TM 55-1520-220-23-1

TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE MAINTENANCE INSTRUCTIONS ARMY MODEL UH-1C/M HELICOPTERS

This manual, together with TM 55-1520-220-23-2, 17 September 1980, and TM 55-1520-220-23-3, 17 September 1980, supersedes TM 55-1520-220-20, 30 April 1973, and TM 55-1520-220-34, 30 April 1973, including all changes.

This copy is a reprint which includes current pages from Changes 1 through 6.

HEADQUARTERS, DEPARTMENT OF THE ARMY

17 SEPTEMBER 1980

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TM 55-1520-220-23-1
C 13

CHANGE NO. 13

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 May 1985

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

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Remove pages	Insert pages
1-91 and 1-92	1-91 and 1-92
5-121 and 5-122	5-121 and 5-122
- - -	5-122.1/5-122.2

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

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

DONALD J. DELANDRO
Brigadier General, United States Army
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C 12

CHANGE
NO. 12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 22 April 1985

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

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Remove pages	Insert pages
1-43 and 1-44	1-43 and 1-44
1-44.1/1-44.2	1-44.1/1-44.2
1-45 and 1-46	1-45 and 1-46
1-83 and 1-84	1-83 and 1-84
5-97 and 5-98	5-97 and 5-98
---	5-98.1/5-98.2

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C 11

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No. 11

HEADQUARTERS
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Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

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Remove pages	Insert pages
1-79 and 1-80	1-79 and 1-80
1-83 and 1-84	1-83 and 1-84
1-87 through 1-92	1-87 through 1-92
5-13 through 5-16	5-13 through 5-16
- - -	5-16.1/5-16.2
5-71 and 5-72	5-71 and 5-72

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C 10

CHANGE
NO. 10

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ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

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Remove pages	Insert pages
1-71 and 1-72	1-71 and 1-72
---	1-72.1/1-72.2
6-117 through 6-120	6-117 through 6-120
---	6-122.5/6-122.6

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C 9

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 9 November 1983

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 1	1-41 thru 1-46	1-41 thru 1-46
	1-89 thru 1-92	1-89 thru 1-92
Chapter 6	6-127 and 6-128	6-127 and 6-128

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Aviation Unit and Intermediate Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove Pages	Insert Pages
Chapter 1	1-1 and 1-2	1-1 thru 1-2.2
		1-4.1 and 1-4.2
	1-15 and 1-16	1-15 and 1-16
	1-21 thru 1-24.1/1-24.2	1-21 thru 1-24.1/1-24.2
	1-29 and 1-30	1-29 and 1-30
	1-37 and 1-38	1-37 and 1-38
	1-43 and 1-44	1-43 and 1-44
	1-53 and 1-54	1-53 and 1-54
	1-71 and 1-72	1-71 and 1-72
	1-79 thru 1-84	1-79 thru 1-84
	1-87 and 1-88	1-87 and 1-88
	1-91 thru 1-102	1-91 thru 1-102
	1-103 and 1-104	1-104
Chapter 2		2-20.1 and 2-20.2
	2-95 thru 2-98	2-95 thru 2-98
	2-101 and 2-102	2-101 thru 2-102.1/2-102.2
	2-119 thru 2-122	2-119 thru 2-122
	2-138.1/2-138.2	2-138.1/2-138.2
Chapter 3	3-6.1 and 3-6.2	3-6.1 and 3-6.2
Chapter 4	4-15 and 4-16	4-15 and 4-16
	4-55 and 4-56	4-55 and 4-56
	4-63 and 4-64	4-63 and 4-64
	4-71 and 4-72	4-71 and 4-72
	4-83 and 4-84	4-83 and 4-84
	4-89	4-89/4-90
	4-101 and 4-102	4-101 and 4-102
Chapter 5	5-7 and 5-8	5-7 and 5-8
	5-30.1/5-30.2	5-30.1/5-30.2
	5-39 and 5-40	5-39 thru 5-40.1/5-40.2
	5-67 thru 5-72	5-67 thru 5-72
	5-81 thru 5-84	5-81 thru 5-84
	5-87 and 5-88	5-87 and 5-88
	5-93 and 5-94	5-93 thru 5-94.1/5-94.2
	5-95 thru 5-98	5-95 thru 5-98
	5-105 and 5-106	5-105 and 5-106
	5-113 and 5-114	5-113 and 5-114

	Remove Pages	Insert Pages
	5-119 thru 5-124	5-119 thru 5-124
	5-129 and 5-130	5-129 and 5-130
	5-133 and 5-134	5-133 and 5-134
	5-137 and 5-138	5-137 and 5-138
	5-143 and 5-144	5-143 and 5-144
Chapter 6	6-48.1 thru 6-48.4	6-48.1 thru 6-48.4
	6-59 and 6-60	6-59 and 6-60
	6-65 and 6-66	6-65 and 6-66
	6-69 and 6-70	6-69 thru 6-70.1/6-70.2
	6-71 and 6-72	6-71 and 6-72
	6-109 and 6-110	6-109 thru 6-110.2
	6-121 and 6-122	6-121 and 6-122
		6-122.3 and 6-122.4
	6-123 thru 6-130	6-123 thru 6-130
	6-155 and 6-156	6-155 and 6-156
	6-165 thru 6-170	6-165 thru 6-170.1/6-170.2
	6-171 and 6-172	6-171 and 6-172
	6-175 thru 6-180	6-175 thru 6-180
Index	Index 7 and Index 8	Index 7 and Index 8
	Index 29 and Index 30	Index 29 and Index 30

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TM 55-1520-220-23-1
C 7

CHANGE NO. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 8 March 1982

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 1	1-21 and 1-22	1-21 and 1-22
	1-41 thru 1-44	1-41 thru 1-44
	1-47 and 1-48	1-47 and 1-48
	1-87 and 1-88	1-87 and 1-88
	1-103 and 1-104	1-103 and 1-104

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C 6

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No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 23 February 1982

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove Pages	Insert Pages
Chapter 2	2-17 and 2-18	2-17 and 2-18
Chapter 5	5-5 and 5-6	5-5 and 5-6
	5-35 and 5-36	5-35 and 5-36
	5-73 thru 5-74.1/5-74.2	5-73 thru 5-74.1/5-74.2
	5-105 and 5-106	5-105 and 5-106
Chapter 6	6-61 and 6-62	6-61 and 6-62

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NOTICE: Change 5 is being printed prior to Change 4 because of priority. Change 4 will be forthcoming. TM changes must be inserted in numerical sequence.

TM 55-1520-220-23-1
C 5

CHANGE
No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *16 November 1981*

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 1	1-66.1/1-66.2	1-66.1/1-66.2
	1-67 and 1-68	1-67 and 1-68
	1-75 thru 1-78	1-75 thru 1-78
	1-81 and 1-82	1-81 and 1-82
	1-89 and 1-90	1-89 and 1-90
Chapter 5	5-83 and 5-84	5-83 and 5-84

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CHANGE
No. 4

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Aviation Unit and Intermediate Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Warning	a and b	a and b
Chapter 1	1-1 and 1-2	1-1 and 1-2
	1-5 thru 1-10	1-5 thru 1-10
	1-13 thru 1-20	1-13 thru 1-20
	1-21 and 1-22	1-21 and 1-22
	1-23 and 1-24	1-23 thru 1-24.1/1-24.2
	1-25 thru 1-32	1-25 thru 1-32
	1-33 and 1-34	1-33 and 1-34
	1-43 thru 1-44.1/1-44.2	1-43 thru 1-44.1/1-44.2
	1-45 and 1-46	1-45 thru 1-46.1/1-46.2
	1-47 thru 1-50	1-47 thru 1-50
	1-79 and 1-80	1-79 and 1-80
	1-83 and 1-84	1-83 and 1-84
	1-91 thru 1-94	1-91 thru 1-94
	1-99 and 1-100	1-99 and 1-100
Chapter 2	2-17 thru 2-20	2-17 thru 2-20
	2-27 and 2-28	2-27 and 2-28
	2-45 and 2-46	2-45 thru 2-46.1/2-46.2
	2-49 and 2-50	2-49 and 2-50
	2-55 and 2-56	2-55 and 2-56
	2-67 and 2-68	2-67 and 2-68
	2-109 and 2-110	2-109 and 2-110
	-	2-128.1/2-128.2
	2-137 and 2-138	2-137 thru 2-138.1/2-138.2
Chapter 3	3-29 and 3-30	3-29 and 3-30
Chapter 4	4-13 and 4-14	4-13 and 4-14
	4-23 and 4-24	4-23
	4-27 and 4-28	4-27 and 4-28
	4-43 and 4-44	4-43 and 4-44
	4-53 and 4-54	4-53 thru 4-54.1/4-54.2
	4-61 thru 4-64	4-61 thru 4-64
	4-79 and 4-80	4-79 thru 4-80.1/4-80.2
	4-81 and 4-82	4-81 thru 4-82.1/4-82.2
	4-83 and 4-84	4-83 and 4-84
	4-89	4-89

	Remove pages	Insert pages
Chapter 5	5-3 thru 5-6	5-3 thru 5-6
	5-13 and 5-14	5-13 and 5-14
	5-37 and 5-38	5-37 and 5-38
	5-59 thru 5-64	5-59 thru 5-64
	5-69 and 5-70	5-69 and 5-70
	5-73 and 5-74	5-73 and 5-74
	5-87 and 5-88	5-87 and 5-88
	5-91 and 5-92	5-91 and 5-92
	5-97 and 5-98	5-97 and 5-98
	5-99 thru 5-104	5-99
	5-105 and 5-106	5-105 and 5-106
	5-109 and 5-110	5-109 and 5-110
	5-117 thru 5-122	5-117 thru 5-122
	5-135 thru 5-138	5-135 thru 5-138
	5-141 and 5-142	5-141 and 5-142
Chapter 6	6-1 thru 6-24	6-1
	6-25 and 6-26	6-26
	6-33 thru 6-36	6-33 thru 6-36
	6-39 and 6-40	6-39 and 6-40
	6-42	6-41 and 6-42
	6-43 thru 6-46.2	6-43 thru 6-46.4
	6-47 thru 6-48.6	6-47 thru 6-48.6
	6-53 and 6-54	6-53 thru 6-54.1/6-54.2
	6-57 and 6-58	6-57 and 6-58
	6-61 thru 6-64	6-61 thru 6-64
	6-69 and 6-70	6-69 and 6-70
	6-127 and 6-128	6-127 and 6-128
	6-135 and 6-136	6-135 and 6-136
	6-145 thru 6-146.1/6-146.2	6-145 thru 6-146.1/6-146.2
	6-147 and 6-148	6-147 and 6-148
	6-151 and 6-152	6-151 thru 6-152.1/6-152.2
	6-191 and 6-192	6-191 and 6-192
Index	Index 1 and Index 2	Index 1 and Index 2
	Index 21 and Index 22	Index 21 and Index 22
	Index 29 and Index 30	Index 29 and Index 30

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C 3

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No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *14 May 1981*

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

TM 55-1520-220-23-1, 17 September 1980, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 1	1-65 and 1-66	1-65 thru 1-66.1/1-66.2
	1-69 thru 1-72	1-69 thru 1-72
	1-79 and 1-80	1-79 and 1-80
	1-85 thru 1-90	1-85 thru 1-90
Chapter 2	2-123 and 2-124	2-123 and 2-124

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C 2

CHANGE
No. 2

HEADQUARTER
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *20 March 1981*

Aviation Unit and Intermediate
Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

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1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Warning	a and b	a and b
Chapter 1	1-39 and 1-40	1-39 and 1-40
	1-75 thru 1-78	1-75 thru 1-78
	1-81 and 1-82	1-81 and 1-82
	1-87 and 1-88	1-87 and 1-88
	1-91 and 1-92	1-91 and 1-92

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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 are 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.

NOISE

Sound pressure levels in this helicopter during some operating conditions exceed the Surgeon General hearing conservation criteria, as defined in TB MED 501. Hearing protection devices, such as aviator helmet or ear plugs are required to be worn by all personnel in and around the helicopter during its operation.

DANGEROUS CHEMICALS ARE USED IN NICKEL-CADMIUM BATTERIES

The electrolyte used in nickel-cadmium batteries contains potassium hydroxide (KOH), which is a caustic chemical agent. Series and deep burns of body tissue will result if the electrolyte comes in contact with the eyes or any part of the body. Use rubber gloves, rubber apron, and protective eye covering when handling the battery. If accidental contact with the electrolyte is made, use ONLY clean water and immediately (seconds count) flush contaminated areas. Continue flushing with large quantities of clean water. Seek medical attention immediately. Before removing or installing the battery, insure that the battery switch is off and the battery has cooled down if overheated. Removal or installation of the battery connector while the battery is under load may result in explosion, electrical arcing, and possible severe burns to personnel.

TOXIC POISONS

Turbine fuels and lubricating oils contain additives which are poisonous and readily absorbed through the skin. Do not allow them to remain on skin longer than necessary.

STARTING HELICOPTER

Starting and operation of the helicopter will be performed only by authorized personnel in accordance with AR95-1.

GROUNDING HELICOPTER

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.

Before removing any engine ignition system component, ground the leads to dissipate any stored voltage in ignition unit.

FIRE EXTINGUISHER

Exposure to high concentrations of monobromotrifluoromethane (CF3BR) extinguishing agent or decomposition products should be avoided. The liquid should not be allowed to come into contact with the skin, as it may cause frost bite or low temperature burns.

ARMAMENT

Loaded weapons, or weapons being loaded or unloaded, shall be pointed in a direction which offers the least exposure to personnel or property in the event of accidental firing. Personnel shall remain clear of hazardous area of all loaded weapons.

ANY ROTATION OF THE GUN ARMAMENT SUBSYSTEM BARRELS WILL CAUSE THE GUN TO FIRE. Upon landing, immediately alert personnel to probable presence of live rounds in the gun. Summon armament repairman to clear weapon.

FUELING AND DEFUELING

When refueling helicopter, the refueling vehicle or forward air refueling unit must be parked a minimum of 20 feet from the helicopter. Before starting the fueling operation, always insert fueling nozzle grounding chain of fuel truck ground wire into GROUND HERE receptacle located on the right side of the helicopter aft of the cabin area. Refer to FM 10-68.

When defueling, turn off all electrical switches and disconnect external power from the helicopter. The helicopter must be electrically grounded prior to defueling.

RADIOACTIVE MATERIALS

Self-luminous dials and ignition units may contain radioactive materials. If such an instrument or unit is broken or becomes unsealed, avoid personal contact. Use forceps or gloves made of rubber or polyethylene to pick up contaminated material. Place materials and gloves in a plastic bag. Seal bag and dispose of it as radioactive waste in accordance with AR755-15 and TM 3-261 (Refer to TB 43-0108). Repair procedures shall conform to requirements in AR700-52.

CLEANING SOLVENTS

Cleaning solvents may be flamable and toxic. Use only in well ventilated areas. Avoid inhalation of vapor and skin contact. Do not use solvents near open flame or in areas where very high temperatures prevail.

ROTOR BLADES

Personnel will stay clear of rotor blades during operation. Refer to Chapter 1 for rotor blade dimensions and clearances.

TECHNICAL MANUAL

No. 55-1520-220-23-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 September 1980

Aviation Unit and Intermediate Maintenance Instructions

ARMY MODEL UH-1C/M HELICOPTERS

NOTE:

This manual is printed in three volumes as follows:

TM 55-1520-220-23-1, consisting of Table of Contents, Preface, Chapter 1 through Chapter 6, and Index.

TM 55-1520-220-23-2, consisting of Table of Contents, Chapter 7 through Chapter 17 and Index.

TM 55-1520-220-23-3, consisting of Table of Contents, Appendix A through Appendix F and Index.

The Appendices are applicable to all volumes.

TECHNICAL MANUAL

No. 55-1520-220-23-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC 17 September 1980

AVIATION UNIT AND INTERMEDIATE MAINTENANCE INSTRUCTIONS

ARMY MODEL UH-1C/M 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-MTT, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you.

TABLE OF CONTENTS

PREFACE

P-1. GENERAL.

a. This manual is the official document for Aviation Unit and Intermediate Maintenance of Army Model UH-1C and UH-1M Helicopters.

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 subsystem as indicated for Aviation Unit and Intermediate maintenance activities in the Maintenance Allocation chart (MAC). (Refer to Appendix B).

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

Quality assurance will be performed in accordance with applicable directives. Quality assurance/quality control personnel shall assure that proper maintenance has been performed by verifying that all dimensions and tolerances contained in this manual have been met.

P-3. DESCRIPTION.

The UH-1C/M is a utility type helicopter. The helicopter has a two-bladed, semirigid main rotor. The fuselage consists of two main sections, the forward section and the aft or tailboom section. Seating positions may be in a two to eleven place arrangement, with the pilot in the forward right-hand location. Conversion from passenger to cargo configuration may be accomplished by removal of the seats. The airframe has built-in work platforms and cowling that can be opened or removed for access to all major components.

a. **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. Tail rotor driveshafts and gearboxes are mounted under covers along the top of the tailboom and front. 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.

b. **Propulsion System.** The propulsion system consists of a gas turbine engine, main driveshaft, transmission and mast, main rotor, and the tail rotor with its driveshafts and gearboxes. The engine drives the transmission through the short main driveshaft, rotating the mast and main rotor. Power is also taken off from the transmission to drive the tail rotor. Fuel tanks consist of two interconnected cells, located in the forward fuselage.

c. **Flight Controls.** Flight controls are direct mechanical linkages from sticks and pedals at pilot and copilot stations, assisted by hydraulic cylinders powered by transmission-driven hydraulic pumps. The hydraulic pump is mounted on and driven by the transmission.

d. **Electrical Power Systems.** The helicopter has two electrical power systems, direct current and alternating current. The basic power supply is a 28 Vdc, single-conductor system using helicopter structure as negative ground. Power for the dc system is provided by either the main generator, standby starter-generator, battery, or external power. Emergency dc power is provided by the standby starter-generator, which is mounted on the engine. Alternating current is supplied by two 250-volt-ampere, 3-phase inverters (main and spare) that convert 28 Vdc to 115 Vac. The inverters are identical, and either is capable of supplying the power required for operation of the ac-operated equipment.

e. **Landing Gear.** The helicopter's landing gear is a skid-type gear. Two ground handling gear wheel assemblies (provided in the loose equipment) may be attached to permanently installed fittings on the skid gear to facilitate ground handling. A tubular steel tail skid is attached to the lower aft section of the tailboom to protect the tail rotor in case of a tail-low landing.

P-4. ENGINEERING AUTHORIZATION.

All requests for engineering authorization, when required by this manual, shall be forwarded to: USATSARCOM, ATTN: DRSTS-ME, 4300 Goodfellow Blvd., St. Louis, Mo. 63120. Urgent request shall be clearly identified to ensure priority handling and

response. The requests shall include detailed information on the problem, e.g., sketches, photographs, dimensional photographs, dimensional data, etc., to assist in the evaluation and assure a prompt reply.

P-5. REPORTING OF ERRORS.

You can help improve this manual. If you find any mistakes 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: US Army Troop Support and Aviation Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow, St. Louis, Mo. 63120. A reply will be furnished to you.

P-6. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

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

P-7. MAINTENANCE OF FORMS AND RECORDS.

Maintenance 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-8. AUTHORITY FOR SUBSTITUTION.

Substitution or interchange of items of material for maintenance of Department of the Army aircraft shall not be authorized, nor shall orders be issued for shipment. Substitution or interchangeability shall be authorized only by TSARCOM.

P-9. SPECIAL TOOLS AND TEST EQUIPMENT.

Aviation Unit and Intermediate maintenance special tools and equipment will be found in TM 55-1520-210-23P. Special tools and test equipment used in accomplishing maintenance tasks are listed in this manual.

P-10. CALIBRATION.

Aircraft components, accessories, and instruments requiring calibration are specified in Chapter 1.

Special tools and test equipment shall be calibrated as specified in TB 43-180 Army Metrology and Calibration System.

P-11. STORAGE.

Refer to TM 740-90-1 and TM 55-1500-204-25/1 for storage requirements not covered in Appendix E, Storage of Aircraft.

P-12. DESIGNATOR SYMBOLS.

Designator symbols such as C (UH-1C) or M (UH-1M) are used in conjunction with text contents, text headings, and illustration titles to show limited effectivity of the material. One or more designator symbols may follow a text heading or illustration title to indicate proper effectivity, unless the material applies to all models and configurations within the manuals. If the material applies to all models and configuration, no designator symbols are used.

P-13. EXPLANATION OF CHANGE SYMBOLS.

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; exception: pages with emergency markings, which consist of black diagonal lines around three edges, may have the vertical line or change symbol placed along the inner margins. 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:

a. Introductory material.

b. Indexes and tabular data where the changes cannot be identified.

c. Blank space resulting from the deletion of text, an illustration, or a table.

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

CHAPTER I

AIRCRAFT GENERAL

SECTION I - SERVICING

1-1. SERVICING.

1-2. Description - Servicing. Instructions and information for complete servicing of the helicopter with fuel, oil, hydraulic fluid and other fluids are provided in the following paragraphs. Location of sight gages and drains are shown on Servicing Points Diagram with indication of how frequently each reservoir should be checked and filled or drained and refilled (figure 1-1) . Instructions for use of greases and other lubrication not shown in servicing illustration will be found in figure 1-3, Lubricaton Chart.

1-3. Fuel System - Servicing. The main fuel system incorporates two interconnected fuel tanks (figure 1-1) for simultaneous flow and venting. Both fuel cells are equipped with a sump and boost pump assembly. The filler cap is located on the left side of the helicopter. The fuel drain valve is located on the bottom of the left fuel cell adjacent to the sump drain. Fuel tank pump and sump drains may be reached through an access door in the bottom of the fuselage.

a. Fuel Tank Capacities.

Fuel Cell Capacity (U.S. Gallons)

Normal service	Spillover level
242.0 (non-crashworthy)	245.0
225.0 (crashworthy)	225.0

b. Approved Fuel. The following fuels are recommended to be used.

ARMY STANDARD FUEL	ALTERNATE FUEL	EMERGENCY FUEL
MIL-T-5624 Grade JP-4	MIL-T-5624 Grade JP-5	MIL-G-5572 Aviation Gasoline Refer to TB 55-9150-200-24

NOTE

An entry shall be made on DA Form 2408-13 if emergency fuel is used.

c. Settling Time for AVGAS. Settling time for AVGAS is 15 minutes per foot of tank depth and one hour per foot depth for jet (JP) fuels. Allow the fuel to settle for the prescribed period before any fuel samples are taken.

d. Fuel System Servicing (Power Off).

(1) Precautions.

NOTE

Servicing personnel shall comply with all safety precautions and procedures in FM 10-68.

(a) Be sure battery switch is in OFF position and external power is disconnected before fueling or defueling the helicopter.

(b) Ground the helicopter at the receptacle located adjacent to the filler cap on the helicopter to the filler-nozzle before removing filler cap.

(c) Servicing unit shall be grounded (servicing unit to ground and servicing unit to helicopter). The helicopter should be grounded to the same ground point as is the servicing unit.

(d) After completion of servicing, remove nozzle, reinstall cap and disconnect all grounds from helicopter.

(2) Closed Circuit Refueling.

CAUTION

The closed circuit refueling receptacle is subject to damage at the gravity refueling port. Refer to figure 1-2.1. This damage can cause external fuel leakage during subsequent closed circuit refueling operations. To preclude damage to the receptacle, the closed circuit nozzle will be used if possible when refueling. If, however, the receptacle has been previously damaged and leakage occurs, the following must be observed:

Closed circuit refueling operations with a leaking receptacle shall be discontinued. Gravity refueling method shall be used until the receptacle can be replaced or repaired.

(a) Ground the helicopter at the receptacle located adjacent to the filler cap on the helicopter to the filler-nozzle and remove filler cap.

(b) Insure that gravity refueling port is closed. If not, rotate inner sleeve counterclockwise until gravity refueling port is closed and flange of sleeve is in contact with rivet at base of receiver cylinder. Refer to figure 1-2.1.

CAUTION

Insure that servicing unit pressure is not above 125 PSI while refueling.

(c) Insert fueling nozzle into receiver and actuate automatic nozzle lever to ON or FLOW position. Pin at base of nozzle will momentarily indicate when fuel flow stops.

(d) Fuel flow will automatically shut off when normal fuel level is reached. Just prior to normal shut off, fuel flow may cycle several times as fuel level is reached. Gage on servicing unit will indicate when flow is stopped.

(e) When fuel flow has stopped, actuate lever on nozzle to OFF, disconnect nozzle from receiver and replace filler cap.

(f) Disconnect fuel nozzle ground and rewind hose assembly.

(g) Disconnect servicing unit ground at helicopter.

(h) Disconnect servicing unit ground at grounding stake.

CAUTION

If helicopter is equipped with closed circuit refueling system and fuel servicing unit is not equipped with related nozzle for closed circuit refueling, a gravity system may be used providing the servicing nozzle does not exceed 1.75 inches outside diameter. To refuel utilizing the gravity nozzle, it is necessary to position the inner sleeve of receiver until slot is lined up with fuel port in bottom of receiver. Position nozzle into port in order to bypass closed circuit valve. Damage could result to the closed circuit refueling system if caution is not used to prevent damage to inner sleeve of receiver at fuel port through improper use of nozzle.

(3) Gravity Refueling.

(a) Ground the helicopter at the receptacle located adjacent to the filler cap on the helicopter to the filler nozzle and remove filler cap.

(b) Rotate inner sleeve clockwise until sleeve clears port in bottom of fuel receiver. Refer to figures 1-2.1 and 1-2.2.

(c) Position nozzle into port of fuel receiver.

(d) Fill to specified level.

(e) Remove nozzle and rotate inner sleeve counterclockwise until gravity refueling port is closed and flange of inner sleeve is in contact with rivet at base of receiver cylinder.

(f) Reinstall filler cap.

(g) Disconnect fuel nozzle ground and rewind hose.

(h) Disconnect servicing unit ground at helicopter.

(i) Disconnect servicing unit ground at grounding stake.

e. Fuel System Servicing (Rapid (Hot) Refueling).

WARNING

When it is determined that rapid (hot) refueling is required (prescribed in FM 10-68), proper grounding of aircraft must be accomplished. In addition, it is recommended that the aircraft be in a revetment type shelter or separated from fuel storage by a firewall.

(1) Precautions.

NOTE

Servicing personnel shall comply with all safety precautions and procedures in FM 10-68.

(a) Ground the helicopter at the receptacle located adjacent to the filler cap on the helicopter to the filler nozzle before removing filler cap.

(b) Servicing unit shall be grounded (servicing unit to ground and servicing unit to helicopter). The helicopter should be grounded to the same ground point as is the servicing unit.

(c) After completion of servicing, remove nozzle, reinstall cap and disconnect all grounds from helicopter.

(2) Before rapid (hot) refueling:

WARNING

Only emergency radio transmission should be made during rapid refueling.

In case of aircraft fire, observe fire emergency procedures in FM 10-68.

(a) Minimum crew will remain at the controls.

(b) Throttle - Idle.

(c) Force Trim - ON or controls frictioned.

(d) Passengers shall depart the aircraft and go to the terminal or passenger marshalling area.

(e) No smoking allowed during refueling operations.

(f) A crew member, if available, should observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required.

(3) During Rapid (Hot) Refueling.

(a) Closed circuit refueling.

1. Ground helicopter at the receptacle located adjacent to the filler cap on the helicopter to the filler-nozzle and remove filler cap.

2. Insure that gravity refueling port is closed. If not, rotate inner sleeve counterclockwise until gravity refueling port is closed and flange of sleeve is in contact with rivet at base of receiver cylinder. Refer to figure 1-2.2.

CAUTION

Insure that servicing unit pressure is not above 125 PSI while refueling.

3. Insert fueling nozzle into receiver and actuate automatic nozzle lever to ON or FLOW positon. Pin at base of nozzle will momentarily indicate when fuel flow stops.

4. Fuel flow will automatically shut off when normal fuel level is reached. Just prior to normal shut off, fuel flow may cycle several times as fuel level is reached. Gage on servicing unit will indicate when flow is stopped.

5. When fuel flow has stopped, actuate lever on nozzle to OFF, disconnect nozzle from receiver and replace filler cap.

6. Disconnect fuel nozzle ground and rewind hose assembly.

7. Disconnect servicing unit ground at helicopter.

8. Disconnect servicing unit ground at grounding stake.

CAUTION

If helicopter is equipped with closed circuit refueling system and fuel servicing unit is not equipped with related nozzle for closed circuit refueling, a gravity system may be used providing the servicing nozzle does not exceed 1.75 inches outside diameter. To refuel utilizing the gravity nozzle, it is necessary to position the inner sleeve of receiver until slot is lined up with fuel port in bottom of receiver. Position nozzle into port in order to by-pass closed circuit valve. Damage could result to the closed circuit refueling system if caution is not used to prevent damage to inner sleeve of receiver at fuel port through improper use of nozzle.

(b) Gravity Refueling.

1. Ground the helicopter at the receptacle located adjacent to the filler cap on the helicopter to the filler-nozzle and remove filler cap.

2. Rotate inner sleeve clockwise until sleeve clears port in bottom of fuel receiver. Refer to figures 1-2.1 and 1-2-2.

3. Position nozzle into port of fuel receiver.

4. Fill to specified level.

5. Remove nozzle and rotate inner sleeve counterclockwise until gravity refueling port is closed and flange of inner sleeve is in contact with rivet at base of receiver cylinder.

6. Reinstall filler cap.

7. Disconnect fuel nozzle ground and rewind hose.

8. Disconnect servicing unit ground at helicopter.

9. Disconnect servicing unit ground at grounding stake.

(4) After rapid refueling.

(a) The pilot shall be advised by the refueling crew that fuel cap(s) are secure and ground cables have been removed.

(b) Crew membres and passengers can enter aircraft.

1-3.1. DEFUELING.

a. Defuel helicopters, with noncrashworthy fuel system incorporated, at defuel valve (16, figure 1-1).

b. Defuel helicopters, with crashworthy fuel system incorporated, at gravity defuel valves located on sumps adjacent to drain valves (18, figure 1-1). The defuel valve is activated by using a

fitting such as: AN815-12 union, AN832-12 union, AN919-12 reducer, and MS33856E12 end fitting after removing protection cover.

NOTE

When cover is installed after defueling, use only enough torque to slightly compress seal.

c. Drain trapped fuel at drain valves (17 and 18, figure 1-1).

NOTE

Each forward cell has two drain valves, one forward and one aft of internal baffle.

d. Electric boost pump has a drain valve.

e. To drain main fuel filter (13, figure 1-1) use valve in drain line from filter sump. Access is by opening lower left engine cowl. Drain line discharges just forward of aft landing gear cross tube.

1-4. Defueling - Servicing.

a. Defueling - Suction.

(1) Ground the helicopter and defueling unit to a common ground.

(2) Check that all electrical power is OFF.

(3) Ground the defueling hose and nozzle to the "Bayonet" type receptacle located below and aft of the filler cap.

(4) Remove fuel cell filler cap and insert the defueling hose into the fuel cell through the filler opening.

NOTE

On closed circuit systems, rotate inner sleeve of receiver clockwise to open gravity port prior to inserting defueling hose.

(5) Start defueling.

(6) Stop defueling when fuel can no longer be drawn from the cell.

(7) Remove the defueling hose. Install and lock the filler cap.

(8) Drain risidual fuel from each cell. (Refer to following step c.)

(9) Remove grounding cables.

b. Defueling - Gravity.

(1) Ground helicopter and make sure all electrical power is OFF.

(2) Gain access to drain/defuel valve (5, figure 1-1) located on right hand fuel cell sump.

(3) Position a suitable container beneath defuel line and rotate defuel valve lever 90 degrees clockwise.

(4) When fuel flow stops, close drain/defuel valve (5) and close access door.

(5) Remove defueling container.

(6) Drain residual fuel from each fuel cell. (Refer to following step c.)

(7) Remove grounding cables.

c. **Draining Residual Fuel.**

(1) Ground helicopter and make sure all electrical power is OFF.

(2) Open access door for access to left fuel cell sump drains. Position suitable container below valve and push valve faces up. After all fuel is drained, remove defueling container.

(3) Open access door for access to right fuel cell sump drains. Position suitable container below valves and push valve faces up. After all fuel is drained, remove defueling container and grounding cables.

NOTE

When aircraft is serviced with fuel other than the specified, the type of fuel, quantity, and operating time shall be entered in Form 2408-13 (Aircraft Inspection and Maintenance Record).

1-5. Auxiliary Fuel System — Servicing. Various auxiliary fuel systems are available to provide additional fuel for extended distance and ferry missions. A 165-gallon capacity fuel tank, composed of a non-self sealing fuel bladder, enclosed in a metal container, may be installed in the passenger-cargo compartment. A 350-gallon capacity, metal enclosed fuel tank is also available for installation in the passenger-cargo compartment. Internal 50 or 60-gallon capacity, self-sealing, auxiliary fuel tanks may be installed in either the forward or the aft portion of the passenger-cargo compartment. Two 60-gallon capacity, external auxiliary fuel tanks may be installed.

a. **Servicing the Auxiliary Fuel System.** Check to ensure all lines and electrical leads are properly installed before servicing.

WARNING

Ensure battery switch is OFF, external power disconnected, and aircraft grounded before fueling or defueling.

NOTE

Refer to paragraph 10-77 for description and location of auxiliary fuel tanks and their components.

b. Service with fuel in accordance with precautions and limitations stated for main fuel system servicing (paragraph 1-3).

NOTE

When filling the 165 and 350-gallon auxiliary fuel tanks, depress the poppet type valves (1, figure 10-12 and 1, figure 10-4) in the top of each end bulkhead to release any air trapped between the cell and the fuel tank cover.

1-6. Miscellaneous Fuel Data. General information regarding fuel is as follows:

a. **Turbine Engine Fuel Limitations.** Turbine engine fuel (C103) Grade JP-4, is intended for use in turbine engine helicopters under all operating conditions. Experience to date indicates no undue difficulties shall be encountered in starting and operating the helicopter turbine engine at low temperatures on Grade JP-4 fuel. Grade JP-5 fuel shall be used as an alternate in the T53-L-11/13 series engines. In event low temperature starting difficulties are encountered using JP-5 fuel, refer to cold weather operation procedures in TM 55-1520-220-10. For details regarding alternate and emergency fuels, refer to TB 55-9150-200-24.

b. **Combustion Heater.** Fuel filter and drain lines shall be checked daily for accumulations of ice or water. During low temperature operation, below 32

degrees F (0 degrees C), water vapor in the combustion gases flowing through the drain line may condense and form ice. Water produced during combustion may collect on the fuel nozzles and ignitor plug and form ice after the heater has been turned off. This ice may prevent the heater from starting without preheating.

1-7. Engine Oil System — Servicing. The supply tank (8, figure 1-1) for the engine oil system is on the right side of the forward engine firewall. A radiator type cooler is mounted in an opening through the bulkhead between the main fuselage compartment and the cargo sling compartment. Access to the engine oil tank is gained by opening the right transmission cowling. The tank may be drained by opening the drain valve in the line outboard of the tank. The oil cooler drain valve is in the drain line route from the lower part of the oil cooler to the aft bottom side of the cabin section. Oil level may be checked on the oil level sight gage (figure 1-2). More frequent oil changes are recommended for helicopters operating under unusually dusty conditions. Failure to change oil more frequently in high dust areas can result in accelerated engine wear. The frequency of oil changes shall depend upon the severity of the dust condition.

WARNING

Prolonged skin contact with synthetic oil MIL-L-7808 (C135) or MIL-L-23699 (C134) may cause a skin rash. Skin should be thoroughly washed after contact and saturated clothing should be removed immediately. Areas where synthetic oils are used should have adequate ventilation to keep mist and fumes to a minimum.

CAUTION

If synthetic oil MIL-L-7808 (C135) or MIL-L-23699 (C134) is spilled on painted surfaces, the surface should be wiped clean to avoid possible softening, blistering, or peeling of paint.

DO NOT mix MIL-L-7808 (C135) and MIL-L-23699 (C134) oils except in cases of emergency. If this becomes necessary, it is required that the system be drained within 6 hours of operation according to TM 55-2840-229-23.

Before servicing oil, determine whether system contains MIL-L-7808 lubricating oil (C135) or MIL-L-23699 lubricating oil (C134).

Engine Oil Capacity	U.S. Gallons
System	4.05
Useful (Normal)	3.25

NOTE

Maximum engine oil consumption is 0.3 gallons per hour (2.4 U.S. pints)

a. Usage and Changing.

(1) Usage of oils:

NOTE

To identify type of oil in system, refer to TB55-9150-200-24.

(a) MIL-L-23699 oil (C134) used in the engine oil system is authorized for ambient temperatures above minus **25** degrees F (minus **31.7** degrees C).

(b) MIL-L-7808 (C135) oil used in the engine oil system is specified for operation in ambient temperatures below minus **25** degrees F (minus **31.7** degrees C). This oil may also be used when MIL-L-23699 (C134) is not available; however, change from MIL-L-7808 to MIL-L-23699 at next scheduled oil change.

(2) Changing engine oil. When changing from MIL-L-7808 oil (C135) to MIL-L-23699 (C134) or from MIL-L-23699 oil (C134) to MIL-L-7808 oil (C135) in engine oil system, refer to TM 55-2840-229-23 and proceed as follows:

WARNING

Prolonged skin contact with synthetic oil MIL-L-7808 (C135) or MIL-L-23699 (C134) may cause a skin rash. Skin should be thoroughly washed after contact and saturated clothing should be removed immediately. Areas where synthetic oils are used should have adequate ventilation to keep mist and fumes to a minimum.

(a) Place a container under the accessory drive gearbox.

(b) Remove magnetic chip detector drain plug from accessory drive gearbox.

(c) Disconnect scavenge oil hose from the accessory drive gearbox.

(d) Drain lubricating system.

(e) After draining is complete, replace and reconnect items removed or disconnected.

(f) Fill engine oil system with appropriate oil, refer to above step a. Usage and Changing.

(g) After 5-hours operation, inspect and clean all engine oil filters and strainers. Refer to TM 55-2840-229-24.

(h) After **15** hours since oil change, inspect and clean all engine oil filters and strainers. Refer to TM 55-2840-229-23.

(i) Revert to normal schedule of inspections of engine oil filters and strainers.

b. Draining engine oil system.

(1) Drain engine oil tank by opening valve in drain line below tank which discharges overboard at lower left side of fuselage.

(2) Drain engine oil cooler by opening valves (4 and 5, figure 1-2) at fitting on front of cooler. Gain access through right transmission cowling.

(3) Inspect, clean, and reinstall all engine oil filters and strainers.

(4) Fill engine oil tank with appropriate oil (paragraph 1-7a.). Motor engine to pump oil into cooler and lines. Check tank level and refill. Repeat until tank level does not change, indicating that cooler and lines are refilled.

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

(6) Inspect, clean, and reinstall all engine oil filters and strainers.

(7) For further details of engine oil system, refer to paragraph 4-50.

1-8. Transmission Oil System — Servicing. The transmission has a self-contained oil supply which is carried in the sump at the bottom of the transmission assembly (figure 1-1). The oil level may be checked through a sight glass in the lower right side of the transmission. A light is provided to make the sight glass visible and can be turned on by pressing a button on the right side of the helicopter aft of the heater access door. Access to the filter cap may be gained by opening cowling on the right side of the transmission. Access to the transmission drain plug on the bottom of the sump is through an access door on the bottom of the fuselage. Capacity of transmission oil system is 2.25 U.S. gallons.

CAUTION

Sight glass is stained, when different type oils are used without cleaning the glass. Make sure oil level is read properly, if sight glass is stained.

Do not overfill transmission.

NOTE

Do not mix oil (C135) with oil (C134) except in cases of emergency. If this becomes necessary, it is required that the system be drained within 6 hours of operation.

a. Draining transmission oil system.

(1) Drain transmission through valve (3, figure 1-2) located under sump, accessible through cargo-sling compartment.

(2) Drain transmission oil cooler through valves (4 and 5, figure 1-2) located aft of oil cooler blower (Sta. 173.00, B.L. 9.00), through right access door (17, figure 2-19).

(3) Change external transmission oil filter (paragraph 6-253).

(4) Fill transmission with appropriate oil.

1-9. Stabilizer Bar Dampers — Servicing. Visually check both stabilizer bar dampers (11, figure 1-1) to be full of hydraulic fluid (C112) to top of window as follows:

a. Remove lockwire from plug.

b. Remove plug.

c. Fill damper to top of window.

d. Install plug and secure plug with lockwire (C127).

e. Check for signs of leakage and record condtions on DA Form 2048-13 since further checks may be necessary.

1-10. Intermediate (42 Degree) Gearbox.

CAUTION

Sight glass is stained when different type oils are used without cleaning the glass. Make sure oil level is read properly, if sight glass is stained.

WARNING

Do not interchange filler caps between the intermediate (42 degree) and tail rotor (90 degree) gearboxes. If filler caps are interchanged, the intermediate (42 degree) will be pumped dry.
The intermediate (42 degree) gearboxes are marked with a black dot on the case and a corresponding black dot on the filler cap. The tail rotor (90 degree) gearboxes and filler caps have white dot markings.

CAUTION

Do not mix (C134) with oil (C135) except in cases of emergency. If this becomes necessary, the gearbox must be drained and flushed within six (6) hours of operation.

1-10.1. Intermediate (42 degree) Gearbox - Servicing. The intermediate (42 degree) gearbox (2, figure 1-1) is serviced through a filler cap on top. A sight glass is on the right side for checking the oil level. Draining the gearbox is accomplished by removing the complete drain plug on the lower side of the gearbox. On helicopters 64-14101 through 64-14191, the inner portion of the drain plug incorporates a magnetic plug. The outer portion of the plug contains a spring-loaded valve which prevents loss of oil when pulling the magnetic plug for inspection purposes. Helicopters 65-9416 and subsequent are equipped with a chip detector warning system which activates a warning light on the pedestal caution panel when excessive contamination occurs. Capacity of the intermediate (42 degree) gearbox is 0.375 U.S. pints.

