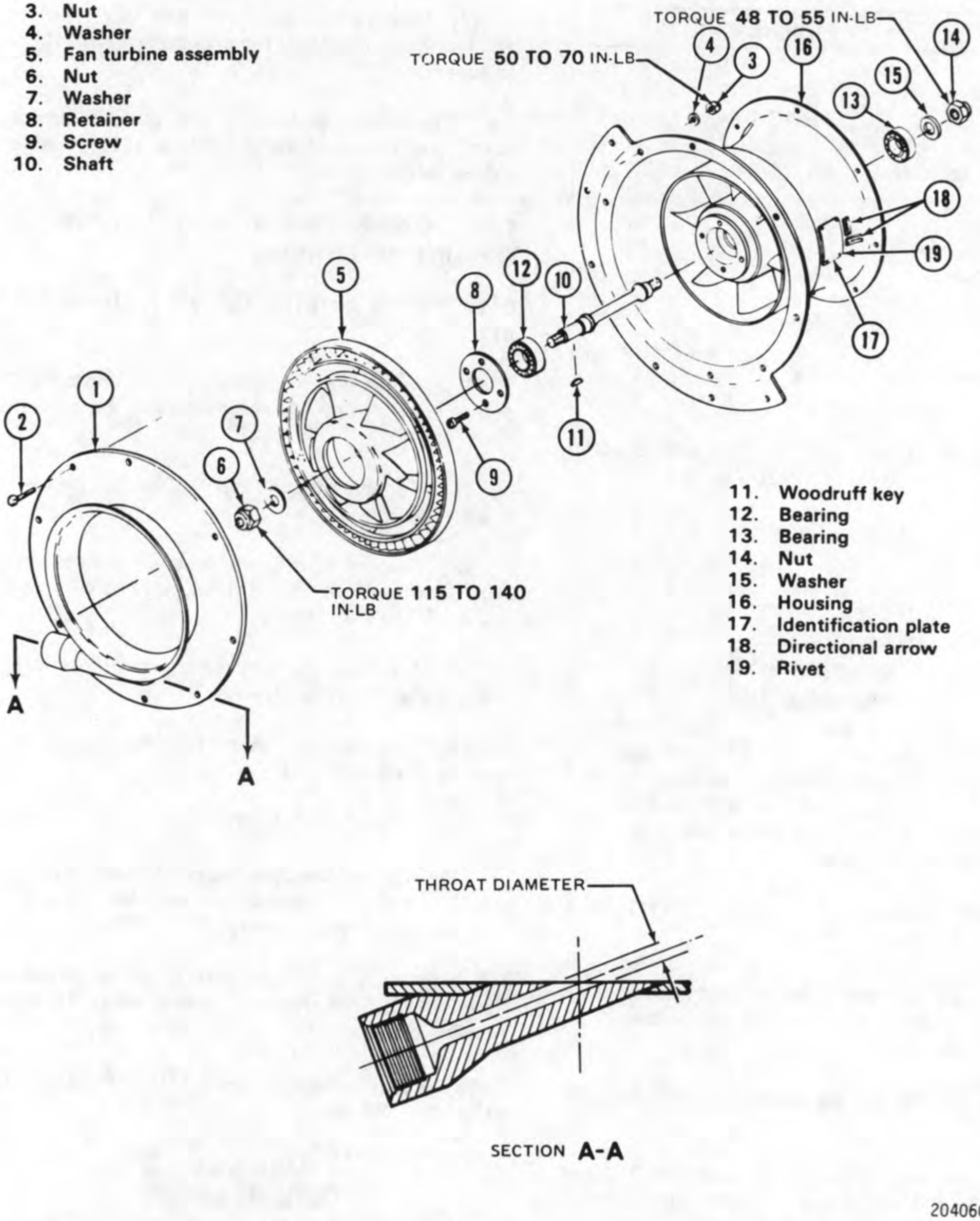
(6) Using suitable bearing puller, remove bearing (12) from shaft (10) and bearing (13) from housing (16).

4-87. CLEANING — OIL COOLING TURBINE FAN.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

1. Cover and bellmouth assembly
2. Bolt
3. Nut
4. Washer
5. Fan turbine assembly
6. Nut
7. Washer
8. Retainer
9. Screw
10. Shaft



11. Woodruff key
12. Bearing
13. Bearing
14. Nut
15. Washer
16. Housing
17. Identification plate
18. Directional arrow
19. Rivet

Figure 4-24. Oil Cooler Turbine Fan — Assembly

a. Clean all parts with lint-free cloths saturated with solvent (C112). A soft bristle brush may be used to dislodge stubborn deposits. Wipe clean and dry with filtered compressed air.

b. Remove corrosion deposits on shaft (10, figure 4-24) and housing (16) bearing liners using fine crocus cloth (C37). Clean parts after removing corrosion with corrosion preventive oil (C40).

4-88. INSPECTION — OIL COOLING TURBINE FAN.

a. Inspect blades on fan turbine assembly (5, figure 4-24) for bent blades, nicks, scratches and cracks. Replace fan and turbine assembly if any of these defects are found on the turbine blades.

b. Inspect all parts, other than turbine blades for nicks, burrs, scratches, dents, cracks and excessive wear. No cracks are acceptable. Minor mechanical damage is acceptable if polished out.

c. Inspect bearings (12 and 13) for spalling, cracks, and for roughness when rotated by hand. Any of these defects are cause to replace bearings.

d. Inspect parts for wear in accordance with table 4-3.

Table 4-3. Dimension Tolerance — Turbine Fan

FIG. NO.	INDEX NO.	NOMENCLATURE	REMARKS
4-24	1	Cover and Bell-mouth Assy Nozzle	Measure throat diameter in Section A-A with inside micrometer. Replace if throat diameter is over **0.3240** inch.
4-24	10	Shaft	Replace if front end bearing journal is not within **0.6695 TO.0.6691** inch diameter or if rear end bearing journal is not within **0.4726 TO 0.4722** inch diameter.
4-24	16	Housing	Replace if front bearing insert is not within **1.3791 TO 1.3780** inch diameter or if rear bearing insert is not within **1.1034 TO 1.1024** inch diameter.

4-89. REPAIR OR REPLACEMENT — OIL COOLING TURBINE FAN (AVIM).

a. Replace components that fail to meet inspection requirements of paragraph 4-88.

b. Replace nuts (3, 6, and 14, figure 4-24) regardless of condition when oil cooling fan is assembled.

c. Match-drill any replacement hanger brackets at installation with **0.280 TO 0.297** inch diameter holes through ends to match existing bolt holes in cooler flanges and deck structure and **0.256 TO 0.263** inch diameter holes in lower legs of hanger brackets to match existing holes in brackets on duct.

d. Refinish all exposed aluminum surfaces, after repair, with chemical film (C31) and repaint with one coat of primer (C88 or C91) as required.

4-90. ASSEMBLY — OIL COOLING TURBINE FAN. (AVIM).

a. Press bearing (12, figure 4-24) on shaft (10) to seat firmly against shoulder on shaft.

CAUTION

Do not force bearings into housing. If bearings do not slip into place with slight hand pressure, check bearing liners for burrs or corrosion.

b. Insert bearing (13) into housing (16).

c. Carefully insert shaft (10) with bearing (12) as a unit, into shaft bore of housing (16).

d. Position retainer (8) in housing with four screws (9). Tighten screws and secure with lockwire (C137).

e. Install Woodruff key (11) in shaft (10) and install fan turbine assembly (5) on shaft, align keyway in fan with key in shaft.

f. Install washer (7) and nut (6) on shaft and holding fan and turbine assembly to prevent rotation, torque nut **115 TO 140** inch-pounds.

g. Install washer (15) and nut (14) on shaft (10) and torque nut **48 TO 55** inch-pounds.

h. Position cover and bellmouth assembly (1) on housing (16) and secure with bolts (2), washers (4), and nuts (3). Torque nuts **50 TO 70** inch-pounds.

4-91. INSTALLATION — OIL COOLING TURBINE FAN.

a. If duct assembly (15, figure 4-23) has been removed, proceed as follows:

(1) Position duct (15) to oil cooler and install bolts (4) washers (2 and 3) and nut (1).

(2) Secure duct to oil cooler flange and airframe structure with four bolts (17) and four washers (16).

b. Position fan (7) to duct (15) and install eight bolts (11) and eight washers (12).

c. Position two braces (10), with attached brackets, on turbine fan (7) and install two bolts (9), washers (8 and 13), and nuts (14).

d. Connect bleed air hose to reducer (6).

e. Reinstall access door and cooling duct on fuselage openings.

f. At next ground run-up, check installation for leaks and proper operation.

4-92. ENGINE OIL COOLER BYPASS SELECTOR VALVE.

4-93. DESCRIPTION — ENGINE OIL COOLER BYPASS SELECTOR VALVE.

This valve is a two-position, motorized valve located on the left side of the engine compartment deck. It is connected in the engine to oil cooler line. See figure 4-18. The purpose of the valve is to automatically bypass the oil cooler when oil level is low. Refer to TM 55-1520-236-10 for additional information on switching action for this valve.

4-94. REMOVAL — ENGINE OIL COOLER BYPASS SELECTOR VALVE.

a. Open engine compartment cowling at left side.

b. Remove oil cooling duct (figure 4-18) from left side of fuselage. Drain oil cooler and lines.

WARNING

Prolonged contact with lubricating oil may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

c. Disconnect electrical cable connector from valve.

d. Disconnect engine scavenge oil hose from valve coupling. Disconnect oil cooler lines and tank return line from valve fittings. Cap open ends of lines.

e. Detach valve from brackets by removing two screws at each side. Lift out valve assembly.

f. Remove fittings from valve by removing attachment screws. Remove check valve and gasket from right fitting.

4-95. INSPECTION — ENGINE OIL COOLER BYPASS SELECTOR VALVE.

Inspect mating surfaces of valve and fittings for nicks and burrs. Inspect threads for damage.

4-96. REPAIR OR REPLACEMENT — ENGINE OIL COOLER BYPASS SELECTOR VALVE.

Replace any damaged fittings or attaching parts. Replace valve assembly if malfunction occurs.

4-97. INSTALLATION — ENGINE OIL COOLER BYPASS SELECTOR VALVE.

NOTE

Be sure flow arrow is toward fitting.

a. Assemble fittings on valve (figure 4-18) with attaching screws. Use new gasket when installing check valve in return line fitting.

b. Position valve assembly between brackets and install two screws at each side.

c. Connect oil cooler lines and tank return line valve fittings. Connect engine scavenge oil hose to coupling.

d. Connect electrical cable to connector on valve.

e. Service oil tank. Reinstall oil cooling duct with screws. Close cowling.

f. Check for leaks and proper operation at next ground run.

SECTION VI. IGNITION SYSTEM

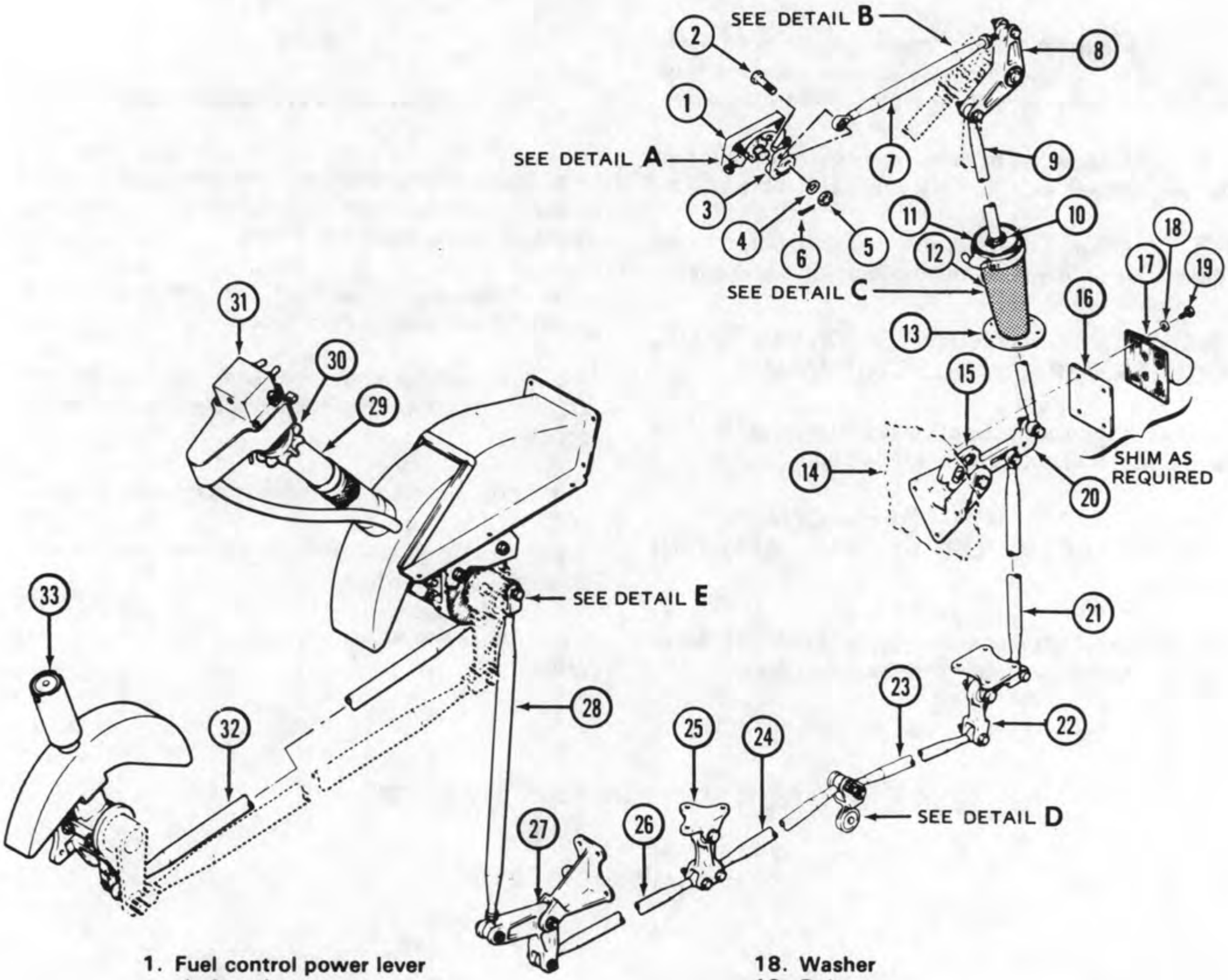
Refer to TM 55-2840-229-24

SECTION VII. POWER LEVER CONTROLS

4-98. POWER LEVER CONTROLS.

4-99. DESCRIPTION — POWER LEVER CONTROLS.

A mechanical linkage system, actuated by twist-grips on collective pitch control sticks, provides manual control of the power lever on the engine fuel control unit. The power lever modulates the engine from zero to full power by controlling the gas producer turbine RPM (N1) limits. The fuel control power lever shaft (1, figure 4-25) is serrated and grooved to accept control arm (3), and has a quadrant marked with power settings in its range of travel between stops which are preadjusted by the engine manufacturer or overhaul facility. The linkage is a series of control rods, bellcranks, idlers, and levers. Control rods (7 and 28), at each end of the series, are adjustable. Bellcrank (20) has an adjustable connection for control rod (21), which determines the travel of linkage above the bellcrank. The idle stop cam (15) makes contact with the spring-loaded plunger of a solenoid (17) to arrest linkage motion at the engine idle position when power is being reduced from higher settings. The solenoid plunger can be retracted by use of the ENGINE IDLE STOP REL pushbutton switch, located on the pilot collective stick to allow control movements in the OFF position.