NOTE

The magnetic plug can be replaced with a chip detector. When such replacement is made, the chip detector will not be connected to the pedestal caution panel.

1-11. Tail Rotor (90 Degree) Gear box.

CAUTION

Sight glass is stained when different type oils are used without cleaning the glass. Ensure oil level is read properly, if glass is stained.

WARNING

Do not interchange filler caps between the tail rotor (90 degree) and intermediate (42 degree) gearboxes. If filler caps are interchanged, the intermediate gearbox will be pumped dry. The rail rotor (90 degree) gearboxes are marked with a white dot on the case and a corresponding white dot on the filler cap. The intermediate (42 degree) gearboxes and filler caps have black dot markings.

CAUTION

Do not mix oil (C134) and oil (C135) except in cases of emergency. If this becomes necessary, the gearbox must be drained and flushed within six (6) hours of operation.

1-11.1. Tail Rotor (90 Degree) Gearbox — Servicing. The tail rotor (90 degree) gearbox (1, figure 1-1) is serviced through a filler cap on top of the gear case. A sight glass is located on the right side for checking the oil level. Draining the gearbox is accomplished by removing the complete drain plug located on the lower side of the gearbox. On helicopters 64-14101 through 64-14191, the inner portion of the drain plug incorporates a magnetic plug. The outer portion of the plug contains a springloaded valve which prevents loss of oil when pulling the magnetic plug for inspection purposes. Helicopters 65-9416 and subsequent, are equipped with a chip detector warning system which activates a warning light on the pedestal caution panel when excessive contamination occurs. Capacity of the tail rotor (90 degree) gearbox is 0.50 U.S. pints.

NOTE

The magnetic plug on earlier helicopters can be replaced with a chip detector. When such replacement is made, the chip detector will not be connected to the pedestal caution panel.

NOTE

Before servicing gearbox oil, determine whether gearbox contains lubricating oil (C135) for ambient temperatures below minus 25 degrees F (minus 31.7 degrees C) or lubricating oil (C134) for ambient temperatures above minus 25 degrees F (minus 31.7 degrees C).

1-12. Hydraulic Reservoir — Servicing. Two hydraulic reservoirs (7, figure 1-1) are mounted on the right side of the cabin aft bulkhead. Access to this reservoir is gained by opening right transmission cowling. Outboard reservoir supplies hydraulic system No. 2 and inboard reservoir supplies hydraulic system No. 1. Fluid level in each reservoir can be checked by means of sight glasses which are visible when right transmission cowling is opened. A reservoir drain plug is located at the bottom of each reservoir. Remove filler cap and fill to overflow with clean hydraulic fluid (C112) or (C112.1). Reinstall filler cap. Close right transmission cowling.

CAUTION

To avoid contamination, do not use previously opened cans of hydraulic fluid. A new, sealed can of fluid shall be opened and used. Do not service system No. 1 reservoir until the emergency accumulator has been drained. Drain accumulator in accordance with paragraph 7-99. After draining, nitrogen pressure in accumulator shall be checked in accordance with paragraph 7-107.

NOTE

Refer to TB 55-1500-334-25 for instructions on usage of fire resistant hydraulic fluid (C112.1).

a. Capacity of Hydraulic System.

Hydraulic Capacities

Total System No. 1 Reservoir System	3.25 U.S. Pints
Total System No. 2 Reservoir Capacity	3.25 U.S. Pints
Reservoir Refill Level	2.60 U.S. Pints
Total System No. 1 Capacity	6.60 U.S. Pints
Total System No. 2 Capacity	6.05 U.S. Pints

b. Draining Hydraulic Reservoir.

(1) Remove drain plug from bottom of reservoir and drain fluid in a container.

(2) Install drain plug to bottom of reservoir.

(3) Remove filler cap from reservoir and fill reservoir to overflow with clean hydraulic fluid (C112) or (C112.1). Install and secure filler cap to reservoir.

1-13. Ground Handling Gear Pump — Servicing. Service ground handling gear pump (detail A, figure 1-1) as follows:

a. Position ground handling gear so that hydraulic pump (10) is in the horizontal position with filler hole at top.

b. Remove filler screw and fill pump tank with clean hydraulic fluid (C112) until fluid comes out the filler hole.

c. Reinstall filler screw and tighten securely. Wipe excess fluid from pump.

1-14. Ground Handling Gear Tires — Servicing. Tires and tubes shall be stored under normal temperature conditions if at all possible. If it becomes necessary to store tubes at subnormal temperatures, partially inflate them in order to remove creases and folds. Tires and tubes shall be warmed before mounting so normal handling will not flex them to the point of cracking. When not actually in use, ground-handling wheels shall be removed from the helicopter and placed in warm storage. If tires become frozen to the ground, they can be released by heat application or by overinflation. Under no circumstances shall the applied heat exceed 160 degrees F (71 degrees C). The proper procedure shall be determined by considering the individual problem. If the tires are to be released by overinflation, the tires may be inflated to **one and one-half** times normal pressure.

Normal Tire Pressure

Single Wheel Ground Handling Gear	50 psig

WARNING

Before overinflating tires, the following precautions shall be observed.

a. Careful inspection shall be made before inflation for evidence of wheel cracks or breaks in the tires.

b. To prevent injury to personnel in case of wheel rim failure, all persons shall stand in line with the tire, rather than broadside of the wheel, during inflation.

c. Heat shall not be applied to over-inflated tires because it will further increase tire pressure.

d. Tire pressure shall be reduced to normal pressure immediately after tires are freed.

NOTE

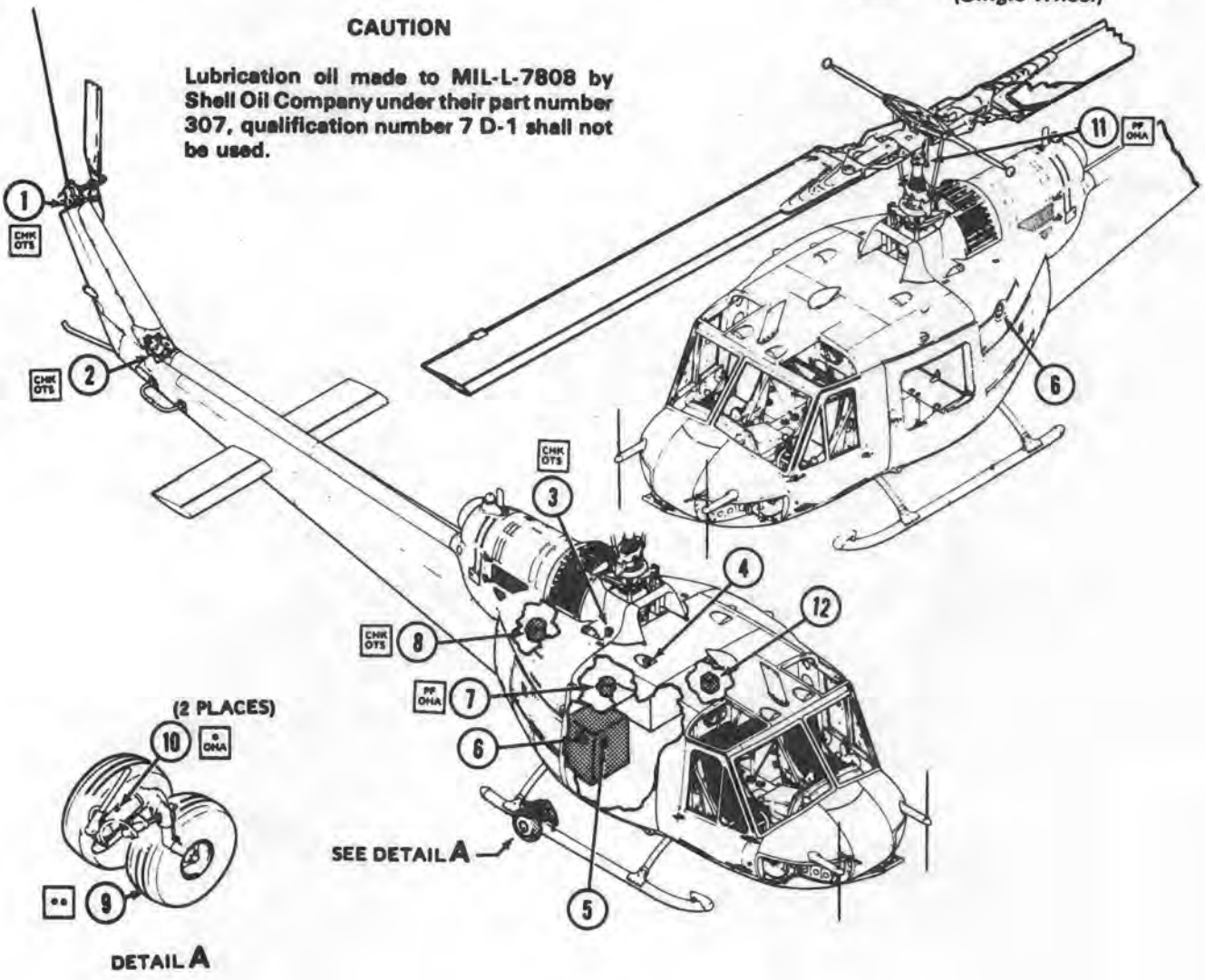
When tires are over-inflated, as described above, immediate action cannot be expected. One-half to one hour may be required before tires are free because of the slow action of the frozen casings in responding to the increased tire pressure.

SYMBOL	SPECIFICATION
OTS	MIL-L-7808 or MIL-L-23699 Use MIL-L-23699 when lowest operating temperature is warmer than minus 25 degrees F. Use MIL-L-7808 when lowest operating temperature will be colder than minus 25 degrees F. (minus 31.7 degreesC)
OHA	MIL-H-5606 or MIL-H-83282 (Fire Resistant)

FREQUENCY SYMBOL	
CHK	Daily Check
PF	Preflight Check
*	As Required
**	50 Psig Air Pressure (Single Wheel)

CAUTION

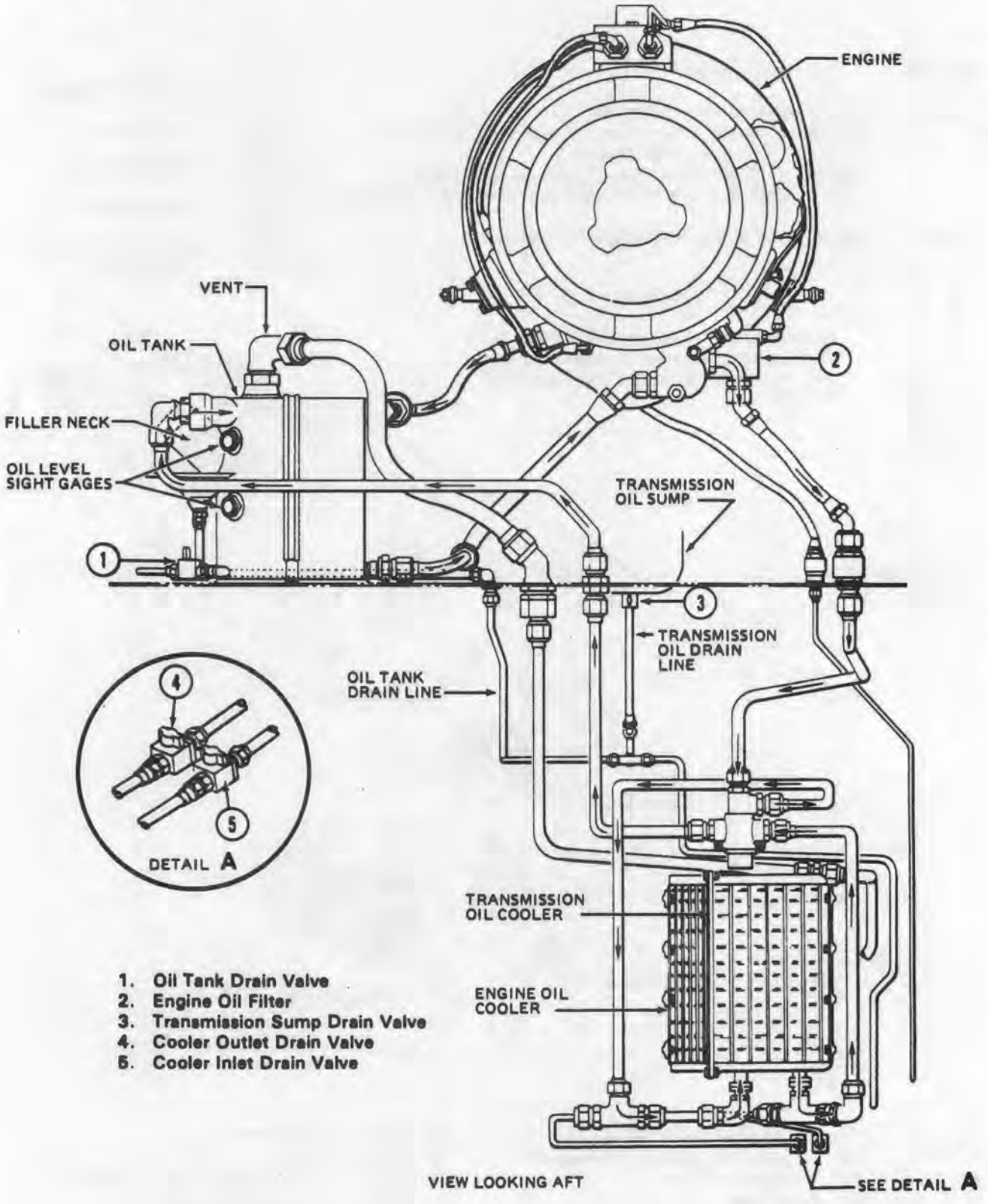
Lubrication oil made to MIL-L-7808 by Shell Oil Company under their part number 307, qualification number 7 D-1 shall not be used.



1. Tail rotor gearbox (90 Degree)
2. Intermediate gearbox (42 Degree)
3. Transmission filler
4. Fuel filter
5. Valve — fuel sump drain/defuel
6. Fuel tank filler
7. Hydraulic reservoirs (2)
8. Engine oil tank
9. Tires — ground handling gear — typical
10. Pump — ground handling gear
11. Stabilizer bar dampers
12. Battery

204900-1046A

Figure 1-1. Servicing points diagram



1. Oil Tank Drain Valve
2. Engine Oil Filter
3. Transmission Sump Drain Valve
4. Cooler Outlet Drain Valve
5. Cooler Inlet Drain Valve

Figure 1-2. Drain valves — engine and transmission oil system

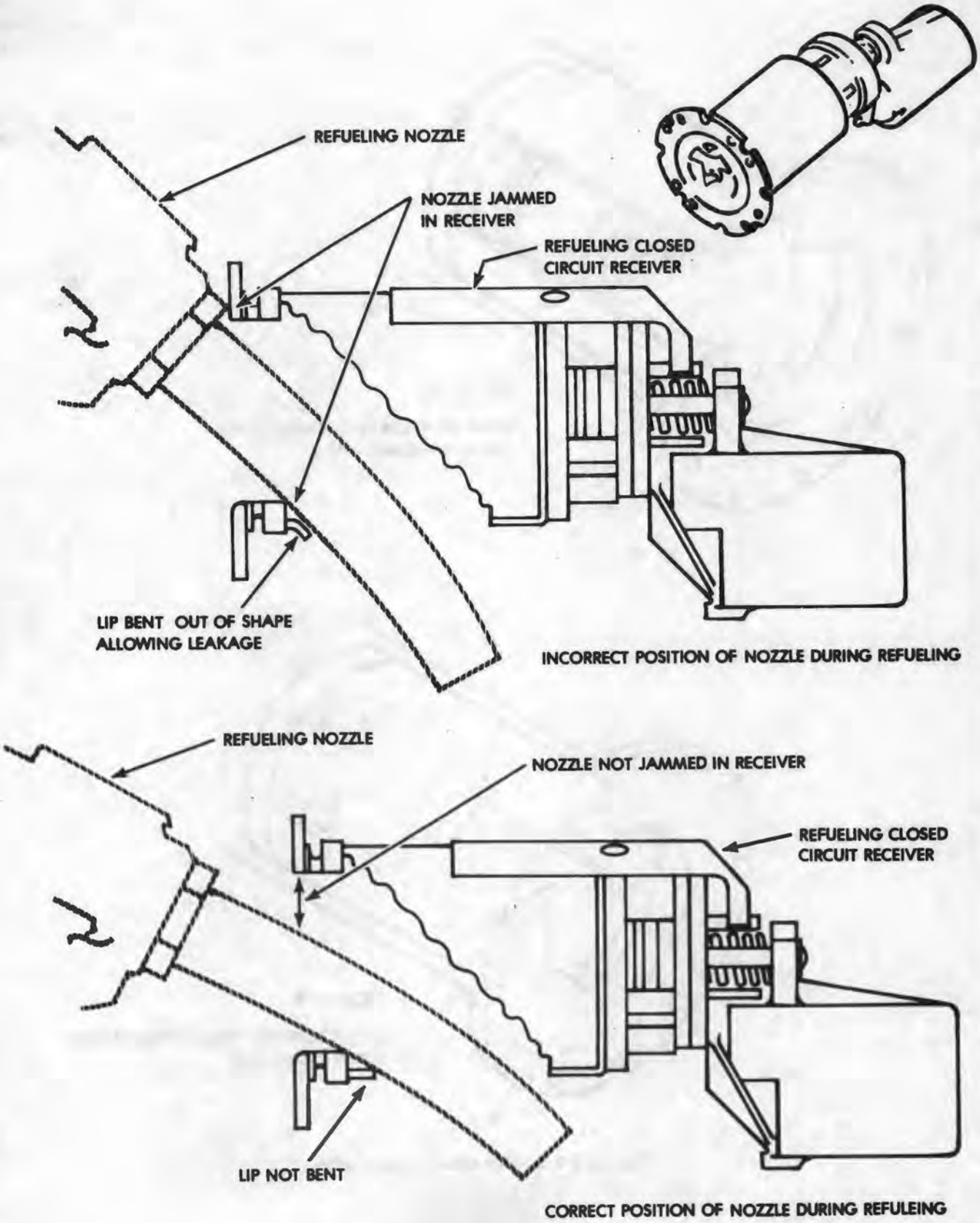
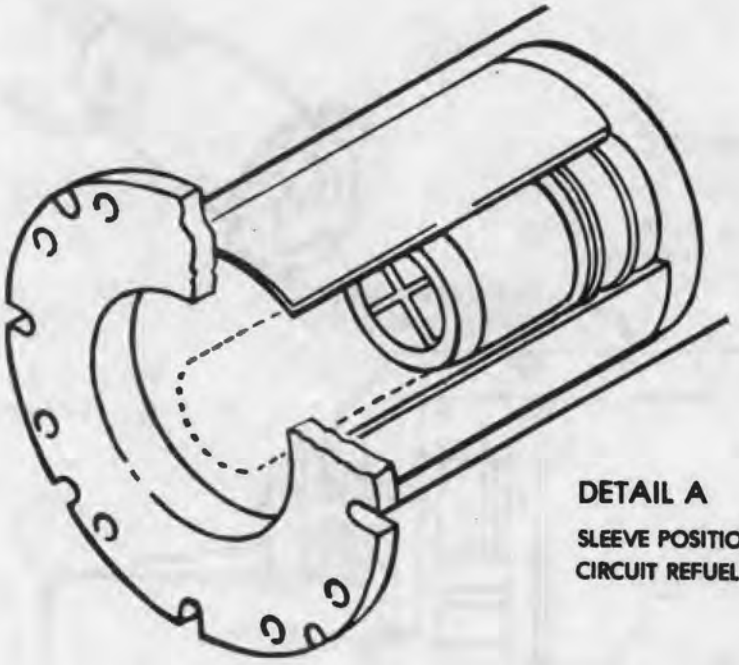
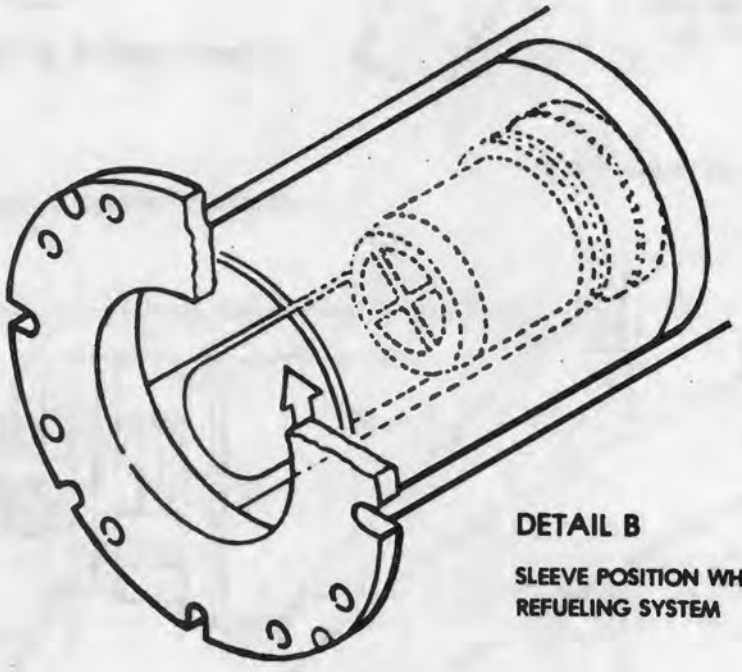


Figure 1-2.1. Gravity Refueling with Closed Circuit Receiver.



DETAIL A

SLEEVE POSITION WHEN USING CLOSED CIRCUIT REFUELING SYSTEM



DETAIL B

SLEEVE POSITION WHEN USING GRAVITY REFUELING SYSTEM

Figure 1-2.2. Refueling Receptacle.

1-15. Battery - Servicing. (Refer to TM 11-6140-203-14-2 for servicing instructions).

1-16. CLEANING.

1-17. Description — Cleaning. Cleaning the helicopter before preparing it for storage is important. Residues from exhaust gases, dirt, and contamination of any kind will accelerate corrosion, whether coated with preservative compound or not. Helicopter must be grounded prior to any cleaning, maintenance, disassembly, or preservation.

WARNING

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

NOTE

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

1-18. Interior — Cleaning. Clean the interior of the helicopter to prevent debris from falling into the operating mechanism. Clean upholstery and seats as outlined in TM 55-1500-204-25/1. To remove grease or oil spots use solvent (C58). Wipe dry with a clean cloth. Clean helicopter with a vacuum cleaner.

Premaintenance requirements for cleaning of helicopter

Condition	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C5), (C43), (C47), (C54), (C58), (C140), (C143), (C166), (C198), (C205),
Special Environmental Conditions	Well ventilated area

WARNING

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

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 or rinsing. Steam cleaning is not to be utilized.

1-19. Exterior - Cleaning. Refer to TM 55-1500-333-24. Clean the exterior structure by applying a mixture of one part cleaning compound (C47) and three to seven parts water. Use stronger mixtures for exhaust outlet areas and other very dirty surfaces. Wash a small area at a time, ensuring area is rinsed thoroughly with warm water under pressure. If allowed to dry or if not completely rinsed off, the compound could harm painted finishes.

CAUTION

Cleaning solution inadvertently splashed on plexiglass shall be rinsed off with clear water before it dries.

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

1-20. Transparent Plastic (Acrylic) — Cleaning. Clean all transparent plastic (acrylic) surfaces as follows:

CAUTION

Do not use compounds containing any abrasive material or solutions containing chlorinated carbons. Avoid excessive scrubbing of plastic (acrylic) panels during washing operation. Do not use aliphatic naptha (C143).

a. Clean all transparent plastics (acrylic) with large quantities of mild soap (C54) Type 1 and water.

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

WARNING

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

c. Remove grease or oil with aliphatic naphtha (C143).

d. Allow surfaces to drip dry.

e. Minor scratches may be reduced or removed with polysand kit (refer to TM 55-1560-276-24/1).

f. A light coat of polish (C166) may be applied to reduce scratching. (Refer to TM 55-1500-204-25/1.)

1-20.1. Windshield (Interior and Exterior) Cleaning. The windshield is a high quality optical part. Proper care and maintenance is most important. Clean and protect windshield surfaces as follows:

CAUTION

Do not use any type thinners on windshield. Thinner will cause windshield to become hazy.

a. If windshield is extremely dirty, carefully wash it with a mixture of nonabrasive mild detergent (C79) and water. Use the bare hand to feel and dislodge insect spots, caked dirt, and mud. Rinse windshield thoroughly with clean water. Allow to dry.

b. Raise windshield wiper blade. Wipe rubber surface to remove dirt. Use a damp cloth.

CAUTION

Do not use aliphatic naphtha, type I.

c. If grease, oil, or paint is present, remove it. Use aliphatic naphtha, type II (C143).

d. On glass windshields, apply glass cleaner (C45.1) to the windshield. Use a piece of clean, soft cotton flannel (C48.1). Use another clean piece to polish entire area until it is clean and dry.

NOTE

Soft double-fleeced cotton flannel, refolded frequently, is recommended. When all flannel surfaces have been used, the piece should be discarded. Frequent repeated thin applications of cleaning and polishing compound provides better protection than infrequent thick applications.

e. Apply rain repellent (C176.2) in accordance with TM 55-1500-204-25/1, Chapter 3.

NOTE

The use of rain repellent on glass surfaces other than exterior of windshields is not required.

1-21. Rotor Blades - Cleaning. a. Rotor blades of helicopter operating in high humidity or salt-laden atmosphere will require the following minimum daily blade cleaning:

(1) Wash blades thoroughly with cleaning compound (C47).

(2) Rinse with clear water and dry.

b. Rotor blades of helicopter operating in any environment will require cleaning in accordance with Section IV.

(1) Wash with cleaning compound (C47). Rinse thoroughly with water. Dry with clean cloth.

1-22. Deleted.

1-23. Treatment of Aluminum and Magnesium Alloy Corrosion. Aluminum and magnesium corrosion shall 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.

1-24. Snow and Ice Removal. Refer to TM 55-1500-333-24 for procedures to remove snow and ice. De- icing fluid MIL-A-8243 may be used to prevent icing or remove ice accumulations from the aircraft (including rotor blades).

1-25. CONSUMABLE MAINTENANCE SUPPLIES AND MATERIALS.

1-26. Description — Consumable Maintenance Supplies and Materials. Consumable maintenance supplies and materials are listed in table 1-1 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 designation and item number. C designators are used only with consumable maintenance supplies and materials. Consumable maintenance supplies and materials are listed in table 1-1 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 designation and item number. C designators are used only with consumable maintenance supplies and materials. Consumable maintenance supplies and materials tables are found only in this chapter; therefore, the table numbers will not be referenced in the text.

1-26.1. The supplies and materials listed in this table are required for maintenance support of this equipment and are authorized to be requisitioned by CTA 50-970 (Common Table of Allowances).

Table 1-1. Consumable Maintenance Supplies and Materials

Item No.	Description	Ref No. and FSCM	NSN
C 1	Abrasive Cloth, Silicon Carbide 400 Grit	P-C-451 (81348)	5350-00-174-0995
C 1.2	180 Grit		5350-00-174-1001
C 1.3	600 Grit		5350-00-174-0985
C 1.4	120 Grit		5350-00-559-7780
C 1.5	250 Grit		5350-00-297-6670
C 1.6	Abrasive Cloth, Aluminum Oxide 400 Grit	P-C-451 (81348)	5350-00-865-5700
C 1.7	180 Grit		5350-00-192-5051
C 1.8	120 Grit		5350-00-638-2693
C 1.9	250 Grit		5350-00-161-9715
C 1.10	320 Grit		
C 2	Abrasive, Grain Soft for Carbon Removal	MIL-G-5634 Type III (81349)	5350-00-050-1094
C 3	Abrasive Pads, Nylon Web, Scotch-Brite, Type A, Very Fine	L-P-50, Type I, Class 1, Size 1 (81348)	7920-00-659-9175

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

Item No.	Description	Ref No. and FSCM	NSN
C 4	Acetone, Technical	O-A-51D	6810-00-184-4796
C 5	Acid, Boric, Technical Grade	O-C-265 (81348)	6810-00-264-6535
C 6	Acrylic Lacquer, P-95, Gloss, Colorless	MIL-L-81352 (81349)	8010-00-490-7651
C 6.1	Aluminized #17178	T-T-L-32 (81348)	8010-00-241-8406
C 6.2	Lusterless Black #37038	MIL-L-19538 (81349)	8010-00-527-2884
C 6.3	Gloss Black #17038	MIL-L-81352 (81349)	8010-00-935-7077
C 6.4	Gull Grey #36440	MIL-L-81352 (81349)	8010-00-935-7060
C 6.5	Insignia Red #11136	MIL-L-19537 (81349)	8010-00-551-7932
C 6.6	Lusterless Olive Drab #34087	MIL-L-81352 (81349)	8010-00-144-9998
C 6.7	Lusterless Orange-Yellow #33538	MIL-L-19538 (81349)	8010-00-530-6387
C 7	Adhesive	BHT Spec 299-947-152	8040-00-833-9565
C 7.1	Type I, RTV 108	(01139)	8040-00-843-0802
C 7.2	Type I, RTV 732	(71984)	8040-00-833-9563
C 7.3	Type II, RTV 106	MIL-A-46146TY1 (80244)	8040-00-118-2695
C 7.4	Type II, RTV 92-024 or RTV 156	(71984)	8040-00-057-4108
C 7.5	Type I, RTV 102	MIL-A-46106 (01139)	8040-00-877-9872
C 7.6	Adhesive, sealant, silicone, noncorrosive	MIL-A-46146	8040-00-224-4655
C 8	Same as C15		
C 9	Adhesive, Airframe Structure, Heat Resistant, Metal to Metal	MMM-A-132, Type I, Class III (81348)	8040-00-152-0017

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

Item No.	Description	Ref No. and FSCM	NSN
C 10	Adhesive A-6 With Activator A	(98911)	8040-00-691-1322
C 10.1	Adhesive, EA 9309	BHT Spec. 299-947-125 Type I (33564)	8040-01-012-8749
C 11	Adhesive, EC22168A Scotchweld	MMM-A-132 (04963)	8040-00-145-0019
C 12	Adhesive, Epoxy	EA934 Type I, Class 3 (33564) 1 QT	8040-00-016-8662
C 12.1	EA9340	(33564)	8040-00-944-7292
C 12.2	Episeal 10-10	(19012)	8040-00-944-7292
C 12.3	Metalset A-4	(90414)	8040-00-944-7292
C 12.4	RP1258	(12684)	8040-00-944-7292
C 13	Adhesive, Epoxy EC 2216	MMM-A-1617 (81348)	8040-00-262-9011
C 13.1	Adhesive, EC 2216	MIL-C-6003	8040-00-152-0019
C 14	Deleted (Same as C12)		
C 14.1	Adhesive, Epoxy Epon 934	Type II Class 2 (04347)	
C 15	Adhesive, General Purpose EC 1300L	BHT Spec. 299-947-107, Type I, Class I (04633)	8040-00-514-1880
C 16	Adhesive, Liquid Form EC678	MIL-A-9117 (81349)	8040-00-262-9060
C 17	Deleted (Same as C 10)		
C 18	Adhesive, Paste, No. 19	(80703)	8040-00-105-0254
C 19	Adhesive, RP1257-3A	(02684)	8030-00-891-3113
C 20	Deleted (Same as C 13)		

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

Item No.	Description	Ref No. and FSCM	NSN
C 21	Deleted (Same as C 7)		
C 22	Deleted		
C 23	Adhesive, Synthetic Rubber EC776	BHT Spec. 299-947-107 Type II, Class 5 (76381)	8040-00-664-0439
C 23.1	Adhesive, Bondmaster M24	BHT Spec. 299-947-107 Type III, Class 6 (01666)	8040-00-181-7784
C 24	Alcohol, Isopropyl, Technical	TT-I-735 (81348)	6810-00-855-6160
C 25	Alcohol, Methyl	O-M-232 (81348)	6810-00-275-6010
C 25.1	Alcoholic Phosphoric Solution Type 4	(61102)	
C 26	Alkaline Aluminum Cleaner	MIL-C-5410 (81349)	6850-00-628-7249
C 26.1	Alodine	1202	8030-01-069-3030
C 27	Aluminum, Oxide Ignited Power, Reagent	MIL-A-10825 (81349)	6810-00-267-8598
C 27.1	Ammonium Nitrate Solution	Commercial	
C 28	Anti-Seize Compound, High Temperature	MIL-A-907D (81349)	8030-00-597-5367
C 29	Bag, Transparent	MIL-B-22020 (81349)	8105-00-027-8485
C 29.1	Barrier material	MIL-B-131	8135-01-019-4165
C 30	Blueing, Gun or Equivalent	Dykemsteel Blue (98148)	6850-00-664-9067
C 31	Brazing, Alloy Nickel Base	AMS-4776	
C 32	Brush, Bristle	HB643 Type 2, Class 1 (81348)	7920-00-514-2417

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

Item No.	Description	Ref No. and FSCM	NSN
C 33	Deleted		
C 34	Calibrating Fluid, Aircraft Fuel System Components	MIL-C-7024B, Type II (81349)	6850-00-264-5771
C 35	Caulking, Lead	QQ-C-40 (81348)	5330-00-171-6545
C 36	Deleted		
C 37	Catalyst, Nuocure 28	Nudex Products Co. Heyden Chemical Corp Elizabeth, N.J.	6810-00-546-4853
C 37.1	Cellophane	PD-608 (82348)	
C 38	Cement	Type 1895-C	
C 39	Cement, EC1357	(76381)	8040-00-165-8614
C 39.1	Cement, Glyptol 1201B	(24446)	8030-00-794-6807
C 40	Cement, Proseal 584	(83527)	8040-00-964-6757
C 41	Cement, Rubber	MIL-C-23092 (02104)	8040-00-051-1318
C 41.1	Cement, Glyptol		
C 41.2	Cheesecloth	(81348)	8305-00-261-8353
C 42	Chemical Film Material (Alodine No. 1200)	MIL-C-81706 Class 1A, Form II	8030-00-057-2354
C 42.1	Chemical Film Solution	Dow Type 1 or 6 Brush On MIL-L-3171	
C 43	Chromic Acid, Technical	O-C-303b, Type II (81348)	6810-00-264-6517
C 44	Deleted — (Refer to C 83)		

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

Item No.	Description	Ref No. and FSCM	NSN
C 45	Cleaner, Engine B and B3100	(21361)	8010-01-016-6584
C 45.1	Cleaner, Glass, Liquid	PG-406 Type I	7930-00-664-6910
C 46	Deleted - (Refer to C 83)		
C 47	Cleaning Compound, Aircraft Surface, Alkaline Waterbase	MIL-C-25769F (81349)	6850-00-935-0996
C 48	Deleted - (Same as C 6)		
C 48.1	Deleted		
C 49	Cloth, Crocus, 600 Grit	P-C-458 (81348)	5350-00-221-0872
C 50	Cloth, Fiberglass 120 or 127 Weave (Volan A finish)	MIL-C-9084 (81349)	8305-00-082-6135
C 51	Cloth, Synthetic and Fiberous, Glass Coated	MIL-C-22787 (81349)	8305-00-514-4263
C 52	Coating, Walkway Color #36211	MIL-W-5044B, Type II (81349)	5610-00-641-0427
C 53	Deleted		
C 54	Compound, Biodegradable Cleaning	MIL-C-18687 Type I (81349)	6850-00-577-4240
C 55	Compound, Carbon Removing	P-C-111 (81348)	6850-00-965-2332
C 56	Compound, Carbon, Removing Agitated Tank	MIL-C-19853 (81349)	6850-00-543-7801
C 56.1	Compound, Cleaning and Polishing	MIL-C-19856	
C 57	Compound, Cleaning, Oil Cooler Solvent	MIL-C-6864 (81349)	6850-00-551-3694
C 58	Compound, Cleaning Solvent	MIL-C-81302 Type II (81349)	6850-00-935-1082

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

Item No.	Description	Ref No. and FSCM	NSN
C 59	Compound, Coating Metal Penetrant	MIL-C-8514 (81349)	8030-00-082-2425
C 60	Compound, Lapping #400	MIL-L-1786C (81349)	5350-00-151-6111
C 61	Compound, Lubricant Dow Corning 325	(71984)	1560-01-027-9231
C 62	Compound, Retaining	Locktite RC-75 (05972)	8030-01-027-2746
C 63	Compound, Sealing, Non-Curing, Polysulfide Base	MIL-S-11030 Type I, Class I (81349)	8030-00-275-8114
C 64	Compound, Shortening and Lard	EE-S-321 (81348)	8945-00-080-9379
C 65	Compound, Turco No. 713	MIL-C-19853 (81349)	6850-00-543-7801
C 66	Compound, Valve Grinding Silicon Carbide Grit No. 400	SS-C-614, Type I (81348)	5350-00-193-1348
C 67	Concentrate, Corrosion Preventive (Brayco 599)	(98308)	6850-00-142-9582
C 67.1	Cord, Nylon	MIL-C-5040	4020-00-248-0688
C 67.2	Deleted		
C68	Deleted		
C 69	Corrosion Preventive, Aircraft Engine	MIL-C-6529C Type II (81349)	6850-00-209-7230
C 70	Deleted - See 70.1		
C 70.1	Corrosion Preventive Compound, Solvent Cutback, Cold Application	MIL-C-16173D Grade 1 (81349)	8030-00-231-2353
C 71	Corrosion Preventive, Fingerprint Remover	MIL-C-15074 (81349)	8030-00-664-4017

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

Item No.	Description	Ref No. and FSCM	NSN
C 72	Corrosion Preventive Oil, Gas Turbine Engine, Aircraft Synthetic Base	MIL-C-8188C (81349)	6850-00-273-2395
C 72.1	Corrosion Preventive	MIL-C-5541	8030-00-811-3723
C 73	Corrosion Preventive Petrolatum, Hot Application	MIL-C-11796B, Class 3 (81349)	8030-00-231-2353
C 73.1	Corrosion Preventive Petrolatum	MIL-C-11796B Class 1	8030-00-231-2354
C 73.2	Corrosion Preventive Petrolatum	Class 1A	8030-00-823-8054 NDT
C 73.3	Cotton Flannel Cloth	CCCC 458	8305-00-653-1259
C 73.4	Cotton Flannel Cloth	CCC-C-0046	7920-00-852-8169
C 74	Cushioning Material, Bound Fiber	MIL-B-121, Type II (81349)	8135-00-753-4661
C 75	Cushioning Material, Cellulosic	PPP-C-843, Type II (81348)	8135-00-183-8814
C 76	Cushioning Material, Uncompressed Bond, Fiber for Packing	PPP-C-1120, Type IV, Class A, (81348)	8135-00-664-0057
C 77	Detergent, General Purpose (Spray On, Wipe Off)	MIL-D-16791 (81349)	7930-00-985-6911
C 77.1	Detergent, General Purpose		7930-00-527-1237
C 78	Detergent, Liquid #285 Type I	P-S-624	8520-00-237-8292
C 79	Detergent, Mild	Joy (74188)	7930-00-764-5066
C 80	Dev. Con F, Holding Compound	MIL-C-24176 (81349)	8030-00-670-8553
C 81	Deleted (See C 83		
C 82	Same as C 86		
C 83	Developer, Kit	MIL-I-25135 (81349)	6850-00-826-0981
C 84	Diethylenetriamine DTA	OD1271 (81348)	6810-00-995-4804
C 85	Desiccants, Activated	MIL-D-3464D (81349)	6850-00-264-6562

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

Item No.	Description	Ref No. and FSCM	NSN
C 86	Dy/Check TURCO	MIL-I-25135C	6850-00-782-2725
C 87	Emulsifier, Liquid ZYGLO ZP-4	MIL-I-25135 (87889)	8030-00-778-4277
C 88	Enamel, Alkyd, Gloss Color No. 13618	TT-E-489 (81348)	8010-00-052-9944
C 89	Epoxy, Anti-Static	XA148A (06613)	8010-00-151-9979
C 90	Epoxy, Catalyst E5621B, E5622B		
C 91	Deleted		
C 92	Epoxy, Engine Gray AD Components A&B E2833A, E2833B	(16193)	8010-00-891-3112
C 93	Deleted (Same as C 93.1)		
C 93.1	Epoxy Primer, Super Koropon	BHT Spec. 299-947-060 MIL-P-23377 (81349)	8010-00-229-4813
C 93.2	Etchant, Tetra-Etch	(17217)	6850-00-431-8662
C 94	Ethylene Glycol Monomethyl, Technical	O-E-780 (81348)	6810-00-264-8997
C 94.1	Everite		
C 95	Felt, Ink, Black	(01195)	7510-00-438-6804
C 96	Felt, Sheet 0.062-Inch Thick, Hard Rabbit Fur	6112 (55899)	8305-01-031-0130
C 97	Filler, RP1220	(02684)	8030-00-878-2063
C 98	Flexible Barrier Material, Water-Proofed, Grease-Proof	MIL-B-121 Type I, Class I Grade A (81349)	8135-00-224-8885
C 99	Fluid, Injection Anti-Detonating	(94647)	
C 99.1	Deleted (Same as C176.2)		
C 100	Flux, Brazing, Silver Alloy, Low Melting Point	O-F-499C	3439-00-943-8889

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

Item No.	Description	Ref No. and FSCM	NSN
C 101	Flux, Solar Type 1 or B		3439-00-996-4995
C 102	Flux, Solar Type (16GH)		3439-00-996-4994
C 103	Fuel, Turbine, Grades JP-4 and JP-5	MIL-T-5624 (81349)	JP-4 9130-00-256-8613 JP-5 9130-00-273-2379
C 104	Gasoline, Aviation	MIL-G-5572 (81349)	9130-00-260-1839
C 105	Grease, Aircraft and Instrument	MIL-G-23827 (81349)	9150-00-985-7246
C 106	GOB Grease		
C 107	Grease, Graphite, Aircraft Lubricating	VV-G-671 (81348)	9150-00-190-0918
C 108	Grease (Lubriplate)	MIL-G-46003	9150-00-057-8976
C 108.1	Grease	MIL-L-3545	9150-00-935-4015
C 109	Grease, Molybdenum, High and Low Temperature	MIL-G-21164B (81349)	9150-00-754-2595
C 109.1	Grease	MIL-G-3278	9150-00-985-7243
C 110	Grease, Pneumatic System	MIL-G-4343 (81349)	9150-00-269-8255
C 111	Grease, Wide Temperature Range, General Purpose	MIL-G-81322 (81349)	9150-00-944-8953
C 111.1	Deleted (Same as C111)		
C 112	Hydraulic Fluid, Petroleum Base, Aircraft, Missile and Ordnance	MIL-H-5606C (81349)	9150-00-180-6181
C 112.1	Hydraulic Fluid, Fire Resistant	MIL-H-83282 (81349)	9150-00-149-7431
C 113	Hydraulic Fluid, Petroleum Base, Preservative	MIL-H-6083D, Type II (81349)	9150-00-935-9807
C 113.1	DexRon, Auto Trans Fluid	(24617)	9150-00-698-2382

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

Item No.	Description	Ref No. and FSCM	NSN
C 114	Hydrochloric Acid, (Muriatic)	O-H-765A (81348)	6810-00-222-9641
C 115	Inhibitor, Corrosion, Rust Lick 606	(14098)	6850-00-066-2333
C 115.1	Inhibitor, Rust and Preservative	LPS-2WD-40	8030-00-838-7788
C 116	Ink, Black, Marco S-1147	(87049)	7510-00-469-7910
C116.1	Ink, White Marking	TT-I-1795 (81348)	7580-00-497-1794

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

Item No.	Description	Ref No. and FSCM	NSN
C 117	Ink, Marking Stencil Color Opaque	TT-I-558 (81348)	7510-00-224-6733
C 117.1	Ink, MKG Parachute	MIL-I-6903 TYPE IV BLUE (81349)	7510-00-286-5362
C 117.2	Insulating Varnish	GLYPTOL1201PT (89954)	5970-00-161-7421
C 118	Insulation Tape, Electrical, Plastic, Pressure-Sensitive, Scotch Brand No. 17	MIL-I-24391 (81349)	5970-00-419-4291
C 119	Kerosene	VV-K-211D (81348)	9140-00-242-6748
C 120	Lacquer	Type 5053-C	
C 120.1	Lacquer	MIL-L-7178	
C 120.2	Lacquer, Acrylic Black	MIL-L-46159 Type 2 (81349) (1 gal.)	8010-01-042-9438
C 120.3	Lacquer, Acrylic Black	MIL-L-46159 Type 2 (81349) (16 oz. Can, Spray)	8010-01-042-4196
C 121	Lacquer, Camouflage, Lusterless Black, #37038	TT-L-20A (81348)	8010-00-166-3147
C 121.1	Lacquer, Dark Gull Grey #36231	TT-L-20A (81348)	8010-00-515-1568
C 122	Lacquer, Cellulose Nitrate, Gloss Grey, Color No. 16081	TT-L-32 (81349)	8010-00-257-5379
C123	Lacquer, Olive Drab Lusterless #34087	MIL-L-19538 (81349)	8010-00-082-2479
C 123.1	Lacquer, Acrylic Olive Drab	MIL-L-46159A (81349)(1 pt. Spray)	8010-01-016-1488

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

Item No.	Description	Ref No. and FSCM	NSN
C 124	Lead, Red, Dry and Paste in Oil	TT-R-191D (81348)	8010-00-243-9265
C 125	Liquid, Fluorescent Penetrant, ZYGLO ZL-22	MIL-I-25135 (81349)	6850-00-782-2740
C 126	Liquid Resin, General Epoxy Purpose Laminating Epon 828	MIL-R-9300 Type I, Grade 0 (86961)	8040-00-822-6430
C 126.1	Lockwire	MS20995C20 (96906)	9505-00-221-2650
C 127	Lockwire	MS20995C32 (96906)	9505-00-293-4208
C 128	Lockwire, MS20995C41 (96906)	QQW423 (81348)	9505-00-804-3814
C 129	Lubricant, Driveshaft Couplings (Tube Pack)	BHT204-040-755-5 (97499)	9150-00-506-8497
C 130	Lubricant, Enclosed Gear, Straight (Mineral)	VV-L-765, Grade 250 (81348)	9150-00-292-0097
C 131	Lubricant, Molybdenum Disulfide	MIL-M-7866 (81349)	6810-00-264-6715
C 132	Lubricant, Plastilube, Moly No. 3	(02307)	9150-00-141-4481
C 133	Lubricant, Solid Film, 500°F Cure, Tio Lube 21	MIL-L-8937A (81349)	9150-00-985-7255
C 133.1	Lubricant, Solid Film	MIL-L-46147	9150-00-168-2000
C 133.2	Lubricant, Graphite	MIL-G-6711	9620-00-233-6712
C 133.3	Corrosion Preventive	MIL-C-23411 Type 2 (81349)	8030-00-838-7789
C 134	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base Aeroshell Turbine Oil 550	MIL-L-23699B (81349) (8 OZ can) (QT)	9150-00-180-6266 9150-00-985-7099
C 134.1	Lubricating Oil, Grade 1010	MIL-L-6081	9150-00-273-1388

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

Item No.	Description	Ref No. and FSCM	NSN
C 135	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base Exxon Turbine Oil 2389	MIL-L-7808G (81349)	9150-00-782-2627
C 136	Lubricating Oil, General Purpose, Low Temperature	MIL-L-7870A (81349)	9150-00-263-3490
C 136.1	Lubrication Oil, Combustion Engine, Grade 30	MIL-L-46152 (81349)	9150-00-186-6689
C 136.2	Lubrication Oil, Grade 10W-30	MIL-L-46152 (81349)	9150-00-186-6699
C 137	Deleted		

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

Item No.	Description	Ref No. and FSCM	NSN
C 138	Magnus OLX4	(37733)	6850-00-885-8302
C 139	Marks-A-Lot (Red, Yellow, Green)	Red	7520-00-973-1062
C 139.1	Metal Conditioner	MIL-M-10578	8030-00-145-0084
C 140	Metal Surface Conditioner, Diversey Everite	(33759)	6850-01-026-9317
C 141	Methanol	O-M-232 (81348)	6810-00-275-6010
C 142	Methyl-Ethyl-Ketone (MEK)	TT-M-261b (81348)	6810-00-281-2785
C 143	Naphtha, Aliphatic	TT-N-95B, Type 2 (81348)	6810-00-238-8119
C 144	Nicro-Braze	AMS 4777 (81343)	3439-00-139-9214
C 145	Nitric Acid, Technical	O-N-350 (81348)	6810-00-237-2918
C 145.1	Nitrogen Gas, Technical	AFPID No. 6830-1	
C 146	Nylatron	Fed. Spec. LP 410 (81348)	9330-00-143-8604
C 147	Oil, Castor, Technical	JJJ-C-86 (81348)	9150-00-261-7455
C 148	Oil, Cutting	VV-O-241	9150-00-276-9212
C 149	Oil, Cutting, Sulphurized Lard	MIL-O-16427	9150-00-231-9059
C 150	Oil, Cutting, Sulphurized - Mineral	VV-O-283	
C 151	Oil, Diesel Fuel	MIL-F-16884 (81349)	9140-00-255-7764
C 152	Oil, Diesel Fuel	VV-F-800	

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

Item No.	Description	Ref No. and FSCM	NSN
C 152.1	Grades DF-A	(81349)	9140-00-286-5282
C 152.2	Grades DF-1	(81349)	9140-00-286-5286
C 152.3	Grades DF-2	(81349)	9140-00-286-5296
C 153	Oil, Fog Type SGF2	MIL-F-12070 (81349)	9150-00-261-7893
C 154	Oil, Lubricating, Jet Engine	MIL-L-6081C Grade 1010 (81349)	9150-00-273-2388
C 155	Oil, Penetrating	VV-P-216A (81348)	9150-00-261-7899
C 155.1	Deleted		
C 156	OPCO (Blue, Green, Black)	(Black)	7520-00-973-1059
C 157	Paint	MIL-C-22750 (81349)	8010-00-148-7091
C 158	Paint, Epoxy (Catalyzed) Grey Color #16473	TT-L-32 (81348)	8010-00-598-5158
C 159	Paint, Heat Resistant Color No. 34087	MIL-P-14105 (81349)	8010-00-616-4009
C 160	Paper, Abrasive 400 Grit	P-P-105 (81348)	5350-00-264-3489
C 161	Pencil, Nonmechanical, Colored Lead	SS-P-201D (81348)	7510-00-285-5832
C 162	Pencil, Yellow Color-brite 2107	(73685)	7510-00-465-0994
C 163	Same as C 86		
C 163.1	Same as C 83		
C 164	Petrolatum, Technical	VV-P-236 (81348)	9150-00-250-0926

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

Item No.	Description	Ref No. and FSCM	NSN
C 165	Pigment, Iron Blue	TT-P-385 (81348)	8010-00-007-8164
C 166	Polish for Acrylic Plastic	P-P-560 Type I (81348)	7930-00-634-5340
C 166.1	Polish, Abrasive, for Glass	MIL-P-3237	5350-00-299-8651
C 167	Polyamide Epoxy Primer	MIL-P-23377, Class 2 (81349)	8010-00-082-2450
C 168	Polyurethane	MIL-C-27227 (81349)	8010-00-898-5984
C 169	Polyurethane Foam Tape, High Density, Single Coated Scotchfoam 4104	4104X1-2 (76381)	9330-00-984-5834
C 170	Primer, Adhesive A934B	(03481)	8040-00-943-2502
C 171	Primer, Lacquer	MIL-P-7962B (81349)	8010-00-584-2426
C 172	Primer, Locquic Grade	MIL-S-22473	
C 172.1	Primer, Locquic Grade AA	(81349)	8030-00-081-2341
C 172.2	Primer, Locquic Grade CV	(81349)	8030-00-081-2330
C 172.3	Primer, Locquic Grade T	(81349)	8030-00-963-0930
C 172.4	Primer Coating	TT-P-1757 (81348)	8010-00-209-8034
C 173	Protective, Steel Corrosion	MIL-C-10578 (81349)	6850-00-174-9672
C 174	Prussian Blue Color (Thinned in Oil)	MIL-P-30501 (81349)	8010-00-247-8706
C 175	Putty, Zinc Chromate, General Purpose	MIL-P-8116 (81349)	8030-00-664-4968
C 175.1	Primer, Zinc Chromate	MIL-P-8585	
C 175.2	Remover, Paint, Organic, Solvent type, Water Rinsable	TT-R-251	8010-00-926-4727
C 176	Remover, Tracer, Technical K410A	(00929)	6625-00-887-7757
C 176.1	Deleted		
C 176.2	Repellant, Rain, Windshield	Repcon	6850-00-139-5297

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

Item No.	Description	Ref No. and FSCM	NSN
C 177	Resin	MIL-R-7575 Grade A, Class O, Form A (20697)	
C 178	Resin, Synthetic	(96464)	
C 179	Retaining Compound Single Component, Anderobic	MIL-R-46082A (81349)	8030-00-891-8358
C 180	Rod, Filler, 4043	QQ-R-566a (81348)	3439-00-178-8590
C 180.1	Rod, Class I Filler	MIL-R-5632 (81349)	3439-00-163-4363
C 181	Rod, Stainless Steel, SAE Type 309	(61497)	3439-00-246-0575
C 182	Rod, Type 347	(84021)	3439-00-881-0500
C 183	Rod, Welding	MIL-R-5031	3439-00-288-1469
C 184	Rubber, Sheet, Soft	MIL-R-6130, Type II, Grade A (81349)	9320-00-618-3180
C 184.1	Rubber Sheet, Solid, 1/2 inch thick	MIL-R-6855 Class 2, Grade 60	9320-00-241-9765
C 185	Sandpaper, Waterproof Grit No. 280	P-P-101 (81348)	5350-00-224-7205
C 185.1	Grit No. 400	P-P-101 (81348)	5350-00-224-7201
C 185.2	Grit No. 600	P-P-101 (81348)	5350-00-224-7215
C 185.3	Grit No. 320	P-P-101 (81348)	5350-00-224-7203
C 185.4	Grit No. 240	P-P-101 (81348)	5350-00-224-7207
C 185.5	Grit No. 180	P-P-101 (81348)	
C 186	Sealant, Proseal, No. 706, PPS 4407	MIL-S-8784 (81349)	8030-00-616-9191

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

Item No.	Description	Ref No. and FSCM	NSN
C 187	Sealing Compound, Dielectric, Pre-Mixed and Prefrozen Pro-Seal 727	BHT Spec. 299-947-074, Type 2, Class 1, 2, 3	8030-00-664-7583
C 187.1	Sealing Compound, Firewall	MIL-S-38249	8030-00-783-8898
C 187.2	Sealing Compound Permatex 1372	Army Spec. 2-86A	
C 187.3	Sealing Compound	MIL-S-7124	8030-00-275-8117
C 187.4	Sealing Compound	MIL-S-8802	8030-00-723-2746
C 188	Sealing Compound, Polysulfide Base, High Adhesion, Pre-Mixed and Prefrozen Pro-Seal 890	MIL-S-8802 Class B	8030-00-753-4599
C 188.1	Sealing Compound, Polysulfide Base, Non-curing	MIL-S-11030	
C 189	Sealing, Locking and Retaining Compounds, Single-Component	MIL-S-22473 Grades AA, C, CV410, Q (81349)	8030-00-081-2330
C189.1	Sealing Compound, Permatex	MIL-S-45180C	8030-00-252-3391
C 190	Shellac, Body 2	TT-S-300, Type I, Grade B (81349)	8010-00-577-4816
C 191	Shot, Lead, 1 Lb. Bag 10511620	(19200)	9650-00-312-6640
C 192	Silastic, 140	(71984)	8040-00-701-9546
C 193	Silastic, 589	(71984)	5330-00-971-7779
C 194	Deleted (Same as C7)		
C 195	Silicone Grease	MIL-S-8660B (81349)	6850-00-880-7616
C 196	Deleted (Same as C7)		

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

Item No.	Description	Ref No. and FSCM	NSN
C 197	Silver Brazing Alloy Easy Flo 45	QQ-B-654 Grade VII (81348)	3439-00-464-4774
C 198	Soap, Toilet, Cake	P-S-620 (81348)	8520-00-531-6484
C 198.1	Soap, Paste	P-S-624	8520-00-281-8273
C 199	Sodium Dichromate, Technical	O-S-595	6810-00-262-8566
C 200	Sodium, Hydroxide, Technical	O-S-598 (81348)	6810-00-270-8177
C 200.1	Soft Bristle Brush HB643T72 Class I	(81348)	7920-00-514-2417
C 201	Solution, Leak Test Oxygen System	MIL-L-25567 (81349)	6850-00-621-1820
C 202	Solution, Light Water FC-194	(76381)	4210-00-935-1616
C 203	Solution, Liquid Soap	P-S-624 (81348)	8520-00-228-0598
C 204	Solvent	TT-M-268 (81348)	6810-00-286-3785
C 204.1	Solvent, Dry Cleaning	P-D-680, Type I	6850-00-264-9039
C 205	Solvent, Dry Cleaning	P-D-680 Type II	6850-00-274-5421
C 205.1	Spray Kit, Self-Pressurizing	MIL-S-22805	4940-00-803-6444
C 206	Stone, Arkansas Hand, Fine		5335-00-243-6087
C 207	Stone, India, Fine	SS-S-736, Type II, Class B (81348)	5345-00-144-6894
C 208	Strippable, Coating, White No. 72-W-005	MIL-C-6799 Type II, Class 2 (81349)	8030-00-297-0189
C 209	Stripper, Rust, Oakite	MIL-C-46156 (81349)	6850-00-935-5853

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

Item No.	Description	Ref No. and FSCM	NSN
C 210	Strip, Rub	MIL-P-22241 (81349)	5970-00-063-8526
C 211	Deleted		
C 212	Surface Treatment and Inorganic Coatings for Metal Surfaces of Weapon Systems, Diversey 299	(33759)	6850-01-031-6399
C 213	Syringe, Hypodermic (LUER-LOK), 10cc Capacity and No. 16 Gauge DZ 1-14 Needle	(06531)	6515-00-514-2395
C 214	Deleted		
C 214.1	Tack Rag		
C 214.2	Talcum Powder	V-T-30	8150-00-817-0295
C 215	Tape	PPP-T-680 Type II	7510-00-835-1247
C 216	Tape, Adhesive, One-Inch Transparent	L-T-90C (81348)	7510-00-551-9823
C 216.1	Tape, Instrument Marking	Scotch Rite 31 Yellow	5390-00-106-2465
C 216.2	Tape, Instrument Marking	Scotch Rite 31 Green	5390-00-106-2466
C 216.3	Tape, Instrument Marking	Scotch Rite 31 Red	5390-00-106-2467
C 217	Tape, Instrument Marking, Adhesive	L-T-90C, Type I, Class B 81348	(Yellow) 7510-00-550-7125 (Red) 7510-00-550-7126 (Green) 7510-00-550-7129
C 217.1	Tape, Insulation, Electrical, 3/4 Inch Black	MIL-I-7798	5970-00-188-5477
C 218	Tape, Masking, 2 Inch	UU-T-106 (81348)	7510-00-290-2026
C 219	Tape, Plastic Foam (3M4508)	(76381)	7510-00-878-2052
C 220	Tape, Pressure-Sensitive Adhesive, For Dissimilar Metal Separation	MIL-T-23142A (81349)	7510-00-472-4021

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

Item No.	Description	Ref No. and FSCM	NSN
C 220.1	Tape, Pressure-Sensitive Adhesive, Hospital	UU-T-00118A	
C 221	Tape, Pressure-Sensitive Adhesive, Waterproof for Packaging	PPP-T-60, Type 2 (81348)	7510-00-663-0199
C 222	Tape, Pressure-Sensitive Polyurethane Film (Y8561)	BHT Spec. 299-947-113 (76381)	7510-00-175-0171
C 222.1	Tape, Polyurethane Film (Y9265A)	FSCM 04963	

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

Item No.	Description	Ref No. and FSCM	NSN
C 235	Twill, Black One Side Coated Nylon Style 665-602		
C 236	Twine, Black One Side Coated Nylon Style 665-002		
C 237	Twine, Lacing and Tying, Waxed	MIL-T-713, Type P, Class 2 (32345)	4020-00-202-1924
C 238	Varnish, Glyceryl Phosphate Base	TT-V-109 (81348)	8010-00-221-2809
C 239	Varnish, Spar, Phoenolic-Resin	TT-V-119 (81348)	8010-00-597-7856
C 240	Vista-Strip (Paste) and Stripper SA	(44389)	8010-00-985-2963
C 241	Wax, Solvent Type, Waterproof, Aircraft	MIL-X-18723 (81349)	7930-00-267-5588
C 242	Wire	AMS 5694 (81343)	3439-00-941-1308
C 243	Wire, Copper	QQ-W-321D	9525-00-882-3741
C 244	Wire, Filler	AMS 5680	3439-00-288-1471
C 245	Wire, Filler	AMS 5784 (81343)	3439-00-471-9899
C 246	Wire, Filler	AMS 5786 (81343)	3439-00-178-8597
C 246.1	Wire, Shear or Seal, Copper 0.020 Inch Diameter	MS20995-CY20 (96906)	9525-01-047-6455
C 247	Wire, Steel Corrosion Resistant (0.020 In. Dia.)	QQ-W-423 (81348)	9505-00-596-5101
C 248	Wire, Welding	AMS 5774	
C 249	Bag, Transparent	MIL-B-117	5105-00-104-9313
C 250	Wool, Aluminum	FF-W-1825	5350-00-286-4851

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

Item No.	Description	Ref No. and FSCM	NSN
C 251	Wool, Steel	FF-S-740 (81348)	5350-00-240-2920
C 252	Xylene	TT-X-916b, Grade A (81348)	6810-00-598-6600
C 253	Zinc Chromate Primer	TT-P-1757 (81348)	8010-00-297-0593
C 254	Cellulose, Nitrate Dope	MIL-D-5553	8010-00-168-8812

1-27. SPECIAL TOOLS AND TEST EQUIPMENT.

1-28. Description — Special Tools and Test Equipment. Special tools and test equipment are listed in table 1-2 of alphanumerical 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/accessories is contained in the helicopter parts manual.

Table 1-2. Special Tools and Test Equipment

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 1	AA4920-8503	Kit, Rotor Balance Positioning	AD	
T 2	AN8515	Wrench, Spanner	D/A	
T 2.1	AN8516	Wrench	D/A	
T 3	AN/PSM-6A	Multimeter	T	
T 3.1	BH112JA-36	Jet Cal Analyzer	A/T	
T 4	BH120-1032-M2	Tool, Torque Nut		
T 5	BL-6529	Wrench, Spline		

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

Item No.	Description	Ref No. and FSCM	NSN
C 235	Twill, Black One Side Coated Nylon Style 665-602		
C 236	Twine, Black One Side Coated Nylon Style 665-002		
C 237	Twine, Lacing and Tying, Waxed	MIL-T-713, Type P, Class 2 (32345)	4020-00-202-1924
C 238	Varnish, Glyceryl Phosphate Base	TT-V-109 (81348)	8010-00-221-2809
C 239	Varnish, Spar, Phoenolic-Resin	TT-V-119 (81348)	8010-00-597-7856
C 240	Vista-Strip (Paste) and Stripper SA	(44389)	8010-00-985-2963
C 241	Wax, Solvent Type, Waterproof, Aircraft	MIL-X-18723 (81349)	7930-00-267-5588
C 242	Wire	AMS 5694 (81343)	3439-00-941-1308
C 243	Wire, Copper	QQ-W-321D	9525-00-882-3741
C 244	Wire, Filler	AMS 5680	3439-00-288-1471
C 245	Wire, Filler	AMS 5784 (81343)	3439-00-471-9899
C 246	Wire, Filler	AMS 5786 (81343)	3439-00-178-8597
C 246.1	Wire, Shear or Seal, Copper 0.020 Inch Diameter	MS20995-CY20	
C 247	Wire, Steel Corrosion Resistant (0.020 In. Dia.)	QQ-W-423 (81348)	9505-00-596-5101
C 248	Wire, Welding	AMS 5774	
C 249	Bag, Transparent	MIL-B-117	
C 250	Wool, Aluminum	FF-W-1825	5350-00-286-4851

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

Item No.	Description	Ref No. and FSCM	NSN
C 251	Wool, Steel	FF-S-740 (81348)	5350-00-240-2920
C 252	Xylene	TT-X-916b, Grade A (81348)	6810-00-598-6600
C 253	Zinc Chromate Primer	TT-P-1757 (81348)	8010-00-297-0593
C 254	Cellulose, Nitrate Dope	MIL-D-5553	8010-00-168-8812

1-27. SPECIAL TOOLS AND TEST EQUIPMENT.

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Table 1-2. Special Tools and Test Equipment

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 1	AA4920-8503	Kit, Rotor Balance Positioning	AD	
T 2	AN8515	Wrench, Spanner	D/A	
T 2.1	AN8516	Wrench	D/A	
T 3	AN/PSM-6A	Multimeter	T	
T 3.1	BH112JA-36	Jet Cal Analyzer	A/T	
T 4	BH120-1032-M2	Tool, Torque Nut		
T 5	BL-6529	Wrench, Spline		

Table 1-2. Special Tools and Test Equipment (Cont)

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 6	JS953	Kit, Hydraulic	RP	3-4, 3-5
T 7	JTB Model 33FS	Meter, Frequence	T	
T 8	LTCT400	Trailer, Engine	R/IN	
T 9	LTCT434	Stand, Engine	R/IN	
T 9.1	LTCT744	Mobile Engine Test Unit		
T 10	LTCT773	Sling, Engine Lift	R/IN/RP	4-43
T 10.1	MP-1	Variable Pressure Tester 0 to 150 psi	I/T	
T 11	PD1201	Wrench, Power	R/IN	5-7
T 12	PD2659	Socket, Mast Nut	R/IN	5-7
T 13	PD2660	Adapter, Reaction Torque	R/IN	5-7
T 14	SWE100	Wrench, Power	A	
T 15	SWE124330	Plate, Anchor	A	
T 16	SWE13851	Stand, Engine and Transmission	R/IN/RP	4-4, 4-44
T 17	SWE13852-1210	Arm, Engine	R/IN/RP	4-44
T 18	SWE13852-1510	Base, Engine Adapter	R/IN/RP	4-44
T 19	SWE13852-40	Adapter	R/IN/A	
T 20	SWE13852-500	Adapter	R	
T 21	SWE13855	Stand, Transmission	R/IN/A	
T 21.1	TE12062	Mobile Engine Test Unit		
T 22	T100220	Slings, Lifting	R/IN	
T 23	T100615-13LW	Fixture Lockwire	IN	
T 24	T100615-15	Tool, Seal Installation	A	
T 25	T100619-2	Adapter, Torque	R/D/A	

Table 1-2. Special Tools and Test Equipment (Cont)

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 26	T100929	Jack Screws	A/R	
T 27	T101303	Socket	A	
T 28	T101304	Adapter	A	
T 28.1	T101305	Wrench, Splined	D/A	
T 29	T101306	Wrench, Splined	D/A	
T 30	T101307	Wrench, Outer Coupling	D/A	
T 31	T101308	Jack Screws	D/A/R	
T 32	T101330	Fixture, Cyclic Stick		
T 33	T101338	Jack Screws	D	
T 34	T101356	Bench, Buildup	AD/D/A/R/IN	
T 35	T101365	Fixture, Quill	R/D/A	
T 36	T101369	Assembly, Support	D/A	
T 37	T101382	Assembly, Ram	D/A	
T 38	T101392	Wrench	D/A	
T 39	T101400	Assembly, Support	AD	
T 40	T101401	Assembly, Scope	AD	
T 41	T101402	Links, Grip Positioning	AD/R/IN/A	
T 42	T101406	Puller, Bearing	D	
T 43	T101407	Tool, Seal Bearing	D	
T 44	T101412	Tool, Grip Spacing	D/A	
T 45	T101414	Wrench	R/IN	
T 46	Deleted (Same as T53)			
T 47	T101419	Tool Set, Alignment Engine to Transmission Driveshaft	AD	6-3

Table 1-2. Special Tools and Test Equipment (Cont)

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 48	T101420	Fixture, Holding	D/A	
T 49	T101421	Plate, Adapter Buildup Bench	AD/R/D/A/IN	
T 50	T101424	Bar, Bearing Removal	D/A	
T 51	T101440	Jack, Transmission Leveling	AD	6-2
T 52	T101449	Wrench, Retaining Nut Quill	D/A	
T 53	T101448	Hoist, Maintenance	AD/R/IN/A	1-8, 1-9, 4-4
T 54	T101455	Fixture, Holding	D/A	
T 55	T101456	Wrench	A	
T 56	T101457	Tool, Grip Spacing	A	
T 56.1	T101485	Gage, Main Rotor Blade Trim Tab	AD	
T 56.2	T101468	Flap Stops	AD	
T 56.3	T101467	Support		
T 56.4	T101460	Maintenance Hoist	R/IN	
T 56.5	T101474	Grip Spacing Tool	AD	
T 56.6	T101475	Bearing Removal Tool	R	
T 56.7	T101487	Bearing Installation Tool	IN	
T 57	T101488	Wrench	A/R/D	
T 57.1	T101491	Bearing Puller	R	
T 58	T101493	Wrench	D/A	
T 58.1	T101525	Bender, Main Rotor Blade Trim Tab	AD	
T 59	T101559	Gage, Grip Spacing	AD	

Table 1-2. Special Tools and Test Equipment (Cont)

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 59.1	T101586	Pusher Set		
T 60	T101600	Wrench, Retaining Nut	D/A	
T 61	T107640	Trailer, Engine	R	
T 61.1	T101864	Grip Positioning Links		
T 62	T101865	Stops, Flap	AD	
T 62.1	T41000310-1	Torque Adapter	AD	
T 63	T41000870-1	Adapter, Torque	A	
T 64	XW20509	Wrench		
T 65	1560-UH1-772-1	Cable, Extender	T	9-9
T 66	1560-VH1-772-2	Cable, Jumper	T	9-9
T 67	204-076-202-100B	Wrench, Spanner	I	
T 68	MIL-T-58092	Test Set, Indicator	T	
T 69	Deleted			
T 70	4920-EG-008	Stand, Engine	R/IN/RP	
T 71	49208975623	Stand, Engine	R/IN	
T 72	67SPL1275-0114	Tool	D/A	
T 72.1	68SAVAED0221	Tool	A/I	
T 72.2	68SPL-1275-136	Tool, Seal Retaining Nut	R/IN	
T 73	7A050	Kit, Balancing	AD	5-22, 5-23
T 74	7FA18005-50	Wrench		
T 75	Deleted			
T 76	7HEL054	Kit, Main Rotor BALANCE	AD	
T 77	7HEL061	Kit, Balancing	AD	5-23
T 78	7HEL065	Kit	AD	

Table 1-2. Special Tools and Test Equipment (Cont)

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 78.1	204-011-178-1	Clevis Assembly, Lifting	RA	
T 78.2	7HEL066	Kit		
T 79	2201	Spacer	AD	
T 80	2215	Wheel, Hand	AD	
T 81	2259	Arbor, Balancing	AD	5-23
T 82	2337	Fixture	AD	5-23

Table 1-2. Special Tools and Test Equipment (Cont)

Item No.	Part No.	Nomenclature	Usability Code Calibration	Figure Reference
T 83	2467	Sleeve	AD	5-23
T 84	2486	Gage, Strut Positioning	AD	5-23
T 85	2586	Plate, Special Tool	AD	
T 86	2588	Adapter	AD	5-23
T 87	T-27872-2	Taper, Reamer	A	
T 88	T-27872-11	Taper, Reamer	A	
T 89	Gage			
T 90	TTU-27E	Tachometer Tester	T/I	
T 91	SWE126377	Socket	R/IN	
T 92	SWE124387	Anchor Plate	R/IN	
T 93	SWE103	Torque Multiplier	R/IN	
T 94	SWE67	Ratchet Adapter	R/IN	
T 95	SWE63	Work Handle	R/IN	
T 96	SWE54	Torque Wrench	R/IN	
T97	T101873	Tool Kit, Bearing Staking	RP	
		USABILITY CODES R — Removal D — Disassembly I — Inspection RP — Repair/Replace T —Testing A — Assembly IN — Installation AD — Adjustment S/P — Storage/Preservation		

1-29. SUPPORT EQUIPMENT.

1-30. Description — Support Equipment. Support equipment (table 1-3) lists equipment authorized for use in support of this helicopter. The listing is arranged in alphanumerical order.

Table 1-3. Support Equipment

Item No.	Part Number	Nomenclature	NSN	Para. Ref.
1	204-040-929-29	Cover and lift plate	1730-00-908-4853	1-50
2	204-070-461-5	Cover assembly, aft cabin	1730-00-148-9081	1-47
3	204-070-462-13	Cover assembly, cap	1730-00-148-9076	1-47
4	204-070-462-17	Cover assembly, tail rotor gearbox (body)	1560-00-488-5004	1-47
5	204-070-463-13	Cover assembly, forward cabin	1560-00-488-5005	1-47
6	204-070-464-1	Cover assembly, engine exhaust	1560-00-675-3215	1-42
7	204-070-466-5	Cover assembly, stabilizer bar (2 required)	1560-00-488-5007	1-47
8	204-070-467-9	Cover assembly, nose cabin	1730-00-258-8372	1-47
9	204-070-469-1	Cover assembly, cowling (forward)	1730-00-674-1945	1-42, 1-47
10	204-070-470-1	Cover, pitot tube	1730-00-674-1946	1-42, 1-47
11	204-070-478-1	Cover assembly, pylon	1730-00-904-9916	1-47
12	204-072-485-1	Cover assembly, main rotor blade (2 required)	N/A	1-47
13	AF5 (31989)	Dispenser, hydraulic fluid	4920-00-245-1832	7-4
14	204-030-123-3	Fitting assembly, jacking (2 required)	1680-00-895-9341	1-38
15	204-030-182-1	Fitting assembly, jack and mooring	1560-00-670-5898	1-38, 1-45
16	204-030-182-2	Fitting assembly, jack and mooring	1560-00-671-4430	1-38, 1-45
17	204-050-104-1	Fitting assembly, tow (2 required)	1560-00-674-4211	1-36

Table 1-3. Support Equipment (Cont)

Item No.	Part Number	Nomenclature	NSN	Para. Ref.
18	988S (02708)	Jack, hydraulic (4 required)	1730-00-391-7932	1-38
19	DL13219EO488 (97403)	Nozzle assembly kit, closed circuit refueling	4930-00-478-5728	1-3
20	204-070-462-1	Sleeve, tail rotor blade (2 required)	1560-00-488-5003	1-47
21	67AMXACD0311 (12757)	Sling, tailboom	N/A	1-51
22	204-070-450-19	Strap webbing, tail rotor	1680-00-967-1821	1-42, 1-47
23	SW4738-1 (17230)	Tiedown assembly, main rotor	1730-00-945-0228	1-36, 1-42, 1-47
24	AA1730-1301 (81996)	Tiedown kit, aircraft mooring	1730-00-089-7806	1-45
25	204-050-200-5	Wheels, helicopter ground handling (2 required)	1730-00-980-9552	1-36

SECTION II — LUBRICATION

1-31. LUBRICATION INSTRUCTIONS.

1-32. Description — Lubrication Instructions. This section covers the lubrication requirements as shown on Lubrication Chart. See figure 1-3. This chart consists of a main drawing which is a perspective diagram of the helicopter, with enlarged or detailed views where required to show items clearly. The chart shows all parts requiring periodic lubrication. The lubrication symbols indicate the time interval of required lubrication. The Lubrication Chart uses symbols and abbreviations to indicate the required lubricant and method of application for each part.

TABLE OF LUBRICANTS

IDENTIFICATION LETTER	SPECIFICATION	TYPE OF LUBRICANT
WTR	MIL-G-81322 (C-111)	Grease, aircraft, wide temperature range
EP	204-040-755-5 (C-129)	Grease, helicopter, driveshaft coupling

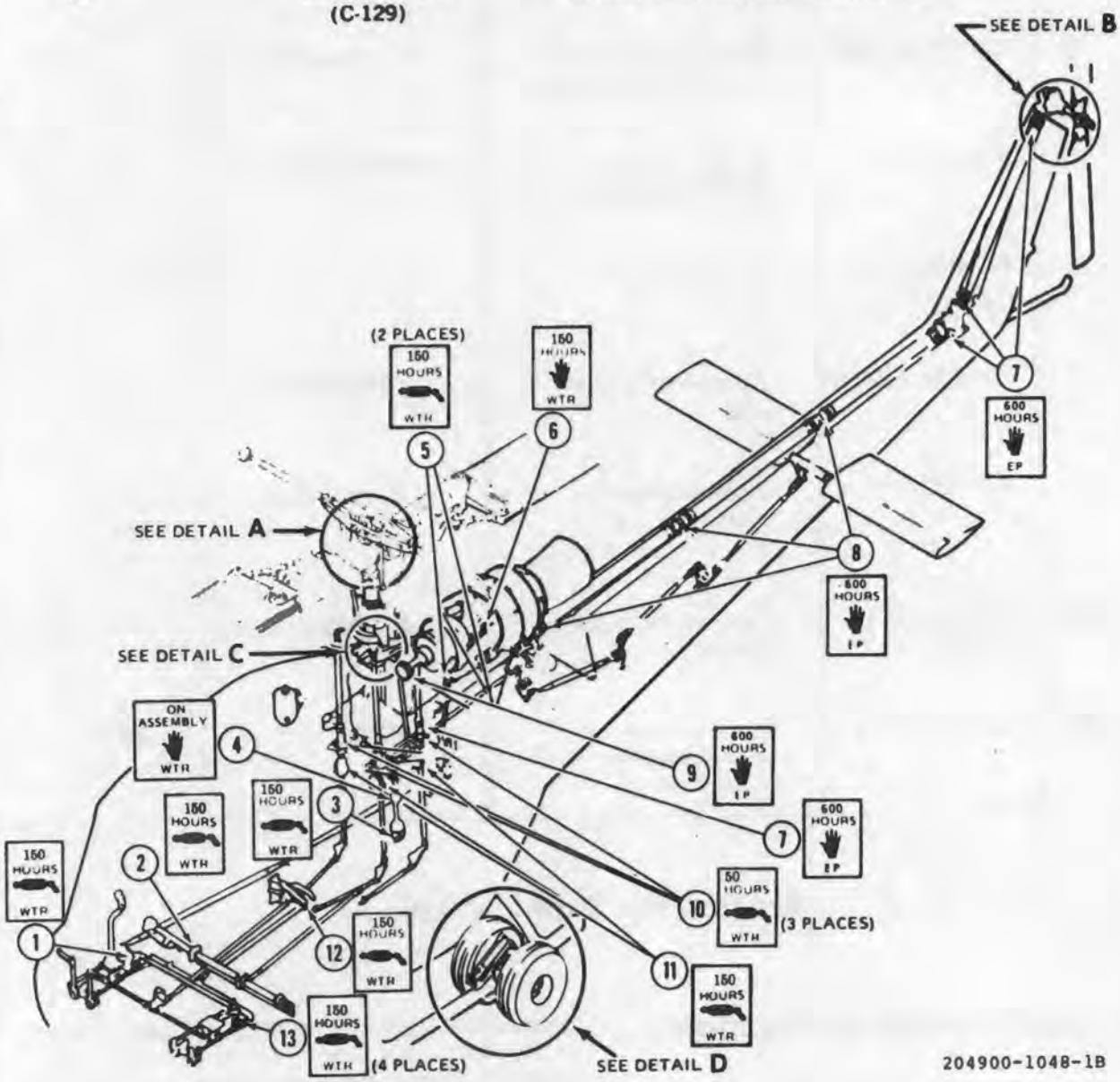


Figure 1-3. Lubrication chart (Sheet 1 of 5)

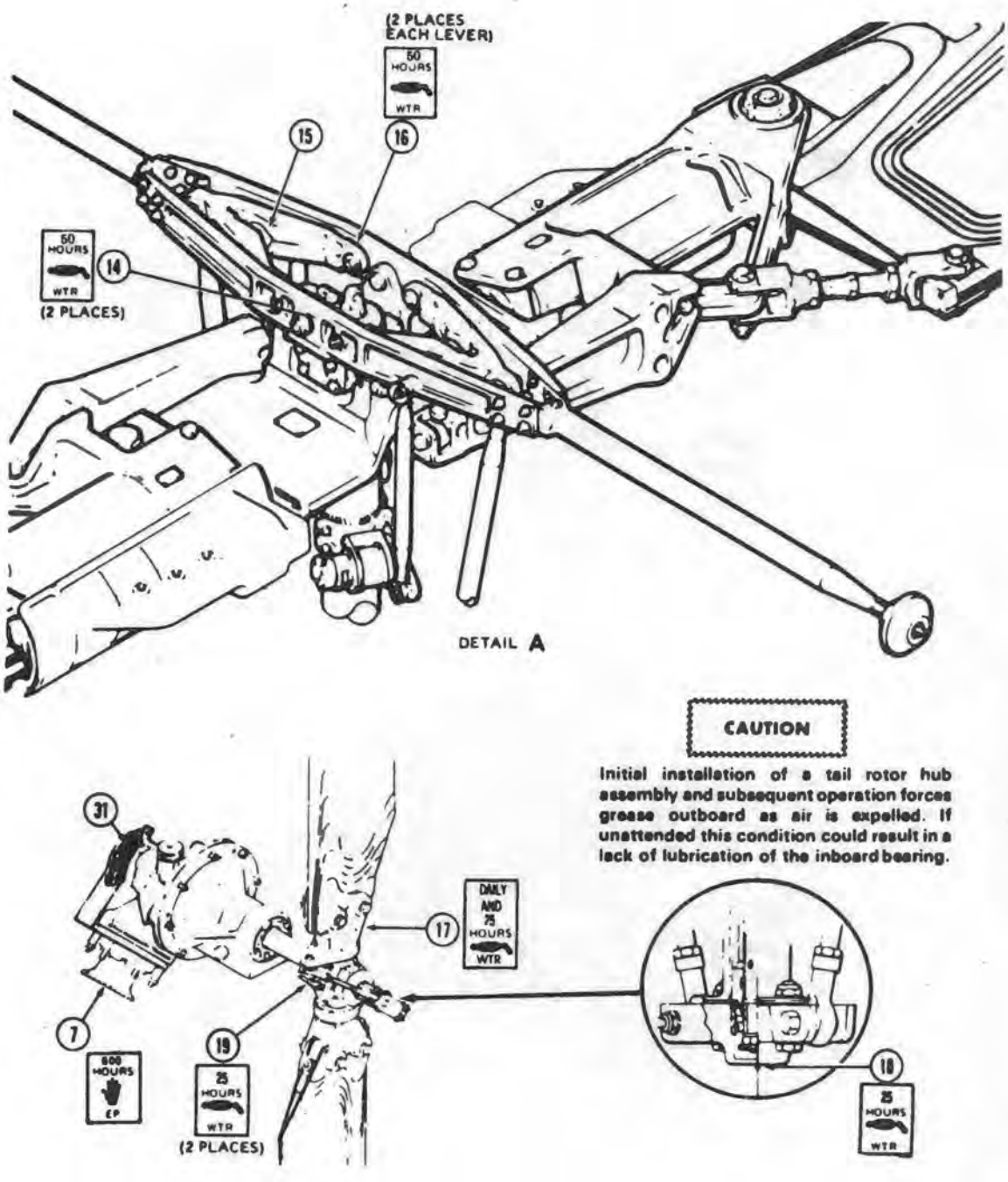
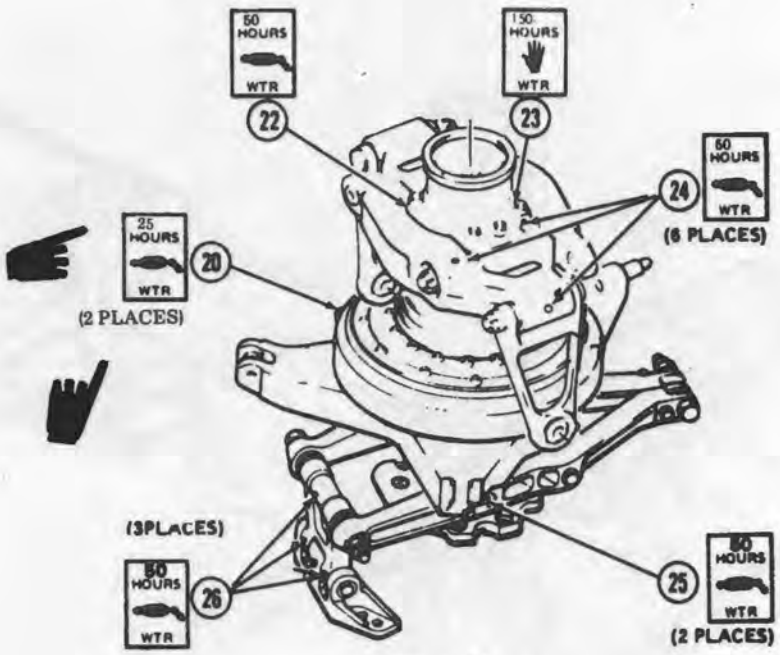
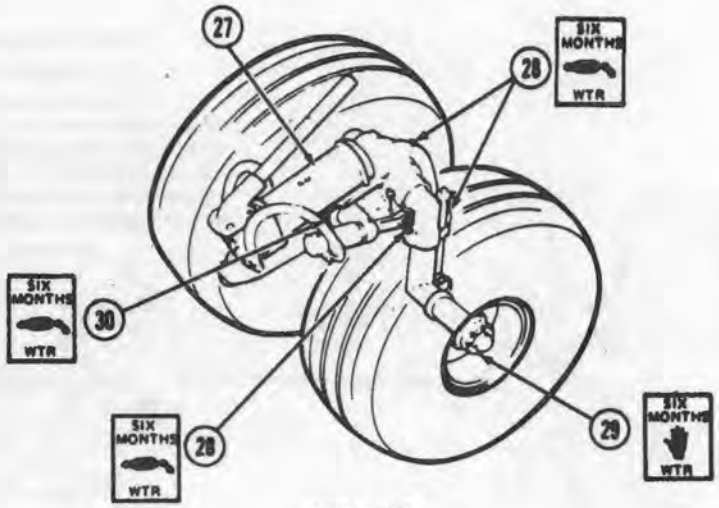


Figure 1-3. Lubrication chart (Sheet 2 of 5)



DETAIL C



DETAIL D

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Figure 1-3. Lubrication chart (Sheet 3 of 5)

1. Tail rotor pedal adjuster gears
2. Throttle control gears
3. Cargo suspension to latch
4. Cargo suspension rod end.
5. Engine mount rod ends (with grease fittings only)
6. Droop cam slider (note 7)
7. Input/output quill couplings (notes 1 and 2)
8. Tail rotor driveshaft hanger couplings (notes 1 and 2)
9. Main driveshaft couplings (notes 1 and 2)
10. Power cylinder support bearing (note 3)
11. Control tube rod ends
12. Cyclic control rod ends (with grease fittings only)
13. Control tube rod ends
14. Center frame — stabilizer bar
15. Universal — main rotor control link
16. Lever — stabilizer bar
17. Grips — tail rotor hub and blade (note 4)
18. Crosshead assembly (note 6)
19. Trunnion bearings (note 4)
20. Ring—swashplate outer (note 11)
21. Deleted
22. Hub — scissors and sleeve
23. Collective sleeve splines (note 5)
24. Levers — collective scissors
25. Levers — collective swashplate
26. Collective lever
27. Pump — actuating (note 8)
28. Arm — actuating (note 10)
29. Wheel — bearing (note 10)
30. Cradle — pivot (note 10)
31. Chain assembly — silent (note 9)

NOTES:

WARNING

Insure that all flexible couplings on replacement components are adequately lubricated prior to installation.