1. Fuel control power lever shaft and stops
2. Bolt
3. Arm
4. Washer
5. Nut
6. Cotter pin
7. Control rod
8. Lever
9. Control rod
10. Split bushing (bearing)
11. Boot retainer
12. Boot
13. Plate
14. Bulkhead (station 250)
15. Power lever cam (idle stop cam)
16. Base
17. Solenoid and bracket
18. Washer
19. Bolt
20. Bellcrank and support
21. Control rod
22. Bellcrank and support
23. Control rod
24. Control rod
25. Idler and support
26. Control rod
27. Bellcrank and support
28. Control rod
29. Pilot control grip
30. Throttle friction nut
31. Pilot collective stick
32. Control rod
33. Gunner control grip

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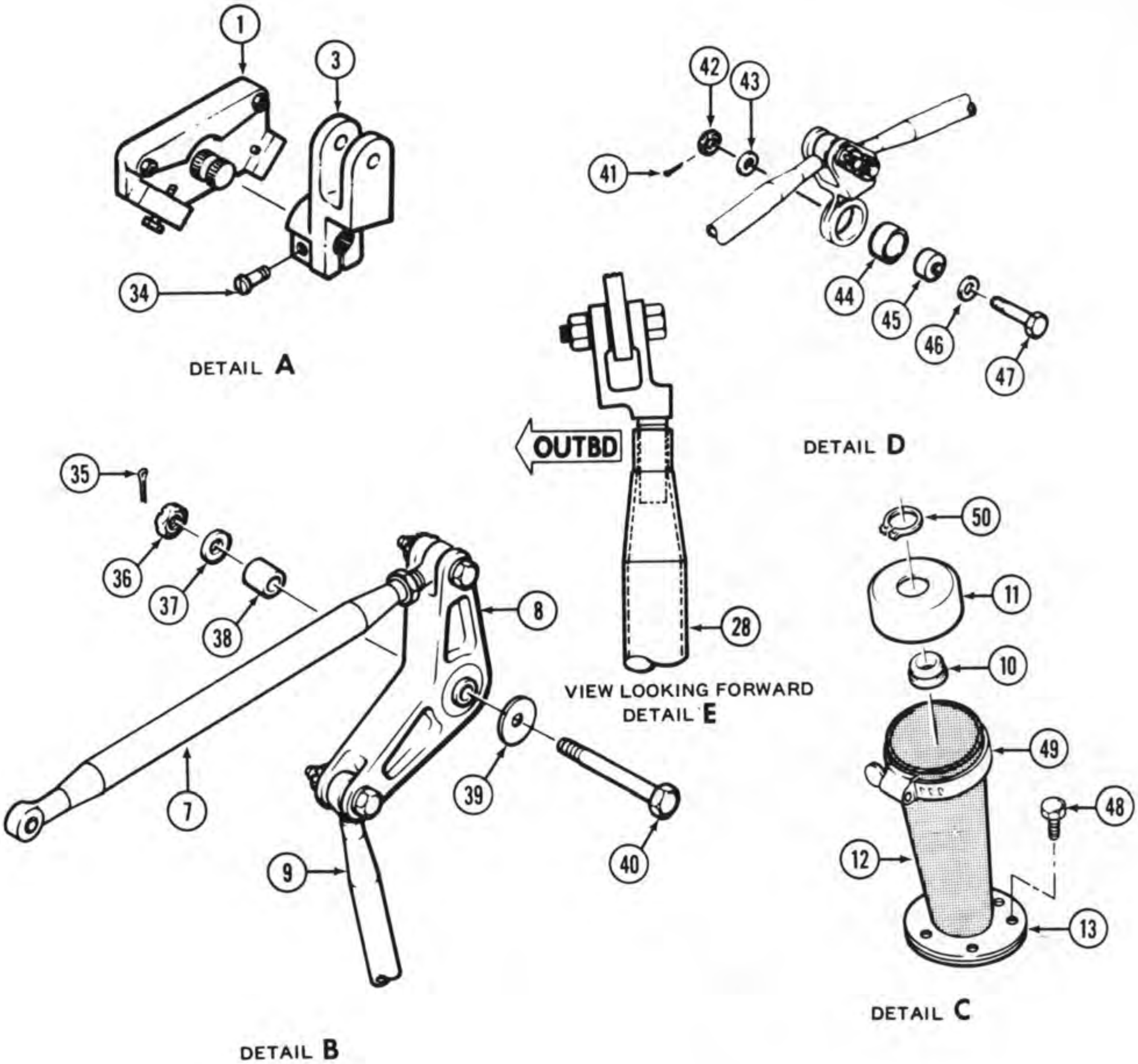
Figure 4-25. Power Lever Control System Installation (Sheet 1 of 2)



34. Screw
35. Cotter pin
36. Nut
37. Thin steel washer
38. Spacer, sleeve
39. Washer
40. Bolt
41. Cotter pin
42. Nut
43. Thin steel washer
44. Bushing sleeve
45. Bearing
46. Thin steel washer
47. Bolt
48. Bolt
49. Hose clamp
50. Retainer ring

209060-123-2

Figure 4-25. Power Lever Control System Installation (Sheet 2 of 2)

4-100. REMOVAL — POWER LEVER CONTROLS.

a. To remove control rod (28, figure 4-25): Remove screw-mounted access panel from left side of fuselage in line with lower end of pilot collective control stick. Remove bolts, nuts, washers, and cotter pins to remove control rod (28).

b. Leave lower linkage (22 through 27) in place for normal maintance and inspection. If necessary to replace damaged parts, obtain access by removing screw-mounted panels from lower skin and detach parts by removing bolts, washers, and nuts.

c. To remove bellcrank (20) and cam (15): Obtain access to compartment, below engine and behind aft fuel cell, by removing oil cooler air intake duct from left side of fuselage. Disconnect control rods (9) and (21) from bellcrank (20), keeping attaching parts with rod-ends. Remove attaching bolt and lift out bellcrank (20) with cam (15) attached. To remove cam (15), use an allen wrench to remove two special bolts and serrated washers.

d. To remove solenoid (17): Obtain access as in step (c). Disconnect electrical connector from solenoid. Remove four bolts (19) and washers (18) to detach solenoid assembly and base (16) from bulkhead (14).

e. To remove control rod (9) and boot (12): Loosen hose clamp (49) on boot (12). Disconnect control rod (9) from bellcrank (20) and lever (8). Remove control rod (9) with boot retainer (11) attached. Remove retainer ring (50) and split bushing (10) and separate boot retainer (11) from rod (9). Remove boot (12) from plate (13).

f. To remove lever (8): Disconnect control rods (7 and 9). Remove bolt (40), nut (36), washers (37 and 39), spacer (38), and cotter pin (35) to detach lever from engine mount pillow block.

g. To remove control arm (3): Disconnect control rod (7). Remove lockwire and screw (34) from arm. Pull arm from fuel control power lever shaft (1). Keep screw (34) with arm (3).

4-101. CLEANING — POWER LEVER CONTROLS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

Clean external surfaces of parts by wiping with a cloth moistened with solvent (C112). Do not permit solvent to enter bearings or solenoid.

4-102. INSPECTION — POWER LEVER CONTROLS.

a. Control rods for cracks and general condition. End fittings for security. Bearings for binding or rough operation.

b. Bellcranks, levers, and idlers for security, cracks, or damage, binding, or rough bearings.

c. Solenoid for security and proper operation.

d. Boot assembly for cracks, tears, or wear.

4-103. REPAIR OR REPLACEMENT — POWER LEVER CONTROLS.

a. Replace parts which fail to meet inspection requirements of paragraph 4-102.

b. If solenoid replacement is required, install solenoid and bracket (17, figure 4-25) and base (16) with four bolts (19) and washers (18). Use shims as required so that plunger operates freely in bracket bushing.

4-104. INSTALLATION — POWER LEVER CONTROLS.

a. Position arm (3, figure 4-25) on fuel control power lever shaft (1). Install screw (34) through arm and groove on shaft. After rigging, lockwire (C137) screw (34).

b. Position lever (8) on outboard side of engine mount pillow block, with spacer (38) between lever (8) and pillow block and with marked arm of lever pointing up. Install bolt (40), washer (39), thin steel washer (37), nut (36), and cotter pin (35).

c. Adjust control rod (7) to nominal length of **11.17** inches between centers of rod-end bearings. Position adjustable end of control rod (7) in lever (8). Install bolt, washers, nut and cotter pin. Do not install forward end of control rod (7) to arm (3) at this time.

d. Place smooth side of idle stop cam (15) on bellcrank and support (20). Install two special bolts and serrated washers as shown on figure 4-26 to secure idle stop cam to bellcrank. Use Allen wrench at shank ends to tighten bolts. Place bellcrank in support and install bolt, thin washers, nut, and cotter pin. Cam position will be adjusted during rigging.

e. Attach solenoid and bracket (17, figure 4-25) and base (16) to bulkhead (14) with four bolts (19) and washers (18). Set solenoid position so that plunger will not engage idle stop cam (15) until ready for adjustment during rigging.

NOTE

If bracket (17) P/N 204-060-797-1 is installed, use shims P/N 120-031-12-7 to adjust solenoid. If bracket P/N 204-060-797-5 is installed, shims are not required.

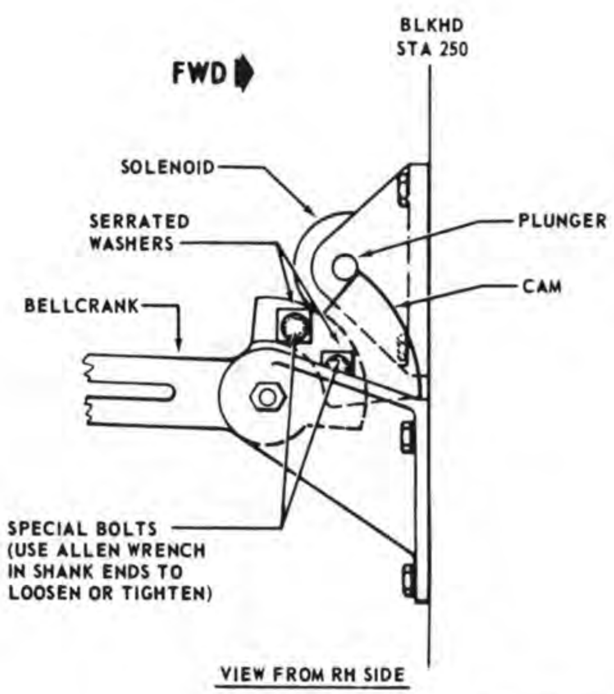


Figure 4-26. Engine Idle Stop Installation

f. Place boot retainer (11) on control rod (9). Insert split bushing (10) between rod (9) and boot retainer (11). Secure with retainer ring (50). Secure boot (12) with clamp on plate (13). Insert rod (9) down through boot and housing. Connect rod to lever (8) and bellcrank (20). At lower rod-end, insert bolt through large safety washer, rod-end, aluminum alloy washer, and bellcrank. Secure bolt with aluminum-alloy washer, nut, and cotter pin. Attach boot (12) to boot retainer (11) with hose clamp (49). Check for **0.06** inch minimum clearance between rod (9) and engine mount leg. If needed, install not more than three thin steel washers under spacer (38) on pivot bolt (40) of lever (8).

g. Connect control rod (21) to bellcrank (22) with bolt, two thin washers, nut, and cotter pin. At upper end, use aluminum-alloy washer and a serrated washer. Set rod-end at middle of bellcrank slot and secure with nut and washer. Install cotter pin after rigging is complete.

NOTE

Center of rod (28) is determined by rod not clevis.

h. Adjust control rod (28) to nominal length of **20.0** inches between center of rod-end bearing and clevis. Position, clevis, with offset outboard, on throttle control bellcrank of pilot collective stick (31). Install bolt from inboard side, with thin washers under bolt head and nut. Connect rod (28) to bellcrank (27) in same manner. Install cotter pins when rigging is complete.

4-105. RIGGING — POWER LEVER CONTROLS.

a. Check that power lever control linkage is completely installed except as follows:

(1) Idle stop solenoid (17, figure 4-25) should not make contact with stop cam (15).

(2) Arm (3) should be installed in fuel control power lever shaft (1) as nearly parallel to shaft stop arm as serration alignment permits. Control rod (7) should not be connected to arm (3).

NOTE

Before starting rigging procedure, make sure rod (28) and rod (7) are at nominal length.

b. Center control rod (21) in bellcrank (20) before trying to obtain center of travel in step c.

c. Support free end of control rod (7) level with fuel control power lever shaft (1). Operate pilot control grip (29) to full on to full off, and check that end of control rod (7) moves equal distances from centerline of shaft (1) at both positions. Adjust control rods (7 and 28) to obtain equal movement noted above. Keep control rods (7 and 28) as close to nominal lengths as possible. Refer to paragraph 4-104, step c and step h for nominal lengths.

d. Position control rod (7) in arm (3). Install bolt (2) with head inboard and install washer (4) and nut (5). Do not install cotter pin (6) at this time.

e. Turn pilot control grip (29) in one direction until fuel control shaft bottoms on stop. Disconnect control rod (7) from arm and check that control grip (29) will turn approximately 5 degrees further before bottoming. Repeat procedure with grip rotated in opposite direction. Make corrections by adjusting position of control rod (21) on slotted bellcrank (20). When satisfactory, leave control rod (7) connected to arm (3). Install cotter pin (6).

f. Operate control grip (29) to set power lever shaft stop arm (3) to 47 degree mark on fuel control. Adjust positions of idle stop cam (15) and solenoid (17) so that cam rests against extended plunger of solenoid. Check that solenoid bracket clears cam by **0.06** inch in all conditions.

CAUTION

Serrations of cam and square washers must be matched.

g. In next ground run, make final adjustment of idle stop cam to obtain **68 TO 72** percent gas producer rpm.

h. Lockwire (C136) screw (34).

i. Ensure that entire power lever control system has all required cotter pins installed and that controls move through full throw without binding or interference.

4-106. DROOP COMPENSATOR CONTROLS.

4-107. DESCRIPTION — DROOP COMPENSATOR CONTROLS.

Engine power turbine (N2 rpm) is controlled through the overspeed governor by means of an actuator and a droop compensator cam and linkage.

An electrically operated linear actuator (20, figure 4-27), controlled by the GOV RPM INCR/DECR switch on the pilot collective pitch control stick, moves a lever (21) on the fuel control overspeed governor to change settings of power turbine rpm. Droop compensation, to stabilize rpm as engine load fluctuates with changes of main rotor pitch, is provided by mounting the actuator to a cambox (19) which is mechanically linked to a bellcrank (2) in the collective pitch control system. The droop compensator linkage consists of control rods, levers, arms, and bellcranks. Bellcrank (4) is attached on shaft (7) by means of a shear pin (9), which is designed to shear to allow unhindered operation of the collective pitch controls if the compensator linkage should become fouled.

4-108. REMOVAL — DROOP COMPENSATOR CONTROLS.

a. Removal — Actautor and Control Lever.

(1) Open engine compartment cowling at left side.