1. **Specified time intervals are for normal conditions. Lubricate more frequently if conditions warrant. Lubricate couplings (7, 8, and 9) at time of replacement, 600 hours or annually, whichever occurs first.**
2. **Lubricate in accordance with instructions in Chapter 6.**
3. **Disconnect rod end and oscillate cylinder assembly while greasing. Check friction drag after** lubrication (not required with KSP6099 bearing).

CAUTION

Do not rotate tail rotor by hand in order to lubricate. Tail rotor may be turned by hand only when completely disconnected from drive train.

4. **During operation of the aircraft, lubricating grease in the tail rotor hub assembly is forced in an outboard direction by centrifugal force, leaving voids in the lubricating grease at the inboard bearing. Operation in rain can result in water being** drawn **into these voids. Either condition, left unattended, can result in a lack of lubrication at the inboard bearing. In view of this, the following lubrication procedures will be used.**
   a. Purge lubricate tail rotor hub and blade grip bearings after each initial installation and subsequent ground run for tracking, after each 25 flying hours and following any operation in rain, ice or heavy snow. Disconnect one pitch link and purge bearing with grease. Rotate grip several times in both directions. Repeat procedure on other grip.
   b. **Lubricate the tail rotor grip bearing with hand grease gun at each daily inspection. If, during lubrication, water is observed coming out of the seal, purge lubricate.**
5. **Remove six bolts from flange on sleeve assembly. Slide flange and plate up mast for access to collective sleeve and mating mast splines and lubricate.**
6. **Hand pack at every Phase inspection. Hand grease gun (one shot only every 25 hours). Use sparingly so that grease is not forced into gearbox.**

Figure 1-3. Lubrication chart (Sheet 4 of 5)

7. Lubricate Droop Cam Slider lightly. Wipe excess off and out of slots. Slide contact should have minimum lubrication required to prevent dry contact without contributing to grip build-up. More frequent lubrication may be necessary depending on environment and usage factors.
8. Fill when required, or at six months.

CAUTION

Operation in blowing dust or sand will cause dirt to accumulate on lubricated silent chain.

9. Lubricate silent chain with lubricant (C 115.1) or with oil (C 134 or C 135) moistened cloth. Lubrication will be at discretion of local maintenance officer, based on environmental conditions. (Not required with roller chain.)
10. Lubricate ground handling gear at six month intervals or as required by climatic conditions.

WARNING

Failure of the swashplate to accept grease requires replacement before releasing the aircraft for flight.

11. Refer to paragraph 5-89.1 for specific lubrication and inspection instructions. Purge lubricate at initial installation and at each 25 hours thereafter. Apply grease (C111) at each fitting until clean grease is forced past seals. Wipe off excess grease.

Figure 1-3. Lubrication chart (Sheet 5 of 5)

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

1-33. GROUND HANDLING.

CAUTION

Installation of structural panels/doors is required prior to jacking, towing, hoisting or flight (figure 2-19).

1-34. Description — Ground Handling. The following paragraphs contain information necessary for towing, jacking and leveling, parking, mooring, hoisting, sling loading, application of external power, and attachment of all weather covers. Refer to figure 2-4 for helicopter dimensions and clearances.

CAUTION

Do not move the helicopter for 25 minutes after power has been removed from MD-1 Displacement Gyros and CN-998/ASN-43 Directional Gyros. If helicopter must be moved after shutdown, power should be reapplied to MD-1 and CN-998/ASN-43 Gyros. After 5 minutes helicopter may be safely moved with power ON.

Do not make any sudden stops, turns, or tow helicopter down grades exceeding two degrees.

NOTE

The helicopter shall be moored if wind is expected to exceed 45 knots. If at all possible, the helicopter should be evacuated to a safe area if wind conditions above 75 knots is expected.

1-35. TOWING.

1-36. Description — Towing. The helicopter can be equipped for towing by attaching two ground handling gear assemblies to the main landing gear skid. Attach a standard aircraft tow bar to the tow rings provided on the forward end of each landing gear skid tube. Use the following procedure (figure 1-4).

WARNING

Do not bend over the ground handling trucks while raising aircraft. Stay in front or rear, but never to the side.

a. Tie down main rotor blades.

b. Attach tow bar to landing gear skid tow rings and to tractor hook.

c. Install ground handling gear. Position ground handling gear assembly over eyebolt fittings on landing skid. Insert fixed pin of cradle in forward fitting, then engage spring-loaded pin in aft fitting.

CAUTION

Ground handling wheels may be damaged if forward portion of skid gear is not raised by pulling down on tail skid, while extending wheels. Do not exert a downward force exceeding 400 pounds.

Premaintenance requirements for towing of helicopter

Condition	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	(S17), (S23) and (S25)
Minimum Personnel Required	Two
Consumable Materials	None
Special Environmental Conditions	None

d. Station one man at tail skid to maintain helicopter in level position during towing operation.

e. Clear departure area of support equipment such as work stands and power units.

f. Disconnect ground wire and extend ground handling gear simultaneously to raise the helicopter from ground.

g. Tow or push slowly, balancing the helicopter with tail skid.

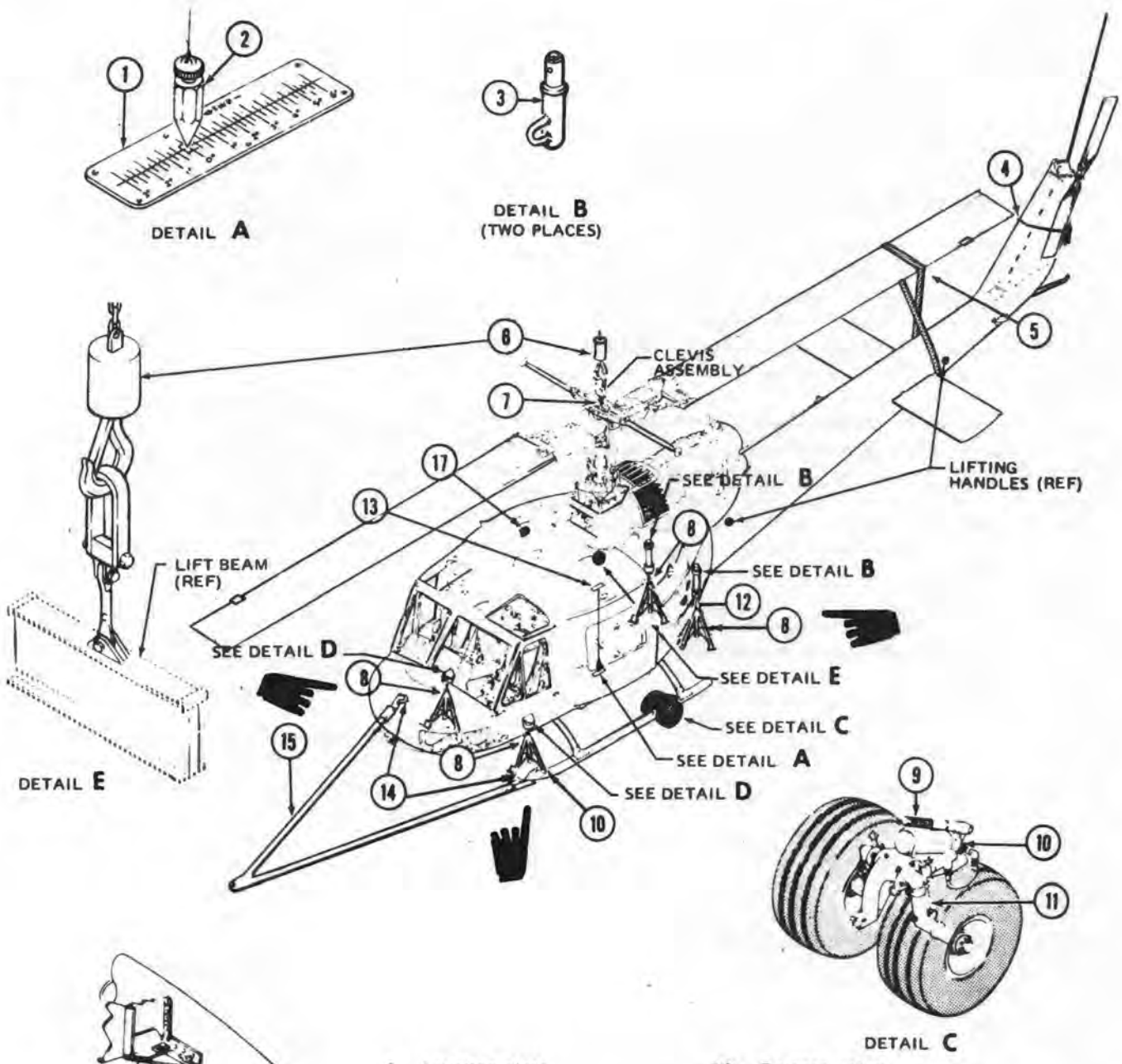
CAUTION

Damage to ground handling gear may occur if aircraft is lowered quickly, therefore, release pressure slowly.

h. Retract ground handling gear simultaneously to lower helicopter to ground.

(1) To retract wheels, release hydraulic pressure by slowly turning valve handle on pump.

(2) Depress spring-loaded pin and remove ground handling gear assembly from landing gear eyebolt fittings.



1. Leveling plate
2. Plumb bob
3. Jack and mooring fittings
4. Tail rotor strap
5. Main rotor strap
6. Hoisting cable
7. Rotor retaining nut
8. Hydraulic jacks
9. Pump assembly
10. Release valve
11. Support cradle and axle assembly
12. External power receptacle
13. Slotted plate — plumb bob
14. Tow rings
15. Tow bar
16. Jack and mooring fittings
17. Hydraulic test connections

204900-1047

Figure 1-4. Towing, leveling, hoisting, and jacking

i. Install ground wire.

j. Remove tow bar from helicopter.

1-37. JACKING AND LEVELING.

CAUTION

Installation of structural panels/doors is required prior to jacking, towing, hoisting or flight (figure 2-19).

1-38. **Jacking Procedures.** Place jacks (8, figure 1-4) under two forward jack pad fittings (16) located just ahead of landing gear forward cross tubes at each side. Place two aft jacks (8) under fittings (3) located under fuselage behind landing gear. Actuate jacks (8, figure 1-4) and raise helicopter evenly.

1-39. **Leveling Procedures.** To level the helicopter, hang a plumb line from slotted plane (13) so that plumb bob (2) just clears leveling plate (1). Adjust jacks (8) under helicopter to align plumb bob (2) exactly over intersection of two lines marked with zero on plate (1). Observe the following precautions while the helicopter is supported on jacks.

Premaintenance requirements for jacking and leveling of helicopter

Condition	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	(T78.1)
Test Equipment	None
Support Equipment	(S14), (S15), (S16) and (S18)
Minimum Personnel Required	Two
Consumable Materials	None
Special Environmental Conditions	Level, hard surface, indoors, draft free

CAUTION

If helicopter is placed on jacks preparatory to removing landing gear skid tubes, take up slack with hoist attached to main rotor retaining nut (7). Do not climb or enter helicopter. All personnel in immediate area shall exercise caution to avoid bumping or otherwise disturbing helicopter while on jacks.

It is recommended that area around helicopter be roped off and signs prominently displayed to warn: CAUTION HELICOPTER ON JACKS. When helicopter is on jacks in hangar, recommend the hangar door be closed.

1-40. PARKING.

1-41. **Description — Parking.** Parking (figure 1-5), as used in this manual, is defined as 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. Maximum velocity of surface winds which can be withstoods by helicopter when parked in following manner depends on gross weight of helicopter.

1-42. **Parking Procedures.** Parking arrangements may vary according to each local facility. The following general procedures should be observed. Refer to TM 55-1500-204-25/1.

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 faciliate removal of any helicopter from parking area, as well as permitting greater ease of movement for mobile fire fighting equipment within area.

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

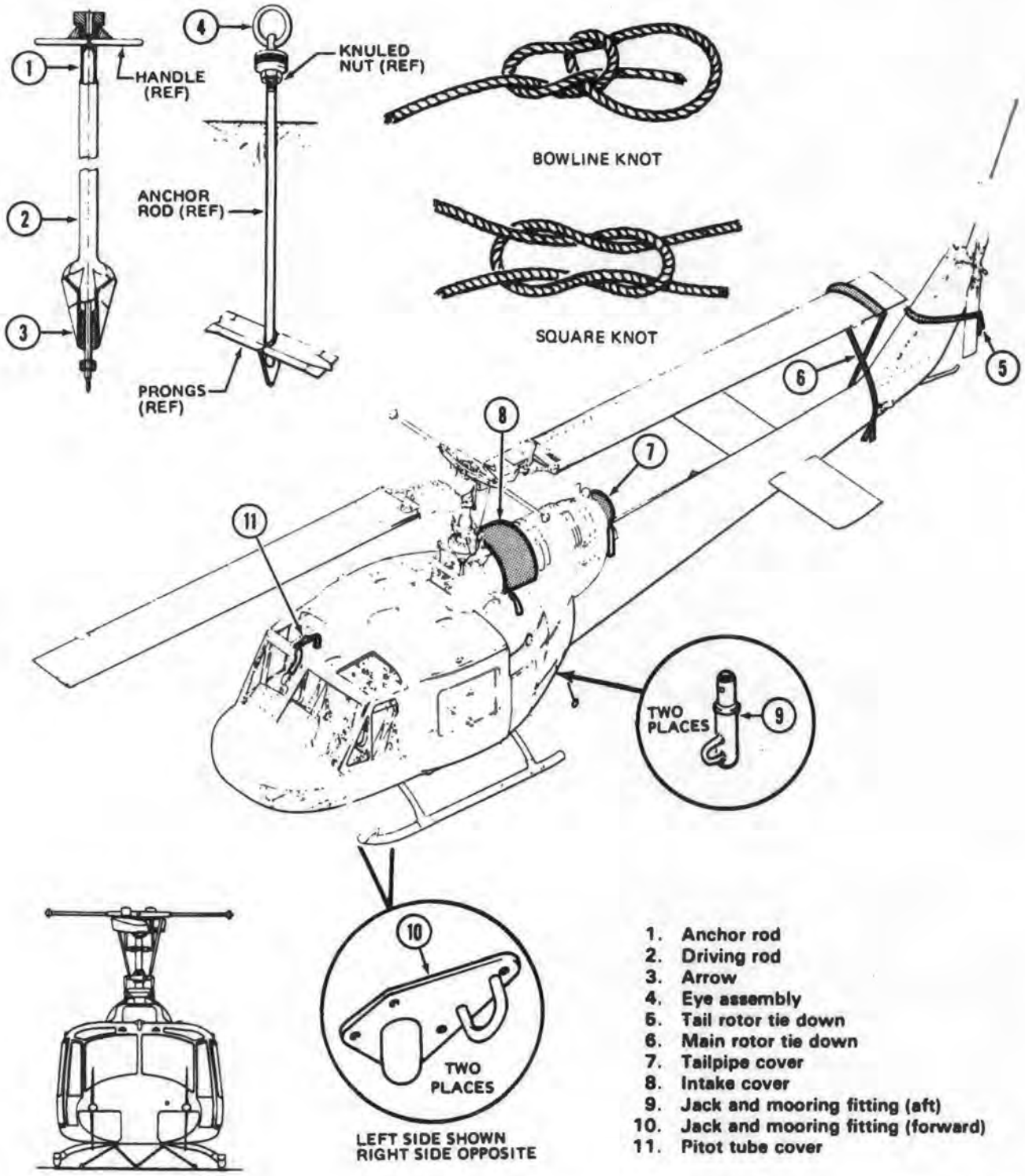


Figure 1-5. Parking and mooring

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

f. Statically ground parked helicopters.

g. Under normal conditions park the helicopter as follows:

(1) Park helicopter on a level surface, whenever possible, so that load will be balanced.

(2) Retract or remove ground handling wheels (detail C, figure 1-4) to allow helicopter to rest on landing skids.

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

(4) Secure main rotor by firmly cross-tying main rotor tie-down (6, figure 1-5) around tailboom.

(5) Attach tail rotor tie-down strap (5) to tail rotor and secure to loop provided on left side of vertical fin.

(6) Install pitot tube cover (11), engine intake fairing cover (8), and exhaust tailpipe cover (7).

NOTE

If required and available, install all-weather covers. (Paragraph 1-46.)

(7) Lock flight controls, check that all switches are OFF and external power disconnected, and close doors, windows, and access panels.

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

CAUTION

Structural damage can occur from turbulent weather conditions. 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 (paragraph 1-40).

(2) Moor helicopter (paragraph 1-43).

(3) Fill fuel tanks to capacity if time permits (paragraph 1-3).

(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 from flying objects.

1-43. MOORING.

1-44. Description — Mooring. Mooring is the process of securing the parked helicopter to avoid damage by high winds or turbulent weather. Mooring ring fittings are provided on jack pad fittings, a quantity of four on the helicopter. Where properly spaced tie-down rings are not available, mooring can be accomplished using standard mooring kit (1 through 4, figure 1-5).

Premaintenance requirements for mooring of helicopter

Condition	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	(S14), (S15), (S16) and (S24)
Minimum Personnel Required	One

Condition	Requirements
Consumable Materials	None
Special Environmental Conditions	None

1-45. Mooring Procedures. The following general procedures should be observed, refer to TM 55-1500-204-25/1:

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

b. Screw anchor rod (1, figure 1-5) into arrow (3).

c. Slip driving rod (2) over anchor rod (1) and into socket of arrow (3).

d. Turn cam of driving rod (2) so that prongs of arrow (3) are not spread by driving.

e. If necessary, loosen surface of ground with ground-breaking pin.

f. Position forward anchor rods approximately one foot ahead of each forward mooring fitting (11) and slightly inboard of skid tubes. Position other rods approximately one foot behind each aft mooring fitting (9 and 10).

g. Drive each arrow (3) into ground until handle of driving rod (2) is approximately **THREE INCHES** above surface.

h. Rotate handle of driving rod (2) approximately 90 degrees and give it a sharp blow to spread prongs of arrow (13).

i. Return driving rod (2) to driving position and remove it from anchor rod (1).

j. Align squared socket of eye assembly (4) with squared end of anchor rod (1). Fit in place and tighten knurled nut.

k. Set prongs of arrow (3) by pulling up on eye assembly (4).

l. Secure helicopter with quarter-inch cables or one-inch polyester rope as shown in figure 1-5.

NOTE

When anchor rods (1) are no longer needed, they may be removed by loosening knurled nut and turning eye assemblies (4) counterclockwise, leaving arrows (3) in ground.

1-46. AIRCRAFT COVERS.

1-47. Description — Aircraft Covers. A set of twelve all-weather covers (1 through 9, figure 1-6) is available for the protection of cabin area and major components. Covers are fastened by cord and snap fasteners and are to be installed in sequence as illustrated.

1-48. HOISTING.

WARNING

Do not stand underneath engine/helicopter while suspended from maintenance hoist. Do not stand between engine and airframe while engine is suspended from the maintenance hoist.

1-49. Description — Hoisting. The helicopter can be lifted by use of a clevis (T 78.1) attached to the main rotor retaining nut (7, figure 1-4). To remove the engine, main rotor, or transmission, use suitable maintenance hoist.

1-50. Aircraft Hoisting. Hoist the helicopter as follows:

a. Attach a clevis (T 78.1) to eye provided on rotor retaining nut (7, figure 1-4) at top of main rotor mast. Connect a suitable hoisting cable (6) and take up slack.

Premaintenance requirements for all-weather covers

Condition	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	None

Condition	Requirements
Test Equipment	None
Support Equipment	(S2 through 12), (S20), (S22) and (S23)
Minimum Personnel Required	Two
Consumable Materials	None
Special Environmental Conditions	None

CAUTION

Maximum operating load of hoisting clevis is 10,000 pounds.

b. Station a man at tail skid to steady helicopter when hoisted. If listing beyond reach from ground, two men and two steadying ropes (one tied to forward end of skid tube and one on tail skid) will be necessary.

c. Hoist slowly with a steady lifting force.

d. If transmission has been removed, attach hoisting cable (6) and clevis assembly at pylon lift-link, detail E, and apply same procedure to lift helicopter.

1-51. Component Hoisting. For hoisting or handling tailboom as a separate component use sling strap (item 21, table 1-3) at center G area of tailboom. Use tail skid for steadying tailboom. The tailboom is provided with stowed handling tubes, as shown, and are reinforced as a lift point. However, the use of sling strap is the preferred method for handling tailbooms.

1-52. SLING LOADING.

1-53. Description — Sling Loading. Retrieval of an inoperative helicopter is accomplished by use of cables, slings, and hoisting equipment. Refer to FM 55-413 for helicopter sling loading.

1-54. APPLICATION OF EXTERNAL POWER.

1-55. Description — Application of External Power. External power receptacle (12, figure 1-4) for 28 VDC is in lower left side of fuselage, below electrical equipment compartments. Access is through a small door, which is equipped with a limit switch to light EXTERNAL POWER caution panel when door is open and power connected. When applying power from external sources, battery switch shall be OFF. Capacity of auxiliary power unit must be 650 to 800 amperes.

1-56. Electrical Power Application. Open access door to external power receptacle (12, figure 1-4) and plug in external power source.

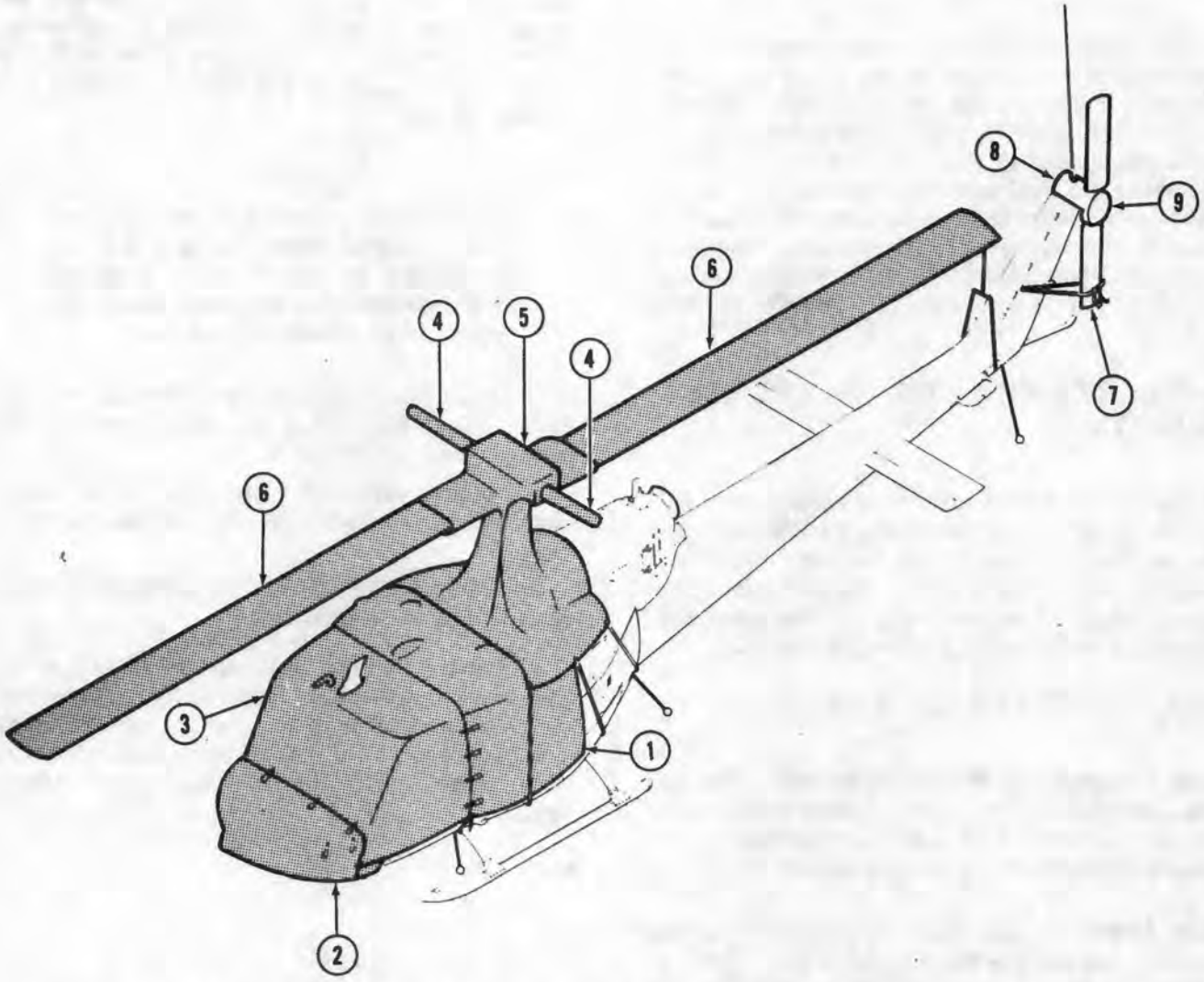
1-57. APPLICATION OF EXTERNAL HYDRAULIC TEST STAND.

1-58. Description — Application of External Hydraulic Test Stand. Hydraulic test connections for the hydraulic test stand are located on hydraulic filter module on aft side of right cabin bulkhead (tranmission area) adjacent to hydraulic reservoir. Access is through the right transmission cowling.

CAUTION

Ensure that hydraulic fluid is the same as the type of hydraulic fluid in helicopter.

1-59. Hydraulic Test Stand Application. Application of the hydraulic test stand to helicopter can be accomplished by removing covers from test connections and attaching test stand connections to filter module connectors. A clean hydraulic test stand with a 10-micron filter and a relief valve setting of **1300** PSIG, a pressure compensator minimum setting of **1500** PSIG, and a volume output of **6** gallons per minute, shall be used for testing the hydraulic system. Hydraulic test stand will be serviced with clean hydraulic fluid (C112) or (C112.1) (figure 1-1).



1. Aft cabin cover
2. Nose cover
3. Forward cabin cover
4. Stabilizer bar cover
5. Pylon cover
6. Main rotor blade cover
7. Tail rotor blade cover
8. Body cover
9. Cap cover

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Figure 1-6. Aircraft all-weather covers

SECTION IV - INSPECTION REQUIREMENTS

1-60. GENERAL INFORMATION.

This chapter contains complete requirements for special inspections, overhaul and retirement schedule, and standards of serviceability applicable to the UH-1C and UH-1M series helicopter. The inspections prescribed in this chapter shall be accomplished at specified periods by aviation unit maintenance activities with the assistance of intermediate maintenance activities when required. Complete Daily and Phased Maintenance inspections are contained in TM 55-1520-220-PMD and TM 55-1520-220-PM.

1-61. STANDARDS OF SERVICEABILITY.

Standards of serviceability to be utilized in day-to-day inspection and maintenance of the helicopter can be found as fits, tolerances, wear limits, and specifications in the helicopter maintenance manuals. Standards of serviceability for transfer of helicopter are contained in TM 55-1500-326-24.

1-62. SPECIAL INSPECTION.

1-63. Description - Special Inspection. The special inspection contains the complete requirements for all components to be inspected at required intervals for maintenance of this helicopter.

1-64. Definition and General Information. This section supplements the scheduled inspections as outlined in the Preventive Maintenance Daily Inspection Checklist, TM 55-1520-220-PMD and Phased Maintenance Checklist, TM 55-1520-220-PM. 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. Areas of inspection are shown on figure 1-7. Refer to TM 38-750 for applicable forms, records, and worksheets required for these inspection intervals. Typical inspection items are:

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

NOTE

Whenever a component is removed after a Special Inspection and is to be forwarded to Depot for evaluation and overhaul, component must be tagged with reason for removal.

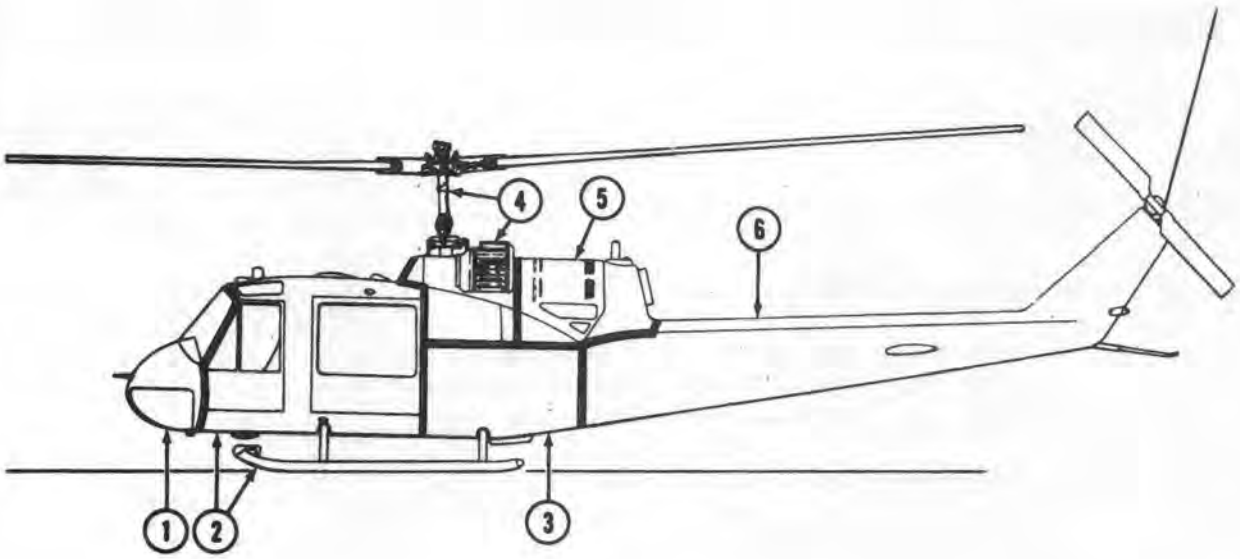
b. Inspection of components or airframe on a calendar basis: first aid kits, weight and balance check, helicopter inventory, etc.

c. Specific definitive inspections on helicopter engines are based strictly upon engine operating time.

d. Refer to TM 38-750 for applicable forms, records, and worksheets.

e. Special 25-hour inspections shall be accomplished at the daily inspection at or less than five (5) hours prior to 25, 50, 75, and 100 flying hours of each phase. The inspection at 100 hours shall coincide with the scheduled phase inspection.

1-65. Requirements. The requirements of this section shall include items which qualify under the criteria in paragraph 1-64 (Definition and General Information - Special Inspection), i.e., hard landings, sudden stoppage, overspeed, etc. The requirements shall be grouped under area headings only and shall be inserted in a columnar listing on the inspection checksheet format, in such a manner as to permit local reproduction of entire section.



AREA No. 1	**Nose Area**	**All surfaces, components, and equipment in nose compartment and on exterior ahead of crew doors.**
AREA No. 2	**Cabin and Landing Gear**	**All surfaces, components, and equipment inside cabin and on cabin exterior between forward sides of crew doors and cabin aft bulkhead. Includes complete landing gear.**
AREA No. 3	**Center Fuselage Area**	**All surfaces, components, and equipment in fuselage below engine deck level, between cabin aft bulkhead and tailboom attachment bulkhead. Includes fuel cells, compartment below main transmission, and compartments accessible through side doors on fuselage.**
AREA No. 4	**Pylon Area**	**All surfaces, components, and equipment of the main rotor pylon group, from top of mast to bottom of transmission and work deck area under forward cowling. Includes main rotor, mast and rotating controls, transmission with accessories and mounts, and main (input) driveshaft.**
AREA No. 5	**Engine Area**	**All surfaces, components, and equipment associated with engine installation, located above engine work deck and within engine cowling, tailpipe fairing, and air intake area.**
AREA No. 6	**Tailboom Area**	**All surfaces, components, and equipment located in or on the tailboom and vertical fin structure. Includes tail rotor, synchronized elevator, and control linkages; also the complete drive train of driveshafts and gearboxes between main transmission and tail rotor.**

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Figure 1-7. Area diagram

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 1	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas	AFTER EVERY HARD LANDING			
		a. Inspect landing gear skid tubes and crosstubes for damage or more than normal deflection. (Refer to LANDING GEAR, figure 3-3.) Inspect aft crosstube mounting for damage.		
		b. Check all cowling and doors for proper fit and alignment. Misaligned cowling may indicate a distorted fuselage, resulting in major stresses and damage to components.		
		c. Remove all cowling necessary to perform a complete visual inspection.		
		d. Inspect airframe structure with a ten-power magnifying glass at the transmission mounting points. Particular attention should be given to the rubber mount attachment points. Inspect lift link and attaching parts. Inspect aft crosstube mounting brackets and adjacent areas for structural damage. Inspect engine mount legs for bends and cracks.		
		e. Inspect tail skid tube and mounting for damage. Inspect tailboom internally and externally for cracks, distortion, and loose rivets. Make complete inspection of area where tailboom is attached to forward fuselage section. This includes all 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.		
		f. Carefully inspect the flight control system from pilot controls to rotor head for bent or damaged tubes, bellcranks, supports, and damaged bearings. Particular attention should be given to the mast control rods and collective sleeve assembly.		
		g. Using a hydraulic test stand, pressurize hydraulic control system and check for leaks, interference or binding, and satisfactory operation.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 2	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas (Cont)		h. Inspect dynamic stop for obvious damage. i. Inspect main rotor blades for evidence of contact with tailboom. If damage is found, refer to inspections for SUDDEN STOPPAGE MAIN ROTOR STRIKE. j. Inspect tail rotor blades for damage. If damage is found, refer to INSPECTION FOR SUDDEN STOPPAGE — TAIL ROTOR STRIKE. k. Inspect fuel and oil systems for damage. Before flight, pressurize fuel and oil systems and check for leaks. l. Check accessory drive gearbox for cracked flanges. m. Check overspeed governor and tachometer drive for distortion, cracks, and bent shafts. n. Inspect oil filter for loose bolts, damaged filter element, and metal particles. o. Inspect oil pump for loose bolts and cracked flanges. p. Check fuel control for cracked flanges. q. Check engine mounting pad for cracks. r. Check oil and fuel hose connections for tightness. s. Check all accessories for loose bolts, nuts, and connections. t. Inspect engine. Refer to TM 55-2840-229-23 for inspection after Excessive Engine G Loads.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 3	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas (Cont)		AFTER EVERY HARD LANDING: IF DAMAGE TO CENTER FUSELAGE STRUCTURE OR TAILBOOM IS SUCH THAT A MAJOR REPAIR, REPLACEMENT, OR ALIGNMENT IS NECESSARY, REPLACE THE FOLLOWING COMPONENTS: **NOTE** **Hard landings, for the purpose of the evaluation criteria outlined below, may be defined as any incident in which the impact of the helicopter with the ground causes severe pitching of the main rotor, allowing dynamic stops to severely contact the mast, or pitching resulting in cracking the aft lugs of the transmission lower case. This definition is confined only to those incidents not involving sudden stoppage.** a. **Hard Landing Evaluation Criteria Established for Transmissions:** Remove the transmission and return to depot for evaluation overhaul. b. **Hard Landing Evaluation Criteria Established for Input Driveshafts:** Remove input driveshaft and return to depot for evaluation overhaul. c. **Hard Landing Evaluation Criteria Established for Mast:** (1) If inspection reveals yielding or deformation in the area which would be contacted by the main rotor or other obvious damage, the mast assembly should be considered unserviceable and nonrepairable.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 4	NO. OF PAGES 34
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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas (Cont)		(2) If post inspection does not reveal above discrepancies, the component should be returned to depot for evaluation overhaul. **d. Components Not Requiring Evaluation Criteria Due to Hard Landings:** Thorough engineering investigation has determined hard landings, as defined above, do not adversely affect the components listed below. If thorough visual inspection does not reveal any discrepancies or obvious damage to components listed below, they may be retained in service for continued usage. (1) Main rotor blades. (2) Tail rotor blades. (3) Main rotor hub. (4) Tail rotor hub. (5) Intermediate (42 degree) gearbox. (6) Tail rotor (90 degree) gearbox. (7) Tail rotor driveshafts. (8) Driveshaft hanger assemblies. (9) Stabilizer bar assembly. (10) Swashplate and support assembly. (11) Scissors and sleeve assembly including collective levers and idler.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 5	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas (Cont)		AFTER EVERY HARD LANDING: IF EXCESSIVELY HARD CONTACT OCCURS BETWEEN THE MAIN ROTOR HUB STOP AND THE MAST, REPLACE AND ALIGN THE FOLLOWING COMPONENTS: a. Main rotor blades and attachments. b. Main rotor hub. c. Transmission and mast assembly. d. Transmission to fuselage lift link. e. Perform engine-to-transmission alignment check (paragraphs 6-12 or 6-24). AFTER EVERY HARD LANDING: IF DAMAGE IS FOUND IN ROTATING CONTROLS, REPLACE THE FOLLOWING COMPONENTS: a. Stabilizer bar assembly. b. Main rotor pitch horns. c. Scissors and sleeve assembly. d. Swashplate and support assembly including collective levers and idler. e. All connecting controls and control bolts. f. Perform engine-to-transmission alignment check. (Paragraph 6-24).		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 6	NO. OF PAGES 34
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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4		SUDDEN STOPPAGE (POWER ON OR POWER OFF) Sudden stoppage is defined as an instantaneous shock load applied to the drive train and rotor systems with POWER ON or POWER OFF. Shock loads result from: a. Blade(s) striking a movable object. b. Blade(s) striking an immovable object. c. Seizures which occur as a foreign object is destroyed when it passes through a drive train component. d. Engine compressor stall. After a sudden stoppage event has occurred, one of the following special inspections shall be conducted depending on the origin of the shock load. SUDDEN STOPPAGE - MAIN ROTOR BLADE STRIKE 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 below.		
4,6		Minor damage to either blade. **NOTE** **This category includes both repairable damage and skin tears whether repairable or not.** a. Inspect and replace the following items if damage is found: **NOTE** **If damage is found on any of these components, the tail rotor grip assemblies and tail rotor blade attach bolts must be scrapped.** (1) Stabilizer bar tubes and frame for distortion/cracks. (2) Main rotor hub pillow block attach bolts and drag brace jam nuts and attach bolts for security. (3) Flight control system, from the rotor to servo cylinder, for bent or damaged tubes.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,6 (Cont)		(4) Scissors levers drive links for damage. (5) Swashplate gimbal mounting for damage. (6) Collective friction collet assembly for free travel. (7) Structure at transmission mounting points (use ten-power magnifying glass) for cracks. (8) Lift link and structure for damage, security and distortion. (9) Main drive shaft. (10) Mast. (11) 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. (12) 42 degree and 90 degree gearboxes for metal particles. (13) Tail rotor drive shafts and hanger assemblies for obvious damage. b. Repair/replace blades as required. c. Inspection complete. 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.** 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) Stabilizer bar and damper assembly (scrap). (8) Control rods (rotor to scissors levers) (scrap).		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 8	NO. OF PAGES 34
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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,5,6		(9) Transmission (overhaul). (10) Engine (refer to TM 55-2840-229-23). (11) Tail rotor hub assembly and blade attach bolts (scrap). b. Inspect and repair/replace the following as required. (1) Tail rotor blades. (2) 42 and 90 degree gearboxes (inspect for damage to gears and input/output couplings). (3) Tail rotor hanger assemblies (inspect for internal and curvic coupling damage). (4) Aircraft structure. (5) Tail rotor drive shaft. (6) Main drive shaft (inspect for internal and curvic coupling damage). (7) Engine (refer to TM 55-2840-229-23). c. Inspection complete.		
6		SUDDEN STOPPAGE - TAIL ROTOR BLADE STRIKE No visible damage to either blade. a. Inspect doublers for bonding separation, attachment area for distortion. b. Scrap tail rotor grip assemblies and tail rotor blade attach bolts. c. Inspect tail rotor rotating controls for damage. d. Inspect 42 degree and 90 degree gearboxes for metal particles. e. Tail rotor drive shafts and hangers for obvious damage. f. If no damage is found, inspection complete. If damage is found, proceed to paragraph below. Visible damage to either blade. a. Scrap tail rotor hub assembly, tail rotor blade attach bolts and damaged blade. b. Replace 42 degree and 90 degree gearboxes and return for overhaul. c. Inspect and replace the following items if damage is found: (1) Opposite blade. (2) Tail rotor rotating controls. (3) Tail rotor drive shafts.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,6		(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 drive shaft.		
		(7) Tailboom attachment points.		
		(8) Mast assembly.		
		(9) Main rotor rotating controls and stabilizer bar assembly.		
		(10) Main rotor blades.		
		(11) Main rotor hub pillow block attach bolts and drag brace jam nuts for security.		
		(12) Engine (refer to TM 55-2840-229-23).		
		d. Inspection complete.		
4,5,6		SUDDEN STOPPAGE - INTERNAL FAILURE OF DRIVE TRAIN COMPONENT		
		Replace the following: (Disposition as noted.)		
		a. Transmission (overhaul).		
		b. Mast assembly (overhaul).		
		c. 42 degree gearbox (overhaul).		
		d. 90 degree gearbox (overhaul).		
		e. Engine (refer to TM 55-2840-229-23).		
		f. Tail rotor hub assembly and blade attach bolts (scrap).		
		g. Main rotor hub assembly (overhaul).		
		Inspect and repair/replace the following as required:		
		a. Main rotor blades.		
		b. Main rotor rotating controls and stabilizer bar assembly.		
		c. Tail rotor blades.		
		d. Main drive shaft (inspect for internal and curvic coupling damage).		
		e. Tail rotor drive shafts.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,5,6 (Cont)		f. Tail rotor hanger assemblies (inspect for internal and curvic coupling damage). g. Aircraft structure. Inspection complete.		
5,6		SUDDEN STOPPAGE - 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 acccordance with TM 55-2840-229-23. b. Inspect 90 degree gearbox for damage to gears, unusual wear pattern on either coast or drive side of gears and damage to input/output coupling internal and curvic coupling splines. (1) No damage to 90 degree gearbox: Visually inspect remaining tail rotor drive shaft components. If no damage is found, inspection complete. (2) Damage to 90 degree gearbox or other drive train component: Perform inspection requirements of paragraph below: (a) Inspect and replace the following items if damage is found: 1 42 degree gearbox (inspect for damage to gears, unusual wear pattern on either coast or drive side of gears and damage to input/output coupling internal and curvic coupling splines). If 42° gearbox inspection reveals damage or abnormal gear wear pattern, it will require a gear wear pattern inspection of the tail rotor drive quill. 2 Tail rotor hanger assemblies (inspect for internal spline and curvic coupling damage). 3 Tail rotor drive shafts. 4 Main rotor drive shaft. 5 Transmission sump oil filter, external oil filter and chip detector for metal particles. (a) Positive indications are cause for replacing transmission.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
5,6 (Cont)		(1) Replace input drive quill. (2) Replace generator drive quill. (3) Replace hydraulic pump and tachometer drive quill and mast assembly shall not be used on the replacement transmission. (4) Replace transmission oil cooler. (5) All hoses, tubes and fittings shall be flushed. (b) If no metal particles are found, continue operation for 5 hours and then repeat inspection. If no positive indications are found, resume normal operation: 6 Mast assembly. 7 Aircraft structure including tailboom attachment area and vertical fin. 8 Replace main rotor hub trunnion attach bolts. 9 Tail rotor blades. (b) Scrap tail rotor hub assembly. (c) Inspection complete.		
4&6		**AFTER MAIN ROTOR OVERSPEED** Inspection and/or replacements are required after any report that main rotor has exceeded 339 RPM. When 356 RPM has been exceeded, additional requirements apply.		
4,6		MAIN ROTOR OVERSPEED LESS THAN 356 RPM. Inspect: a. Inspect main rotor blades for damage, bond separation and distortion. b. Inspect tail rotor blades for damage, bond separation and distortion.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,5,6		**MAIN ROTOR OVERSPEED EXCEEDING 356 RPM.** a. Inspect main rotor blades as follows: (1) Remove tip cap and inspect balance weights. Looseness or deformation of weights is cause for blade replacement. (2) Visually inspect blade skins. Any wrinkle or deformation is cause for blade replacement. (3) Visually inspect for evidence of looseness of inertia weight inside blade spar. If blades have visible screws through the leading edge abrasion strip to attach inertia weight inside spar, inspect for loose screws or distorted holes. If screws are covered by the abrasion strip, remove tip cap to inspect inertia weight. Any evidence of looseness of weight is cause for blade replacement.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,5,6 (Cont)		(4) Blades which pass these inspections are acceptable for further service.		
		b. Replace main rotor hub assembly. Send removed hub to overhaul facility with information on overspeed incident.		
		c. Visually inspect blade retention bolts and drag brace bolts for damage.		
		d. Inspect tail rotor blades as follows:		
		(1) Bond separation around tip block or crack in tip block through tip weight holes is cause for replacement of blades. Send removed blades to overhaul facility for evaluation and possible repair.		
		(2) If laminate or grip plate bond separation is found, the tail rotor blades ehall be locally condemned and demilitarized rather than sent to an overhaul facility.		
		(3) If there is no visible damage, blades are acceptable for further service.		
f		e. Perform a thorough visual inspection of tail rotor hub assembly. If discrepancies are not found, the hub may be retained in service.		
		f. Replace the four tail rotor blade retention bolts and rebalance tail rotor hub and blade assembly.		
		g. Visually inspect the following components, which may be considered satisfactory for continued use if visible damage is not found. Replace any damaged components.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
	(g Cont)			
4,5,6 (Cont)		(1) Transmission. (2) Intermediate gearbox. (3) Tail rotor gearbox. (4) Mast. (5) Main input driveshaft. (6) Tail rotor driveshaft. (7) Driveshaft hanger assemblies. (8) Stabilizer bar assembly. (9) Swashplate and support assembly. (10) Scissors and sleeve assembly, collective levers, and idler.		
	h. Inspection complete.			
5	**AFTER ENGINE OVERSPEED**			
		Perform an engine overspeed inspection. Refer to TM 55-2840-229-23 for overspeed limits and inspection procedure.		
	AFTER OVERTORQUE			
		Overtorque is defined as any incident in which torsional loads are introduced into the helicopter dynamic system in excess of 50 psi as determined on the engine torquemeter (calibrated).		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
5 (Cont)		**NOTE** **Use calibrated torque for overtorque limits. The following table will aid in converting indicated torque to calibrated torque, when the numbers are extrapolated beyond the scale in TM 55-1520-220-10, Chapter 7, Torque Available Chart.** (T53-L-11) ENGINE **Calibration Factor: — Multiply Indicated Torque By:** 50 — .96 49 — .975 48 — .99 47 — 1.005 46 — 1.02 45 — 1.035 44 — 1.05 Example: Indicated Torque 60 PSI, with calibration factor of 44 (60x1.05 = 63 PSI Calibrated). (T53-L-13) ENGINE **Calibration Factor: — Multiply Indicated Torque By:** 64 — .96 63 — .97 62 — .98 61 — 1.00 60 — 1.02 59 — 1.04 58 — 1.07 **Example: Indicated torque 60 psi, with calibration factor of 58 (60 x 1.07 = 64.2) (psi calibrated).**		
6		OVERTORQUE FROM 50 THROUGH 56 PSI If thorough visual inspection does not reveal obvious damage, the following parts may be retained in service: **a. Tail rotor blades.** **b. Tail rotor hub.** **c. 42 degree gearbox.** **d. 90 degree gearbox.**		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,6 (Cont)		e. Drive shaft hanger assemblies. f. Stabilizer bar assembly.		
4,6		OVERTORQUE FROM 56 THROUGH 61 PSI a. Inspect main transmission sump oil filter, external oil filter and chip detector for metal particles. (1) Positive indications are cause for replacing transmission and returning to overhaul for evaluation. (2) If there are no positive indications, continue operation for 5 hours, then repeat inspection. If no positive indications are then found, resume normal operation. b. Remove and replace main rotor trunnion cap bolts. c. If thorough visual inspection does not reveal obvious damage, the following parts may remain in service: (1) Main rotor blades. (2) Main rotor hub. (3) Tail rotor blades. (4) Tail rotor hub. (5) 42 degree gearbox. (6) 90 degree gearbox. (7) Tail rotor drive shaft. (8) Drive shaft hanger assemblies. (9) Stabilizer bar assembly. (10) Swashplate. (11) Scissors and sleeve assembly. (12) Input drive shaft. (13) Mast. (14) Drive links. OVERTORQUE IN EXCESS OF 61 PSI a. Return the following assemblies to overhaul for evaluation. (1) Transmission assembly. (2) Input driveshaft assembly.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4,6 (Cont)		(3) Main rotor blades. (4) Main rotor hub assembly. (5) Mast assembly. b. If thorough inspection after overtorque in excess of 61 PSI does not reveal obvious damage, the following parts may remain in service: (1) Tail rotor blades. (2) Tail rotor hub. (3) Intermediate gearbox. (4) Tail rotor gearbox. (5) Tail rotor driveshaft. (6) Driveshaft hanger assemblies. (7) Stabilizer bar assembly. (8) Swashplate. (9) Scissors and sleeve assembly, collective levers, and idler. (10) Drive lines. **NOTE** **It is imperative that component removal record of dynamic components should reflect overtorque as reason for removal.**		
4	MAST BUMPING	a. Visually inspect the mast area where the dynamic stop installation would contact the mast. If no surface deformation of the mast has occured, the inspection is complete.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
ALL		**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. (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 systems 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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b. If there is visual evidence of surface deformation of the mast due to main rotor hub to dynamic stop installation contact:

(1) Evaluate the condition of the mast per the damage limits in Chapter 6.

(2) Inspect and replace the following items if damage is found:

(a) Main rotor hub trunnion cap attach bolts and drag brace jamnuts and attach bolts for security.

(b) Flight control system, from rotor to servo cylinder, for bent or damaged tubes and rod end bearings.

(c) Structure at transmission mounting points.

(d) Lift link and structure for damage, security and distortion.

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

(f) Main driveshaft.

(g) Tail rotor driveshafts and hanger assemblies for obvious damage.

(h) Tail rotor drive quill.

(i) Top forward section of fuselage.

(j) Tail rotor drive shaft cover.

(k) Dynamic stop installation.

WHEN THE ENGINE HAS EXCEEDED OVER TORQUE LIMITS

Refer to TM 55-2840-229-23.

AFTER EMERGENCY FUEL HAS BEEN USED

Refer to TM 55-2840-229-23 and TB 55-9150-200-24.

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas (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.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas (Cont)		(e) Check short shaft for residual magnetism. If magnetized, remove, disassemble and visually inspect short shaft for damage and remove engine and return for overhaul. Repair or replace short shaft as required. (f) If strike occurred on stabilizer bar, replace bar. Inspect remainder of the stabilizer assembly for damage. (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. If no damage, replace all bearings and blade/trunnion attach bolts, and return to service. (c) Remove and condemn pitch change links, counterweight links, crosshead bearing, and control quill bearings. (d) Inspect crosshead, control quill components, 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.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
		(g) If all hangers are magnetized, remove transmission and return for overhaul. (h) 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 HELICOPTER IS FLOWN INTO AREA WITH BLOWING SAND AND/OR LOOSE GRASS ENVIRONMENT. (REFER TO TM 55-2840-229-23.) **NOTE** **If FOD screen and particle separator are installed, remove upper halves to accomplish this inspection. If blockage is evident, the lower half of the separator must be removed to ensure complete removal of grass or foreign material.**		
5		AFTER ENGINE OVER-TEMPERATURE. Perform an engine over-temperature inspection. (Refer to TM 55-2840-229-23.) **NOTE** **If engine cannot be operated without exceeding egt limits as specified in TM 55-2840-229-23 "Engine Operating Limits Table", this is indication of engine malfunction or instrument error. Refer to troubleshooting (TM 55-2840-229-23) to determine cause and correct action, as overtemperature inspection may not be required.** ENGINE OIL OVER TEMPERATURE LIMITS. (REFER TO TM 55-2840-229-23.)		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
5 (Cont)		AFTER ENGINE OVERSPEED. (Refer to TM 55-2840-229-23.)		
		ENGINE OVERSPEED LIMITS EXCEEDED. (Refer to TM 55-2840-229-23.)		
		ENGINE POST-INSTALLATION INSPECTION.		
2,3,5		a. Check installation of power control linkage in accordance with Chapter 4, Section VII.		
		b. Perform exhaust gas temperature (egt) system test. (Refer to TM 55-2840-229-23 and TM 55-4920-244-14.)		
		c. Perform a Daily Inspection. **NOTE** **The following paragraph d need not necessarily be performed if the engine has merely been removed and reinstalled for reasons other than engine maintenance. However, the engine should be inspected for leaks and security of mounting provisions, hoses and accessories prior to flight.**		
		d. Inspect engine before and after initial check run. (Refer to TM 55-2840-229-23.)		
		e. Perform an engine vibration test. (Refer to TM 55-2840-229-23.)		
		f. Perform a limited test flight.		
		g. Check torque to tail pipe "V" band clamp again after test flight or engine ground run. **NOTE** **Not required when engine has been removed and reinstalled for other maintenance.** **NOTE** **If engine performance appears to deviate from desirable limits, perform adjustment of fuel control. (Refer to TM 55-2840-229-23.)**		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
5		WHENEVER AN ENGINE HAS BEEN REMOVED, REPLACED OR RE-INSTALLED FOR ANY REASON; OR WHEN ANY MAINTENANCE HAS BEEN PERFORMED THAT AFFECTS THE FUEL FLOW, AIR FLOW OR GAS PATH OF THAT ENGINE. Perform a baseline turbine engine analysis check (TEAC). (Refer to TM 55-2840-229-23.)		
5		ENGINES DROPPED DURING HANDLING. **(Refer to TM 55-2840-229-23.)** ENGINE SUBJECTED TO LOADINGS POSSIBLY EXCEEDING 10G VERTICAL, 4G LATERAL, 3G FORWARD, AND 4G AFT. If it is suspected that excessive G loads have been imposed on engine, make the following inspections immediately after flight during which excessive loads occurred. (Refer to TM 55-2840-229-23, ENGINE EXCESSIVE G LOADS.) a. Check overspeed governor and tachometer drive assembly for cracks, distortion, and bent shafts. b. Check engine mounting pads for cracks. c. Check fuel control, accessory drive gearbox, oil filter, and all accessories for cracked flanges, loose bolts, nuts, and hose connections for cracks. d. Perform a baseline turbine engine analysis check (TEAC). **(Refer to TM 55-2840-229-23.)**		
6		AFTER AOAP NOTIFICATION OF HIGH CONCENTRATIONS OF COPPER, ALUMINUM, IRON, SLUDGE, OR A COMBINATION OF THESE IN TAIL ROTOR GEARBOX. a. Inspect tail rotor control tube for wear and excessive grease. b. Inspect tail rotor control quill assembly for wear.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
6 (Cont)		c. Drain, flush with operating oil to eliminate sludge. Repeat if necessary. d. Resample oil per AOAP instructions. (TB 43-0106).		
5		REPORTED LOSS OF POWER OR HIGH EXHAUST GAS TEMPERATURE CONDITION. Thoroughly investigate the engine inline (engine deice) valve for proper functioning prior to proceeding with troubleshooting procedures (TM 55-2840-229-23).		
4		TRANSMISSION OIL OVER TEMP a. Troubleshoot transmission oil system to determine cause. b. Replace transmission, mast, oil cooler and external oil filter if cause is due to transmission internal failure. c. 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, drain and refill transmission oil system. d. If temperature exceeded above limits, replace transmission and mast. If abnormal contamination is present, also replace oil cooler and external oil filter. 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. c. Inspect quick disconnects for engagement and of cut-off valves.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4 (Cont)		MAIN ROTOR HUB INSPECTION The following inspection shall be performed whenever external indications of hub problem exist, i.e., unusual noises, excessive heat, vibrations, etc. a. Remove hub assembly from aircraft and disassemble to the extent required in order 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. (6) Flapping axis Teflon bearings, trunnion sleeves, and dust seals (P/N 540-011-101-9 UH-1 hub assemblies only). b. Replace items as required, reassemble hub assembly and reinstall on aircraft. c. If the hub feathering axis bearings were worn to the extent that rotor feedback forces were evident in the controls, connecting links P/N 540-011-428-1/-5 shall be replaced.		
5		EVERY 20 TO 25 HOURS INSPECT THE 540 MAIN ROTOR HUB a. Inspect feathering bearings for squeaking, binding and ratcheting while feathering grips to each limit of travel, pitch change links disconnected (one grip at a time). Remove sand defector (P/N 540-011-174-11) for a more detailed visual inspection of feathering bearings for deteriorated or loose teflon lining. b. Inspect Teflon trunnion bearings (P/N 540-011-101-5/-9 hubs only) for squeaking, binding and ratcheting while flapping hub to each limit of travel. NOTE Do not flap the rotor hard against the mast. EACH 550, 650, 750, 850, 950, AND 1,050 BLADE TOTAL HOURS SINCE NEW Perform Ultrasonic Shear Wave and Thru Transmission Inspection on P/N 540-011-001-5 and 540-011-250-1 main rotor blades.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
4		AFTER INSTALLATION - MAIN ROTOR HUB. Retorque main rotor hub retention nut **520 TO 780** foot-pounds after first flight and after five to ten hours of operation (not required when Power Dyne Equipment is employed during initial installations).		
4		AFTER INSTALLATION — SCISSORS AND SLEEVE COLLECTIVE MAST FRICTION COLLET. After test flight and after five hours of operation following installation of a new or reinstalled collet set, recheck friction as outlined in paragraph 5-86.i.		
6		AFTER INSTALLATION — TAIL ROTOR. Between five and ten hours of flight, after installation of tail rotor, torque tail rotor retaining nut **300 TO 400** inch-pounds. AFTER INSTALLATION — CONTROL CHAIN AND/OR SPROCKET Between five and ten hours after installation of control chain and/or sprocket, check tail rotor control cable tension and adjust as required. AFTER INSTALLATION — TAIL ROTOR HUB AND/OR BLADES. Balance and track tail rotor hub and blade assembly.		
All Areas		AFTER INSTALLATION OF TAIL BOOM Retorque (apply torque force in the tightening direction only) attachment bolts after first flight. **AFTER THE AIRCRAFT HAS REMAINED INACTIVE FOR SEVEN CONSECUTIVE DAYS:** Process the aircraft into the appropriate storage category. (Refer to Appendix E.) **AFTER TRANSMISSION, ELECTRICAL EQUIPMENT, OR MAJOR STRUCTURAL EQUIPMENT CHANGE, LIKELY TO AFFECT COMPASS.** Magnetic and remote compass - check for accuracy. Swing compass (TM 55-1500-204-25/1). **AIRCRAFT IN FLYABLE STORAGE.** Perform preventive maintenance. (Refer to Appendix E.)		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
3		OVERFLOW OF BATTERY. a. Sheet metal surfaces and overlaps both internal and external for damage. b. Rivets, bolts, screws, and other hardware in area internally and externally for damage. c Hidden areas in vicinity of battery for damage.		
6		d. All metal parts throughout length of tailboom assembly for damage.		
1		AFTER WASHING HELICOPTER. Check pitot static system for moisture (drain plug removed).		
All Areas		AFTER THE HELICOPTER HAS BEEN SUBJECTED TO SALTWATER OR SALTWATER 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 (TM 43-0105). Apply corrosion preventive compound to exposed nonpainted, anodized, or cadmium plated assemblies. Clean engine compressor in accordance with TM 55-2840-229-23.		
4		HELICOPTERS WHICH ARE BEING OPERATED UNDER HIGH HUMIDITY (80 PERCENT) OR SALT LADEN ATMOSPHERIC (50 PERCENT HUMIDITY) ENVIRONMENTAL CONDITIONS WILL REQUIRE THE FOLLOWING MINIMUM DAILY BLADE MAINTENANCE. Daily using a mild soap detergent wash blades thoroughly. Rinse with clear water and dry. All aircraft down for maintenance or non-flyable storage are not subject to blade wash and inspection.		
5,6		AFTER HELICOPTER HAS BEEN EITHER PARKED OR OPERATED IN RAIN, AND/OR HEAVY SNOW.		
6		a. Purge lubricate tail rotor hub and blade grip bearings.		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
5		b. Open engine inlet area and remove upper air filter assembly. Inspect and clean particle separator parts. **NOTE** **Inspection does not apply to helicopters with self-purge type separators.** **NOTE** **Inspection not required if helicopter was parked with protective covers installed.**		
4,5		IMMEDIATELY AFTER EXPOSURE TO WATER FROM AIRFRAME OR ENGINE WASHING; OR AT NEXT DAILY INSPECTION AFTER EXPOSURE TO RAIN, SNOW, SLEET OR ICE. Using a clean dry cloth, wipe water deposits from plyon structural members and engine deck.		
All Areas		WHEN AVAILABLE INFORMATION INDICATES EXPOSURE TO RADIOACTIVITY Accomplish the following. (Refer to TM 3-220.) a. Survey helicopter for level of radioactivity. b. Decontaminate helicopter as required.		
		UPON TRANSFER AND UPON RECEIPT OF A HELICOPTER, UPON EXPIRATION OF 12 MONTHS ELAPSED TIME SINCE LAST INVENTORY, AND UPON PLACING HELICOPTER IN STORAGE AND UPON REMOVING FROM STORAGE, (NOT REQUIRED WHEN AIRCRAFT IS PLACED IN OR REMOVED FROM FLYABLE STORAGE), INVENTORY HELICOPTER FOR AVAILABILITY OF INVENTORIABLE PROPERTY. (REFERENCE TM 38-750.) HELICOPTER NEED NOT BE INVENTORIED WHILE IN STORAGE.		
1		**AFTER M-5 SYSTEM INSTALLED.** **Inspect attachment points and adjacent area with a 10-power magnifying glass for loose rivets, cracks, and corrosion.**		

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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
All Areas		EVERY 30 MONTHS THE AIRCRAFT WILL BE WEIGHED. **Weigh helicopter per AR 95-16 and/or TM 55-405-9 after installation, removed or relocation of equipment and/or major modification which results in an unknown change in the basic weight and balance; after report of unsatisfactory flight characteristics. Accomplish necessary weight and balance data (DD Forms 365).**		
3		PREFLIGHT AND/OR EACH USAGE OF RESCUE HOIST. **NOTE** **Use safety strap with forest penetrator if possible.** a. Inspect rescue hoist hook (NSN 1680-931-7084, Part No. BL6280) for damage. Give special attention to hook keeper; cable covered by boot for broken strands. b. Straighten bent clips. c. Bend weak springs as necessary to restore tension. d. Replace AN526-C632-12 screws and MS21045006 nuts that are damaged.		
2		AFTER RESCUE HOIST CABLE MAINTENANCE A 300 pound load should be raised and lowered by the hoist a minimum of five up and down cycles. Length of cycle is a minimum of 5 feet. Cable will then be inspected for condition and fraying.		
5		PRIOR TO EVERY ARMED FLIGHT Make thorough inspection of fuel tank and fuel lines for leaks. Inspect filler cap for sealing, security and spillage.		
4		AFTER ONE HOUR OF OPERATION AFTER OVERHAUL, REPAIR OR REPLACEMENT **Visually inspect engine to transmission drive shaft for cracks, excessive grease, leakage, security and condition.**		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 29	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
6		Deleted		
5		EVERY 12-1/2 HOURS OF OPERATION Engine spectrometric oil analysis. (Refer to TB 43-0106.)		
4,6		EVERY 25 HOURS OF OPERATION Transmission spectrometric oil analysis; hydraulic system spectrometric oil analysis; 42 degree gearbox spectrometric oil analysis; 90 degree gearbox spectrometric oil analysis. (Refer to TB 43-0106.)		
4		**EVERY 25 HOURS** Remove transmission sump oil filter (wafer disk screens) and electrical chip detector and check for contamination; then clean.		
4		EVERY 25 HOURS Disconnect scissors drive links from trunnions and check swashplate bearing for roughness, binding, and vertical play.		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 30	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
6		EVERY 25 HOURS OF OPERATION All silent chains shall be subjected to a close visual inspection for cracks, while installed on helicopters (by opening tail rotor drive shaft covers) using at least a three-power magnifying glass and adequate light source.		
1		EVERY 25 HOURS OR 30 DAYS, WHICHEVER OCCURS FIRST, ACCOMPLISH THE FOLLOWING: a. Perform preventive maintenance checks and services on the nickel-cadmium battery (TM 11-6140-203-14-2). b. Check voltage regulator setting (on carbon pile regulators only): adjust for temperature as required (TM 55-1500-204-25/1 and TM 11-6140-203-14-2).		
		EVERY 50 HOURS OF OPERATION Bypass strainer in main fuel line to manifold (T53-L-11 Series): Inspect before and after cleaning.		
4		EVERY 50 HOURS OR 30 DAYS, WHICHEVER OCCURS FIRST: Wash main and tail rotor blades. (Refer to Section I).		
2		EVERY 50 HOURS (HELICOPTERS EQUIPPED WITH LOCALLY FABRICATED HEAVY DUTY SKID SHOES ONLY). ACCOMPLISH THE FOLLOWING: **NOTE** **The crosstube inspection may be accomplished utilizing either Procedure A or Procedure B as described in the following paragraphs. Procedure A provides for a non-destructive inspection by the ultrasonic shear wave method whereas Procedure B provides for a non-destructive inspection method (refer to TM 43-0103).** a. Procedure A should be conducted as follows: (1) Make aircraft safe for jacking procedures (paragraph 3-7).		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 31	NO. OF PAGES 34
AIRCRAFT AND SERIAL NO.	INSPECTION NO.	DATE OF INSPECTION	

AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
2 (Cont)		(2) Loosen and remove forward and aft cap assemblies (paragraph 3-3) which secure landing gear to the fuselage. (3) Jack airframe and remove landing gear assembly (paragraphs 1-37 and 3-3). (4) Conduct visual inspection of crosstubes for nicks, scratches or gouges over entire crosstube surface. Refer to paragraph 3-8 and 3-9 for allowable damage criteria. (5) Smooth upper half of crosstube surface outboard of the attachment fitting with abrasive cloth (C1.10) and wipe clean. **NOTE** **It is not absolutely necessary to remove all paint on surface of crosstubes for the ultrasonic inspection. However, it is necessary to remove any scratches or rough spots to allow integral contact between the transducer and the crosstube.** (6) The ultrasonic inspection will be conducted by any certified ultrasonic inspector in accordance with Field Services Activity, Ultrasonic Inspection Procedures as provided to Field Service personnel by TSARCOM. (7) Prime and repaint all inspected surfaces necessary to restore to original condition for corrosion prevention. (8) Reinstall landing gear assembly (paragraph 3-4). b. Procedure B should be conducted as follows: **NOTE** **This inspection is to be conducted by AVUM maintenance with assistance from AVIM maintenance as required to gain access to inspection area.**		

AIRCRAFT INSPECTION CHECKSHEET	TYPE OF INSP. (Daily, Intermediate, etc.) SPECIAL	PAGE NO. 32	NO. OF PAGES 34
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AREA NO.	REQUIREMENT EVERY	ITEM	STATUS	RECORDED ON WORKSHEET
2 (Cont)		(1) Jack airframe and remove landing gear assembly (paragraphs 1-37 and 3-3). (2) Conduct visual inspection for nicks, scratches or gouges over entire crosstube surface. Refer to paragraph 3-8 and 3-9. (3) Remove rivets securing crosstube/fuselage attachment fittings to crosstubes and remove fittings. Save fittings for reuse. (4) Prepare the surfaces for and conduct an NDI Inspection following procedures as described in TM 43-0103, penetrant kit NSN 6850-00-782-2740 on the surfaces of the crosstubes previously covered by the attachment fittings. (5) Wash and remove all excess penetrant from the crosstube surfaces. (6) Recoat surface of crosstube to be covered by the attachment fittings with sealant (C188). (7) Reinstall attachment fittings with MS20601M6W7 rivets. (8) Reinstall landing gear assembly in (paragraph 3-10). c. Any crosstube identified as showing crack indications by Procedure A should be subjected to Procedure B as a verification inspection. All those crosstubes which show crack indications either by Procedure A and B together or Procedure B alone are to be scrapped. All crosstubes found with no crack indications are to be returned to service.		
1		**EVERY 100 HOURS OR 120 CALENDAR DAYS, WHICHEVER OCCURS FIRST, ACCOMPLISH THE FOLLOWING:** **a. Perform preventive maintenance checks and services on the nickel-cadmium battery (TM 11-6140-203-14-2).** b. Check voltage regulator setting (solid state regulators only); adjust for temperature as required (TM 55-1500-204-25/1 and TM 11-6140-203-14-2).		

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
4		**EVERY 600 HOURS OR ANNUALLY, WHICHEVER OCCURS FIRST, ACCOMPLISH THE FOLLOWING:** **Main input drive shaft disassembled and coupling internal splines inspected and lubricated.**		
All Areas		EVERY 600 HOURS OR ANNUALLY, WHICHEVER OCCURS FIRST, ACCOMPLISH THE FOLLOWING: a. Lubricate tail rotor driveshaft flexible couplings. b. Visually check splines for wear and nicks. c. Visually check flexible coupling seal for proper installation, cuts, and tears. d. Inspect hanger bearings for evidence of grease leakage, corrosion, overheating (discoloration of adjacent metal), and notchiness. e. Hanger bearing support fittings for nicks, scratches, corrosion or hole elongation or wear.		
5		**EVERY 600 HOURS** **Hot end inspection on T53-L-13B engine with P/N 1-110-520-21 nozzle installed. (Refer to TM 55-2840-229-23.)**		
5		**EVERY 900 HOURS OR EACH TIME THE ENGINE IS REMOVED AND REPLACED.** **Engine oil tank and oil cooler drained and refilled. If engine is replaced due to internal failure, flush all airframe mounted engine oil lines, engine oil tank and replace engine oil cooler.**		
4		**EVERY 900 HOURS OR EACH TIME THE TRANSMISSION IS REMOVED OR REPLACED.** Transmission and transmission oil cooler drained. Transmission oil pump screen inspected for metal particles and other contaminants. Clean screen and replace transmission oil. Refill to proper level.		

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 6 MONTHS** a. Weight check CF3Br type fire extinguishers (TM 55-1500-204-25/1). b. Inspect and test connector receptacle (ground) in accordance with TM 55-1500-204-25/1.		
2		EVERY 12 MONTHS: a. Magnetic compass for discoloration of liquid and proper calibration; recompensate if necessary (TM 55-1500-204-25/1). b. Remote compass for calibration (TM 55-1500-204-25/1).		
2		EVERY 24 MONTHS First aid kit for inspection (TM 55-1500-328-25).		
1,2		EVERY 24 MONTHS OR NEAREST SCHEDULED INSPECTION Perform functional check of pitot-static system.		
2		**PRIOR TO INSTALLATION OF OUTSIDE AIR TEMPERATURE GAGE** Each time the outside air temperature gage is replaced, test the replacement gage (TM 55-1500-204-25/1). **EVERY 5 YEARS** Replace primer charge for rescue hoist guillotine (paragraph 14-39).		

SECTION V - OVERHAUL AND RETIREMENT SCHEDULE

1-66. INTRODUCTION.

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

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

1-67. OVERHAUL INTERVAL.

1-68. Description - Overhaul Interval. The maximum authorized operating time on calendar interval of parts prior to removal for overhaul at category of maintenance authorized in accordance with Maintenance Allocation Chart (table 1-4 and Appendix B).

1-69. RETIREMENT SCHEDULE.

1-70. Description — Retirement Schedule (Table 1-4). The operating time or calendar interval specified for removal, condemnation, and disposal of parts in accordance with TM 55-1500-328-25.

NOTE

Items replaced on a calendar basis (for the purpose of overhaul or retirement) will not be listed on DA Form 2408-16, Component Installation and Removal Record, but will be listed on DA Form 2408-18, Equipment Inspection List, for scheduling purposes.

Table 1-4. Overhaul and Retirement Schedule

Area	Overhaul Interval (Hours)	Retirement Interval (Hours)	Item	Part Number
			MAIN ROTOR	
4		1100	Blade Assembly	540-011-001-5
4		1100	Blade Assembly	540-011-250-1
4		1100	Blade Assembly	540-015-001-1
4	1200		Hub Assembly	540-011-101-9/23
4		3600	Yoke	540-011-102-5
4		3600	Extension Assembly	540-011-153-9/13/15/17

Table 1-4. Overhaul and Retirement Schedule (Cont)

Area	Overhaul Interval (Hours)	Retirement Interval (Hours)	Item	Part Number
4		2400	Retention Straps	204-012-112-7
4		2400	Retention Straps	204-012-122-3
4		2400	Retention Straps	204-012-122-7
4		2400	Pin	540-011-112-1/3/5/7
4		2400	Fitting	540-011-113-1
4		2400	Nut	540-011-177-1
			TRANSMISSION	
4	1100		Transmission Assembly	204-040-016-1/3
4	2000		Transmission Assembly	204-040-016-5
4	1100		Mast Assembly	204-040-366-11
4	1500		Mast Assembly	204-040-366-103
4		1500	Mast Bearing	204-040-136-7/9 212-040-136-1
4	1500		*Main Input Quill Assembly	205-040-263-3/111
			MAST CONTROLS	
4	1100		Swashplate and Support Assembly	540-011-450-3/5
4	1200		Swashplate and Support Assembly	540-011-450-7
4	1100		Scissors and Sleeve Assembly	540-011-451-3
4	1200		Scissors and Sleeve Assembly	540-011-451-5
4		3600	Drive Link	540-011-409-1

Table 1-4. Overhaul and Retirement Schedule (Cont)

Area	Overhaul Interval (Hours)	Retirement Interval (Hours)	Item	Part Number
4		2400	Stabilizer Bar Center Frame	540-011-301-5
4		400	Stabilizer Bar Tube	204-011-328-1/11
4		3300	Cylinder Actuator	41000310-001
4		3300	Cylinder Barrel	100328
4		3300	Bearing Housing	204-076-317-1/5/7
4		1650	Rod End Bearing	204-076-428-1/3/5
			TAIL ROTOR AND DRIVE SYSTEM	
6		1200	Blade Assembly	204-011-702-17
6		300	Grip Assembly	204-011-728-1
6		300	Grip Assembly	204-011-728-19
6		1500	Yoke Assembly	204-011-722-5
6	1500		42-degree Gearbox	204-040-003-7/13/19/23/29
6	1200		90-degree Gearbox	204-040-012-7
			SYNCHRONIZED ELEVATOR	
6		3000	Elevator	205-030-856-45
6		3000	Elevator	205-030-856-47
6		2400	Elevator	205-030-856-65
6		2400	Elevator	205-030-856-67
6		3600	Horn, Elevator Control	205-001-914-5

Table 1-4. Overhaul and Retirement Schedule (Cont)

Area	Overhaul Interval (Hours)	Retirement Interval (Hours)	Item	Part Number
			POWER PLANT	
5	1200		Rotor Turbine	1-100-490-04
5	1200		Engine	T53-L-11 Suffix A
5	1200		Engine	T53-L-11, -11B
5	1800		Engine	T53-L-11C, -11D
5	600		Engine	T53-L-13 Ser. No. Suffix A
5	600		Engine	T53-L-13A
5		450	Oil Cooler Turbine Bearings	J33C32, H33C32, P203NPPPS50160 15819-11, 62032RSJC3QLA
2		24 months.	Seat Covers, Raschel Knit	AL1018-11-00 and AL1040-11-00
			Backrest Covers, Raschel Knit (Refer to TM 55-1500-204-25-1)	AL1018-12-00 and AL1040-12-00

*Unless otherwise known, the time since new on the quill assembly shall be established by assuming that the quill assembly has the same number of flight hours as the transmission either time since new and/or time since last overhaul, whichever is applicable. Requirement for establishment of proper record in accordance with TB 55-1500-307-24 is directed.

Figure 1-8 deleted.

SECTION VI — TORQUE DATA

1-71. TORQUE DATA

1-72. Description — Torque Data. This section covers torque requirements, torque wrenches, and torque tables as shown on different charts. These charts breakdown different torque application and various standard torque table.

1-73. GENERAL TORQUE INFORMATION.

CAUTION

Maximum allowable torque shall not be exceeded.

1-74. Standard Torque Procedures and Requirement. Standard torque values are not called out for individual maintenance procedures in this maintenance manual. Use Standard Torque Chart, table 1-5 to determine correct standard torque. The torque values specified in table 1-5 are based upon the combination of bolt strength, nut strength and loading application. Several charts exist which allow for determination of proper torque value based solely on bolt and nut combination used. To determine the specific torque chart to be used, determine designation of both the bolt and nut combination to be tightened; find chart in which both the bolt and nut are listed and torque to value specified for fastener thread size used. In those instances where special torque values are required, special torque is called out in the assembly instructions for the parts requiring special torque.

a. Requirements Governing Application of Torque Loads.

(1) Torque is expressed in inch-pounds or foot pounds. One inch-pound (or one foot-pound) is the twisting force of one pound applied to a twist-type fastener (as a bolt or nut) with one inch (or one foot) of leverage. This twisting stress is applied to the fastener to secure the component. The torque values are listed as either standard or special torques. Use the standard torque values listed in tables 1-5 through 1-7.

(2) Manufacturer-applied lubricant must not be removed nor additional lubricant added.

(3) The bolts, nuts, and the surfaces they bear on must be clean, dry and free of lubricant (except as stated in (2), above).

(4) The turning (drag) torque required to install a self-locking nut up to the point of final tightening must always be added to the final torque value specified in table 1-5 or the maintenance instruction, as applicable.

(5) Torques specified in maintenance instructions are spec al torques that take precedence over those in table 1-5.

(6) Bolts and screws with strength of less than 125,000 psi do not require a mandatory torque value. The nut-bolt combination will be tightened sufficiently to make a satisfactory joint.

(7) Bolts and screws with strength of 125,000 psi or higher must be torqued to table 1-5 values (except as stated in preceding step (5)).

(8) If extensions are used such that the extensions and the torque wrench are not at right angles (90°) to each other, the wrench or indicator reading must be corrected. (Refer to TM 55-1500-204-25/1.)

(9) Any reuse of self-locking nuts will be governed by the values in table 1-5 and paragraph 1-75.

(10) The bolt must not be rotated during installation or torquing.

b. **Installation of Castellated Nuts on Nonrotating (Static) Parts.** Maximum applied torque must not exceed the applicable values in table 1-5.

c. **Installation of Castellated Nuts on Rotating (Dynamic) Parts.** When tightening castellated nuts on bolts, it is possible that the cotter pin holes will not line up with the slots in the nuts for the range of recommended installation torques. In such a case, the nut may be over-tightened just enough to line up the nearest slot with the cotter pin hole, but the maximum applied torque must not exceed MAXIMUM ALLOWABLE in table 1-5.

d. Tightening bolt head end.

CAUTION

Assure stack up of bolted joint will not allow bolt thread bottoming to occur.

When tightening the bolt head end is necessary, tighten to the high limit of torque value specified. If drag friction is evident during installation, add drag torque to torque value specified. Where maintenance instructions do not specify a torque value and bolt is not threaded into a nut, use Chart II for tension application.

Table 1-5. Standard Torque Chart (Sheet 1 of 5)

TORQUE VALUE CHART I
(For 125 KSI Bolts - Shear Application)

BOLT	NUT	BOLT THREAD SIZE	RECOMMENDED INSTALLATION TORQUE RANGE	MAXIMUM ALLOWABLE TIGHTENING TORQUE
AN3 thru AN20 AN42 thru AN49 AN173 thru AN186 AN509 AN525 MS20004 thru MS20024 MS20033 thru MS20046 MS20073 thru MS20081 MS24694 MS27039 NAS144 thru NAS158 NAS220 thru NAS227 NAS333 thru NAS340 NAS464 NAS517 NAS583 thru NAS590 NAS623 NAS1003 thru NAS1020 NAS1202 thru NAS1210 NAS1218 NAS1297 NAS1303 thru NAS1320 NAS1351 (Non-Locking) NAS1352 (Non-Locking) ALL THREADED STUDS	AN316 AN320 AN341 AN345 AN364 AN150401 thru AN150425 MS20341 MS20364 MS21083 MS25082 MS35650 MS35691 MS51968 NAS1022	10-32	12 to 15 in.-lb.	25 in.-lb.
		1/4-28	30 to 40 in.-lb.	60 in.-lb.
		5/16-24	60 to 85 in.-lb.	140 in.-lb.
		3/8-24	95 to 110 in.-lb.	240 in.-lb.
		7/16-20	270 to 300 in.-lb.	500 in.-lb.
		1/2-20	24 to 34 ft.-lb.	55 ft.-lb.
		9/16-18	40 to 50 ft.-lb.	80 ft.-lb.
		5/8-18	55 to 65 ft.-lb.	116 ft.-lb.
		3/4-16	108 to 125 ft.-lb.	250 ft.-lb.
		7/8-14	125 to 150 ft.-lb.	350 ft.-lb.
		1-12	183 to 275 ft.-lb.	500 ft.-lb.
		1 1/8-12	250 to 350 ft.-lb.	750 ft.-lb.
		1 1/4-12	450 to 550 ft.-lb.	1250 ft.-lb.