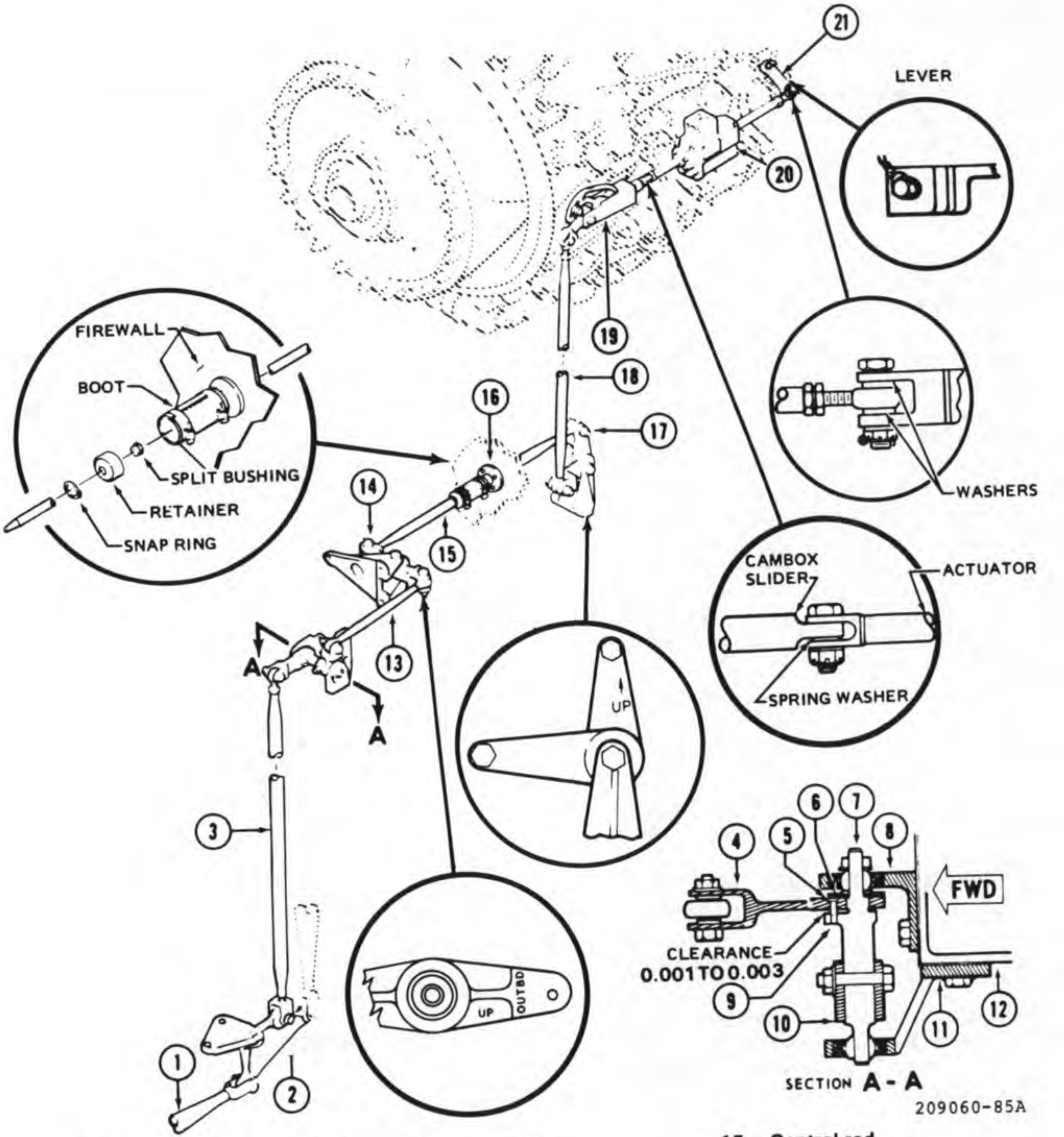
(2) Remove terminal cover with attaching screws from top of linear actuator (20, figure 4-27). Disconnect and stow electrical leads. Reinstall cover.

(3) Detach actuator jackshaft end-fittings from lever (21) on governor control shaft, and from slider of cambox (19), by removing bolts with nuts, washers, and cotter pins. Use care to avoid losing spring washer, which is installed between actuator clevis and slider, also washers installed between rod-end and lever (21).

(4) Remove lockwire and clamping bolt, and pull lever (21) from serrated shaft at top of overspeed governor.

b. Removal — Cambox and Linkage.

(1) Disconnect control rod (18) from bellcrank of cambox (19) by removing bolt with nut, washers, and cotter pin.



1. Collective system control tube
2. Bellcrank
3. Control rod
4. Bellcrank
5. Shims (2 max.)
6. Special washer
7. Shaft
8. Bracket
9. Shear pin
10. Lever
11. Bracket
12. Pylon support
13. Control rod
14. Arm and support
15. Control rod
16. Firewall retainer and boot
17. Lever and support
18. Control rod
19. Cambox assembly
20. Linear actuator
21. Lever on governor control shaft

Figure 4-27. Droop Compensator Controls Installation

(2) Remove nuts and washers from inboard ends of two bolts that attach cambox to support bracket. Remove cambox with bolts in place. Reinstall nuts and washers on bolts, with care that shims remain in place on bellcrank pivot bolt between bearing and sides of housing.

NOTE

As an alternate method, remove cambox and bracket as an assembly by removing two bolts that secure bracket to forward engine mount trunnion. Reinstall bolts to secure mount trunnion.

(3) To remove bellcrank (4) and shaft (7) and associated parts, disconnect control rods (3 and 13). Remove nut and washer from inboard end of shaft. Remove three attaching bolts and bracket (11) from outboard end of shaft. Pull shaft free of inboard bracket (8). Remove shaft assembly with bellcrank, shear pin (9), shims (5), and special washer (6). When replacement of shear pin (9) is required, remove old shear pin and install new shear pin as follows:

(a) Remove special washer (6) from shaft (7).

(b) Remove shims (5) from shaft (7).

(c) Use aluminum drift or press to remove shear pin (9) from bellcrank (4) and shaft (7).

(d) Remove bellcrank (4) from shaft (7).

NOTE

Shear pin (9) must be an interference fit with bellcrank (4) and shaft (7). If pin hole or counterbore in bellcrank (4) or shaft (7) is elongated, procure a new bellcrank or shaft.

(e) Position bellcrank (4) on shaft (7) with counterbore for head of shear pin (9) exposed.

(f) Press shear pin (9) into bellcrank (4) and shaft (7). Ensure that head of shear pin (9) is flush with surface of bellcrank (4).

(g) Install shims (5) on shaft (7).

(h) Install special washer (6) on shaft (7).

(4) If control rod (15) must be removed, disassemble firewall retainer and boot (16).

(a) Remove cotter pin, nut, washers, and bolt from inboard end of arm (14).

(b) Remove cotter pin, nut, washers and bolt from upper end of lever (17).

(c) Loosen clamps on boot and retainer (16).

(d) Pull control rod (15) forward through firewall and remove from helicopter.

(e) Remove clamps from boot and retainer (16).

(f) Remove boot from control rod (15).

(g) Remove snap ring, retainer and split bushing from control rod (15).

4-109. CLEANING — DROOP COMPENSATOR CONTROLS.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

Clean external surfaces of parts by wiping with a cloth moistened with solvent (C112). Do not permit solvent to enter bearings or actuator.

4-110. INSPECTION — DROOP COMPENSATOR CONTROLS.

a. Inspect linear actuator for evidence of damage or malfunction.

b. Inspect cambox for security of parts and smooth operation with no evidence of binding. Check for proper clearance of **0.001 TO 0.003** inch between bellcrank (4) and flange of shaft (7). (Refer to figure 4-27, view A-A.)

c. Check for broken shear pin (9, figure 4-27) by manually holding lever (10) and applying slight force to bellcrank (4).

d. Inspect other parts of droop compensator linkage for freedom of operation, looseness, and damage.

4-111. REPAIR — DROOP COMPENSATOR CONTROLS.

a. Replace components that fail to pass inspection requirements of paragraph 4-110.

b. Replace shear pin (9, figure 4-27) in event of failure. Investigate cause of failure and correct any fouling of linkage or other faulty condition.

4-112. INSTALLATION — DROOP COMPENSATOR CONTROLS.

a. Cambox and Linkage.

(1) Position cambox (19, figure 4-27) on outboard side of bracket. Insert two bolts and secure with nuts and washers. Be sure shims are in place on bellcrank pivot bolt.

(2) If bracket was removed, reinstall on two upper bolts of forward engine mount trunnion.

(3) Lockwire trunnion bolt heads with lockwire (C137).

(4) Adjust control rod (18) to nominal length of **19.0** inches between centers of rod-end bearings. Connect non-adjustable end to forward arm of lever (17) with bolt, thin aluminum alloy washers, nut, and cotter pin. Adjustable end will be connected to bellcrank of cambox (19) during rigging.

(5) If bellcrank (4), shaft (7), and associated parts are removed, reinstall as follows:

(a) Attach bracket (8) on pylon support with two bolts and washers.

(b) Place shims (5), special washer (6), and thin steel washer on shaft.

(c) Insert shaft through bearing of inboard bracket and secure with thin steel washer and nut, finger tight.

(d) Install bracket (11) over outboard end of shaft and attach to pylon support with two bolts and washers.

(e) Tighten nut on inboard end of shaft.

(f) Check for **0.001 TO 0.003** inch clearance between bellcrank and shaft as shown. (See section A-A.) If necessary, disassemble to change shim thickness and reassemble.

(6) Adjust control rod (3) to nominal length of **32.46** inches between center of bolt holes in rod-end and clevis. Connect clevis to collective system bellcrank (2) forward hole with bolt, thin aluminum alloy washers, nut, and cotter pin. Align upper rod-end in fork of bellcrank (4), with a thin steel washer between each side of bearing and inside of fork. Install bolt, secured by washer, nut, and cotter pin.

(7) Assemble retainer, split bushing, snap ring, and boot with clamps on rod (15). Insert rod-end aft through firewall retainer and connect to upper arm of lever (17) with bolt, thin aluminum alloy washers, nut, and cotter pin. Connect forward end of rod to inboard end of arm (14) in the same manner. Secure boot with clamps on retainers.

CAUTION

Arm (14) should be installed with angled clevis outboard and sloping down forward to meet with control rod (13).

b. Actuator and Control Lever.

(1) Place control lever (21) on control shaft of fuel control overspeed governor, approximately **90** degrees to centerline of stop arm on shaft. Install retaining bolt into lever and through shaft groove. Torque bolt **12 TO 15** inch-pounds. Lockwire bolt to lever.

(2) Align actuator (20) with front end-fitting clevis on end of cambox slider. Insert spring washer between clevis and underside of slider and install bolt from top, secured with washer, nut, and cotter pin.

(3) Attach actuator shaft rod end with a thin steel washer on each side of rod-end bearing into clevis of governor control lever with bolt (washer under head). Install washer and nut, omit cotter pin until rigging is complete. If necessary, loosen bolts attaching cambox bracket on engine to align actuator to lever. After installing actuator, tighten and lockwire bracket bolts, apply standard torque to bolts.

(4) Remove actuator terminal cover. Connect electrical leads on terminals. (See wiring diagrams, Appendix F.) Reinstall terminal cover.

4-113. RIGGING — DROOP COMPENSATOR CONTROLS.

NOTE

Collective pitch control system rigging must be complete before using this procedure.

a. Check that installation of governor control linkage is complete except:

(1) Actuator disconnected from governor control shaft lever (21). Support actuator near normal position, so that its jackshaft rod-end can be moved freely.

(2) Vertical control rod (18) disconnected from bellcrank of cambox (19).

b. Set cam adjustment bolt in middle of slot, within **0.06** inch. Match serrations of square washer and cam while tightening nut on bolt.

c. Measure stroke of actuator jackshaft rod end while operating GOV RPM switch, on collective control stick, to INCR and DECR. Set actuator adjusting screw (or screws) to limit stroke to **1.20** inches. After adjustment, leave actuator at full INCR (retracted) position.

NOTE

If actuator has two adjustment screws: Electrically position actuator shaft to approximately midpoint of stroke. Turn both adjusting screws to obtain maximum stroke. Reduce stroke by turning each screw equal number of turns away from maximum adjustment until rod end travel length is 1.20 inches.

d. Place collective stick full down. Manually position cambox bellcrank so that **0.09 (±0.03)** inch of cam slot is visible below cambox housing. Adjust two vertical control rods (3 and 18, figure 4-27) to align and connect upper rod to cambox bellcrank at this setting.

CAUTION

Keep control rods as near as possible to nominal lengths, for safe thread engagement of rod ends.

e. At overspeed governor control shaft, adjust upper stop screw to extend **0.210** inch from its mounting boss. Adjust lower stop screw to extend not less than **0.060** inch from its boss. See figure 4-28. Check installation of lever on governor shaft, to be as nearly **90** degrees to shaft stop arm as serrations permit.

CAUTION

Never shorten either stop screw on governor to less than 0.060 inch length from inner side of boss.

Insufficient stop clearance will cause shearing of pin (9, figure 4-27).

f. Move collective stick to full up position.

g. Manually position lever so that shaft stop arm is **0.010** inch from upper stop screw. (See figure 4-28.) Adjust actuator jackshaft rod-end and connect to lever at this setting. Check that rod-end bearing is properly centered in lever clevis, ensure that washers are installed between rod-end and lever, while tightening jam nut on actuator shaft. Torque nut **12 TO 15** inch-pounds.

h. Place collective control stick full down. Hold GOV RPM switch to DECR until actuator is fully extended. Adjust lower stop screw on governor to be **0.010** inch away from governor shaft stop arm. (See figure 4-28.) Tighten jamnuts and lockwire both stop screws.

i. After preliminary rigging by preceding steps, final rigging adjustments will be made as required in next ground-run or flight:

(1) Readjust actuator stroke as necessary to obtain **91 TO 101** percent with collective stick full down.

(2) Set cam to maintain **100** (± **1**) percent rpm engine output shaft speed from flat pitch

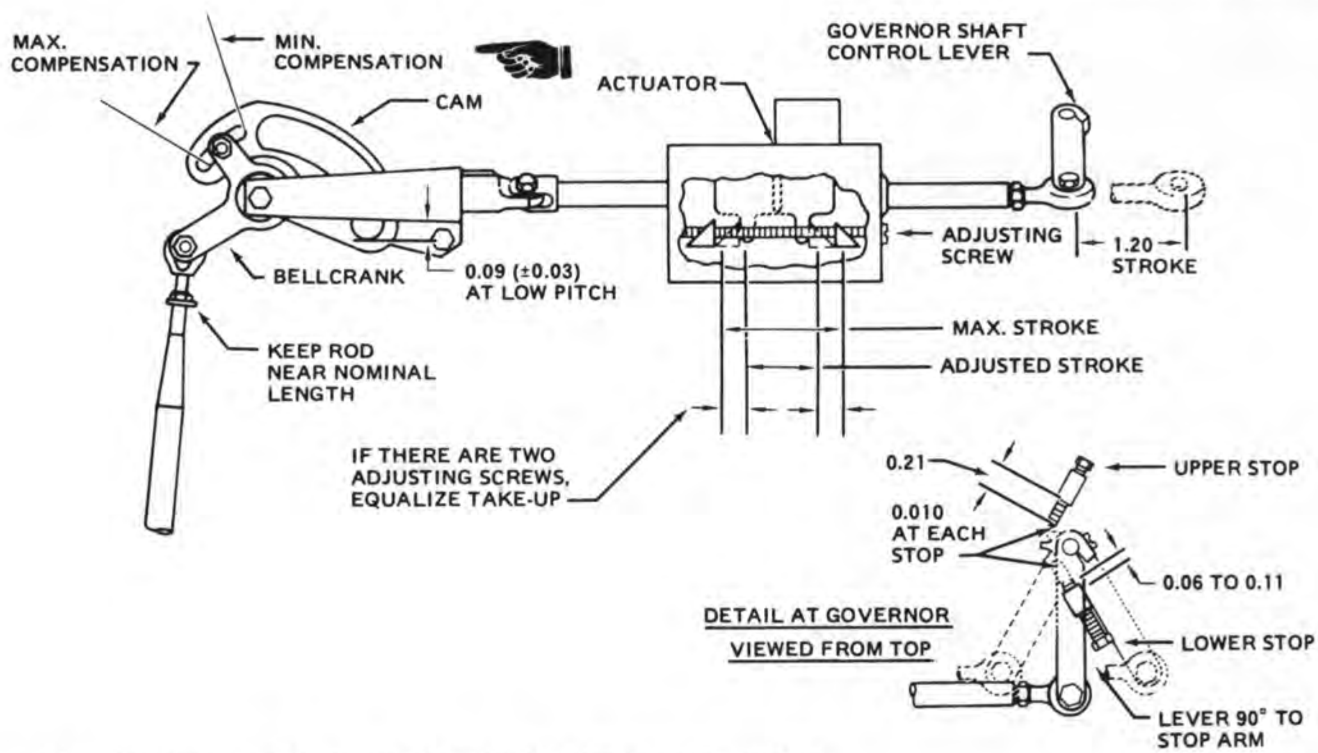


Figure 4-28. Rigging Procedures — Droop Compensator Controls

to full power. If rpm droop occurs, loosen cam adjustment bolt and rotate the cam counter-clockwise (toward maximum compensation). Engage lockwasher and cam serrations and tighten nut. If maximum cam compensation does not correct rpm droop, shorten control rod attached to cambox bellcrank to reduce the amount of cam slot visible below cambox housing. Cam slot must not bottom out against the cam follower in either extreme collective stick position.

CAUTION

Any adjustments made after preliminary rigging will require recheck and adjustment of governor stop screws in accordance with steps f., g., and h.

j. Check that all hardware is connected and cotter pin installed in bolt attaching actuator rod end to governor control lever.