NOTES: 1. The above values apply to any combination of bolt and nut shown.

2 Drag torque must be added to recommended torque for self-locking nuts.

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Table 1-5. Standard Torque Chart (Sheet 2 of 5)

TORQUE VALUE CHART II
(FOR 125 KSI BOLTS - TENSION APPLICATION)

BOLT	NUT	THREAD SIZE	RECOMMENDED INSTALLATION TORQUE RANGE	MAXIMUM ALLOWABLE TIGHTENING TORQUE
AN3 thru AN20 AN42 thru AN49 AN173 thru AN186 AN509 AN525 MS20033 thru MS20046 MS20073 thru MS20081 MS24694 MS27039 NAS220 thru NAS227 NAS333 thru NAS340 NAS517 NAS623 NAS1003 thru NAS1020 NAS1202 thru NAS1210 NAS1297 NAS1352 (Non-locking) ALL THREADED STUDS	AN256 AN310 AN315 AN362 AN363 AN365 AN366 AN121576 thru AN121600 MS9358 MS20365 MS20500 MS21042 thru MS21045 MS21047 thru MS21049 MS21051 thru MS21056 MS21058 thru MS21062 MS21069 MS21076 MS21083 MS21086 MS21208 MS21209 MS21991 MS124651 thru MS124850 MS122076 thru MS122275 NAS509 NAS577 NAS671 NAS679 thru NAS687 NAS696 thru NAS698 NAS1021 NAS1023 NAS1031 NAS1033 NAS1067 NAS1068 NAS1291 NAS1329 NAS1330 NAS1473 NAS1474 80-004 thru 80-007 80-013 90-002 90-003 110-061 110-062	10-32	20 to 25 in.-lb.	40 in.-lb.
		1/4-28	50 to 70 in.-lb.	100 in.-lb.
		5/16-24	100 to 140 in.-lb.	225 in.-lb.
		3/8-24	160 to 190 in.-lb.	390 in.-lb.
		7/16-20	37 to 42 ft.-lb.	70 ft.-lb.
		1/2-20	40 to 58 ft.-lb.	91 ft.-lb.
		9/16-18	66 to 83 ft.-lb.	133 ft.-lb.
		5/8-18	91 to 108 ft.-lb.	200 ft.-lb.
		3/4-16	191 to 208 ft.-lb.	416 ft.-lb.
		7/8-14	208 to 250 ft.-lb.	583 ft.-lb.
		1-12	308 to 458 ft.-lb.	833 ft.-lb.
		1 1/8-12	416 to 583 ft.-lb.	1250 ft.-lb.
		1 1/4-12	750 to 916 ft.-lb.	2083 ft.-lb.

NOTES: 1. The above values apply to any combination of bolt and nut shown.
2. Drag torque must be added to recommended torque for self-locking nuts.

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Table 1-5. Standard Torque Chart (Sheet 3 of 5)

TORQUE VALUE CHART III
(For 160 KSI Bolts - Shear Application)

BOLT	NUT	THREAD SIZE	RECOMMENDED INSTALLATION TORQUE RANGE	MAXIMUM ALLOWABLE TIGHTENING TORQUE
MS20004 thru MS20024 NAS144 thru NAS158 NAS583 thru NAS590 NAS1218 NAS1303 thru NAS1320 NAS1351 (Non-locking)	AN256 thru AN310 AN315 AN362 thru AN366 AN121576 thru AN121600 MS9358 MS20365 MS20500 MS21043 thru MS21045 MS21047 thru MS21049 MS21051 thru MS21056 MS21058 thru MS21062 MS21069 thru MS21076 MS21083 MS21086 MS21208 MS21209 MS21991 MS124651 thru MS124850 MS122076 thru MS122275 NAS509 NAS671 NAS679 thru NAS687 NAS696 thru NAS698 NAS1021 thru NAS1023 NAS1031 NAS1033 NAS1067 NAS1068 NAS1329 NAS1330 NAS1473 NAS1474 80-004 thru 80-007 80-013 90-002 90-003	10-32	20 to 25 in.-lb.	40 in.-lb.
		1/4-28	50 to 70 in.-lb.	100 in.-lb.
		5/16-24	100 to 140 in.-lb.	225 in.-lb.
		3/8-24	160 to 190 in.-lb.	390 in.-lb.
		7/16-20	37 to 42 ft.-lb.	70 ft.-lb.
		1/2-20	40 to 58 ft.-lb.	91 ft.-lb.
		9/16-18	66 to 83 ft.-lb.	133 ft.-lb.
		5/8-18	91 to 108 ft.-lb.	200 ft.-lb.
		3/4-16	191 to 208 ft.-lb.	416 ft.-lb.
		7/8-14	208 to 250 ft.-lb.	583 ft.-lb.
		1-12	308 to 458 ft.-lb.	833 ft.-lb.
		1 1/8-12	416 to 583 ft.-lb.	1250 ft.-lb.
		1 1/4-12	750 to 916 ft.-lb.	2083 ft.-lb.

NOTES: 1. The above values apply to any combination of bolt and nut shown.

2. Drag torque must be added to recommended torque for self-locking nuts.

Table 1-5. Standard Torque Chart (Sheet 4 of 5)

TORQUE VALUE CHART IV (FOR 160 KSI BOLTS - TENSION APPLICATION)				
BOLT	NUT	THREAD SIZE	RECOMMENDED INSTALLATION TORQUE RANGE	MAXIMUM ALLOWABLE TIGHTENING TORQUE
MS20004 thru MS20024 NAS144 thru NAS158 NAS583 thru NAS590 NAS1218 NAS1303 thru NAS1320 NAS1351 (Non-locking)	MS21042 NAS577 NAS1291	10-32	30 to 40 in.-lb.	70 in.-lb.
		1/4-28	75 to 95 in.-lb.	170 in.-lb.
		5/16-24	120 to 160 in.-lb.	340 in.-lb.
		3/8-24	25 to 28 ft.-lb.	53 ft.-lb.
		7/16-20	39 to 43 ft.-lb.	83 ft.-lb.
		1/2-20	53 to 71 ft.-lb.	125 ft.-lb.
		9/16-18	83 to 100 ft.-lb.	183 ft.-lb.
		5/8-18	116 to 133 ft.-lb.	250 ft.-lb.
		3/4-16	200 to 216 ft.-lb.	444 ft.-lb.
		7/8-14	333 to 375 ft.-lb.	708 ft.-lb.
		1-12	433 to 583 ft.-lb.	1041 ft.-lb.
		1 1/8-12	691 to 858 ft.-lb.	1541 ft.-lb.
		1 1/4-12	1441 to 1608 ft.-lb.	3041 ft.-lb.

NOTES: 1. The above values apply to any combination of bolt and nut shown.
2. Drag torque must be added to recommended torque for self-locking nuts.

Table 1-5. Standard Torque Chart (Sheet 5 of 5)

TORQUE VALUE CHART V

BOLTS

AN3 thru AN20
AN42 thru AN49
AN173 thru AN186

NAS144 thru 158
NAS333 thru NAS340
NAS464
NAS1003 thru NAS1020
NAS1202 thru NAS1210
NAS1297
NAS1303 thru NAS1320

SELF-LOCKING CASTELLATED NUTS

THREAD SIZE	MS17826 NUT (THIN)		MS17825 NUT	
	RECOMMENDED INSTALLATION TORQUE RANGE	MAXIMUM ALLOWABLE TIGHTENING TORQUE	RECOMMENDED INSTALLATION TORQUE RANGE	MAXIMUM ALLOWABLE TIGHTENING TORQUE
10-32	7 to 12 in.-lb.	20 in.-lb.	12 to 15 in.-lb.	35 in.-lb.
1/4-28	25 to 35 in.-lb.	45 in.-lb.	30 to 40 in.-lb.	80 in.-lb.
5/16-24	50 to 70 in.-lb.	90 in.-lb.	60 to 85 in.-lb.	225 in.-lb.
3/8-24	70 to 90 in.-lb.	125 in.-lb.	95 to 110 in.-lb.	325 in.-lb.
7/16-20	110 to 150 in.-lb.	225 in.-lb.	270 to 300 in.-lb.	575 in.-lb.
1/2-20	150 to 200 in.-lb.	300 in.-lb.	24 to 34 ft.-lb.	75 ft.-lb.
9/16-18	200 to 300 in.-lb.	400 in.-lb.	40 to 50 ft.-lb.	91 ft.-lb.
5/8-18	300 to 420 in.-lb.	600 in.-lb.	55 to 65 ft.-lb.	133 ft.-lb.
3/4-16	45 to 62 ft.-lb.	91 ft.-lb.	108 to 125 ft.-lb.	233 ft.-lb.
7/8-14	79 to 96 ft.-lb.	158 ft.-lb.	125 to 150 ft.-lb.	383 ft.-lb.
1-12	125 to 150 ft.-lb.	250 ft.-lb.	183 to 275 ft.-lb.	566 ft.-lb.
1 1/8-12	208 to 292 ft.-lb.	416 ft.-lb.	250 to 350 ft.-lb.	833 ft.-lb.
1 1/4-12	292 to 375 ft.-lb.	583 ft.-lb.	450 to 550 ft.-lb.	1166 ft.-lb.

NOTES: 1 The above values apply to any combination of bolt and nut shown.
2 The maximum torque allowable is based on the strenght of the nut.

205-00-275-5

Table 1-6. Torque Values for Fluid Connectors

*FLUID CONNECTORS TORQUE VALUE CHART						
	AN818		HOSE END FITTINGS AND HOSE ASSY (MS28740 AND MS28759)	NAS591 THRU NAS596		
TUBE SIZE	AL. TUBING (FLARE MS33583 OR MS33584)	STEEL TUBING (FLARE MS33584)		DASH NO.	STEEL TUBING	AL. TUBING
3/16	30 to 40 in.-lb.	90 to 100 in.-lb.	70 to 100 in.-lb.			
1/4	40 to 65 in.-lb.	135 to 150 in.-lb.	70 to 120 in.-lb.	4	60 to 90 in.-lb.	48 to 96 in.-lb.
5/16	60 to 80 in.-lb.	180 to 200 in.-lb.	85 to 180 in.-lb.	5	66 to 108 in.-lb.	60 to 108 in.-lb.
3/8	75 to 125 in.-lb.	270 to 300 in.-lb.	100 to 250 in.-lb.	6	72 to 120 in.-lb.	72 to 120 in.-lb.
1/2	150 to 250 in.-lb.	450 to 500 in.-lb.	210 to 420 in.-lb.	8	144 to 232 in.-lb.	120 to 216 in.-lb.
5/8	200 to 350 in.-lb.	54 to 58 ft.-lb.	300 to 480 in.-lb.	10	204 to 360 in.-lb.	144 to 360 in.-lb.
3/4	300 to 500 in.-lb.	75 to 83 ft.-lb.	41 to 70 ft.-lb.	12	300 to 540 in.-lb.	216 to 540 in.-lb.
1	41 to 58 ft.-lb.	100 to 116 ft.-lb.	58 to 95 ft.-lb.	16	42 to 58 ft.-lb.	480 to 696 in.-lb.
1 1/4	50 to 75 ft.-lb.			20	50 to 75 ft.-lb.	50 to 75 ft.-lb.
1 1/2	50 to 75 ft.-lb.			24	50 to 75 ft.-lb.	50 to 75 ft.-lb.
1 3/4				28	60 to 90 ft.-lb.	62 to 90 ft.-lb.
2				32	75 to 110 ft.-lb.	75 to 110 ft.-lb.
2 1/2				40	150 to 175 ft.-lb.	110 to 150 ft.-lb.
3				48	150 to 175 ft.-lb.	
4				64	200 to 225 ft.-lb.	

* Flareless tubing connections shall be tightened as follows:
Tighten the MS21921 nut 1/6 to 1/3 turn (1 to 2 flats) past point of sharp torque rise on all sizes and materials. The 1/16 to 1/3 turn (preformed after the presetting operation) is the final installation torque.

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Table 1-7. Torque Values for Studs

STEPPED STUDS				STRAIGHT STUDS			
Types A and B are driven from nut end.				Types X and Y are driven from nut end.			
		Type A	Type B			Type X	Type Y
Stud Size		Torque Value Pound - Inches		Stud Size		Torque Value Pound - Inches	
Nut * End	Stud End			Nut * End	Stud End		
10-32	1/4-20	30- 40	30- 40	10-32	10-24		30- 40
1/4-28	5/16-18	50- 110	50- 80	1/4-28	1/4-20	50- 95	50- 70
5/16-24	3/8-16	100- 240	100- 160	5/16-24	5/16-18	100- 225	100- 130
3/8-24	7/16-14	175- 475	175- 325	3/8-24	3/8-16	175- 375	175- 250
9/16-20	1/2-13	250- 725	250- 525	7/16-20	7/16-14	250- 650	250- 400
1/2-20	9/16-12	400-1150	400- 850	1/2-20	1/2-13	400-1000	400- 700
9/16-18	5/8-11	600-1650	600-1150	9/16-18	9/16-12	600-1450	500-1050
5/8-18	11/16-11	900-2400	900-1700	5/8-18	5/8-11	900-2000	700-1400

* For nut torque refer to applicable chart for type of nut used.

212900-60A

WARNING

Do not exceed the maximum value; overstressing of the nut or bolt may result.

g. Torque-Tightening Porcedures.

(1) Tighten at a uniformly increasing rate until the desired torque is obtained. In some cases, where gaskets or other parts cause a slow permanent set, the torque must be held at the desired value until the material is seated or retorqued after a period of time.

NOTE

When applying torque to a series of bolts on a flange or in an area, select a median value. If some bolts in a series are torqued to a minimum value and others to a maximum, force is concentrated on the tighter bolts and is not distributed evenly. Such unequal distribution of force may cause bolt failure.

(2) It is not desirable to tighten to the final torque value during the first drawdown; uneven tension can cause distortion or overstressing of parts. Seat and torque mating parts by gradually drawing down the bolts or nuts until the parts are seated firmly. Then loosen each one separately and apply final tightening. Tightening, in a diametrically opposite (staggered) sequence is desirable in most cases. Do not exceed listed maximum torque values.

CAUTION

When chilling or heating parts during assembly do not torque nuts or bolts until the part returns to room temperature. If the part has been heated, the fastener may loosen as the part cools. If the part has been chilled, the fastener may be overstressed as the part expands.

h. Hose and Tube Fitting Assembly Procedures (figure 1-11).

i. Decimal Equivalent Conversions. (figure 1-12.)

j. Dimensions and Tolerances.

(1) Dimensions in this manual are normally in inches, unless otherwise specified, and decimal

All data on page 1-103 is deleted, including figures 1-9 and 1-10.

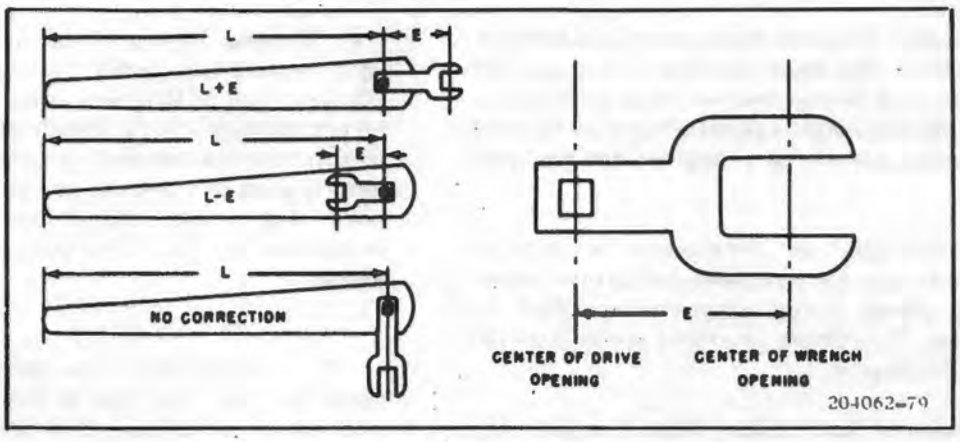
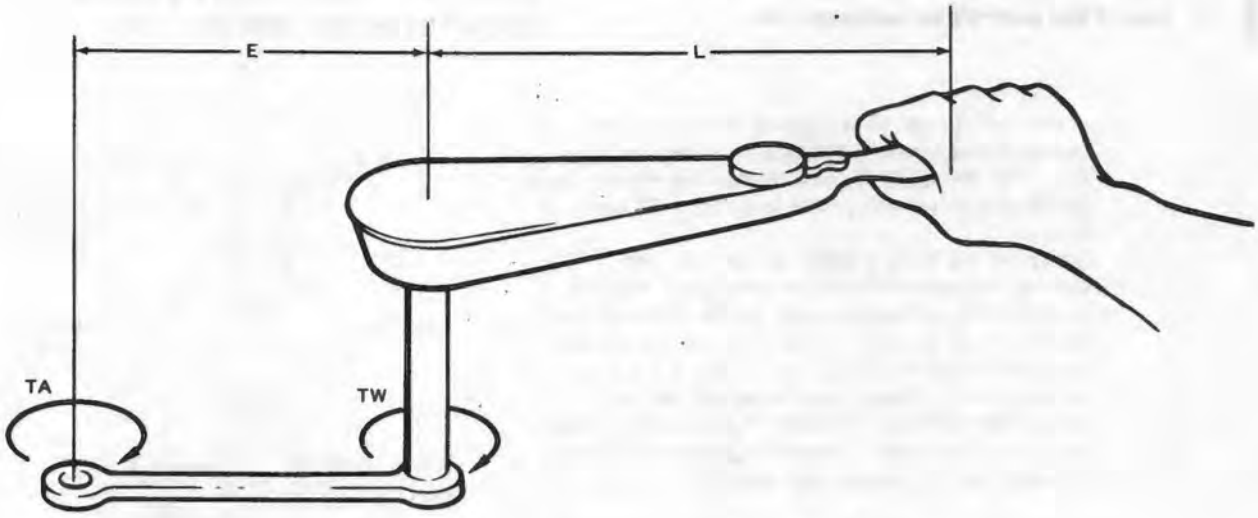


Figure 1-9. Measuring effective length of extension wrench



TW = Actual torque value by torque wrench.

TA = Actual torque value applied to fastener.

L = Torque wrench effective length.

E = Extension length

$$TW = \frac{TA \times L}{L + E} = \frac{265 \times 8}{8 + 2} = \frac{2120}{10} = 212 \text{ In.Lb}$$

204062-79

Figure 1-10. Torque application

fractions thereof. Common fractions are used to refer to rivets, cables, raw stock, and other items supplied in fractional sizes, and sometimes for an estimated or nominal dimension which cannot or need not be more precise. Angles are stated in degrees and common fractions.

(2) Tolerances on dimensions in decimal fractions of an inch can be determined by the number of decimal places, unless otherwise specified, as shown below. Tolerances on angles are in common fractions of a degree.

1-75. Reuse of Self-Locking Nuts. The following information provides application and reuse procedure for self-locking nuts. For additional information, refer to TM 55-1500-204-25/1.

WARNING

Self-locking nuts shall not be reused in applications where failure could cause loss of the aircraft or endanger life.

a. General. New self-locking nuts or bolts provide tight connections which will not loosen under vibration. Self-locking nuts or bolts approved for use on aircraft meet critical specifications as to strength, corrosion-resistance and temperature. Reuse of self-locking nuts or bolts are limited to those nuts and bolts that meet the minimum requirements established in table 1-8 for drag or breakaway torque values.

(1) Self-locking nuts come in two general types: metallic lock type which are all metal, and nonmetallic which have nonmetallic locking insert. Nonmetallic self-locking nuts should not be subject to temperatures in excess of 250 degrees F (121 degrees C).

(2) Self-locking bolts come in three general types: a round pellet, a hex pellet, or a trip type insert is placed in the threaded area to provide the self-locking feature. In addition to checking for breakaway torque values listed in table 1-8, the bolts should be checked for loose or missing inserts.

1. Assemble the nut first running it up over the thread relief between the two threaded sections, and on to the upper thread so that the recess faces the thread relief and projects about 1/32 inch over it.
2. Grasp the back-up washer on the O.D. and squeeze between thumb and forefinger. Thread the end of the fitting into the inside diameter so that the bevel shaped washer has the bowed-out position toward the end of the fitting. Do not use any lubricant. Thread the fitting all the way through washer until washer is free at the relief section. Pick off any slivers of plastic material that may be cut free by this process.
3. Press the washer into the nut recess. Bring the nut down to meet the washer at the relief section so that the fitting threads will not interfere with placement of the washer.
4. Lubricate the male threads of fitting and packing. Assemble the packing to the fitting and position the nut so that the packing is pressed against the lower threaded section.
5. Thread the bulkhead fitting assembly into the boss until packing contacts the boss countersink. Then, holding the nut in position, turn the fitting in from 1-1/2 - 2-1/2 turns, according to the outlet position desired. Tighten the nut to the proper torque.

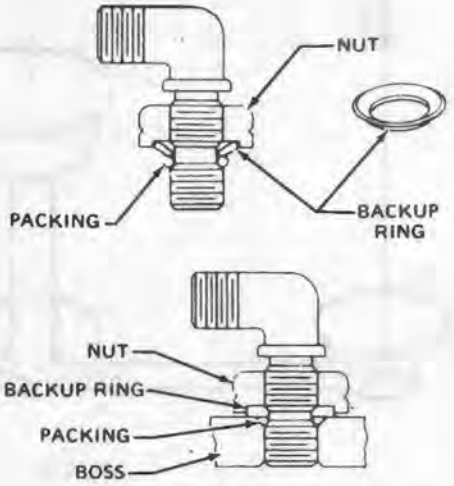


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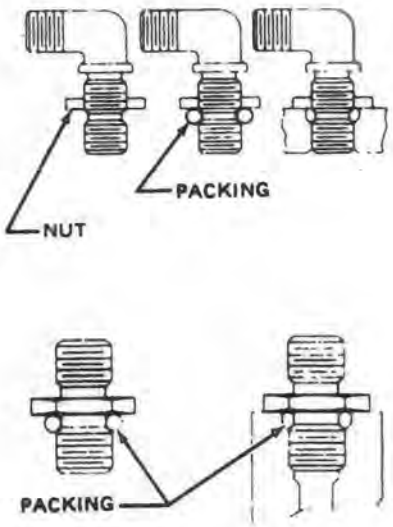
Figure 1-11. Hose and tube fitting—assembly procedures (Sheet 1 of 2)



BULKHEAD FITTING

1. Lubricate the fitting end. Assemble the nut to the fitting until the washer face of the nut lines up with the upper corner of the seal groove.
2. Lubricate the packing and assemble the packing to the groove on the fitting so that it contacts the nut.
3. Screw the fitting and nut simultaneously into the boss until the seal contacts the chamfer at the face of the boss and until the nut contacts the boss.
4. Position the fitting by either turning in as much as 3/4 turn (+270 degrees) or turning out as much as 1/4 turn (-90 degrees). Assemble the line to the fitting to check the alignment of the fitting. Tighten the nut to the proper torque.

UNION

1. Lubricate the packing and assemble the packing to the relief on the union.
2. Thread the union into the box until contact is made with the surface of the boss.
3. Tighten the union to the proper torque value.

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Figure 1-11. Hose and tube fitting — assembly procedures (Sheet 2 of 2)

b. Application. Bolts, studs, or screws of 5/16-inch diameter and over, with cotter pin holes, may be used with self-locking nuts provided the cotter pin holes are free from burrs. Burrs on cotter pin holes tend to tear the nonmetallic inserts. Bolts and screws of 1/4-inch diameter and under, with cotter pin holes, may be used with self-locking nuts only in an emergency for circle red X condition (one time flight). They will be replaced before the next flight with the specified type. Observe torque notes on illustrations and text where applicable to prevent clamp-up on lugs to avoid preloading of the control system components due to improper torque. The nuts which are attached to the structure must be attached in a positive manner to eliminate the possibility of their rotating or misaligning when the tightening is to be accomplished by rotating the bolts or screws. The manner of attachment must permit removal without injury to the structure and the replacement of the nuts. Round or chamfered-end bolts must extend at least the full round or chamfer through the nut. Flat end bolts must extend at least 1/32-inch through the nut.

CAUTION

If any size self-locking nut under 3/8-inch can be run down with the fingers after the locking feature engages the bolt or stud, indicating the locking friction does not exist, the nut or friction device shall be replaced. These values for self-locking nuts over 3/8-inch are to be used only for determining continued serviceability. The values apply only when the nut is being run down on the mating threads prior to reaching the clamp-up point. Standard torque values for final tightening are shown in table 1-5.

NOTE

The final torque value for self-locking nuts must be determined by adding the free running torque (torque wrench reading) to the specified torque value. (The free running torque is the torque required to overcome the friction of the nut running down the bolt thread prior to tightening.)

Fraction	Decimal Equivalent
1/64	0.015625
1/32	0.03125
3/64	0.046875
1/16	0.0625
5/64	0.078125
3/32	0.09375
7/64	0.109375
1/8	0.125
9/64	0.140625
5/32	0.15625
11/64	0.171875
3/16	0.1875
13/64	0.203125
7/32	0.21875
15/64	0.234375
1/4	0.250
17/64	0.265625
9/32	0.28125
19/64	0.296875
5/16	0.3125
21/64	0.328125

Fraction	Decimal Equivalent
11/32	0.34375
23/64	0.359375
3/8	0.375
25/64	0.390625
13/32	0.40625
27/64	0.421875
7/16	0.4375
29/64	0.453125
15/32	0.46875
31/64	0.484375
1/2	0.500
33/64	0.515625
17/32	0.53125
35/64	0.546875
9/16	0.5625
37/64	0.578125
19/32	0.59375
39/64	0.609375
5/8	0.625
41/64	0.640625
21/32	0.65625

Fraction	Decimal Equivalent
43/64	0.671875
11/16	0.6875
45/64	0.703125
23/32	0.71875
47/64	0.734375
3/4	0.750
49/64	0.765625
25/32	0.78125
51/64	0.796875
13/16	0.8125
53/64	0.828125
27/32	0.84375
55/64	0.859375
7/8	0.875
57/64	0.890625
29/32	0.90625
59/64	0.921875
15/16	0.9375
61/64	0.953125
31/32	0.96875
63/64	0.984375

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Figure 1-12. Decimal equivalent conversions

Table 1-8. Minimum Breakaway Torque (Note 1) For Used All-Metallic and Nonmetallic Self-Locking Nuts

Nut Size	Minimum Breakaway Torque (In-Lbs) (Note 1)
FINE THREAD	
10-32	NOTE 2
1/4-28	NOTE 2
5/16-24	6.5
3/8-24	9.5
7/16-20	14.0
1/2-20	18.0
9/16-18	24.0
5/8-18	32.0
3/4-16	50.0
7/8-14	70.0
1-12	90.0
1 1/8-12	117.0
1 1/4-12	143.0
1 3/8-12	180.0
1 1/2-12	210.0
COARSE THREAD	
4-40	NOTE 2
6-32	NOTE 2
8-32	NOTE 2
10-24	NOTE 2
1/4-20	NOTE 2
5/16-18	7.5
3/8-16	12.0
7/16-14	16.5
1/2-13	24.0
9/16-12	30.0
5/8-11	40.0
3/4-10	60.0
7/8-9	82.0
1-8	110.0
1 1/8-7	137.0
1 1/4-7	165.0
1 3/8-6	200.0
1 1/2-6	230.0
1 3/4-5	300.0

NOTE 1: Minimum breakaway torque is defined as the torque necessary to start the nut off the bolt with no axial load on the nut and with the bolt completely through the nut.

NOTE 2: Test nut for minimum breakaway torque by attempting to insert a matching bolt by hand. Reuse only those nuts that cannot be tightened down with fingers after the locking action engages bolt or stud. Nuts that do not meet the minimum breakaway torque shall not be used.

CHAPTER 2

AIRFRAME

SECTION I — FUSELAGE

2-1. FUSELAGE.

2-2. Description — Fuselage. The fuselage assembly consists of two main sections: the forward section and aft section (tailboom). The forward section includes the cabin area, power plant, main rotor and landing gear. The aft section includes the tailboom, elevator, driveshafts, gearboxes, and tail rotor. (Figure 2-1.)

2-3. FUSELAGE STRUCTURE.

NOTE

Refer to maintenance allocation chart, Appendix B to determine maintenance responsibility for specific structural repairs.

2-4. General Information. Paragraph 2-5 through 2-14 provides general information necessary for repair of fuselage structure.

2-5. Type of Construction. (Figure 2-1 and 2-2.)

a. Forward Section Construction. Two main beams with transverse bulkheads, make up the primary structure. The primary structure provides support for the cabin section, fuel cells, transmission, landing gear, engine, and tailboom. The forward section employs aluminum alloy and fiberglass skins, aluminum alloy honeycomb panels, and titanium work decks and firewalls.

b. Aft Section Construction. The aft section (tailboom) is a semimonocoque structure, employing aluminum and magnesium alloy skins, longerons, bulkheads and stringers. The vertical fin consists of aluminum alloy forward and aft spars, aluminum alloy trailing edge extrusion, and aluminum alloy ribs and skins.

2-6. Investigating Damage. a. Remove grease, dirt, and paint in area of damage 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 cracks.

c. Inspect all riveted and bolted joints in vicinity of damaged 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 be resulted from a shock load transmitted from the primary damage.

2-7. Classification of Damage and Types of Repair. After the extent of damage has been determined, the damage should be classified as negligible, repairable, or damage necessitating replacement of parts. Definitions of damage classification and types of repairs are as follows:

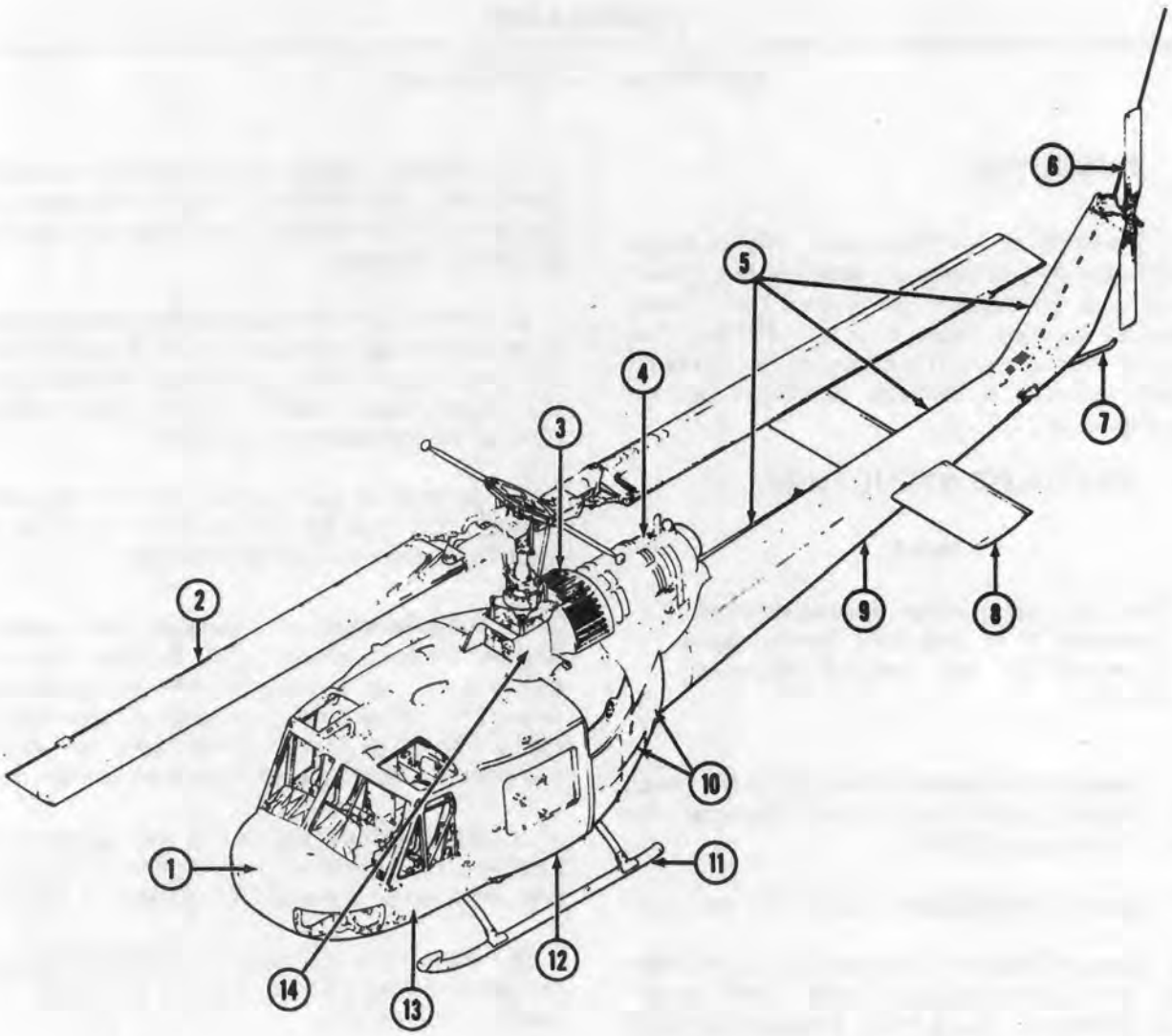
a. Negligible damage is that damage which may be allowed to exist as it, or corrected by some simple procedure without placing restrictions on flight.

b. Repairable damage is damage exceeding negligible damage limits, but not so severe as to warrant replacement.

c. Damage requiring replacement of parts is damage which cannot be repaired by practical means, or damage which exceeds the limits specified as repairable.

d. Mechanical damage includes, but is not limited to, abrasions, cracks, nicks, dents, scratches, distortion and wear. Corrosion damage is usually identified by a scaly or blistered appearance, powdery deposits, and etching or pitting of metal surface.

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 instructions on the use and installation of rivets, refer to TM 55-1500-204-25/1.



1. Nose compartment door
2. Main rotor
3. Engine air inlet filter
4. Engine cowling
5. Driveshaft covers
6. Tail rotor
7. Tail skid
8. Elevator
9. Tailboom
10. Compartment doors
11. Landing gear
12. Cargo door
13. Crew door
14. Transmission cowling

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Figure 2-1. Helicopter assembly

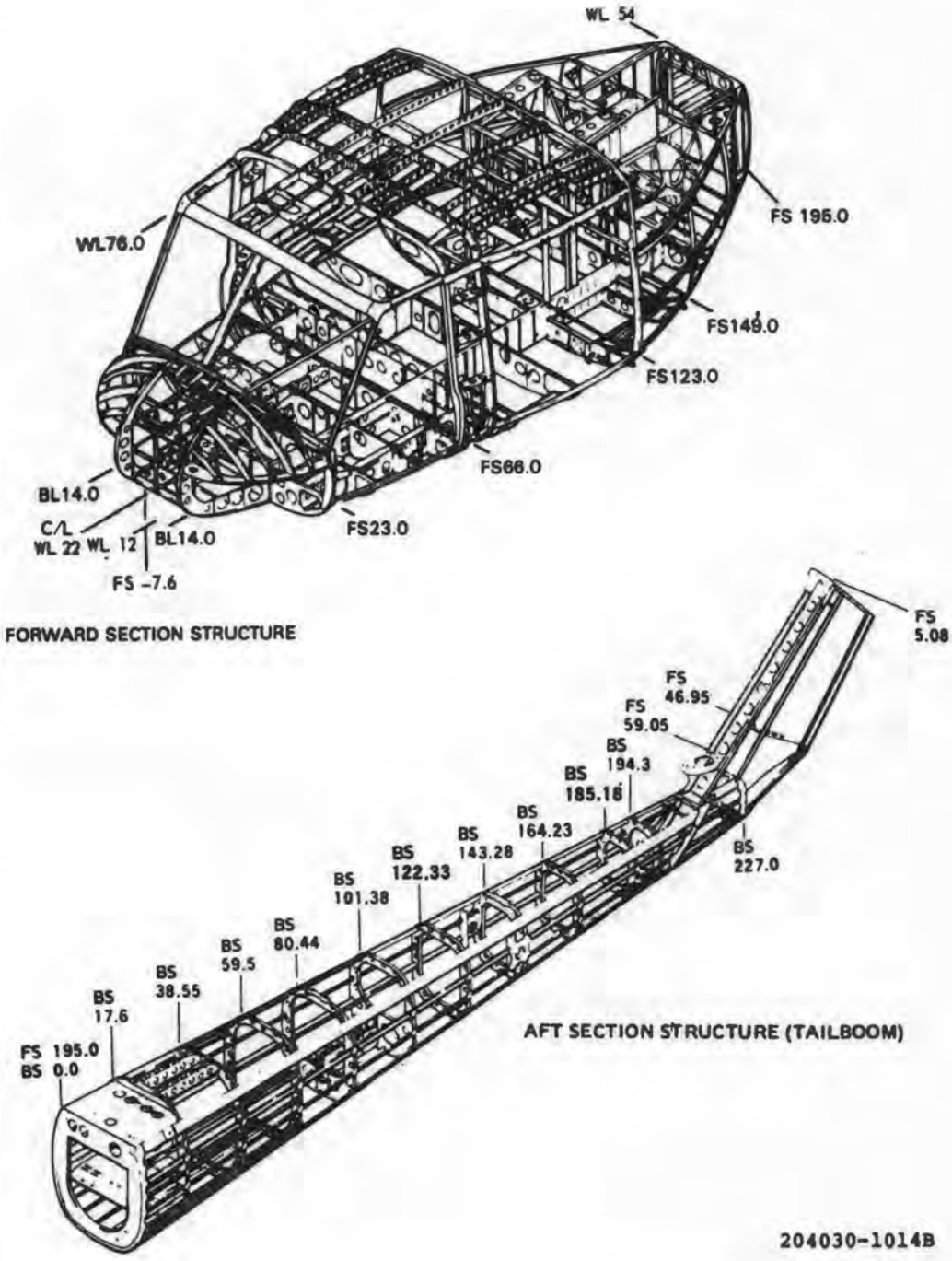


Figure 2-2. Fuselage structure

f. Welded repairs. For weld repair information to components, such as tailpipe and spot welds, refer to TM 55-1500-204-25/1. Weld repair procedures for the tailpipe, refer to paragraph 4-47.

2-8. Support of Structure During Repair.

a. Assemble Helicopter.

(1) Support helicopter on landing gear.

(2) If landing gear removal is required, accomplish the following steps:

(a) Fabricate wooden, padded supports, contoured to fore and aft and transverse main structural members.

(b) Lift helicopter and remove landing gear. (Refer to paragraph 1-48 for hoisting instructions.)

(c) Position supports under structure and lower helicopter.

(d) Leave hoist attached to mast nut.

b. Support of Tailboom.

(1) Support tailboom on suitable cradle or fabricate two supports as shown in figure 2-3.

(2) Attach forward support to tailboom attach holes, using same size bolts used in installing tailboom on the forward fuselage. Locate aft support under bulkhead at station 194.30.

2-9. Location of Leveling Points. (Refer to paragraph 1-37 for leveling instructions.)

2-10. Principal Dimensions. See figure 2-4 for principal dimensions.

2-11. Reference Lines. See figure 2-5 for major reference lines. Definitions of reference lines 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 a line of origin, located approximately 7.60 inches aft of the most forward nose contour and designated as Station 0 (figure 2-2).

b. Boom Station Lines. Boom station lines (BS) are reference lines perpendicular to the centerline of the tailboom. Boom Stations indicate the distance in inches from a line of origin, located on the forward surface of the boom structure (BS 0.0) (figure 2-2).

c. Waterlines. Waterlines (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 or origin located below the lower skin contour and designated as Water Line 0 (figure 2-2).

d. Buttock Lines. Buttock 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 Buttock Line 0 (figure 2-2).

2-12. Structural Repair Materials. Structural repair materials are listed in table 2-1.