SECTION VIII. QUICK CHANGE ASSEMBLY

4-114. QUICK CHANGE ASSEMBLY. (AVIM)

4-115. DESCRIPTION — QUICK CHANGE ASSEMBLY.

The engine quick change assembly consists of a basic T53-L-703 engine (as shipped in engine container) and all necessary adapting parts (generator, hoses, mounts, brackets, etc.) to build a complete engine assembly.

When the engine buildup is complete in buildup stand, a defective engine may be removed from helicopter and spare quick change assembly engine installed. This eliminates a time consuming task of removing components and adapting parts from defective engine and installing on replacement engine before installation.

Premaintenance Requirements for Engine Buildup (QCA)

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All T53-L-703 Engines
Special Tools	(T9), (T19)
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C13), (C85), (C113), (C137)
Special Environmental Conditions	None

4-116. REMOVAL — ENGINE FROM SHIPPING CONTAINER.

a. Remove engine records from records receptacle (figure 4-29).

b. Release air pressure from container by removing filter valve core.

WARNING

Do not open container until completely depressurized.

c. Remove nuts and bolts securing upper half of container to bottom half.

CAUTION

When removing, ensure upper half of container does not strike engine.

d. Attach a suitable chain or cable to lifting eyes on container upper half. Using a suitable hoist, attached to chain, lift container upper half from lower half and set to one side. Reinstall filler valve core.

e. Attach lifting sling (T9) to attaching points on engine.

NOTE

One engine attaching point is located on the diffuser housing and one is located on the inlet housing.

f. Attach lifting sling (T9) to suitable hoist.

g. Remove nuts and washers that secure four shipping trunnions to mounts in lower half of shipping container.

h. Remove engine from shipping container.

i. Install engine in engine and transmission stand (T19).

j. Remove shipping trunnions from engine mount pads.

k. If another engine is not to be installed in shipping container proceed with the following:

(1) Reinstall shipping trunnions in bottom half of shipping container.

(2) Place top half of shipping container on bottom half. Install four bolts and nuts, one at each corner, tighten finger tight. Shift upper half of container as necessary to align flange bolt holes in top and bottom halves of container.

(3) Install bolts and nuts at midpoints of sides and ends of shipping container, and the bolts and nut at midpoints between them. Install all remaining bolts and nuts. Torque nuts in order of installation **500 TO 640** inch-pounds.

(4) Using clean dehydrated air, pressurize container 4 to 6 PSI. Check container seals for leaks by applying liquid soap (C113) and observing for air bubbles.

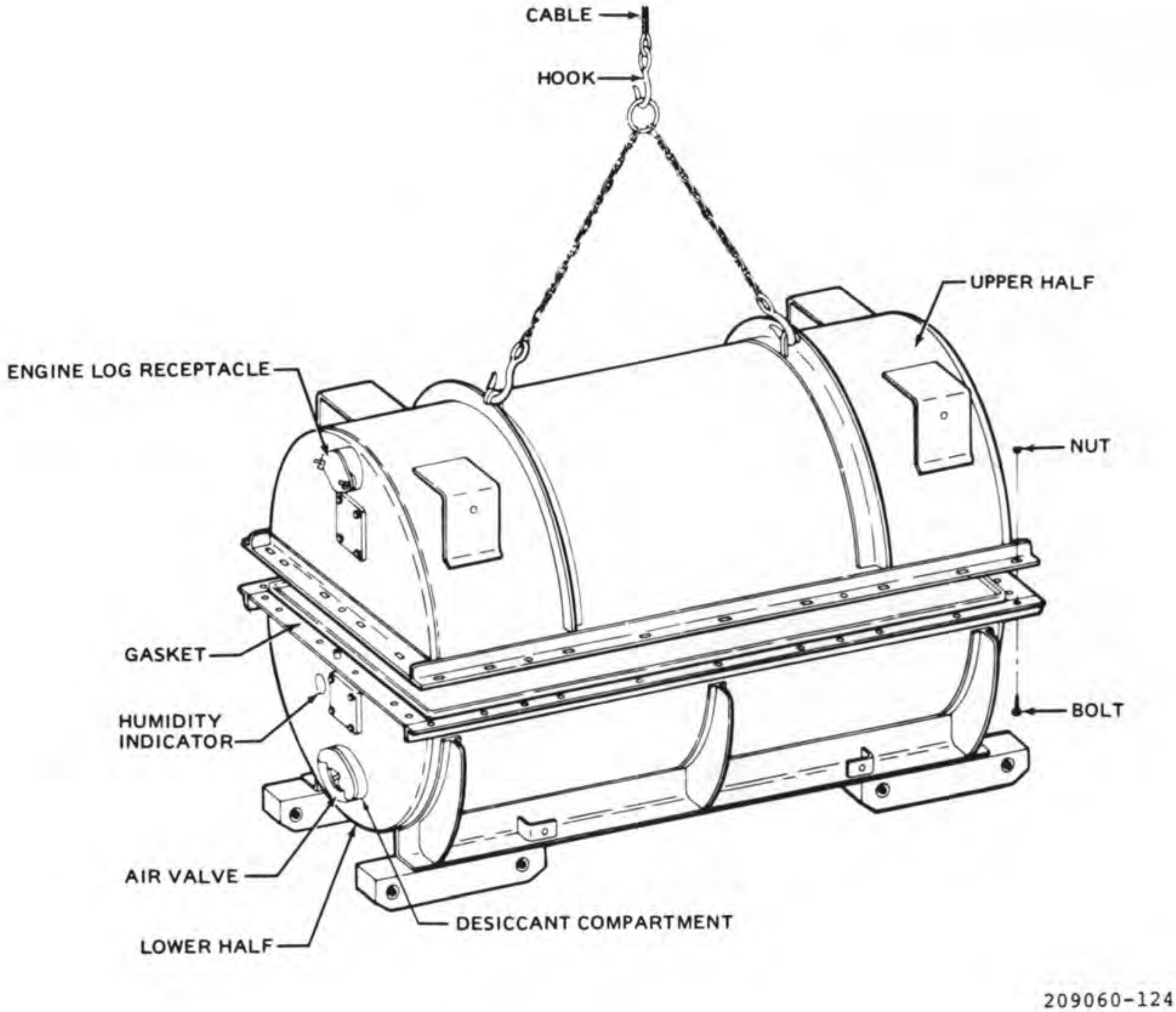


Figure 4-29. Engine Shipping Container

4-117. INSTALLATION OF ENGINE IN BUILDUP STAND.

NOTE

Use of a buildup stand which will allow the engine to be placed in vertical position will facilitate installation of engine accessories.

a. Remove engine inlet cover.

b. Adjust hoist as necessary and guide engine into stand.

c. Loosen nuts that secure clamps to ring of stand and slide clamps toward outside diameter of plate, secure clamps in this position.

d. Guide front end of engine into opening of plate so that inlet housing is flush against rear of plate.

e. Position clamps over inlet housing flange and tighten nuts to secure engine to plate.

4-118. ENGINE PREPARATION.

WARNING

HANDLING IGNITION UNIT

The ignition unit contains a very small amount of radioactive material (Cesium-Barium 137) and normally requires no handling precautions. However, severely damaged units that have been broken open must be handled with forceps or gloves, and disposed of in accordance with AR-755-15 and TB 55-1500-314-25.

Disconnect electrical lead (1, figure 4-30) from ignition unit (2). Install danger tag stating, "DO NOT CONNECT UNTIL GROUND RUN".

a. Rotate engine in maintenance stand until in the vertical position.

b. Remove all plastic plugs from around engine inlet housing.

4-119. INSTALLATION — AFT ENGINE MOUNT TRUNNIONS.

a. Position fitting (1, figure 4-31) on left side of engine and install bolts (5) with washers under heads.

b. Tighten bolts and lockwire (C137).

c. Place bearing (4), washer (3), and nut (2), on fitting (1). Torque nut.

d. Install fitting (1) on right side of engine in accordance with step (1), (2), and (3).

4-120. INSTALLATION — COMPONENTS ON ENGINE LEFT SIDE.

a. Forward trunnion, cambox, and oil pressure transducer mounting bracket.

(1) Position trunnion (3, figure 4-32) on left side engine pad. Install cambox assembly mounting bracket (4) over top mounting holes of trunnion. Install one bolt (5) and washer (6) in upper left hole to attach cambox bracket and trunnion.

(2) Position oil pressure transducer bracket (7) over cambox and trunnion. Secure using three bolts (5) and three washers (6).

NOTE

Add AN960C816 and/or AN960C816L washers (8) as required (3 maximum) for flush fit between trunnion (3) and bracket (7).

(3) Tighten all bolts (5) and lockwire (C137).

b. Linear actuator and N1 and N2 control levers (figure 4-32).

(1) Position engine governor control shaft to mid-position between governor stops.

(2) Install lever (19, figure 4-32) on governor control shaft at ninety degree angle to centerline of shaft arm, as serrations permit. Install bolt (18) and lockwire (C137).

(3) Attach linear actuator (15) to lever (19) as follows:

(a) Position linear actuator (15) with terminal block facing up. Position rod end of linear actuator (15) in lever (19) with washers (21) on each side of rod end.

(b) Install bolt (20) through lever and rod end. Install nut (17). Tighten nut (17) and install cotter pin (16).

(4) Attach linear actuator (15) to cambox assembly as follows:

(a) Position slider of cambox assembly (9) in clevis of linear actuator (15) with spring washer (13) positioned against lower side of slider.

(b) Install bolt (14) through slider and clevis. Install washer (12) and nut (11). Tighten nut and install cotter pin (10).

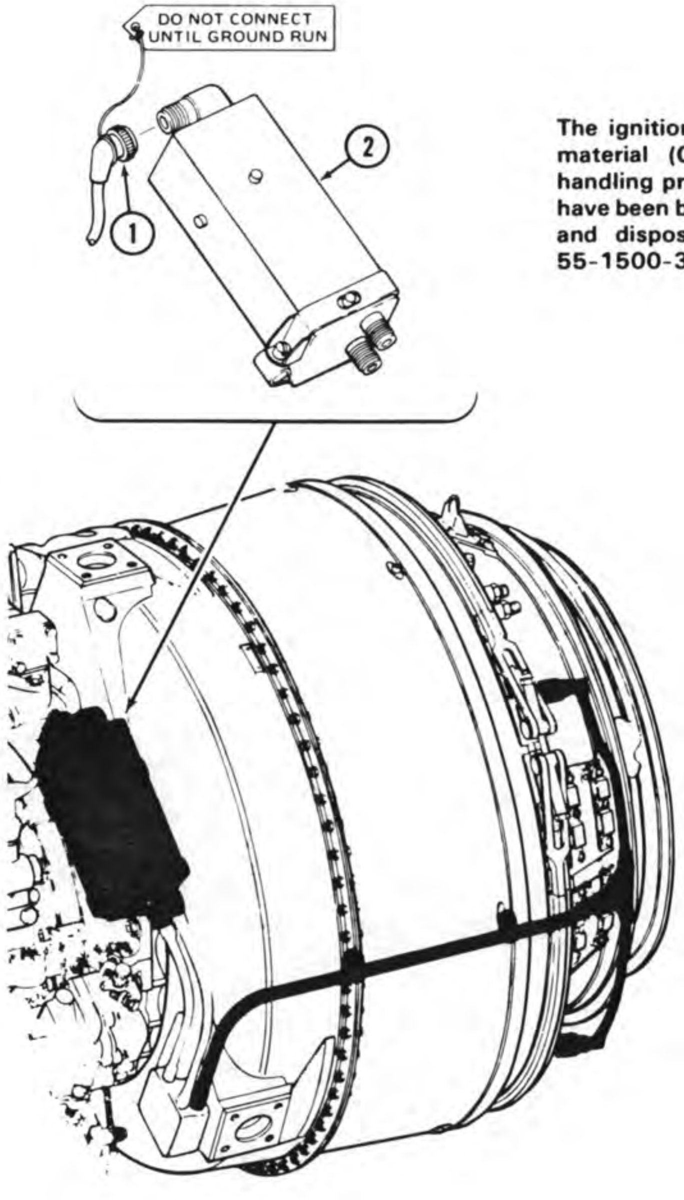
(5) Install power lever arm on fuel control as follows:

(a) Position power lever control arm (2) on fuel control power lever shaft as nearly parallel to power lever shaft stop arm as serrations will permit. Install screw (1) in arm and lockwire (C137) to hole in arm.

WARNING

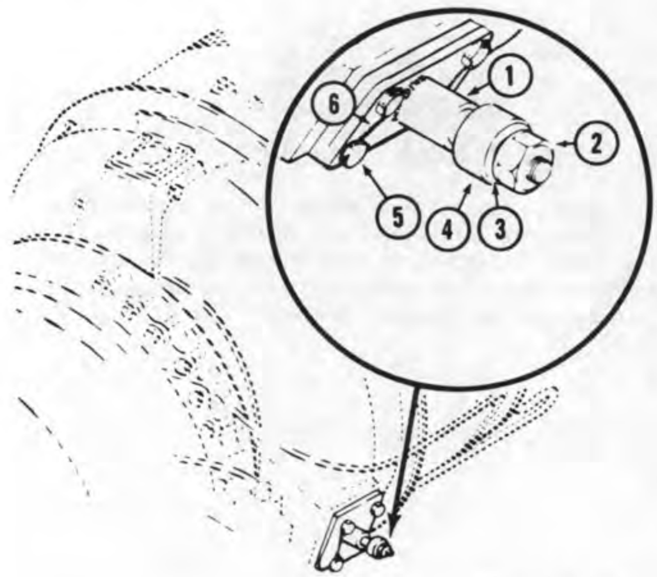
HANDLING IGNITION UNIT

The ignition unit contains a very small amount of radioactive material (Cesium-Barium 137) and normally requires no handling precautions. However, severely damaged units that have been broken open must be handled with forceps or gloves, and disposed of in accordance with AR-755-15 and TB 55-1500-314-25.



1. Electrical lead
2. Ignition unit

Figure 4-30. Ignition Unit



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1. Fitting
2. Nut
3. Washer
4. Bearing
5. Bolt
6. Lockwire

Figure 4-31. Aft Engine Trunnion Installation

(b) Check rigging (paragraph 4-113).

c. Power turbine tachometer generator (figure 4-33).

(1) Remove nuts and washers and remove shipping cover from tachometer generator mounting pad.

(2) Remove and discard gasket on mounting pad and install new gasket.

(3) Lubricate tachometer shaft using lubricant (C85).

(4) Position tachometer generator (26, figure 4-33) on mounting pad with electrical receptacle pointing up.

(5) Install washers (27) and nuts (28).

d. Oil pressure transducer.

(1) Attach transducer (13, figure 4-33) to bracket (18) as follows:

(a) Install clamp (23) over transducer (13). Attach clip (19) to clamp using screw (24), washer (20), and nut (21).

(b) Install screw (9) through plate (10), bracket (18), and clip (19). Secure using nut (22).

e. Oil pressure switch.

(1) Install nut (7) and packing (6) on elbow (8).

(2) Install elbow (8) in oil pressure switch (4). Tighten nut (7).

(3) Attach oil pressure switch through plate (10) and bracket (18) using screws (3 and 11) and nuts (5 and 25).

(4) Install nut (16) and packing (17) on restrictor (15). Install tee in oil pressure port of engine. Tighten nut (16) fingertight.

(5) Install tube assembly (14) between lower port of restrictor (15) and elbow (8).

(6) Install tube assembly (12) between upper port of restrictor (15) and oil pressure transducer (13).

(7) Tighten nut (16). Tighten all tube assembly end nuts.

(8) Connect electrical plugs (cable assembly) to oil pressure switch (4) and oil pressure transducer (13).

f. Fuel pressure switches.

(1) Remove two plugs from lower fuel pump ports of fuel control.

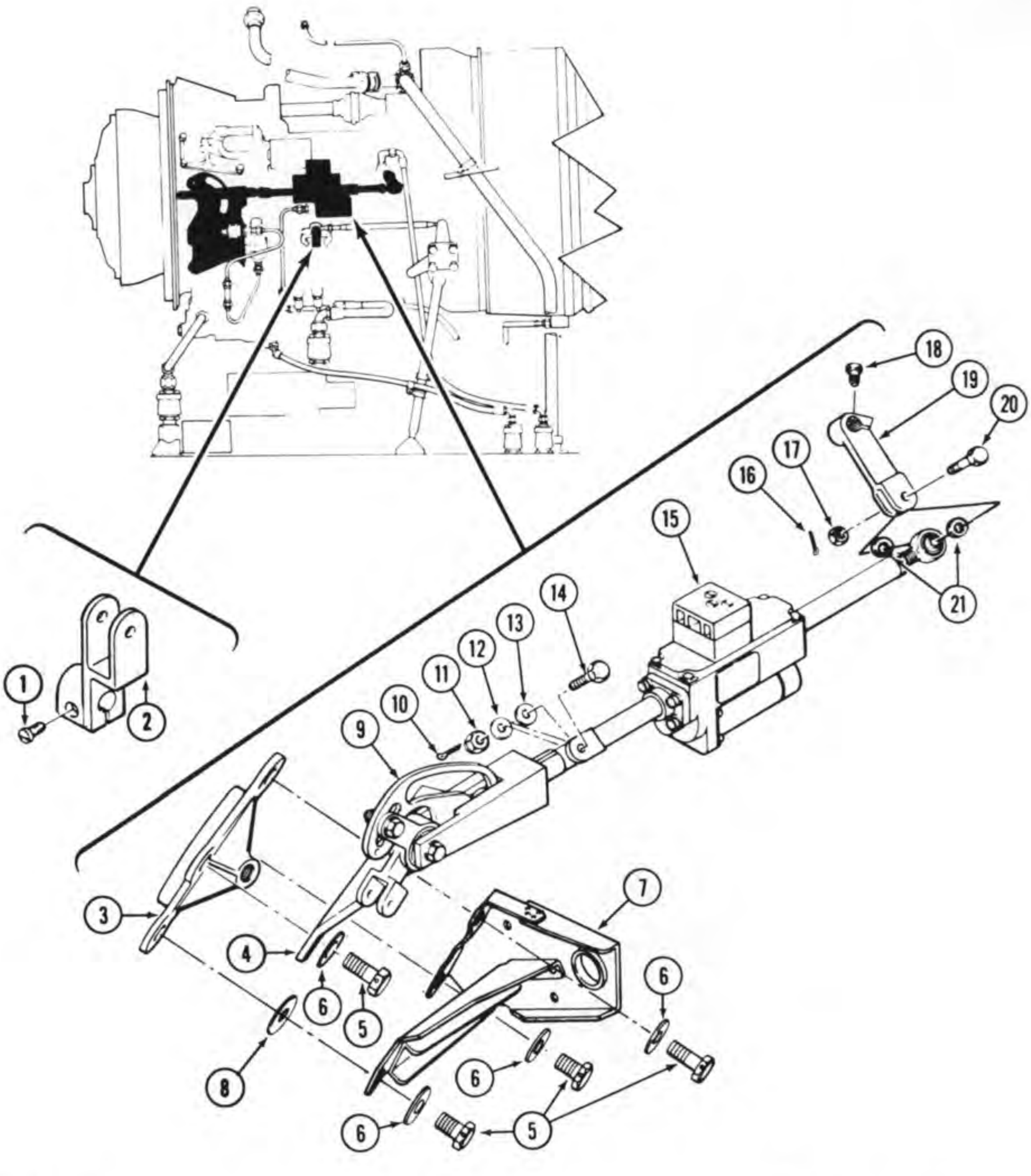
(2) Install two packings (1) on two pressure switches (2). Install pressure switches in ports and tighten.

(3) Connect electrical plugs to pressure switches (2).

4-121. INSTALLATION — COMPONENTS ON ENGINE RIGHT SIDE.

a. Starter-generator and shroud (figure 4-34).

(1) Remove nuts and washers and remove shipping cover from starter-generator mounting pad.



1. Screw
2. Power control lever arm
3. Forward trunnion
4. Cambox mounting bracket
5. Bolts
6. Washers
7. Oil pressure transducer mounting bracket
8. Washer (shim)
9. Cambox
10. Cotter pin
11. Nut
12. Washer
13. Spring washer
14. Bolt
15. Linear actuator
16. Cotter pin
17. Nut
18. Bolt
19. Lever
20. Bolt
21. Washers

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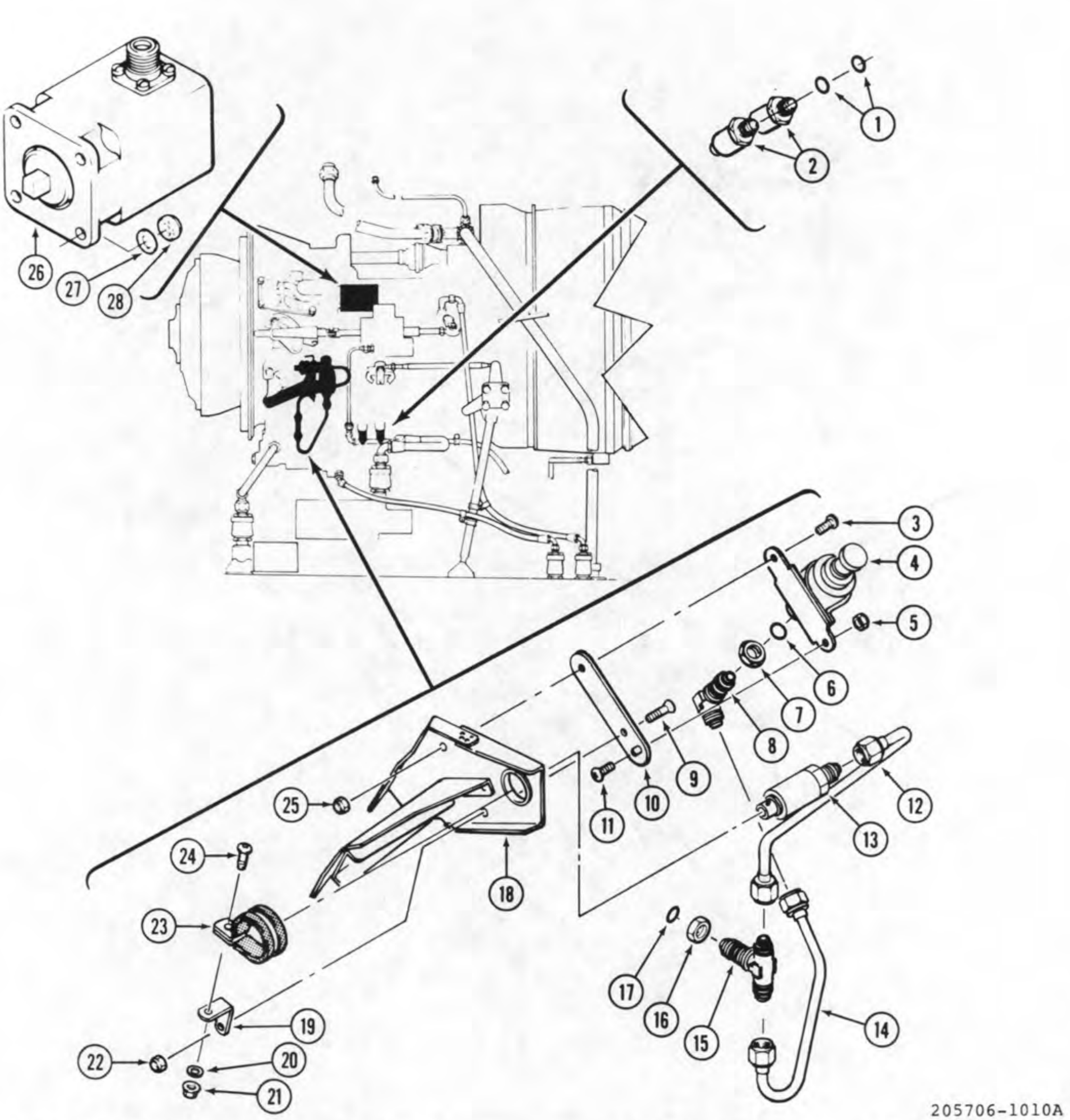
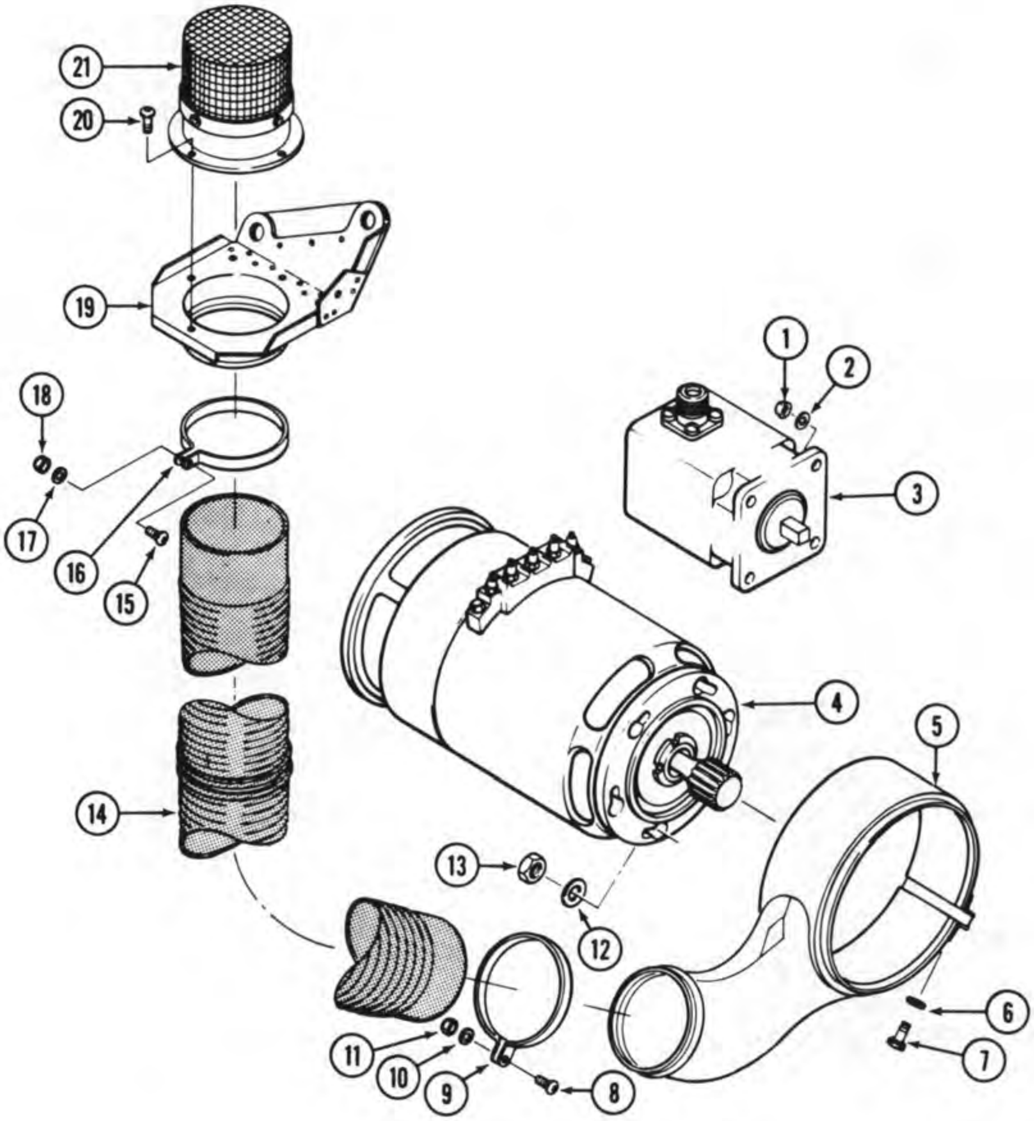
Figure 4-32. Trunnion, Cambox, and Linear Actuator Installation



1. Packing (2 reqd)
2. Fuel pressure switch (2 reqd)
3. Screw
4. Oil pressure switch
5. Nut
6. Packing
7. Nut
8. Elbow
9. Screw
10. Plate
11. Screw
12. Tube assembly
13. Oil pressure transducer
14. Tube assembly
15. Restrictor
16. Nut
17. Packing
18. Bracket
19. Bracket
20. Washer
21. Nut
22. Nut
23. Clamp
24. Screw
25. Nut
26. Power turbine tachometer generator
27. Washer
28. Nut

Figure 4-33. Power Turbine Tachometer Generator, Oil Pressure Transducer, Oil Pressure Switch, and Fuel Pressure Switch Installation



1. Nut	8. Screw	15. Screw
2. Washer	9. Clamp	16. Clamp
3. Gas producer tachometer generator	10. Washer	17. Washer
4. Starter generator	11. Nut	18. Nut
5. Shroud	12. Washer	19. Bracket
6. Washer	13. Nut	20. Screw
7. Bolt	14. Hose assembly	21. Air inlet adapter

Figure 4-34. Starter-Generator and Gas Producer Tachometer Generator

(2) Install new gasket on mounting pad.

NOTE

To aid in starter-generator installation, washers (12, figure 4-34) may be cemented to nuts (13) using adhesive (C12) or equivalent. Due to inaccessibility, upper left nut and washer may be omitted.

(3) Install nuts (13) and washers (12) on starter-generator mounting studs.

NOTE

Coat starter-generator shaft and pack female splines in gearbox two-thirds full with lubricant (C85).

(4) Position inlet shroud (5) on starter-generator (4) with flange of shroud toward starter-generator mounting flange. Install bolts (7) with washers (6) under heads; do not tighten bolts (7) at this time.

(5) Engage starter-generator (4) splined shaft to drive splines. Install starter-generator mounting studs and turn generator to locked position. Ensure starter-generator is mounted with terminals at approximately seven o'clock position. Tighten nuts (13).

NOTE

Shaft splines may be aligned by rotating the N1 tachometer generator driveshaft with a 1/4 inch extension.

(6) Ensure inlet shroud is positioned correctly and tighten bolts (7).

b. Gas producer tachometer generator.

(1) Remove nuts and washers and remove shipping cover from tachometer generator mounting pad, located on aft right side of engine accessory gearbox.

(2) Install new gasket on mounting pad.

(3) Lubricate tachometer driveshaft using lubricant (C85).

(4) Position tachometer generator (3) on engine mounting pad with electrical connection positioned up.

(5) Install washers (2) and nuts (1). Tighten nuts.

c. Hose, bracket and air inlet adapter (generator cooling).

(1) Install bracket (19, figure 4-33) to engine mount pad using existing engine supplied hardware.

(2) Install air inlet adapter (21) to bracket (19) using four screws (20).

(3) Install flex hose (14) between generator shroud and bracket.

(4) Secure hose to bracket using clamp (16), screw (15), washer (17), and nut (18).

(5) Secure hose to shroud using clamp (9), screw (8), washer (10), and nut (11).

d. Engine torque transducer hoses and restrictor.

NOTE

Refer to paragraphs 8-111 and 8-113 for removal/installation instructions for engine torque transducers.

NOTE

Orifice in restrictor (4, figure 4-35) is 0.0250 to 0.0270 inch in diameter.

(1) Install restrictor (4, figure 4-35) with new packing.

(2) Install hose assembly (2) on restrictor (4).