Table 2-1. Structural Repair Materials

Item No.	Description	Ref. No. and FSCM	NSN
1	Aluminum Alloy Extrusion, AND 10134-1205, 7075-T6	QQ-A-200/11 (81348)	9540-00-052-7087
2	Aluminum Alloy Extrusion, NAS344-63, 7075	QQ-A-200/11 T6	9540-00-394-9866
3	Aluminum Alloy Sheet, 0.008 inch thick, 2024-T3	QQ-A-250/5 (881348)	
4	Aluminum Alloy Sheet, 0.012 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2274

Table 2-1. Structural Repair Materials (Cont)

Item No.	Description	Ref. No. and FSCM	NSN
5	Aluminum Alloy Sheet, 0.012 inch thick, 2024-T4	QQ-A-250/5 (81348)	
6	Aluminum Alloy Sheet 0.012 inch thick, 7075-T6	QQ-A-250/5 (81348)	9535-00-236-7091
7	Aluminum Alloy Sheet, 0.016 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-232-0543
8	Aluminum Alloy Sheet, 0.020 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2277
9	Aluminum Alloy Sheet, 0.020 inch thick, 2024-T4	QQ-A-250/5 (81348)	
10	Aluminum Alloy Sheet, 0.020 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-086-9808
11	Aluminum Alloy Sheet, 0.025 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2278
12	Aluminum Alloy Sheet, 0.025 inch thick, 2024-T4	QQ-A-250/5 (81348)	
13	Aluminum Alloy Sheet, 0.025 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-086-9864
14	Aluminum Alloy Sheet, 0.032 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-086-9729
15	Aluminum Alloy Sheet, 0.032 inch thick, 2024-T4	QQ-A-250/5 (81348)	9535-00-086-9729
16	Aluminum Alloy Sheet, 0.032 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-249-5811
17	Aluminum Alloy Sheet, 0.040 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-167-2280
18	Aluminum Alloy Sheet, 0.040 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-084-4581
19	Aluminum Alloy Sheet, 0.050 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-232-0569
20	Aluminum Alloy Sheet 0.050 inch thick, 2024-T4	QQ-A-250/5 (81348)	
21	Aluminum Alloy Sheet, 0.050 inch thick, 7075-T6	QQ-A-250/13 (81348)	9535-00-086-9465

Table 2-1. Structural Repair Materials (Cont)

Item No.	Description	Ref. No. and FSCM	NSN
22	Aluminum Alloy Sheet, 0.063 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-232-0378
23	Aluminum Alloy Sheet, 0.100 inch thick, 2024-T3	QQ-A-250/5 (81348)	9535-00-288-0675
24	Aluminum Alloy Sheet, 0.125 inch thick, 2024-T4	QQ-A-250/5 (81348)	
24.1	Aluminum Alloy Tubing 0.083 inch thick, 4 inch diameter, 2024-T3	QQ-A-300-3B	
25	Aluminum Alloy Tubing, 0.095 inch thick, 4 inch diameter, 2024-T3	QQ-A-200/3	4710-00-278-6376
26	Aluminum Honeycomb, 0.250 inch thick, 5052	MIL-C-74380 (81349)	5680-00-926-4648
27	Aluminum Honeycomb,	MIL-C-74380 (81349)	
28	Aluminum Honeycomb, 0.500 inch thick, 5052	MIL-C-74380 (81349)	5680-00-926-4650
29	Aluminum Honeycomb, 0.750 inch thick, 5052	MIL-C-74380 (81349)	5680-00-926-4651
30	Asbestos Cloth, J-M89	(92798)	
31	Cellophane, PD600	(82348)	8135-00-753-4546
32	Fiberglass, 181 weave	MIL-C-9084 (81349)	
33	Magnesium Alloy Sheet and Plate, 0.025 inch thick, AZ31B-H24	QQ-M-44	9535-00-575-5983
34	Magnesium Alloy Sheet and Plate, 0.032 inch thick, AZ31B-H24	QQ-M-44	9535-00-542-4705
35	Magnesium Alloy Sheet and Plate, 0.040 inch thick, AZ31B-H24	QQ-M-44	9535-00-542-4704
36	Nylatron, 0.062 inch thick	Fed. Spec. LP418 (81348)	9390-00-013-8960
37	Plexiglas Sheet 0.080 inch thick	MIL-P-8184 (81349)	9330-00-634-8631

Table 2-1. Structural Repair Materials (Cont)

Item No.	Description	Ref. No. and FSCM	NSN
38	Plexiglas Sheet 0.100 inch thick	MIL-P-8184 (81349)	9330-00-634-8632
39	Plexiglas Sheet Acrylic 0.080 inch thick	MIL-P-5425 (81349)	
40	Plexiglas Sheet Acrylic 0.125 inch thick, Type II	MIL-P-5425 (81349)	9330-00-202-1890
41	Plexiglas Sheet Acrylic Modified 0.125 inch thick	MIL-P-8184 (81349)	9330-00-634-8633
42	Plexiglas Sheet Acrylic Modified 0.150 inch thick, 55	MIL-P-8184 (81349)	9330-00-634-8634
43	Plexiglas Sheet Acrylic Modified 0.187 inch thick, 55	MIL-P-8184 (81349)	9330-00-634-8636
44	Rivet, Blind, Flush Head	CR2263-4-1 (11815)	
44.1	Rivet, Blind, Flush head	CR 2248-6-3	5320-00-916-9534
44.2	Rivet, Blind, Protruding head	NAS1738B-6 (80205)	
45	Rivet, Blind, Structural Pull Stem, Protruding Head	MS20600-B4-W1 (80205)	5320-00-582-3273
46	Rivet, Blind, Universal Head	CR2249-4 (11815)	
47	Rivet, Blind, Universal Head	CR2249-5 (11815)	
48	Rivet, Solid, Aluminum Alloy, Flat Head	MS20426AD3 (96906)	
49	Rivet, Solid, Aluminum Alloy, Flat Head	MS20426AD4 (96906)	
50	Rivet, Solid, Aluminum Alloy, Flat Head	MS20426AD5 (96906)	
51	Rivet, Solid, Aluminum Alloy, Universal Head	MS20470AD4 (96906)	
52	Rivet, Solid, Aluminum Alloy, Universal Head	MS20478AD5 (80205)	

Table 2-1. Structural Repair Materials (Cont)

Item No.	Description	Ref. No. and FSCM	NSN
53	Rivet	MS20600AD4	
53.1	Rivet, Universal	CR 2249-6-3 (11815)	5320-00-779-0300
54	Steel Sheet, 0.040 inch thick, 4130 COND-N	MIL-S-18729 (81349)	9515-00-528-4783
55	Steel Sheet, 0.063 inch thick, 4130 COND-N	MIL-S-18729 (81349)	9515-00-683-9294
56	Steel Sheet, Corrosion Resistant, 0.016 inch thick, Type 321, 1/4 hard	MIL-S-6721	
57	Steel Sheet, Stainless, Type 301, 1/2 hard	MIL-S-6721	
58	Steel Sheet, Stainless 0.032 inch thick, Type 321, 1/4 hard	MIL-S-6721	
59	Stringer, Bell STD120-021-32	(97499)	
60	Tedlar, PVF #40S	(82348)	
61	Titanium, 0.020 inch thick	MIL-T-9046	

2-13. Skin Identification. Refer to figures 2-6 and 2-7 for skin identification.

NOTE

Corrosion inspection and repair per TM 43-0105.

2-14. Corrosion Control. a. General: Corrosion is usually attributed to two factors: location of operation and fabrication process of parts. Corrosion is caused by presence of salt in moist air, certain chemicals in water, elements in the metal, treatment of parts, and contact of dissimilar metals. Corrosion will not normally be as prevalent on painted, clad, or plated surfaces.

Corrosion on painted parts is usually characterized by a scaly or blistered appearance, and sometimes by discoloration of paint. Corrosion on clad or plated parts is recognized by a dulling and pitting of the surface and is sometimes accompanied by a whitish or reddish powdery deposit. The extent and forms of corrosion may be determined by examination and visual inspection. A pointed instrument may be used to make the test. Care should be taken to avoid further damage. In some cases the area must be cleaned to remove scales and powdery deposits before examination can be made.

(1) Superficial Corrosion. This type is the least serious on alclad parts. After deposits are removed, an etching will be noticed which results in the clad surface having a series of hills and valleys. Provided the etching has not reached the core, the effect on the strength of the metal is negligible. Corrosion of this same type on non-clad alloy parts is serious.

(2) Electrolytic Corrosion. There are two major causes for this type corrosion: contact between dissimilar metals and condensation. When dissimilar metals come in contact with each other with moisture

present, an electrical current flows between the metals producing chemical by-products that dissolve one of the metals. Corrosion caused by condensation is a result of exhaust gases, battery acid, etc., contacting the metal.

(3) Intergranual Corrosion. This form of corrosion is not easily detected. It is caused by imperfect heat treatment and occurs mostly in unclad structural alloy parts. It is the most dangerous form of corrosion for sheet stock because the strength of the metal can be lowered without visible structure indications.

(4) Stress Corrosion. This form occurs in a part along the lines of cold working, if the part has been stressed too high without proper heat treatment.

(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. Metals grouped together as illustrated in the following chart have no strong tendency to produce galvanic corrosion and are relatively safe to use in contact with each other. The coupling of metals from different groups in the chart will usually result in galvanic or accelerated corrosion of the metal higher on the list. The farther apart the metals are in the chart, the greater will be the galvanic tendency, as can be determined by measurement of the electrical potential difference between them.

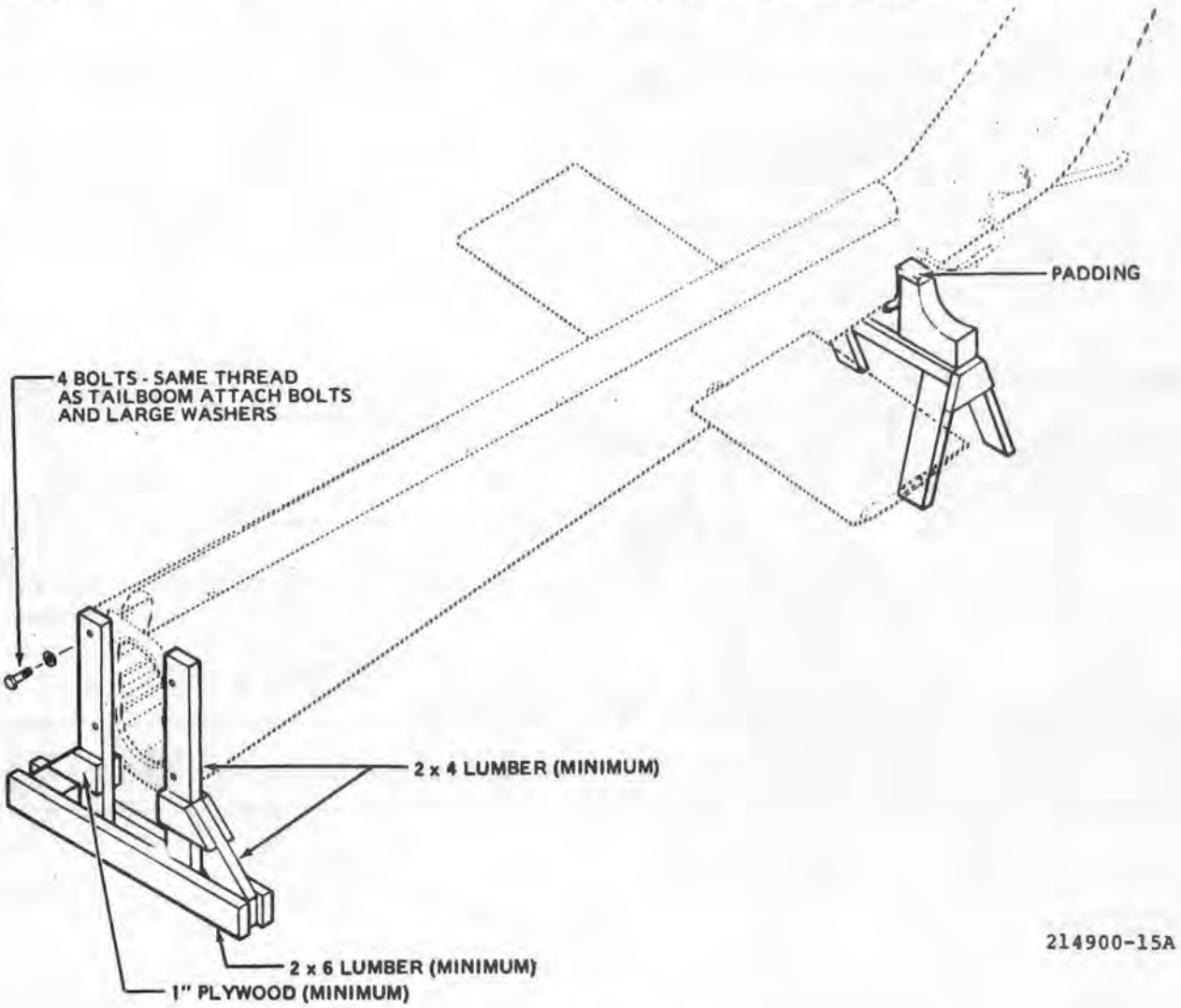


Figure 2-3. Tailboom support

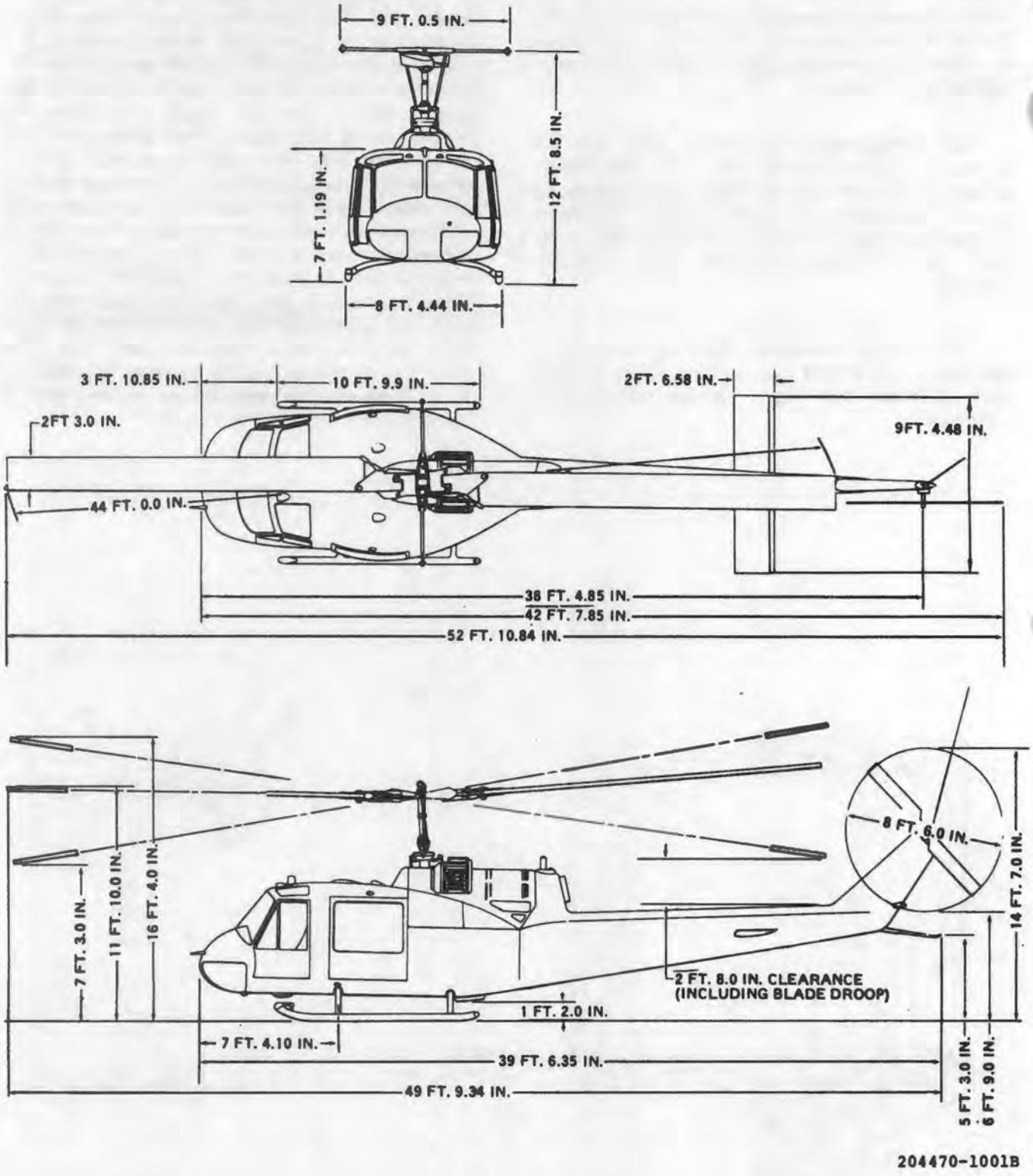
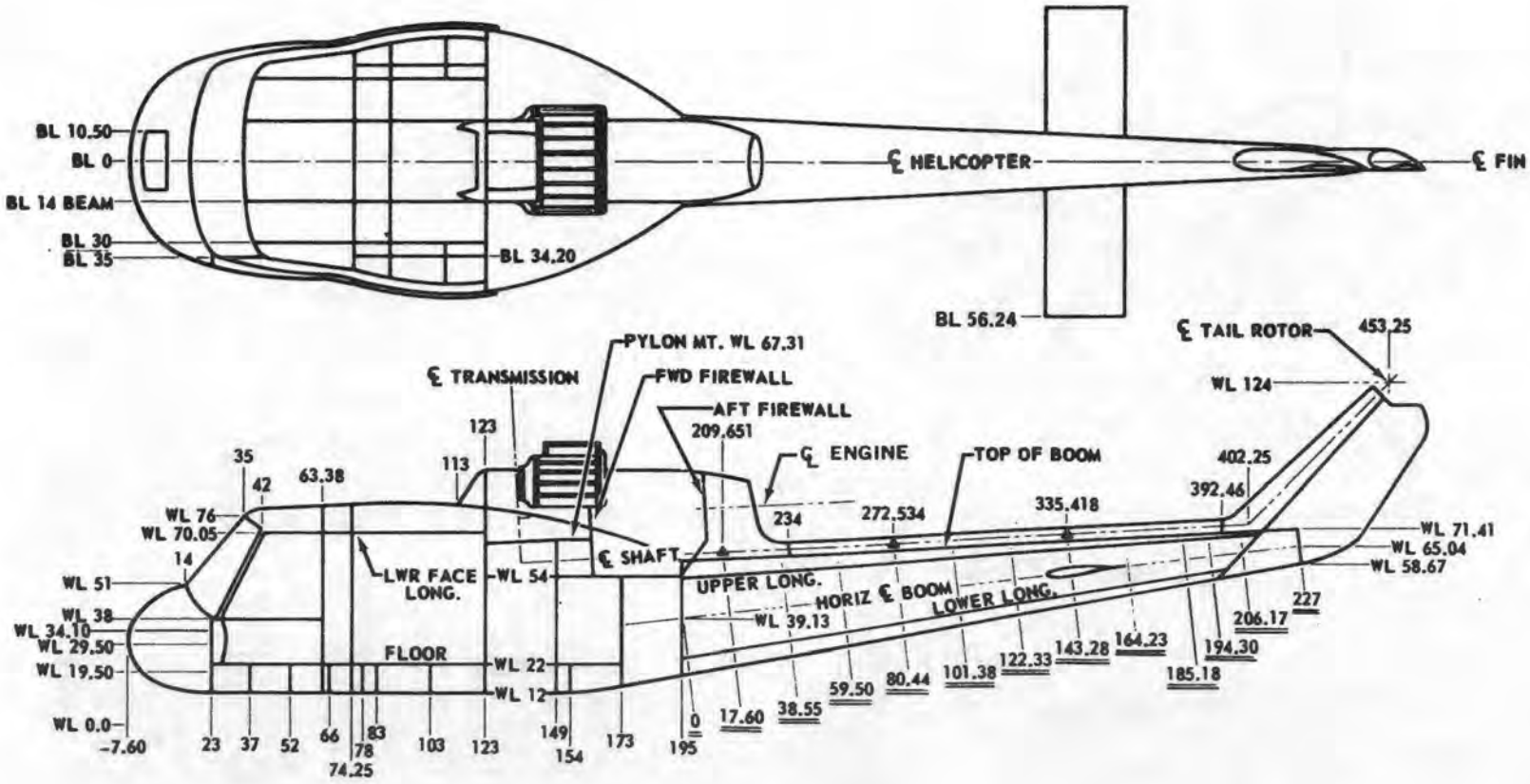


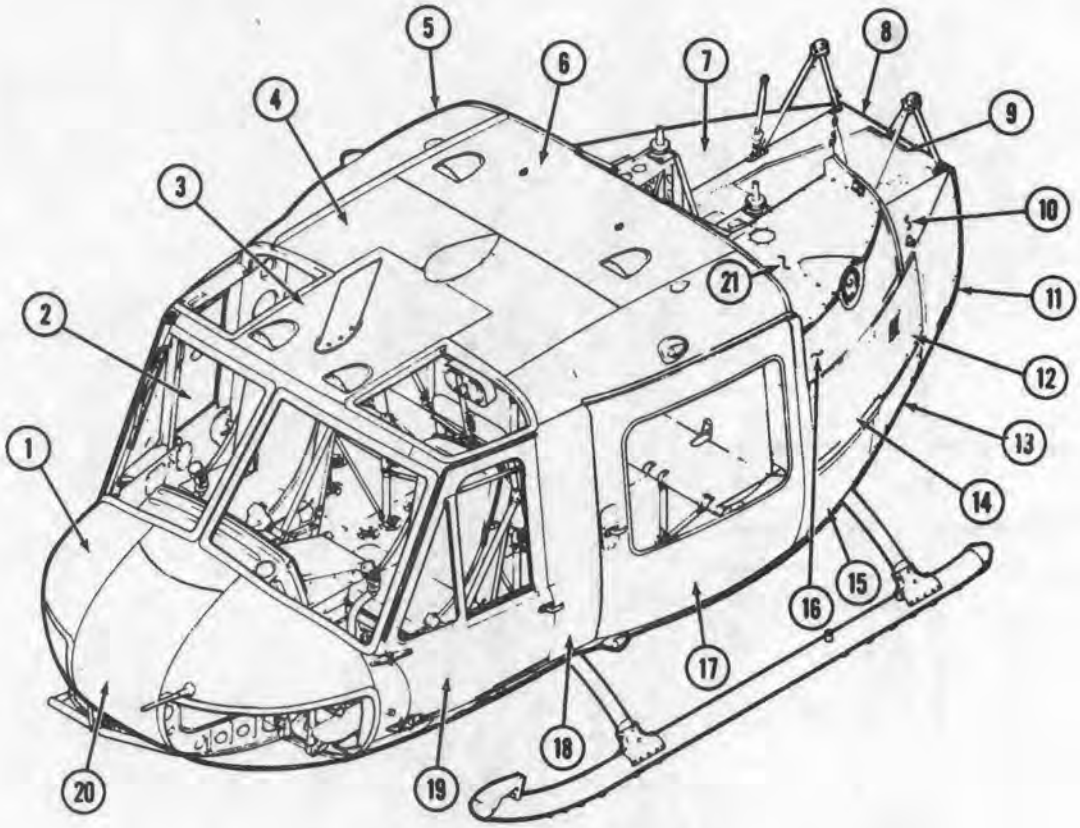
Figure 2-4. Helicopter dimensions



△ TAIL ROTOR DRIVE SHAFT BEARINGS LOCATED ON FUSELAGE STATIONS (FS)
X BOOM STATION (BS)
BL BUTT LINE
WL WATER LINE

204900-214B

Figure 2-5. Station, water and butt lines



ITEM	NAME	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
1	Nose Skin	2024 Al Aly	QQ-A-250/5	T42	0.020
2	Windshield	Acrylic Plastic	MIL-P-8184		0.187
3	Center Skin	2024 Al Aly	QQ-A-362	T3	0.025
4	Inboard Skin	2024 Al Aly	QQ-A-362	T3	0.025
5	Outboard Skin	2024 Al Aly	QQ-A-362	T4	0.025
6	Panel				
	Upper Skin	Titanium	MIL-T-9046		0.012
	Core	Al Aly Honeycomb	MIL-C-7438		0.375
	Lower Skin	Glass Fabric	299-947-037, Type E		
7	Deck RH				
	Upper Skin	Titanium	MIL-T-7993		0.016
	Core	Al Aly Honeycomb	299-947-059		0.500
	Lower Skin	Glass Fabric	299-947-057		
8	Deck Center				
	Upper Skin	Titanium	MIL-T-9046		0.016
	Core	Al Aly Honeycomb	MIL-C-7438		0.500
	Lower Skin	Glass Fabric	299-947-012, Type VIII		
9	Pan Assembly	6061 Al Aly	QQ-A-327	O	0.032

NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-6. Forward fuselage skins (Sheet 1 of 3)

ITEM	NAME	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
10	Deck				
	Upper Skin	Titanium	MIL-T-9046		0.016
	Core	Al Aly Honeycomb	MIL-C-7438		0.500
	Lower Skin	Glass Fabric	299-947-018		
11	Door				
	Outer Skin	Glass Fabric	299-947-012, Type VIII		
	Core	Al Aly Honeycomb	MIL-C-7438		0.250
	Inner Skin	Glass Fabric	299-947-012, Type VIII		
12	Door	Same as item 11			
13	Door	Same as item 11			
14	Panel				
	Outer Skin	Glass Fabric	299-947-012, Type VIII		
	Core	Al Aly Honeycomb	MIL-C-7438		0.500
	Inner Skin	Glass Fabric	299-947-012, Type VIII		
	Sealer	Neoprene impregnated nylon cloth			
15	Panel	Same as item 14			
16	Panel				
	Outer Skin	Glass Fabric	299-947-018		0.016
	Core	Al Aly Honeycomb	MIL-C-7438		0.500
	Inner Skin	Glass Fabric	299-947-018		
17	Cargo Door	2024 Al Aly	QQ-A-250/5	T4	0.025
18	Post	2024 Al Aly	QQ-A-362	T4	0.032
19	Crew Door	2024 Al Aly	QQ-A-250/5	T4	0.020
20	Nose Door				
	Outer Skin	Glass Fabric	299-947-012, Type VIII		
	Core	Al Aly Honeycomb	MIL-C-7438		0.250
	Inner Skin	Glass Fabric	299-947-012, Type VIII		
21	Cover	Titanium	MIL-T-9046		0.016
	Outer Skin	Al Aly Honeycomb	299-947-059		0.500
	Core	Glass Fabric	299-947-057		
	Inner Skin				

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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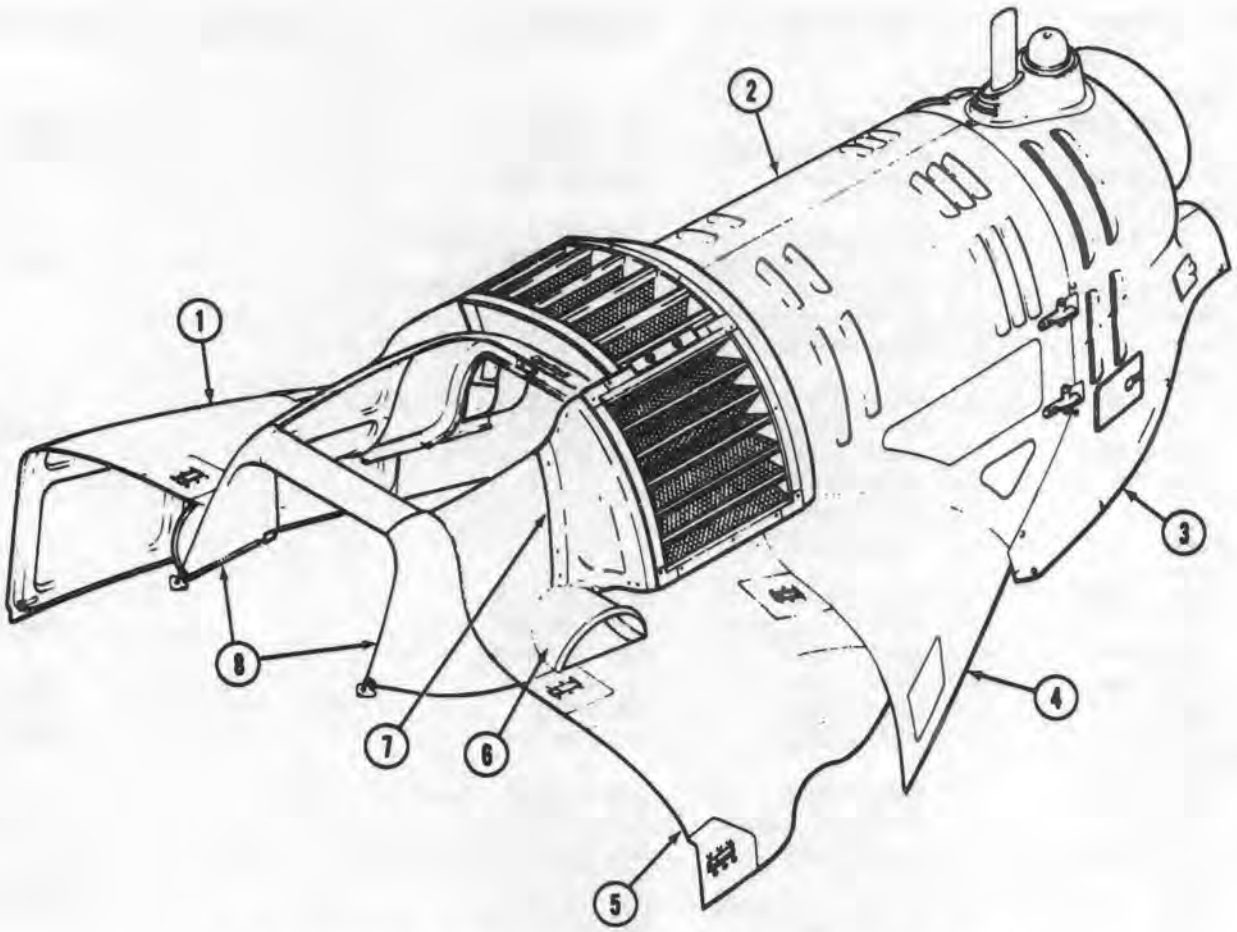
Figure 2-6. Forward fuselage skins (Sheet 2 of 3)

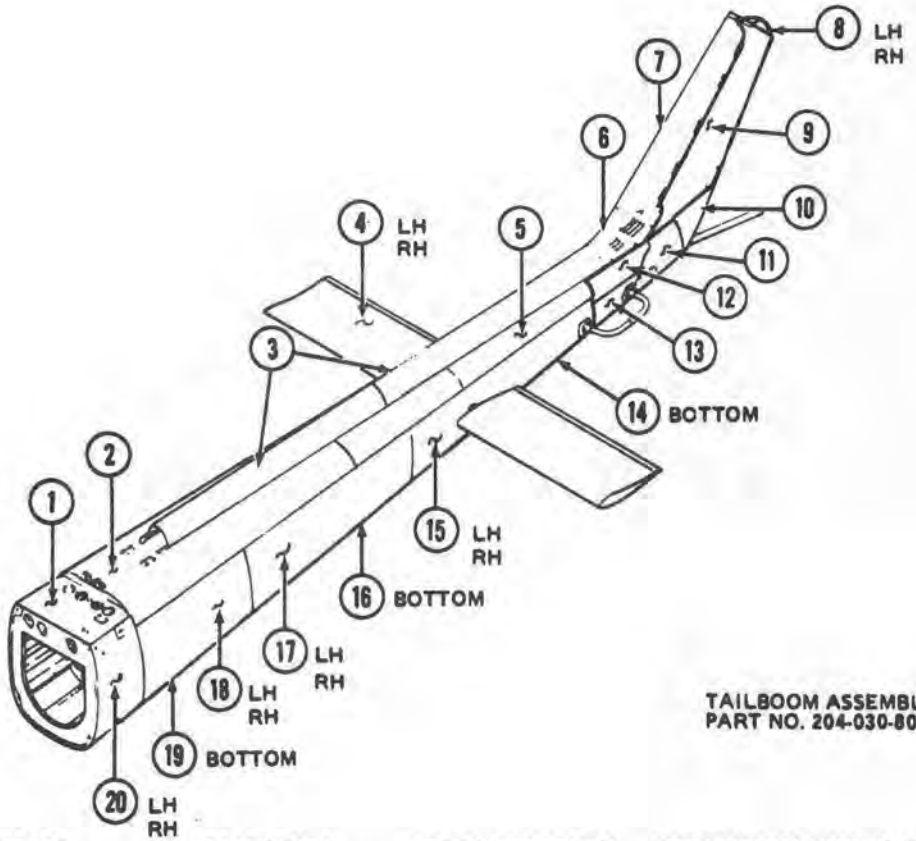


ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

ITEM	NAME	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
1	Cowl Transmission RH				
	Skin, Inner	2024 Al Aly	QQ-A-250/5	T4	0.025
	Skin, Outer	2024 Al Aly	QQ-A-250/5	T4	0.020
2	Cowl Transmission LH				
	Skin, Inner	2024 Al Aly	QQ-A-250/5	T4	0.025
	Skin, Outer	2024 Al Aly	QQ-A-250/5	T4	0.025
3	Tailpipe Fairing	7075 Al Aly	QQ-A-250/11	T6	0.032
4	Cowl Assembly LH				
	Skin, Inner	2024 Al Aly	QQ-A-250/5	T4	0.025
	Skin, Outer	2024 Al Aly	QQ-A-250/5	T4	0.020
5	Cowl Transmission LH				
	Skin, Inner	2024 Al Aly	QQ-A-250/5	T4	0.025
	Skin, Outer	2024 Al Aly	QQ-A-250/5	T4	0.020
6	Cover	Glass Fabric	209-947-102, Type VIII		
7	Fairing	2024 Al Aly	QQ-A-250/5		0.025
8	Air Duct, Transmission				
	Skin	Glass Fabric	209-947-102, Type VIII		
	Doubler	2024 Al Aly	QQ-A-250/5	T42	0.032

204900-1036-3B

Figure 2-6. Forward fuselage skins (Sheet 3 of 3)



TAILBOOM ASSEMBLY
PART NO. 204-030-800-469

ITEM	NAME	MATERIAL	SPECIFICATION	CONDITION	THICKNESS
1	Deck	7075 Al Aly	QQ-A-250/13	T6	0.016
2	Skin	2024 Al Aly	QQ-A-250/5	T3	0.020
3	Doors	2024 Al Aly	QQ-A-250/5	T3	0.012
4	Skin	Mag Aly	QQ-M-44AZ	H-24	0.025
5	Skin	2024 Al Aly	QQ-A-250/5	T3	0.032
6	Cover	5052 Al Aly	QQ-A-250/8		0.032
7	Door Skins	Glass Fabric	299-947-012, Type VIII		
	Core	Al Aly Honeycomb	MIL-C-7438		0.125
8	Mount	Glass Fabric	299-947-057, Type C		
9	Panel				
	Outer Skin	2024 Al Aly	QQ-A-250/5	T3	0.012
	Inner Skin	2024 Al Aly	QQ-A-250-5	T3	0.008
	Core	Al Aly Honeycomb	MIL-C-7438		0.375
10	Fairing	Glass Fabric	299-947-018		
11	Skin	2024 Al Aly	QQ-A-250/5	T3	0.032
12	Skin	2024 Al Aly	QQ-A-250/5	T42	0.050
13	Skin	2024 Al Aly	QQ-A-250/5	T3	0.050
14	Skin	2024 Al Aly	QQ-A-250/5	T3	0.032
15	Skin	2024 Al Aly	QQ-A-250/5	T3	0.032
16	Skin	2024 Al Aly	QQ-A-250/5	T3	0.025
17	Skin	2024 Al Aly	QQ-A-250/5	T3	0.025 LH/ 0.040 RH
18	Skin	2024 Al Aly	QQ-A-250/5	T3	0.020 LH/ 0.040 RH
19	Skin	2024 Al Aly	QQ-A-250/5	T3	0.020
20	Skin	2024 Al Aly	QQ-A-250/5	T3	0.032

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204030-1039

Figure 2-7. Tailboom skins

Grouping of Metals and Alloys

Group I..... Magnesium and its: aluminum alloys: aluminum alloys 5052, 5056, 5356, 6061, and 6063.

Group II..... Cadmium, zinc, and aluminum and their alloys (including the aluminum alloys in Group I)

Group III..... Iron, lead, and tin and their alloys (except stainless steel)

Group IV..... Copper, chromium, nickel, silver, gold, platnium, titanium, cobalt, and rhodium and their alloys; stainless steel and graphite.

Metals classified in the same group are considered similar to each other.

Metals classified in different groups are considered dissimilar to each other.

(6) **Hydroscopic Material Corrosion.** This form of corrosion is caused by such materials as sponge rubber, felt, cork, etc., absorbing water and holding it in contact with the part.

b. **Corrosion Forms and Causes.** Refer to table 2-2.

Table 2-2. Forms and Causes of Corrosion

Form	Description	Cause
Chafing	A rubbing action between two parts	Improper clearance between parts and improper lubrication.
Brinelling	Raised areas indicating separation of metal. Normally found on plated or finished parts and precedes flaking and peeling	Improper assembly or disassembly technique, such as using force to install a roller or ball bearing in the race; also caused by heat and wear.
Fretting Corrosion	Discoloration where surfaces are pressed or bolted together under pressure. Color or residue on steel parts is usually reddish brown and black on aluminum or magnesium parts	Incomplete adhesion of metal or excessive loads
Scuffing	Surface damage of pieces of a plated or finished surface	Rubbing of fine particles of metal by slight movement.
Galling	Transfer of metal form one surface to another.	Rubbing off of particles of two surfaces under high pressure
Abrasion	Roughened area can vary from light or heavy	Presence of fine particles of foreign material between moving surfaces

c. **Corrosion Damage Repair.** Refer to table 2-3 and TM 43-0105 for general instructions for cleaning and treating corroded parts.

d. **Corrosion Prevention at Metal Fastener Locations.** Rivets, lock bolts, blind rivets, and threaded fasteners shall be assembled using wet, unthinned zinc chromate primer (TT-P-1757), item C172.4, table 1.1. Fasteners, holes, and washers if applicable, shall be coated with wet unthinned primer. If the fasteners are dissimilar to and can result in direct contact with magnesium, a washer of 5052 aluminum alloy with a minimum overlap of 1/8 inch shall be used in addition to TT-P-1757 primer.

Table 2-3. Cleaning and Treating Corroded Parts

Metal	Condition	Cleaning	Treatment
Aluminum Alclad Surfaces	Mild or heavy pitting, staining and; superficial etching	Apply cleaning compound, (C47), and rinse with water. Do not use abrasives.	Apply paint as required. On internal surfaces use epoxy primer, (C167). Unfinished external surfaces should be finished with aluminum pigmented lacquer.
	Mild surface pitting staining and superficial etching	Apply cleaning compound, (C47) and heavy duty brightener.	Apply paint as required. On internal surfaces use epoxy primer (C167). Unfinished external surfaces should be finished with aluminum pigmented lacquer.
	Heavy surface pitting	Hand rub with aluminum wool (C250) and kerosene (C119); apply cleaning compound (C47), and rinse with fresh water.	
Aluminum	Intergranular corrosion	Remove corroded area. Burnish part to remove sharp edges.	Treat with a five percent solution of potassium dichromate and alloy to dry. Brush off excess crystals. Apply epoxy primer (C167).
Magnesium	Surface pitting, large nonremovable parts	Remove corrosion with a stiff bristle brush.	Apply corrosion treatment, (TM 43-0105).
Steel	Lightly rusted parts. No pitting	Clean parts with cleaning compound, (C47), and rinse with fresh water. Use steel wool (C251) to remove compound, if necessary.	Apply epoxy primer, (C167) on previously cadmium plated parts.
	Badly rusted	Not applicable	Replace parts.

2-15. HONEYCOMB PANELS.

2-16. Description — Honeycomb Panels. Structural panels consisting of aluminum alloy core with metal facings and/or glass cloth facings are used in forward fuselage structure. (figure 2-6.)

2-17. Classification, inspection of damage — Honeycomb Panels. Refer to table 2-4 for classification of damage.

Table 2-4. Classification of Damage — Honeycomb Panels

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
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 under dent. 3. Maximum diameter does not exceed 4.0 inches for single dent. 4. Edge of dent is 1.0 inch minimum from supporting structure or beveled edge of panel. Smooth contoured dents up to 1.0 percent of panel thickness provided: 1. No voids under dent. 2. Maximum diameter does not exceed 0.75 inch for a single dent. 3. No more than three dents can be encompassed by a 4.0 inch diameter circle. NOTE: Dents closer than 1.0 inch are classed as one dent. 4. Edge of dent is minimum 1.0 inch from supporting	a. Damage exceeds negligible damage limits. No cracks, holes, or voids. (Figure 2-8) Dent has sharp nicks, hole or crack. Damage penetrates only one surface and does not exceed 0.5 inch after cleanup. Refer to paragraph 2-18 step b., and figure 2-9. If cleanup exceeds 0.5 inch, refer to paragraph 2-18, step c. and figure 2-10.	a. Damage exceeds repairable limits. Corrosion in honeycomb core.

Table 2-4. Classification of Damage — Honeycomb Panels (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
	structure or beveled edge. 5. Total damage does not exceed 2 percent of panel area.		
b. Voids.	b. Voids up to 0.25 inch square (0.5 X 0.5) 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 inch from supporting structure, panel edge bevel or insert or fitting. NOTE: Voids closer than 1.0 inch are classed as one void. Edge separation is never classed as negligible damage.	b. Damage exceeds negligible limits. (figure 2-12).	b. Damage exceeds repairable limits.
c. Nicks and scratches (metal facing)	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 2-9 and 2-10 for aluminum faced panel. See figure 2-13 for titanium faced panels. (Excluding center service deck.)	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 2 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, beveled edge.	d. Same as preceding step c.

Table 2-4. Classification of Damage — Honeycomb Panels (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
e. Cracks, holes, punctures.	e. None.	e. Cracks, holes or punctures. 1. Damages affect only one skin and core. (Figure 2-9) (a) Damage limited to two holes within a **4.0** inch dia. circle. (b) Holes separated by **1.0** inch of undamaged materials. NOTE: Holes closer than **10** inches are classed as one hole. (c) Hole diameter is **0.5** inch or less after cleanup. (d) Edge of cleanup is minimum **3.0** inches from supporting structure beveled edge, or mounting surface. 2. Damage exceeds **0.5** inch dia. after cleanup (figure 2-10). (a) Damage limited to **12.0** square inches when only one skin and core are affected, or **10.0** square inches when both skins and core are affected. (b) Maximum two repairs per panel with **5.0** inches of undamaged material between repairs. (c) Edge of cleanup minimum **3.0** inches from panel edge, cutout or supporting structure.	e. Same as preceding step c.
f. Loose or damaged inserts.	f. None. (figure 2-11)	f. Replace as required.	