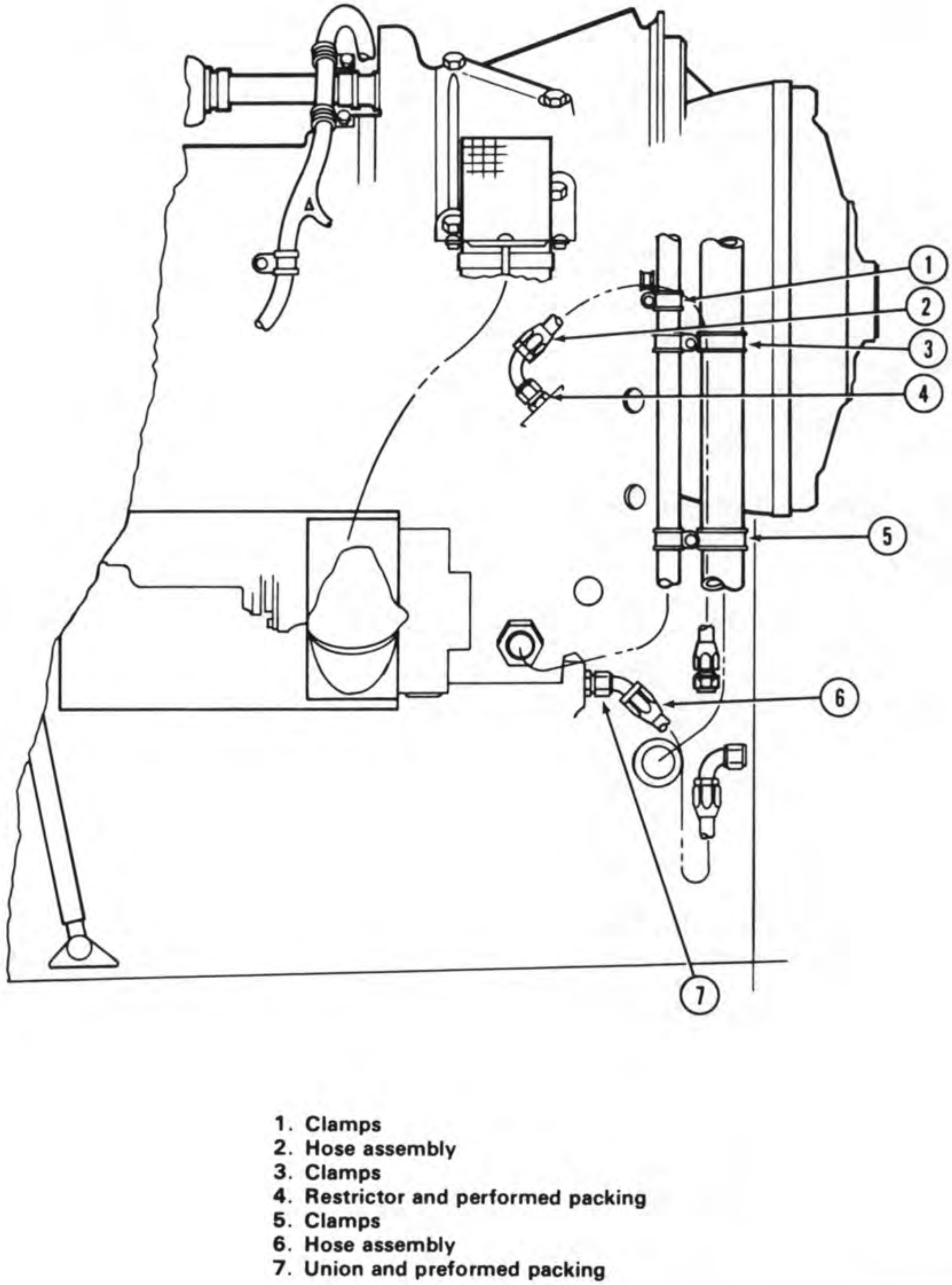
(3) Install two clamps (1).

(4) Install three clamps (3).

(5) Install three clamps (5).

(6) Install union (7) with new packing.

(7) Install hose assembly (6) on union (7).



1. Clamps
2. Hose assembly
3. Clamps
4. Restrictor and performed packing
5. Clamps
6. Hose assembly
7. Union and preformed packing

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Figure 4-35. Installation — Engine Torque Transducer Hose

4-122. INSTALLATION — HOSES, TUBES, AND FITTINGS.

a. Fuel drain hoses and tubing.

(1) Install packing (1, figure 4-35) on reducer (2). Install reducer in seal drain port of governor.

(2) Install nut (5) and packing (4) on tee (6). Install tee in seal drain port of fuel control.

(3) Install tube assembly (3) between tee (6) and reducer (2).

(4) Connect hose assembly (7) to tee (6) at seal drain port of fuel control.

(5) Install hose assembly (12) to combustion chamber drain on engine assembly.

(6) Install three unions (13) with three packings (14) to cross (16). Install coupling (15) with one packing (14) to cross (16).

(7) Connect lower end of hose assembly (7) to forward port of cross (16).

(8) Connect lower end of hose assembly (12) to top port of cross (16).

(9) Connect lower end of hose assembly (21) to aft port of cross (16).

NOTE

Tube assembly (22) and hose assembly (21) are not installed at this time. Refer to paragraph 4-44, 4-51, or 4-58 as applicable for instructions to install drain lines.

(10) Clamp hose assembly (7) at two locations as shown in figure 4-36. Clamp in a butterfly fashion, secure using screws (8), washers (10), and nuts (11).

(11) Clamp hose assemblies (12) and (21) together using two clamps (20). Loosely assemble remaining two clamps (20), screw (17), washer (18), and nut (19). Leave clamp installation loose until after installation of electrical cables.

b. Starter, fuel filter, and oil bypass valve hoses - engine left side.

(1) Install hose assembly (1, figure 4-36) to manifold inlet port of engine. Refer to paragraph 10-62 for special inspection requirements for fuel hose assembly (12, figure 10-2). Install coupling (2, figure 4-37) in 90 degree end of hose assembly (1).

(2) Install nut (12) and packing (11) on elbow (13). Install elbow in bleed port of governor.

(3) Connect hose assembly (7) to elbow (13). Install coupling (8) to hose assembly (7).

(4) Install packing (15) on reducer (14). Install reducer (14) in seal drain port of starter-generator.

(5) Connect hose assembly (10) to reducer (14). Install coupling (9) to hose assembly (10).

(6) Install two clamps (5) on hose assemblies (7 and 10) at locations shown. Connect clamps together at each location using screw (6), washer (4), and nut (3). Leave clamps loose until engine installation.

(7) Install packing (19) on union (18). Install union (18) on OIL OUT port of engine.

(8) Install hose assembly (17) to union (18). Connect coupling (16) to opposite end of hose assembly (17).

c. Bleed air tubing installation.

NOTE

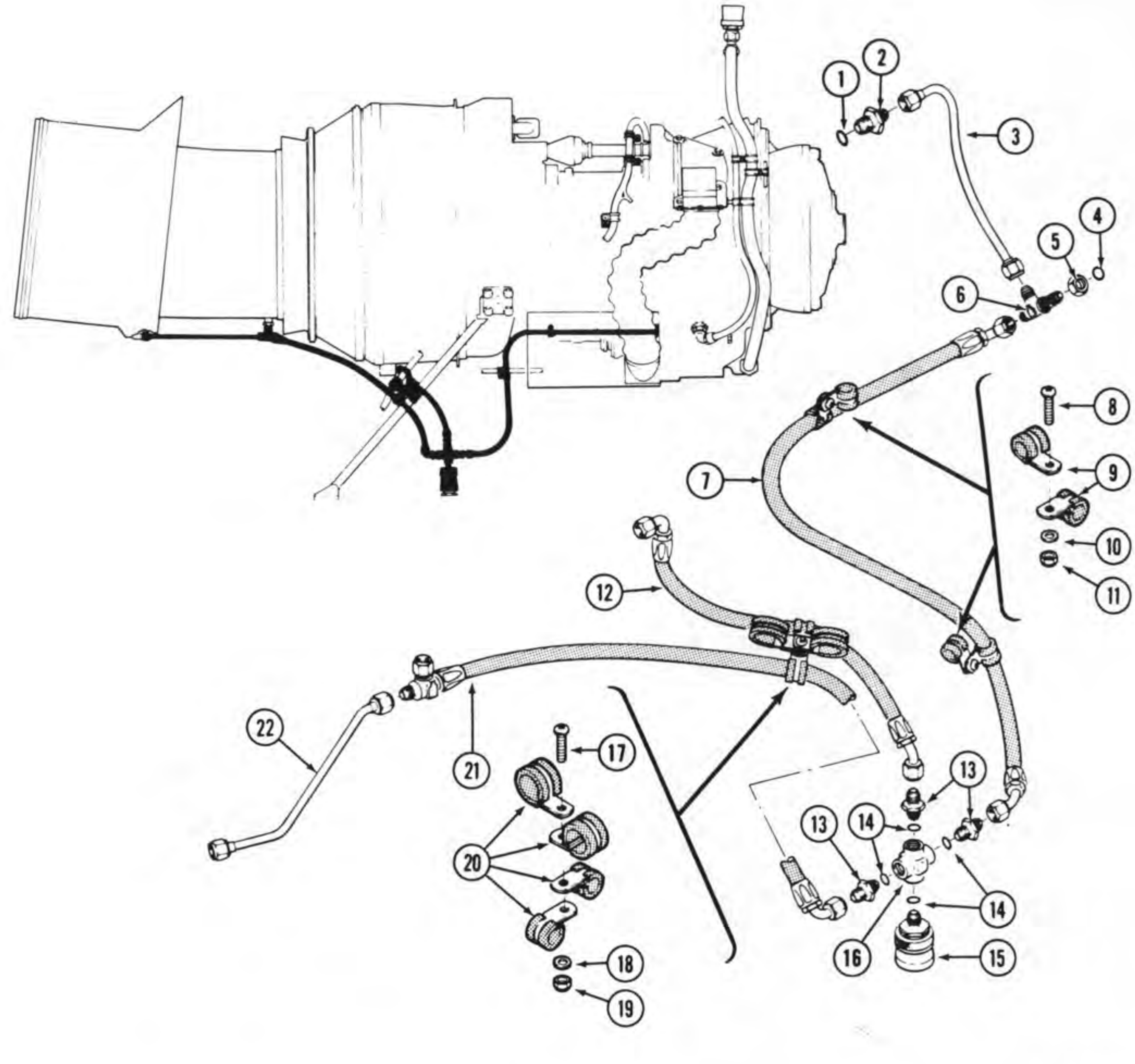
Install plugs in open ends of tube assemblies (1 and 14, figure 4-38). Place half coupling (8) in plastic bag. Tubes and half coupling will be connected when engine is installed in helicopter.

(1) Install fitting (5, figure 4-38) with gasket (18) to top bleed air port of engine. Secure using four bolts (16) and four washers (17).

(2) Install packings (2 and 4) to reducer (3). Install reducer in port of fitting (5).

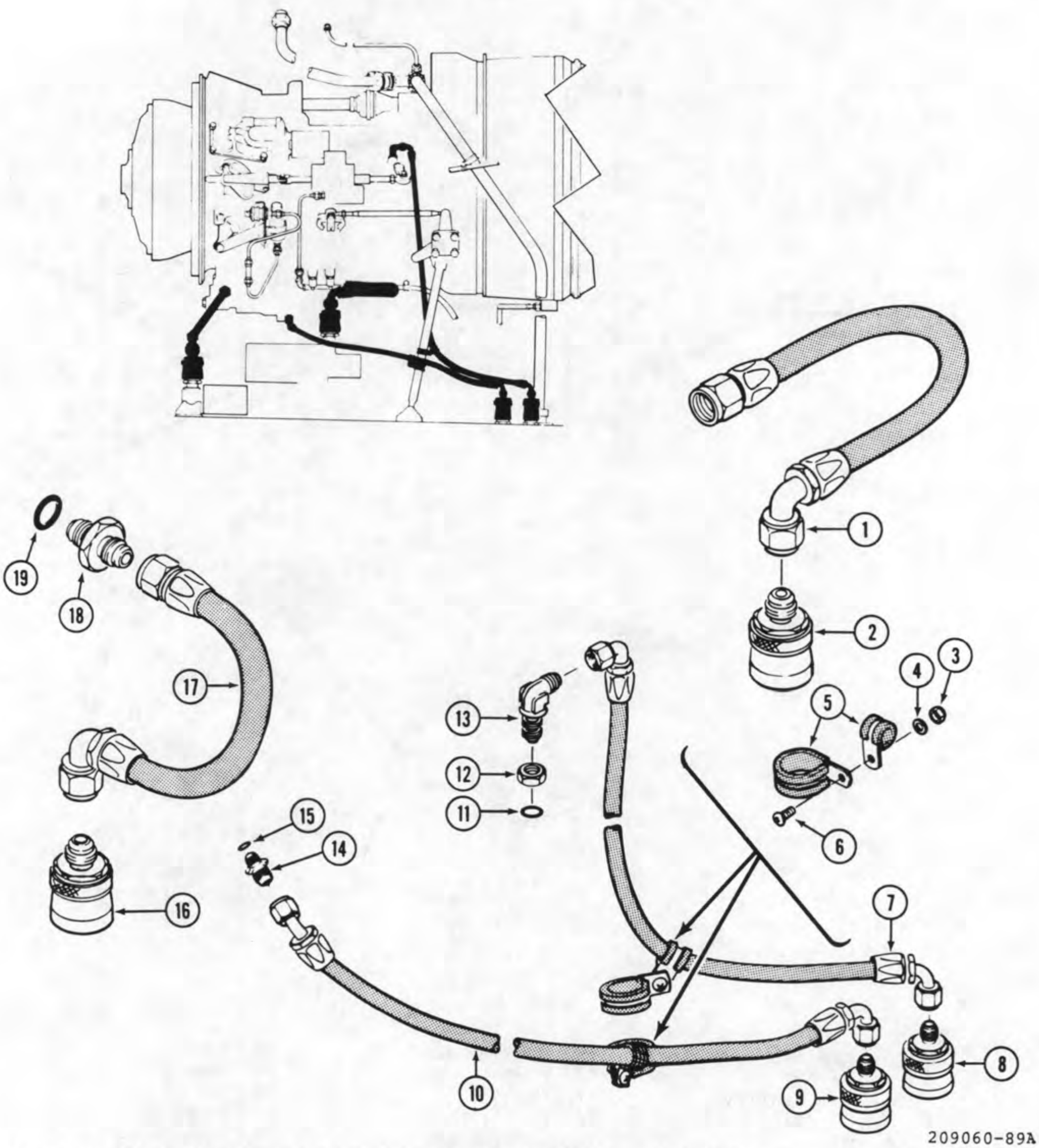
(3) Connect tube assembly (1) to reducer (3).

(4) Install tube assembly (14) to fitting (5) using coupling assembly (15). Install coupling half, washer, and packing on each end of fitting (5) and tube assembly (14). Place flexible center part of coupling over tube beads and tighten coupling halves.



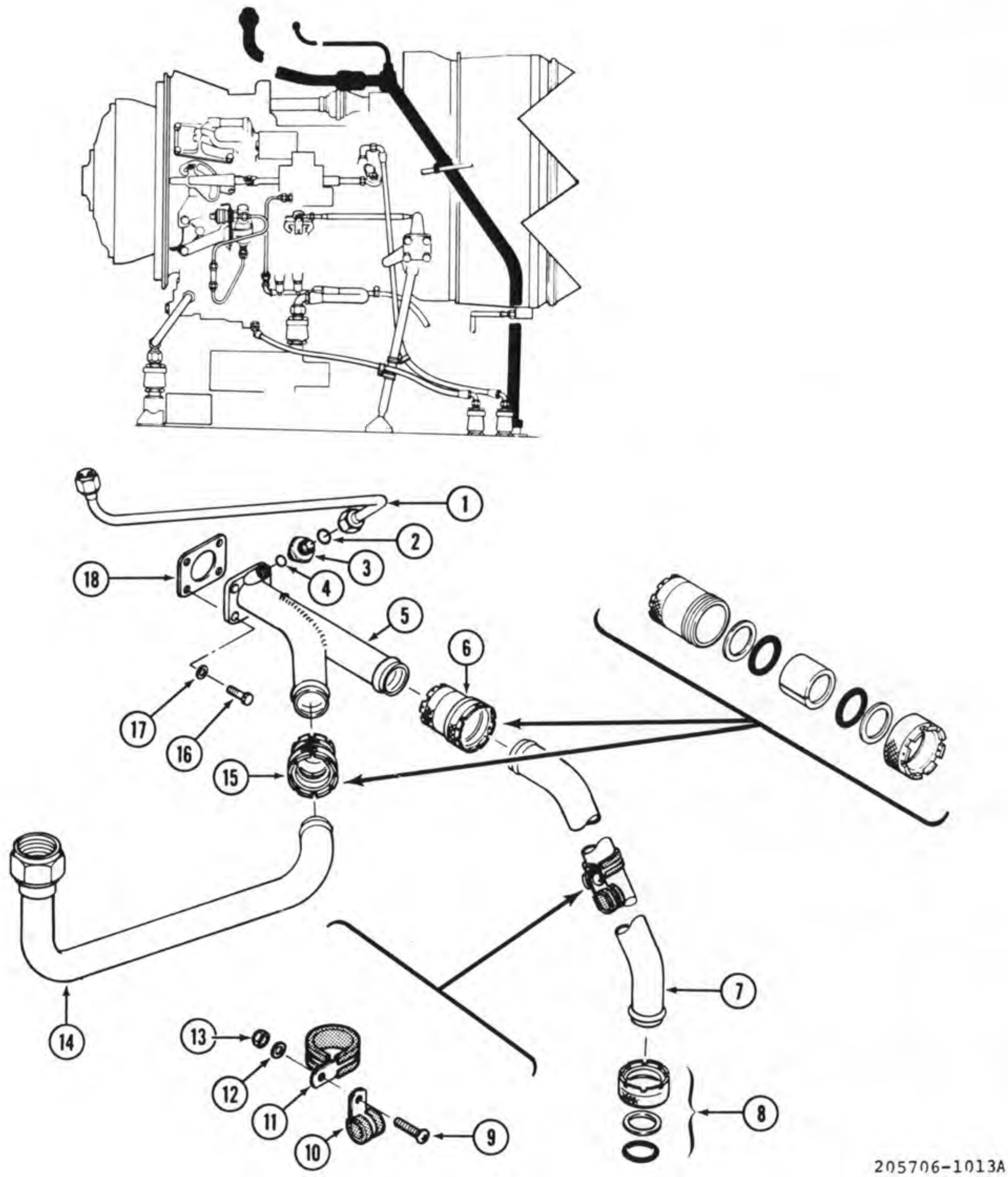
1. Packing
2. Reducer
3. Tube assembly
4. Packing
5. Nut
6. Tee
7. Hose assembly
8. Screw
9. Clamp (2 reqd)
10. Washer
11. Nut
12. Hose assembly
13. Union (3 reqd)
14. Packing (4 reqd)
15. Coupling
16. Cross
17. Screw
18. Washer
19. Nut
20. Clamp (4 reqd)
21. Hose assembly
22. Tube assembly

Figure 4-36. Installation — Fuel Drain and Bleed Lines



1. Hose assembly (fuel filter)
2. Coupling
3. Nut
4. Washer
5. Clamp (2 reqd)
6. Screw
7. Hose assembly (governor bleed)
8. Coupling
9. Coupling
10. Hose assembly (starter seal drain)
11. Packing
12. Nut
13. Elbow
14. Reducer
15. Packing
16. Coupling
17. Hose assembly (oil bypass valve)
18. Union
19. Packing

Figure 4-37. Installation — Starter, Fuel Filter, and Oil Bypass Valve Hose



1. Tube assembly
2. Packing
3. Reducer
4. Packing
5. Fitting
6. Coupling assembly
7. Tube assembly
8. Half coupling
9. Screw
10. Clamp
11. Clamp
12. Washer
13. Nut
14. Tube assembly
15. Coupling assembly
16. Bolt
17. Washer
18. Gasket

Figure 4-38. Installation — Bleed Air Tubing

(5) Install tube assembly (7) to fitting (5), using coupling assembly (6). Assemble as outlined in preceding step.

(6) Install clamp (11) on tube assembly (7). Secure to hose on engine assembly, using clamp (10), screw (9), washer (12), and nut (13). Arrange clamps in a butterfly fashion.

d. Oil hose assemblies.

(1) Install union (12, figure 4-39) with packing (11) in engine accessory gearbox port.

(2) Connect oil breather hose assembly (14) to union (12).

(3) Install coupling (13) to hose assembly (14).

(4) Install union (10) with packing (9) in OIL IN port of engine.

(5) Connect hose assembly (2) to union (10).

(6) Install coupling (1) to hose assembly (2).

(7) Install clamps (6 and 7) to oil hoses as shown. Secure to engine, using screw (8), spacer (5), washer (4), and nut (3).

(8) Install clamp (18) to hose assembly (2). Secure to tube on assembly, using screw (19), clamp (17), washer (16), and nut (15).

(9) Install clamp (22) to hose assembly (2). Install clamp (23) to hose assembly (14). Secure clamps together, using screw (24), washer (21), and nut (20).

4-123. P E INSTALLATION — HEAT SHIELD, TAILPIPE, AND EJECTOR.

NOTE

Installation of the following components should be accomplished after engine is installed in helicopter.

a. Attach heat shield (2, figure 4-40) to engine assembly, using clamp (1). Seat clamp using a plastic mallet while tightening. Torque clamp **100 TO 130** inch-pounds.

b. Attach tailpipe (5) to heatshield (2), using clamp (3). Seat clamp using a plastic mallet while tightening. Torque clamp **100 TO 130** inch-pounds.

c. Position ejector (9) over tailpipe. Secure ejector to aft fairing, using three screws (7) and three nuts (8).

d. Connect hose assembly (11) to tailpipe.

e. Install tube assembly between hose (11) and ejector (9).

4-124. M INSTALLATION — EXHAUST SYSTEM COMPONENTS (INFRARED SUPPRESSION SYSTEM).

NOTE

The infrared suppression system illustrated on figure 4-17 is attached to, and partially supported by, the IR suppressor cowling; therefore, infrared suppression system illustrated on figure 4-17 must be installed after engine is installed in helicopter.

a. Install Infrared Suppressor Cowling (7, figure 4-17) as outlined in paragraph 2-89.

b. Install Infrared Suppressor System Components as outlined in paragraph 4-58.

4-125. INSTALLATION — ENGINE ELECTRICAL CABLES.

NOTE

Refer to wiring diagram in Appendix F for wiring or connector identification.

a. Install nipples over ends of wires of starter-generator cable (6, figure 4-41).

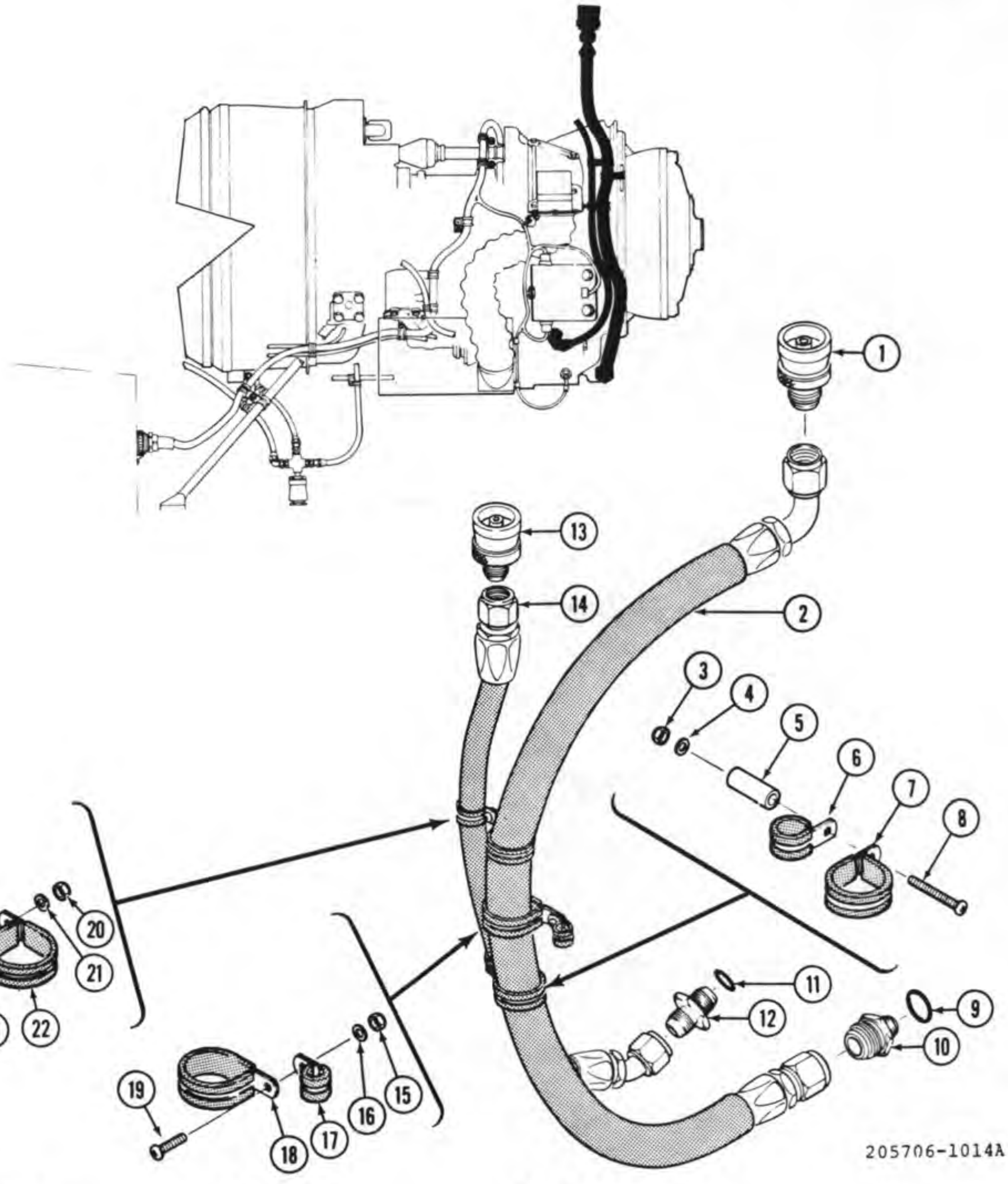
(1) One nipple on wires K5C4 and K5A1.

(2) One nipple on wires P26A1 and P26C4.

(3) One nipple on wires K4B4 and K4D4.

(4) One nipple on wire P25A16.

b. Remove nuts and washers from terminals C, B, and E of starter-generator.



1. Coupling	9. Packing	17. Clamp
2. Hose assembly	10. Reducer	18. Clamp
3. Nut	11. Packing	19. Screw
4. Washer	12. Union	20. Nut
5. Spacer	13. Coupling	21. Washer
6. Clamp	14. Hose assembly	22. Clamp
7. Clamp	15. Nut	23. Clamp
8. Screw	16. Washer	24. Screw

Figure 4-39. Installation — Oil Hose

1. Clamp
2. Heatshield
3. Clamp
4. Aft engine firewall
5. Tailpipe
6. Insulation (Ref)
7. Screw
8. Nut
9. Ejector
10. Tube assembly
11. Fuel hose

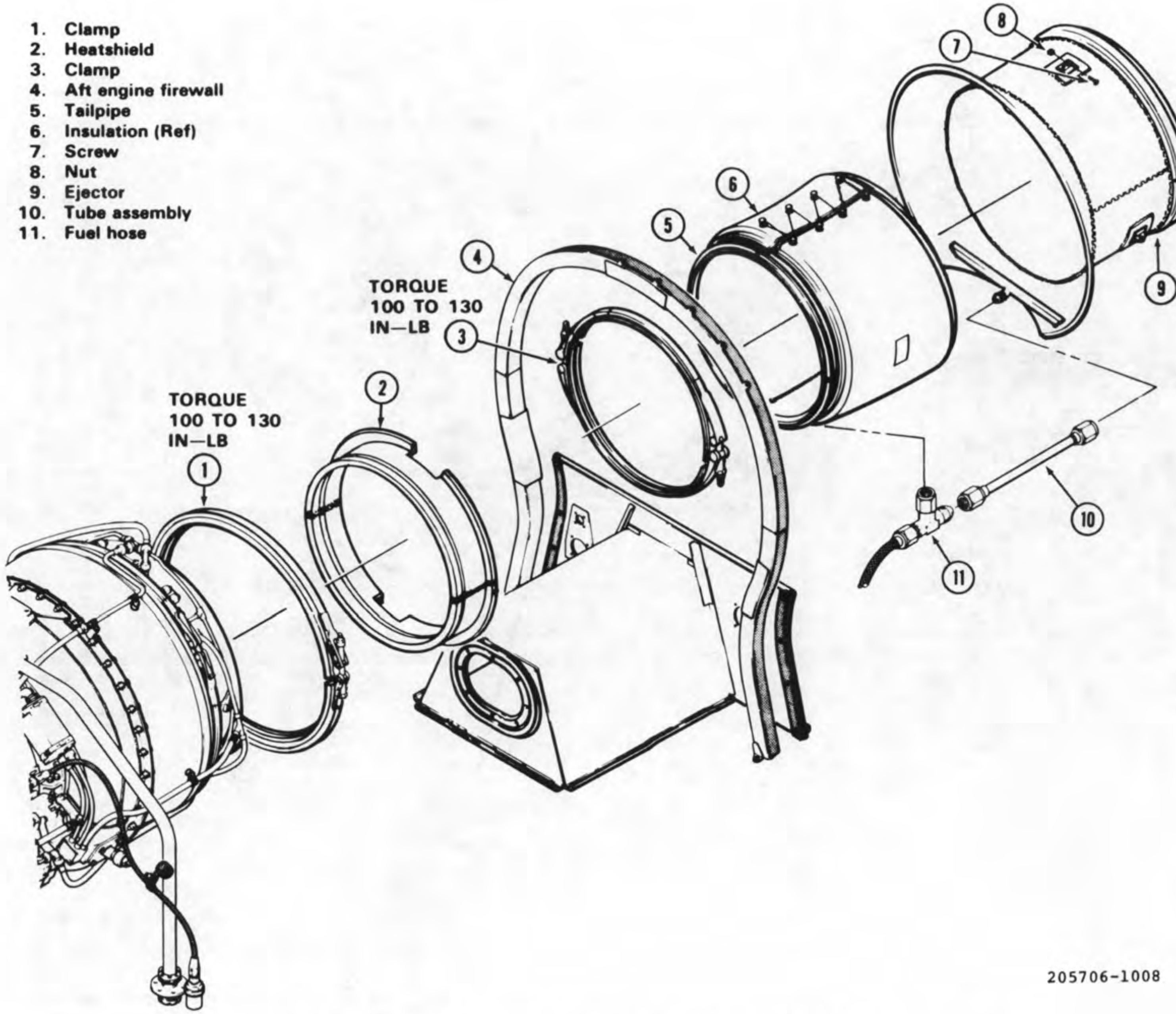


Figure 4-40. Installation — Heat Shield, Tailpipe and Ejector

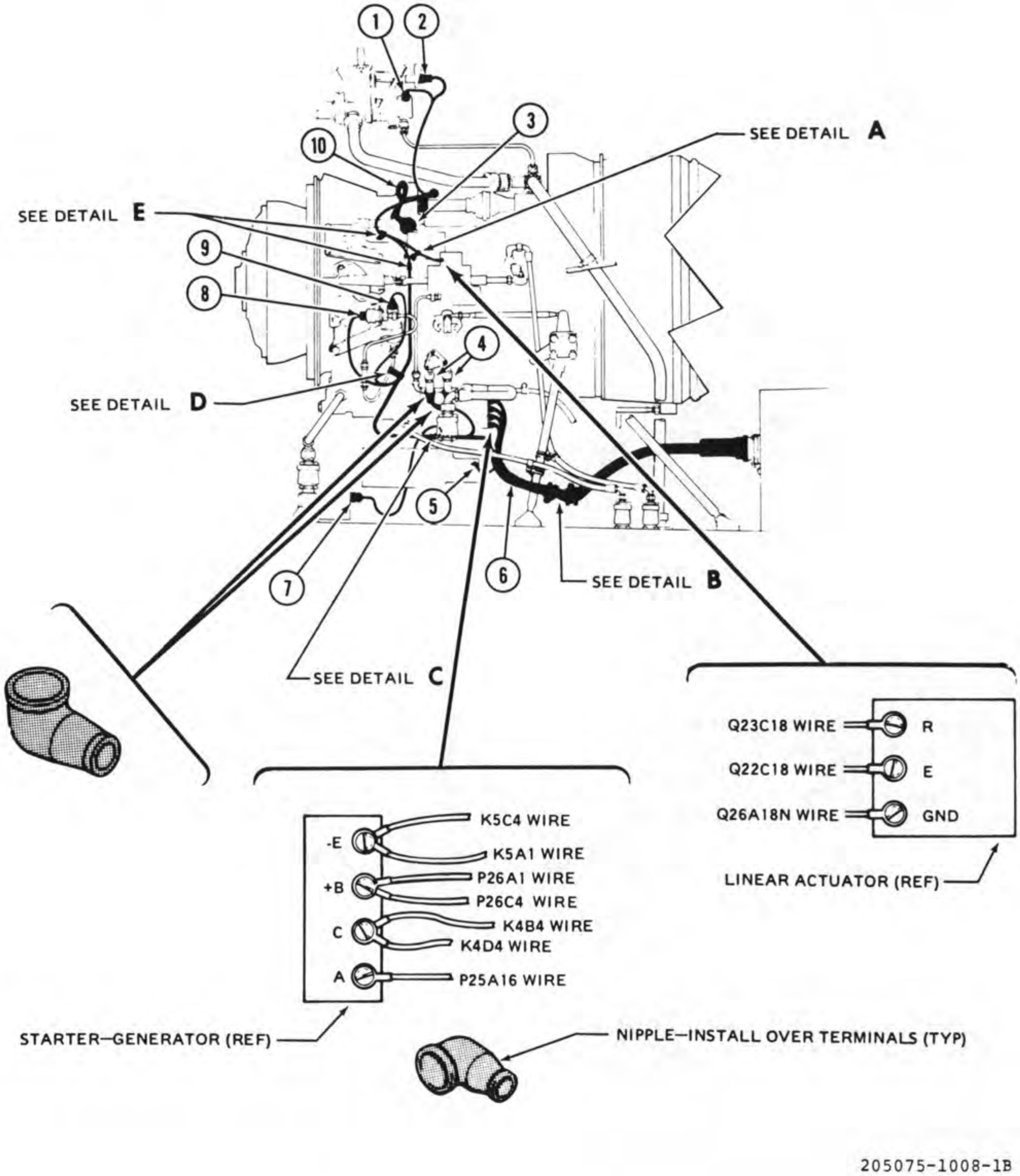
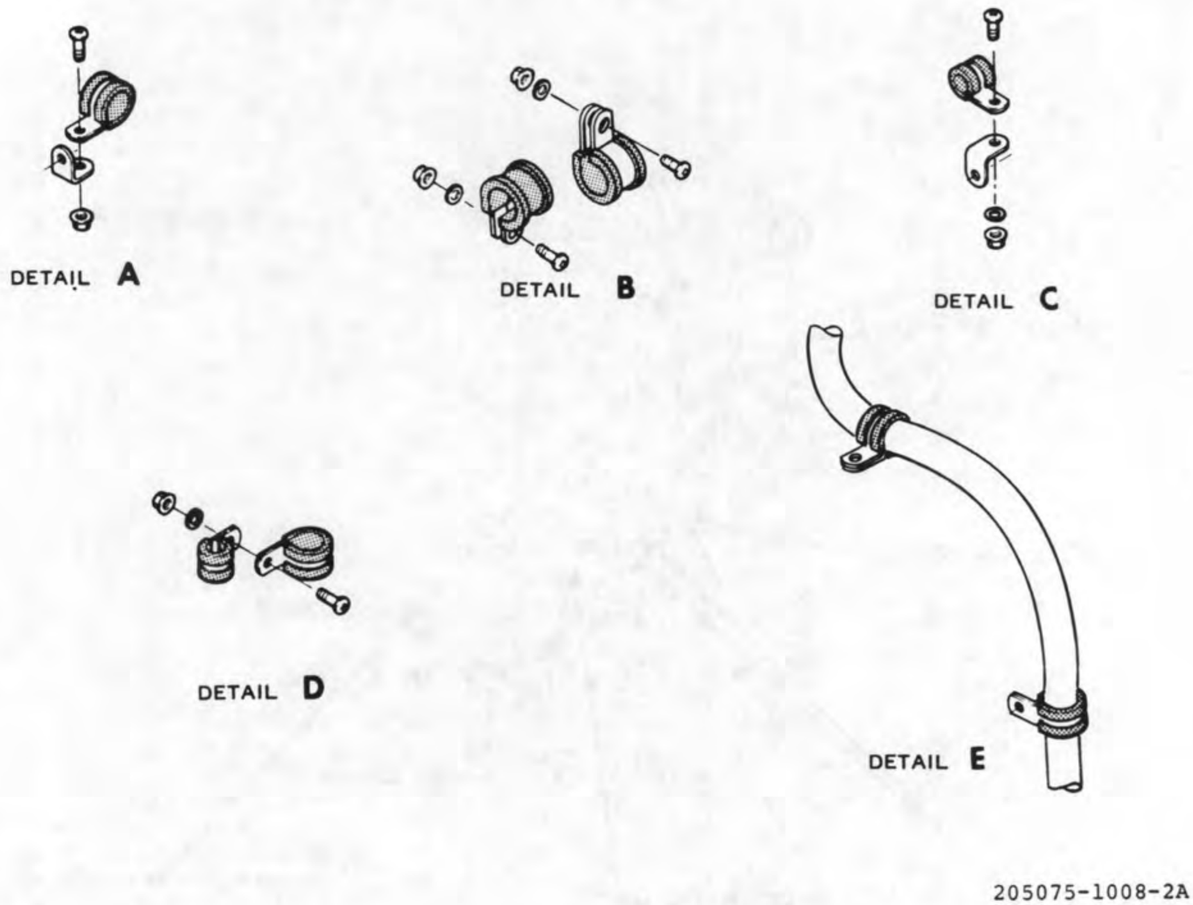


Figure 4-41. Electrical Cable Installation — Engine Left Side (Sheet 1 of 2)



1. Electrical connector (engine oil low level switch)
2. Electrical connector (bleed air low level switch)
3. Electrical connector
4. Fuel pressure switches
5. Electrical connector (fuel filter bypass)
6. Starter—generator cable
7. Electrical connector (engine oil bypass valve)
8. Electrical connector (engine oil pressure transducer)
9. Electrical connector (engine oil pressure switch)
10. Main engine cable

Figure 4-41. Electrical Cable Installation — Engine Left Side (Sheet 2 of 2)

NOTE

If terminals of starter-generator are too short, thin washers may be used.

c. Position wires K5C4 and K5A1 on terminal E, wires P26A1 and P26C4 on terminal B, wires K4B4 and K4D4 on terminal C and wire P25A16 on terminal A. Reinstall washers and nuts. Place nipples over terminals.

d. Loosely assemble clamps on starter-generator cable. Clamps are used to secure cable during engine installation. See Detail B.

e. Position main engine cable (10) on engine and connect electrical connector (3) to airframe main connector.

f. Remove cover from linear actuator wire terminals and connect wiring (figure 4-41) as follows:

(1) Connect wire Q23C18 to terminal R.

(2) Connect wire Q22C18 to terminal E.

(3) Connect wire Q26A18N to terminal GND.

g. Secure wiring with bracket and clamp. See Detail A.

h. Connect electrical connector (8) to engine oil pressure transducer and connect electrical connector (9) to engine oil pressure switch.

i. Secure cable with clamps as shown in details D and E.

j. Install one nipple on wire W71D18 and one nipple on wire W71E18.

k. Remove nuts and washers from terminals of fuel pressure switches (4). Position one wire on each pressure switch and reinstall washers and nuts. Place nipples over terminals.

l. Connect electrical connector (5) to fuel filter bypass switch and connect electrical connector (7) to engine oil bypass valve.

m. Secure cable with bracket and clamp. See detail C.

n. Connect electrical connector (2) to bleed air valve and connect electrical connector (1) to engine oil low level switch receptacle.

o. Secure harness to bleed air duct with clamps. See figure 4-42, detail C.

p. Connect electrical connectors (1 and 2) to torque pressure transducers.

q. Assemble terminal board assembly details (6 thru 11) to engine support. Connect engine ground wires to terminal board 1TB1. Secure wires to terminal board with washers (5), nuts (4), and cover (3).

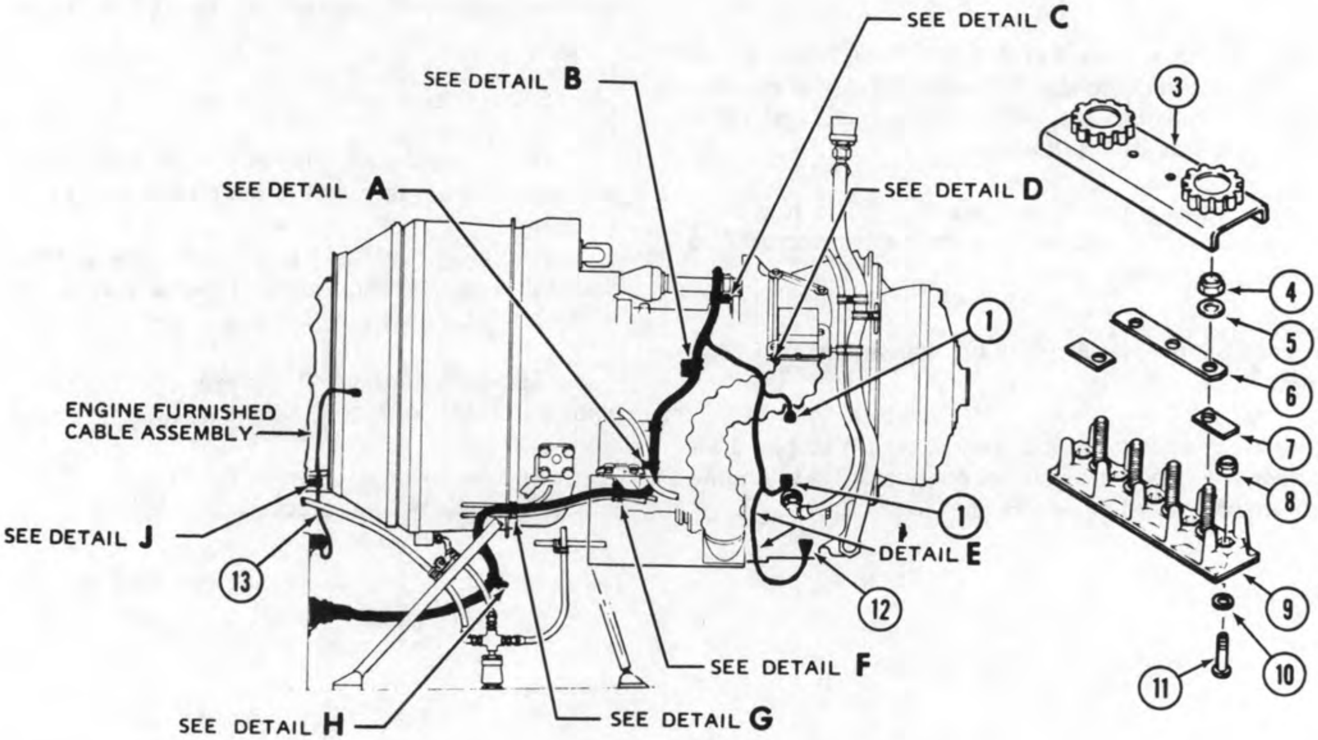
r. Secure cable with clamps. See detail D.

s. Install nipple on wire W10C18. Remove nut and washer from terminal of chip detector (12).

t. Install wire W10C18 on chip detector terminal. Reinstall washer and nut and place nipple over terminal. Secure wire with clamps. See detail E.

u. Secure remainder of harness to engine using clamps and brackets. See details A, B, F, G, and H.

v. Secure exhaust thermocouple cable (13) to engine with clamp and bracket. See detail I.



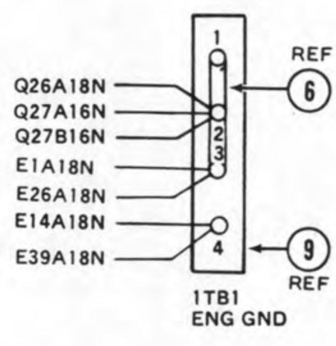


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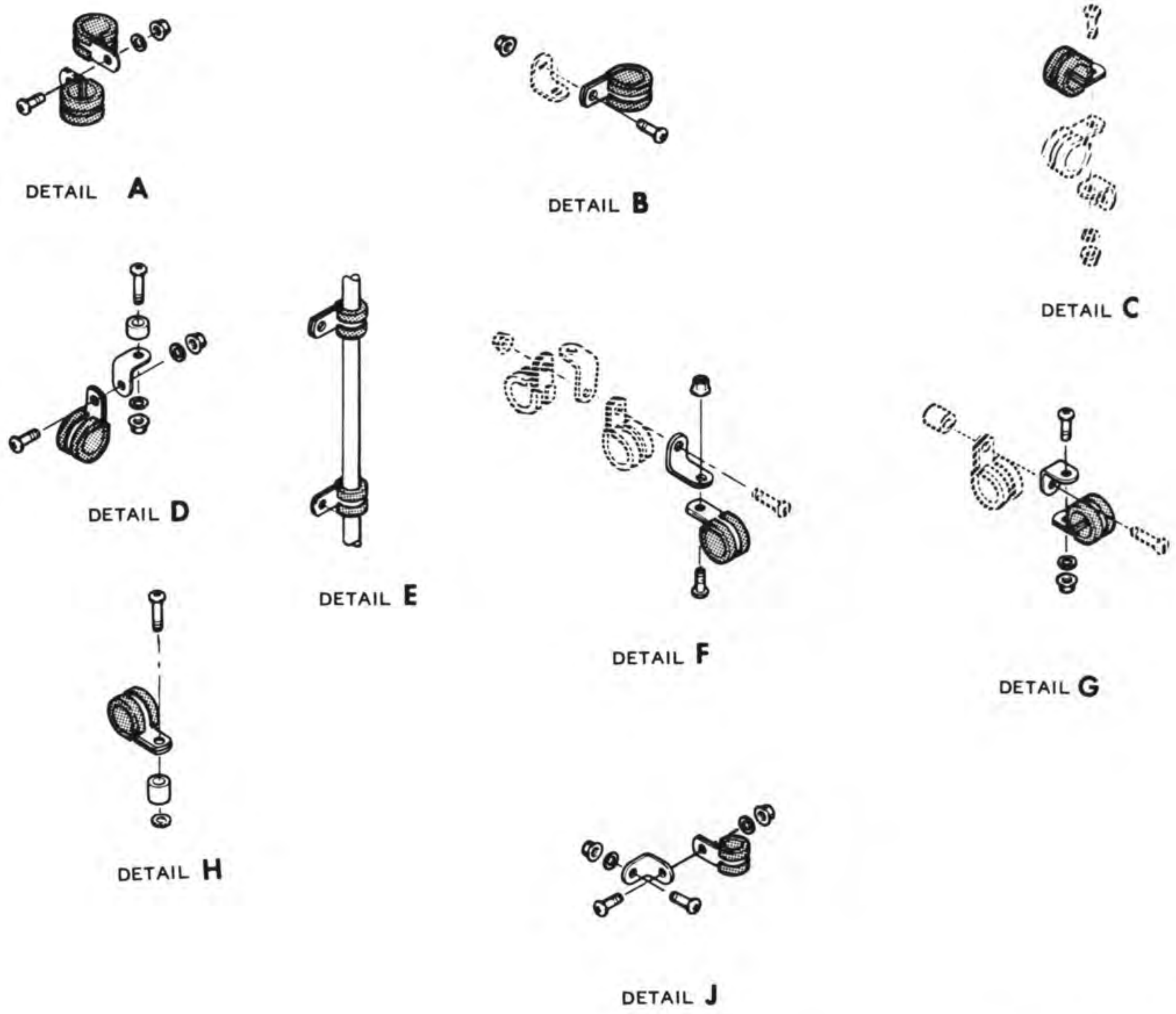
Figure 4-42. Electrical Cable Installation — Engine Right Side (Sheet 1 of 2)



1. Electrical connector
2. Electrical connector
3. Terminal board cover
4. Nut
5. Washer
6. Link
7. Insulator
8. Nut
9. Terminal board
10. Washer
11. Screw
12. Chip detector
13. Exhaust thermocouple cable

Figure 4-42. Electrical Cable Installation — Engine Right Side (Sheet 2 of 2)