Table 2-4.1 Inspection Limits for Control Rods, Tube Assemblies and Connecting Links

INSPECT FOR	LIMITS	REPAIR/ REPLACE
a. Nicks and scratches on rods.	10 percent of wall thickness.	Repair
b. Nicks and scratches on end fittings	10 percent of material thickness or .040 inches, whichever is less.	Repair
c. Dents.		
Divide connecting link tube into three equal sections. Check tube for dents in middle third.	One dent not exceeding 0.010 inch deep and free from any abrasions is premissible in this area.	
Check tube for dents in other two-thirds.	A maximum total of two dents, each not exceeding 0.015 inch in depth and free from any abrasions is permissible in these areas.	
d. Visually check for out-of-round ness.	a. If an out-of-round condition is found, determine the extent of this condition. Use calipers at out-of-round location to measure diameter. Move calipers 90° around link and repeat measurement. b. On tubes less than 2 inches in diameter, an out-of-round condition of 0.010 inch is permissible in middle one-third of tube. On tubes greater than 2 inches in diameter, an out-of-round condition of 0.015 inch is permissible. c. On any diameter tube an out-of-round condition of 0.015 inch is permissible in each of end one-third portions of tube.	
e. Corrosion.	5 percent of wall thickness after removal of 10 percent of thickness of rod ends or fittings or 0.040 inch, whichever is less.	
f. Rod ends for looseness in rod.	No looseness allowed.	
g. Checknuts on the adjustable end of the connecting link for looseness.	If the checknut on the adjustable end of the connecting link is loose, install an internal star washer under the checknut as follows: a. For checknut AN316-6R, use washer MS35333-42. b. For checknut AN316-7R, use washer MS35333-43. c. For checknut AN316-8R, use washer MS35333-44.	

Table 2-4.1 Inspection Limits for Control Rods, Tube Assemblies and Connecting Links

INSPECT FOR	LIMITS	REPAIR/ REPLACE
h. Bearings for looseness.	Dry type bearings. .007 inch radial play max. 0.10 inch axial play max. Antifriction bearings. .004 inch radial play max. Axial play on antifriction bearings can vary. It is not a satisfactory criterion for checking serviceability of antifriction bearings.	
Bolts and bushings used at moving connections.	Max wear. Bolt shank minimum diameter is no less than .001 inch below minimum production diameter. Max wear wear. Bushing hole maximum diameter no more than .001 inch above maximum production diameter.	

2-18. Repair or Replacement — Honeycomb Panels (AVIM).

Premaintenance requirements for repair of honeycomb panels.

Conditions	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C3) (C14) (C10.1) (C15) (C142) (C185) (C178)
Special Environmental Conditions	None

a. Repair nonpenetrating damage to external honeycomb panels (excluding titanium faced panels).

(1) Smooth contoured dents on surface may be filled and faired providing damage does not exceed limits of figure 2-8.

(2) Apply paint and primer to match surrounding area (TB746-93-2).

b. Repair of holes, sharp dents, and dents exceeding 10 percent of honeycomb panel thickness (excluding titanium faced panels).

(1) Damage not to exceed:

(a) 0.50 inch diameter after cleanup. (Does not include under cut.)

(b) No more than two damages encompassed by a 4.0 inch diameter circle and damage comes no closer than 1.0 inch to a similar damage or repair. Damage closer than 1.0 inch is classed as a single damage.

(c) Penetration affects only one surface.

(d) Damage after cleanup, comes no closer than 3.0 inches to panel edge or cutout, insert or attachment point for structural members.

(e) Replace panel if corrosion or water is found in core.

(2) Repair damage in accordance with figure 2-9 and the instructions following:

(a) Protect opening to prevent entry of cleaning materials.

(b) Remove paint and primer from surface extending 3.0 inches from edge of damage.

(c) Cut away skin and core to remove all damage (figure 2-9).

WARNING

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

CAUTION

All corrosion and damage must be removed. Do not cut into inner skin of panel. No corrosion or water allowed in core.

(d) Flush cavity with MEK (C142). Dry immediately with clean compressed air.

(e) Fill cavity with adhesive (C15).

(f) Sand adhesive to contour (after curing) and refinish area to match surrounding finish.

c. Repair of honeycomb panels requiring a cleanup hole in excess of 0.50 inch diameter. (Excluding titanium faced panels (figure 2-10).

CAUTION

Repairs to honeycomb panels must be applied subject to component limitations, and must not be accomplished if weight and balance, structural integrity, interchangeability, or operational characteristics will be adversely affected.

(1) Protect the opening to prevent entry of cleaning agents and solvents.

204030-111H

FIBERGLASS AND METAL FACED HONEYCOMB PANELS — STRUCTURAL

DESCRIPTION OF DAMAGE

FIBERGLASS FACED PANELS

Dents, scratches, scars, or erosion in facings with no holes, cracks, or voids.

METAL FACED PANELS

Smooth dents or depressions in the skins with no holes, or cracks or voids.

LIMITS — REPAIRABLE DAMAGE

1. Maximum depth: 25 percent of panel thickness.
2. Minimum distance from an edge bevel: 0.500 inch.

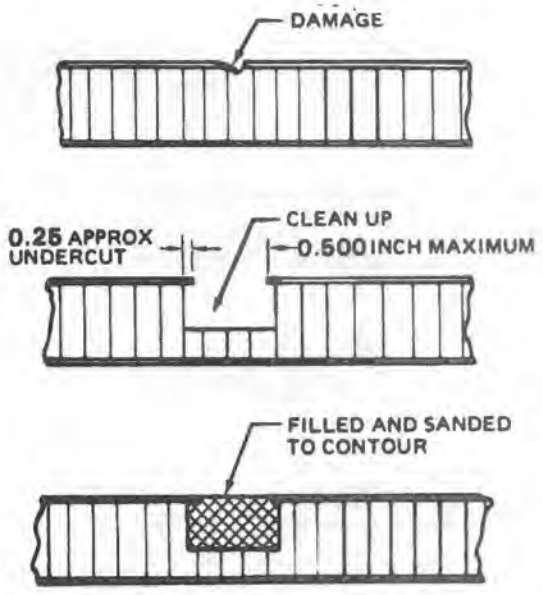
1. Maximum diameter of damage: 1.00 inch.
2. Maximum depth: 20 percent of panel thickness.
3. Maximum area of all dents combined in any one bay: 3 percent of area of bay.
4. Maximum of two 1.00 inch diameter dents in a 3 square inch area.
5. No voids may exist under damage.
6. Minimum of 1.0 inch from panel beveled edge.

REPAIR PROCEDURES

FIBERGLASS AND METAL FACED

1. Remove paint and/or primer from damaged area.
2. Smooth out damaged area by lightly sanding with abrasive pad (C3), or No. 400 grit sandpaper (C185.1).
3. Clean sanded area with methyl-ethyl-ketone (C142) and wipe dry.
4. Apply adhesive (C14) with suitable tool. Level to panel contour and allow to cure.
5. Sand smooth with abrasive pad (C3) or No. 400 grit sandpaper (C185.1).
6. Apply two coats of lacquer of color to match original finish.

Figure 2-8. Honeycomb panels — repair of dents, scars, and scratches



NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED

Figure 2-9. Honeycomb panels — minor damage repairs

(2) Remove paint and primer from an area extending 3.0 inches beyond the edge of damage.

(3) Cut away skins and core to remove all damaged and contaminated materials. Undercut core approximately 0.10 inch from edge of cleanup. Use a minimum of 0.500 inch radius at corners. Do not exceed cleanup limits of table 2-4.

WARNING

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

CAUTION

Any core or skin contaminated by fuel, oil, water, corrosion or debris must be cut out. Replace panel if water or corrosion is found in panel.

NOTE

Where damage is limited to one skin, the opposite skin may be left intact provided cleanup operations does not cut into the skin.

(4) Flush the cavity with MEK (C142). Dry promptly with clean dry compressed air.

(5) Fill the cavity as follows:

(a) Damage of 1.0 inch or less in diameter may be filled with adhesive (C14) and smoothed to contour of skins (figure 2-10, detail C).

(b) Damage exceeding 1.0 inch in diameter must be filled with a core plug of like honeycomb material. Refer to following steps 1 through 5. (See Detail D.)

1. Cut a core plug (use only clean material of the same type as original) to fit the damaged area allowing approximately 0.10 inch gap for adhesive of the edges.

WARNING

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

2. Flush the plug with MEK (C142) and dry immediately with dry filtered air.

3. Apply a 0.20 TO 0.30 inch film of adhesive (C14) to a piece of P.V.F. Tedlar (area to be equal to surface area of plug).

4. Place the core plug on the adhesive, apply firm contact to five PSI pressure and allow adhesive to cure.

NOTE

This will seal the core cells and provide a better bonding surface. If both panel skins are affected, both sides of plug should be sealed.

5. Protect the core plug from contamination until ready for use.

(6) Patching metal faced panels.

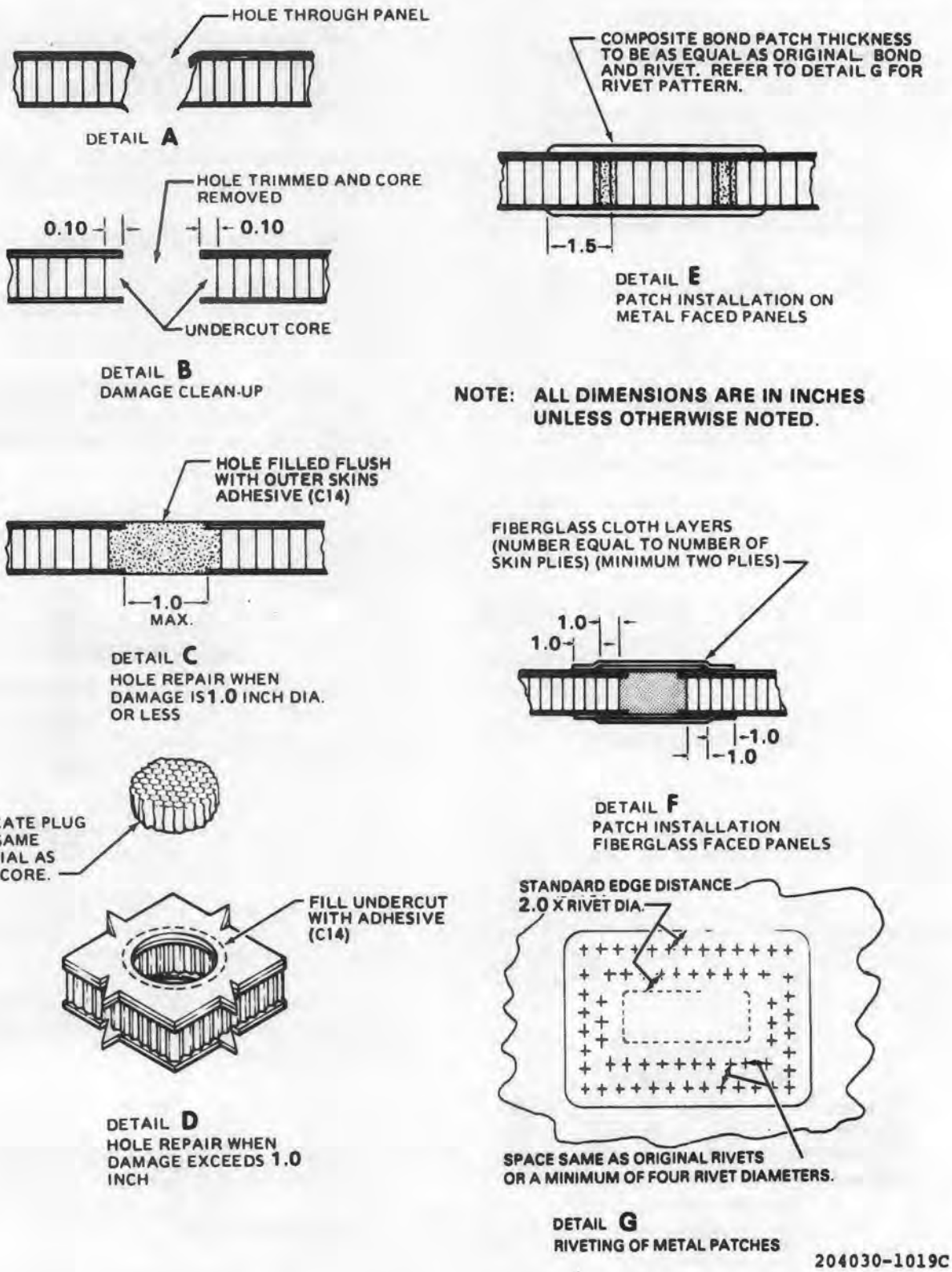


Figure 2-10. Honeycomb panels, major repair

(a) Cut a skin patch (of composite bond material) (prebond), sufficiently large to provide a 1.5 inch overlap outside of the damaged skin trim, remove the peel ply protecting the adhesive and apply adhesive (C15) evenly to the patch 0.020 TO 0.030 inch thick. Minimum patch thickness to be that of existing skin (figure 2-10, detail E).

NOTE

Where the panel is curved, the skin patch must be shaped to match.

(b) Install skin patch over the repair area.

(c) Add NAS1738-4-1 rivets or equivalent around patch in the overlap area at a maximum spacing of 1.50 inches and width 2D edge distance. Rivets are to be installed within the pot life of the adhesive.

(d) Apply pressure to the patch in the cavity area to ensure a good bond.

(7) Patching fiberglass faced panels.

NOTE

Fiberglass repairs should be accomplished after core plug has cured.

(a) Prepare a patch of fabric layers (equal to number of plies lost) or a minimum of two plies to provide a minimum of 1.0 inch minimum overlap outside the damaged skin trim and to provide a minimum of 1.0 minimum overlap, overeach preceding layer (figure 2-10, detail F).

(b) Saturate the first patch with adhesive (C10.1). Apply resin (C178) to the exposed filler and to the exposed clean area of the panel around the damage.

(c) Fit the impregnated patch into place. Smooth out air pockets and wrinkles.

NOTE

Ensure that adequate resin is forced through the patch ply in the core area.

(d) Saturate each succeeding ply with adhesive (C10.1) and brush coat with entire repair area with resin (C178) and apply the patch. Work each ply to remove the wrinkles and entrapped air prior to application of the next ply. Minimum number of plies to be the same as existing skin.

(e) Cover repair with cellophane and apply firm contact pressure to the patch with shot bags, clamps, vacuum bag or other suitable means.

d. **Repair bonded panel inserts.** See figure 2-11 for repair limitations and instructions.

2-19. Repair or Replacement — Honeycomb Panel Service Decks (AVIM). Repair engine service decks as follows:

a. **Center service deck repair.** Evacuate to Depot for repair or replacement if damage exceeds negligible limits.

b. **Left and right side service deck repair.**

(1) Dents in top skin constitute negligible damage and need not be repaired provided the top skin is not pierced and the fiberglass facing on the underside is not cracked.

(2) Repair acceptable voids in accordance with figure 2-12 observing the restrictions on sheets 1 and 2 of figure 2-12.

(3) Repair penetrating damage in accordance with figure 2-13, observing the damage limits noted on sheets 1 and 2 of figure 2-13.

(4) Replace damaged or loose inserts or plug and sleeve (table 2-4, defect f.).

c. Replace right service deck if repairable limits are exceeded (figure 2-14). Evacuate to Depot if damage limits to left side are exceeded and replacement of service deck is required.

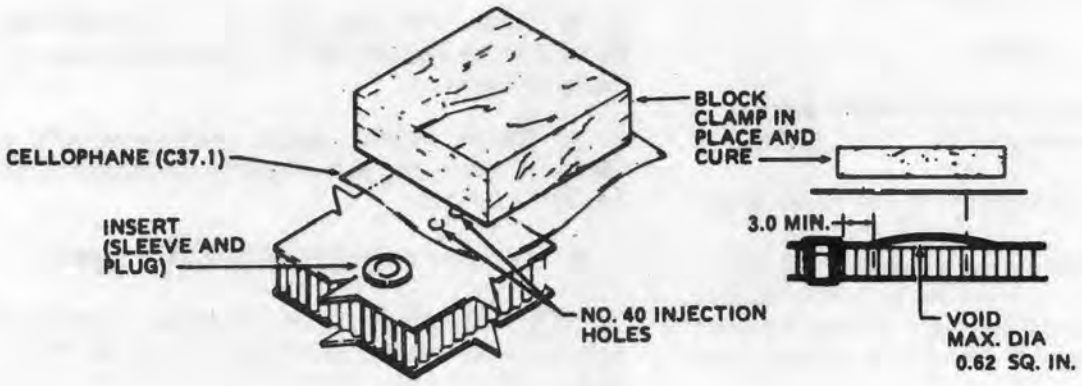
CAUTION

Precautions shall be taken to prevent airframe distortion during the remove and replacement operation. The precautions include removing all heavy components such as engine, fuel, transmission and tailboom, and supporting the fuselage in a level position while removing and replacing a defective panel, one at a time.

(1) Remove tailboom (paragraph 2-278).

(2) Remove cowling and engine transmission cowling (paragraph 2-39 and 2-46).

(3) Remove engine (paragraph 4-13).



INSERTS OF BONDED PANELS

APPLICATION A:

Void existing in area of metal insert bonded in honeycomb panel.

RESTRICTIONS A:

1. **Void area not to exceed 0.62 inch square.**
2. **Insert not to be damaged.**
3. **Edge of void 3.0 inch minimum from insert.**

REQUIRED A:

Adhesive (C10.1)

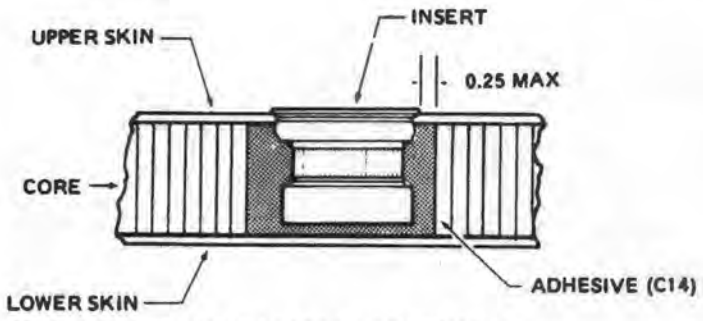
PROCEDURE:

1. **Drill No. 40 hole at each end of void.**
2. **Inject (C10.1) into one hole until it flows out opposite hole.**
3. **Clamp flat and cure.**
4. **If void enlarges or still exists after full cure, submit for re-evaluation.**
5. **Refinish as required if void is eliminated.**

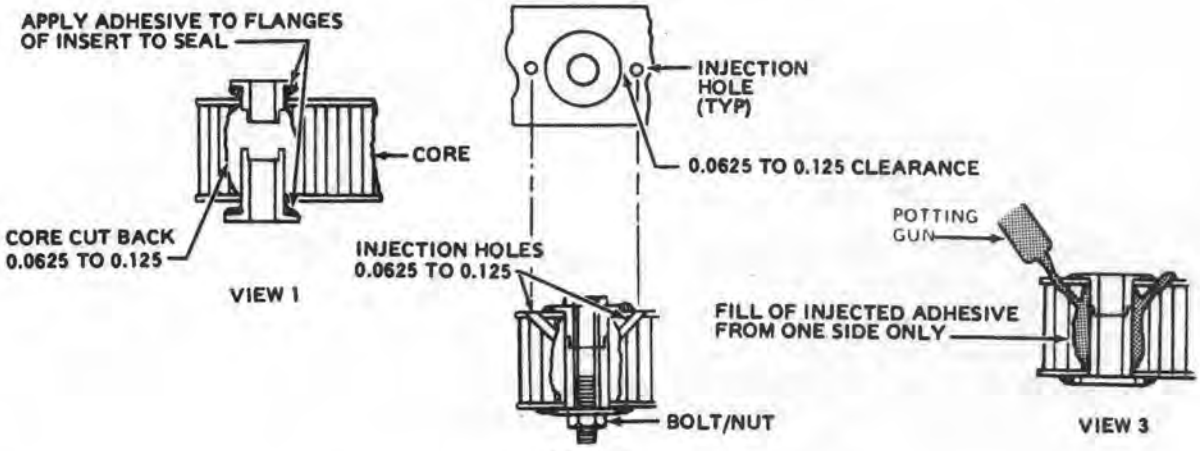
NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

204030-235-1G

Figure 2-11. Inserts of bonded panels (Sheet 1 of 2)



TYPICAL INSERT INSTALLATION



TYPICAL SLEEVE AND PLUG INSTALLATION

INSERTS OF BONDED PANELS

INSERTS OF BONDED PANELS

APPLICATION B:

Damaged or improperly installed potted insert that can be removed by counterboring without enlarging the blueprint size hole in the panel surfaces.

RESTRICTIONS B:

1. **Immediate adjacent surface area is not to be damaged.**

REQUIRED B.

1. **Adhesive (C14) 33 parts "B" to 100 parts "A".**
2. **Insert.**

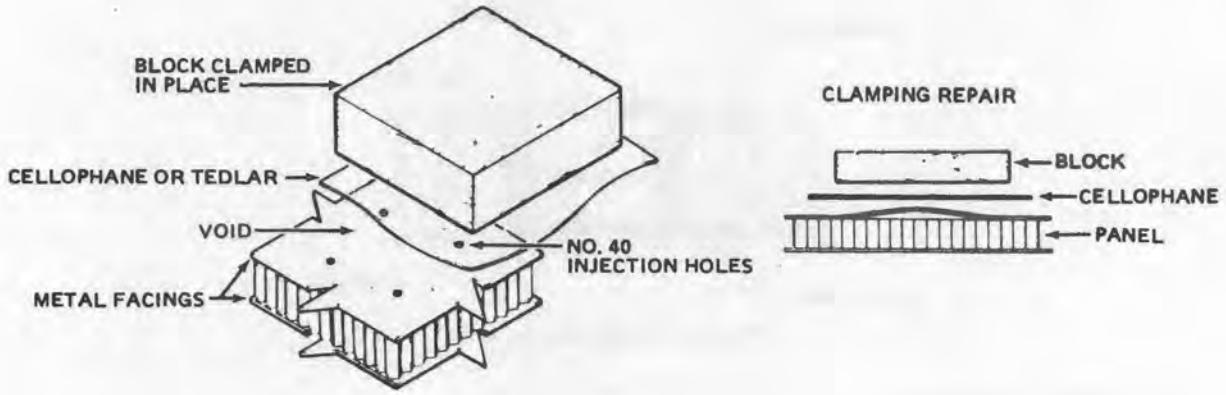
PROCEDURE B:

1. **Counterbore to depth required to remove discrepant insert without enlarging existing hoels through outer skins.**
2. **Install insert with adhesive (C14) and fair.**
3. **Refinish as required.**

NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

204030-235-2E

Figure 2-11. Inserts of bonded panels (Sheet 2 of 2)



REPAIR OF VOIDS IN METAL SURFACED BONDED PANELS

APPLICATION A

DAMAGE DESCRIPTION A:

Adhesion voids between metal skin and core less than 1.5 square inches.

RESTRICTIONS A:

1. Total area of voids shall not exceed 3 percent of total panel area.
2. A minimum of two inches between voids is allowable.
3. Voids shall not occur within 3.0 inches of an insert of adjacent structure.

REQUIRED A:

1. Adhesive (C10.1).
2. Adhesive (C14).

PROCEDURE A:

1. Drill No. 40 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 adhesive (C10.1) with hypodermic syringe until forced out opposite hole.
3. Cover repair with cellophane and level out by clamping with blocks. Allow to cure.
4. Clean up and smooth with sandpaper (C185.1). Refinish as required.

NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

204030-233-1F

Figure 2-12. Repair of voids in metal surfaced bonded panels (Sheet 1 of 2)

REPAIR OF VOIDS IN METAL SURFACED BONDED PANELS

APPLICATION B

DAMAGE DESCRIPTION B

Edge voids or delaminations.

RESTRICTIONS B

1. Voids shall not extend into attachment holes.
2. Void must be less than 4 .0 inches in length.
3. No more than three voids per panel.
4. Minimum distance between two distinct voids to be 1.0 inch.

REQUIRED B

1. Adhesive (C10.1).
2. Sealant (C188).

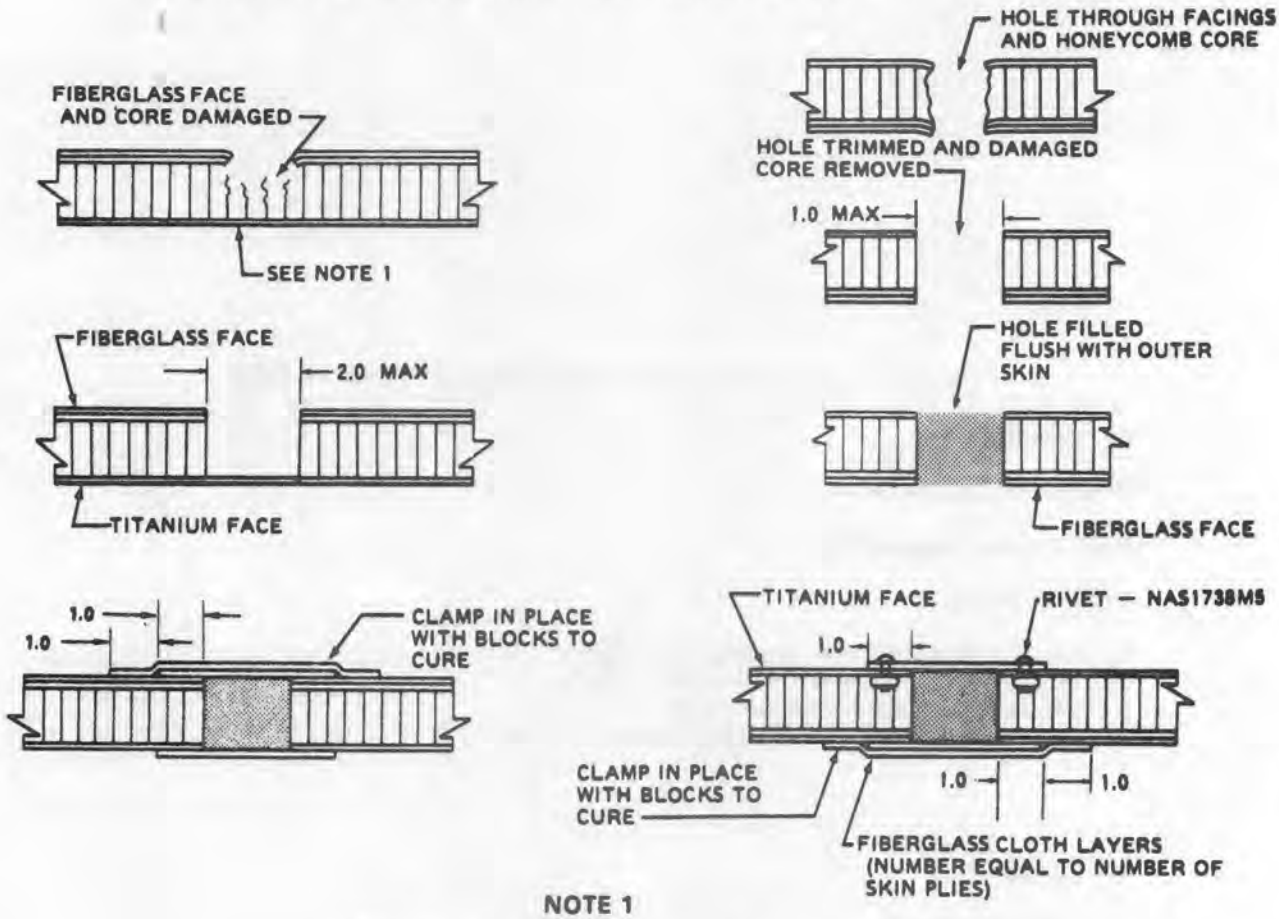
PROCEDURE B

1. Inject void with epoxy resin (C178).
2. Sealant (C188) may be used for edge sealer.
3. Cover repair with cellophane or tedlar and level out by clamping. Cure under pressure.
4. Clean up and smooth with sandpaper (C185).

204030-233-2F

Figure 2-12. Repair of voids in metal surfaced bonded panels (Sheet 2 of 2)

FIBERGLASS AND METAL FACED HONEYCOMB PANELS — STRUCTURAL



NOTE 1

If the titanium face has been damaged, the damage after clean-up shall not exceed the limits of repairable damage for titanium facing. Repair in accordance with titanium face repair procedures.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

NOTE 2

If water or corrosion is found in the honeycomb, the entire panel must be replaced.

DESCRIPTION OF DAMAGE

FIBERGLASS FACE	TITANIUM FACE
Damage penetrating one or both facings and extending into core. The following limits apply only to fiberglass facings and core damage associated with it.	Damage penetrating titanium facing greater than 0.50 inch diameter, and damage extending completely or partially through panel.

212030-77-G

Figure 2-13. Honeycomb panel — repair of damage penetrating titanium and fiberglass facings and core (Sheet 1 of 2)

LIMITS — REPAIRABLE DAMAGE

FIBERGLASS FACE

1. Maximum damaged area after cleanup: Total of 3.0 square inches. Applies whether a single area of combination of separate areas.
2. Maximum length of damage: 2.0 inches in any direction.
3. Maximum diameter of cleanup hole 2.0 inches.
4. Minimum distance of completed repair from an edge bevel: 1.0 inches.
5. Minimum distance between adjacent repairs 2.0 inches (distance measured from edge of patch). Maximum of one repair per bay. Minimum distance from edge patch, fitting, insert, hard point, or control mounting surface is 2.0 inches.

TITANIUM FACE

1. Maximum diameter of any hole after cleanup is 1.0 inch.
2. Only one 1.0 inch hole is permitted per bay, except in critical edge areas.
3. Minimum distance from existing repair is 2.0 inches.
4. Minimum distance from an edge bevel is 1.0 inch.
5. Minimum distance between adjacent repairs 3.0 inches (distance measured from edge of patch). Minimum distance between edge of patch, fitting, hard point, or insert is 3.0 inches.

REPAIR PROCEDURES

WARNING

Cleaning materials are flammable and toxic. Avoid skin contact and breathing of solvent vapors.

FIBERGLASS FACE

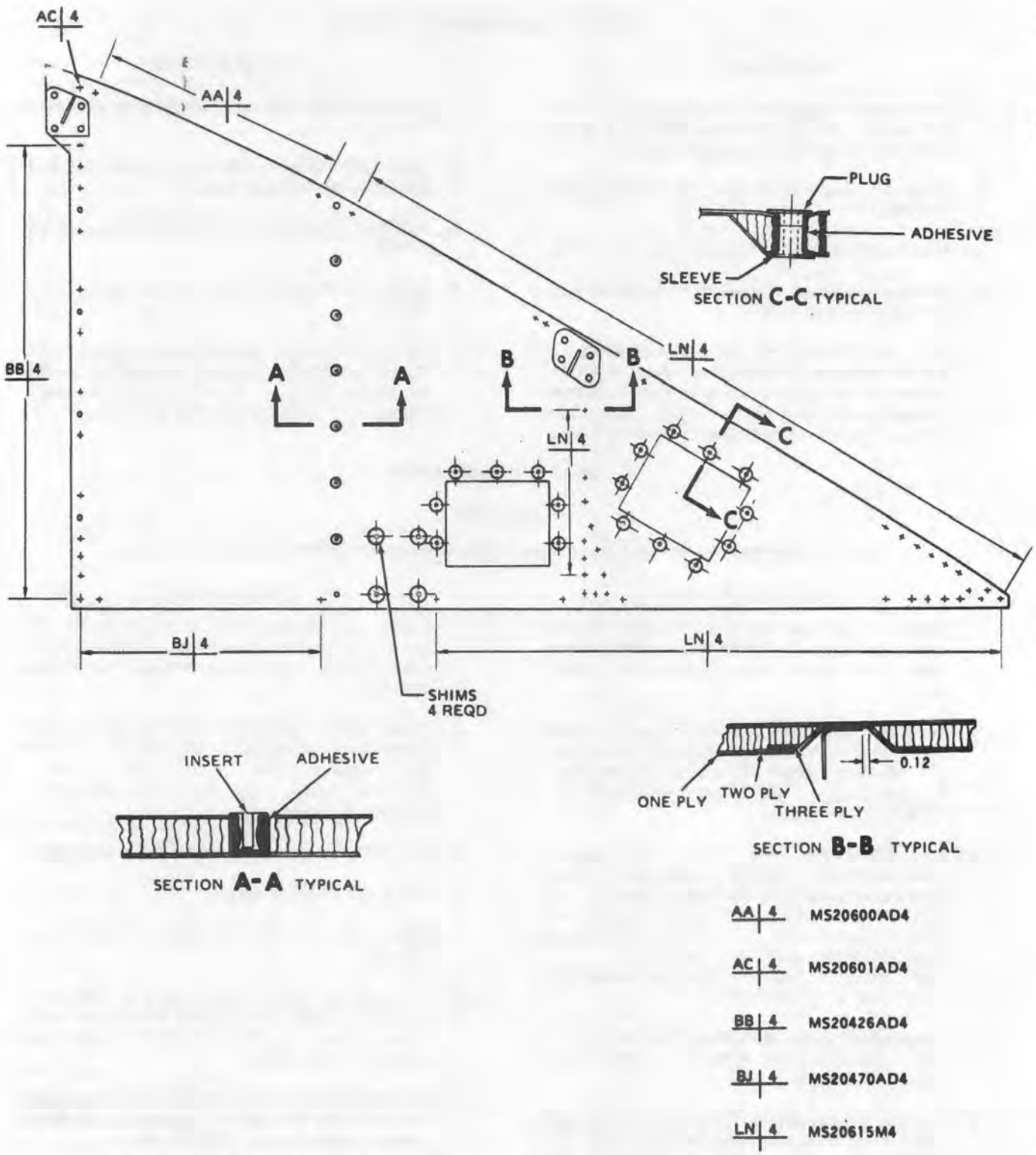
1. Clean up damage with counterbore or hole cutter. If damage is limited to one side of panel, counterbore only deep enough for proper cleanup.
2. Pack hole with adhesive (C14). Allow to cure and lightly sand with abrasive pads (C3), or No. 400 grit abrasive paper (C185.1), to smooth surface. Clean with Methyl-Ethyl-Ketone (C142) and wipe dry.
3. Cut fiberglass plies from 181 weave, specification MIL-C-9084, as necessary to equal the number plies in the area being repaired. Each ply shall be of sufficient size to overlap the ply being covered by 1.0 inch in all directions. Saturate all plies with adhesive (C10).
4. While still wet, position fiberglass plies over repair area, as shown above.
5. Cover repair area with cellophane (C37.1), or P.V.F. Tedlar No. 40S (C223.1). Press down to smooth and allow to cure.
6. Remove cellophane or Tedlar after curing and sand lightly, if necessary, with abrasive pad (C3) or No. 400 grit paper (C185.1).
7. Apply two coats of paint of color to match original finish.

TITANIUM FACE

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 adhesive (C14). Allow to cure and lightly sand with abrasive pad (C3), or No. 400 grit abrasive paper (C185.1) to smooth surface. Clean with Methyl-Ethyl-Ketone (C142) and wipe dry.
3. Cut patch from stainless steel or titanium sheet.
4. Bevel the edges of patch.
5. Clean all surfaces with Methyl-Ethyl-Ketone. (C142).
6. Lay out rivet pattern (space rivets to a minimum of 4D or equivalent spacing of adjacent edge attachments) and position patch in place and drill. Deburr all holes.
7. Apply adhesive (C14) to patch and position patch in place and rivet patch to panel at predrilled location using NAS1738M5 rivets.
8. Apply two coats of paint of color to match original finish.

212030-157

Figure 2-13. Honeycomb panel — repair of damage penetrating titanium and fiberglass facings and core (Sheet 2 of 2)



NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

204030-1038

Figure 2-14. Service deck replacement — right side

(4) Remove screws securing fireshield to aft firewall and clamp from forward firewall.

(5) Drain fuel cells (paragraph 1-4). Remove fuel cell cover and protect cavity from debris.

(6) Remove transmission (paragraph 6-31).

(7) Remove screws or fasteners securing upper aft firewall to lower aft firewall.

(8) Remove screws attaching lower aft firewall to service deck. Remove screws from forward and aft brace legs of firewall.

(9) Remove fuel cell cover (paragraph 10-3 or 10-10). Remove maintenance hoist fitting from service deck.

(10) Remove electrical harness, clamps and clips from service deck. Remove compartment doors as required for access.

NOTE

Firewall is loosened to permit access to rivets and to allow removal of deck. Slide firewall fore and aft or lift as necessary.

(11) Remove rivets securing deck to main beams and lateral bulkheads. Use caution when removing rivets to prevent damage to fuselage or elongation of rivet holes. Remove service deck. Remove debris from drilling operation.

(12) If a new service deck is not to be installed immediately, fabricate a holding fixture or strap, to be installed in place of service deck as follows:

(a) Fabricate a strap of aluminum alloy approximately 0.125 inch thick, length sufficient to pick up rivet holes on outboard and inboard sides at approximately station 163.00 and wide enough to pick up two fasetners at each end.

(b) Install fixture or strap on helicopter by back-drilling holes in ends of straps through existing rivet holes and using 0.125 inch steel screws and nuts to secure.

(c) Holding fixture should remain installed until new service deck is ready for installation. Place sign in area to prevent personnel from climbing on fuselage at location of repair. Remove all debris from drilling operation.

(13) Apply sealant (C188) to faying surfaces of service deck. Position service deck on main beams and lateral bulkheads. Hold or clamp tightly in place and back-drill existing rivet holes, fastening deck with cleco fasteners or equivalent, as drilling progresses.

(14) Check all screw and bolt holes for alignment. Install service deck using rivets as indicated in figure 2-14. Remove debris from drilling operation. Install fuel cell cover (paragraph 10-13).

(15) Position aft firewall on service deck and install previously removed hardware.

(16) Install engine (paragraph 4-16).

(17) Install transmission (paragraph 6-40).

(18) Install tailboom (paragraph 2-281).

(19) Install transmission cowling and engine cowling (paragraph 2-43 and 2-50).

(20) Secure upper aft firewall to lower aft firewall.

(21) Secure tail rotor driveshaft clamp retaining coupling to forward driveshaft. Install screw securing tail rotor driveshaft fireshield to lower aft firewall. Tighten clamp securing driveshaft to foward firewall.

(22) Install electrical harness, clips and clamp to service deck.

(23) Install compartment doors below engine deck level, left or right side.

(24) Service helicopter (paragraph 1-3).

2-20. SHEETMETAL SKINS.

2-21. Description — Sheetmetal Skins. The external skins of the forward and aft sections consist of formed aluminum alloy or magnesium skins and aluminum alloy faced honeycomb panels (figure 2-6 and 2-7).

2-22. Classification of Damage — Sheetmetal Skins. Refer to table 2-4 for honeycomb panels, table 2-5 for forward fuselage skins and table 2-6 for tailboom skins.

NOTE

Repair at (AVUM) Aviation Unit Maintenance is limited to minor repairs of sheetmetal cracks, scratches, corrosion, loose or missing hardware. If any extensive damage occurs or major repair is required, then these shall be accomplished by (AVIM) Intermediate Level of Maintenance. If major damage occurs requiring jigs and fixtures to repair, then these repairs shall be accomplished by Depot Level Maintenance.

2-23. Repair — Sheetmetal Skins (AVIM). Repair acceptable damage to external skins as follows:

a. Polish out acceptable nicks, scratches, and corrosion classified as negligible in table 2-5. Treat corroded areas in accordance with paragraph 2-14. Refinish area to match surrounding finish.

b. Repair mechanical and corrosion damage that is within repairable limits. See figure 2-15 through 2-18 for typical repair illustrations.

c. Refer to TM 55-1500-204-25/1 for additional standard repairs and fastener replacement.

d. Refinish repaired areas and replace any decals or stencils removed in accordance with TB 746-93-2.

Table 2-5. Classification of Damage — Sheetmetal Skins Forward Fuselage

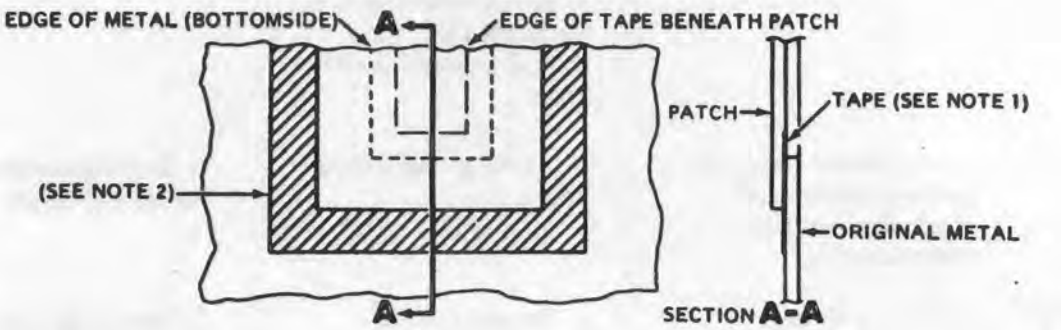
Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
Damaged, loose, missing, sheared, or improperly installed fasteners.		Replace as required.	
a. Dents	a. Smooth contoured dents, free of cracks or gouges. Depth and diameter not to exceed: Depth — Diameter 0.0156 in. — 1.0 in. 0.0469 in. — 2.0 in. 0.0625 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 classified 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-in structure.	a. Damage exceeds repairable limits between any two bulkheads. Damage and subsequent repair interferes with supporting structure.

Table 2-5. Classification of Damage — Sheetmetal Skins Forward Fuselage (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
b. Corrosion	b. Not to exceed 10 percent of material thickness and less than 4.0 square inches after cleanup. 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 cleanup.	d. Same as preceding step c.	d. Damage exceeds repairable limits.
e. Trapped or stretched skin.	e. 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, area is stretched or oil canned and must be replaced or	e. Creased dents not classified as oil can or stretched skin, not exceeding 25 percent of a sectional area and no closer than 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 2-5. Classification of Damage — Sheetmetal Skins Forward Fuselage (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
	repaired. Oil canning or stretched condition can be determined bypressing in on a sectional area and that section remains depressed and a bulge appears in that section or adjacent structure.		



NOTE

1. Apply tape between dissimilar metal joints to extend at least 0.250 inch past metal joint.
2. Use vinyl tape (C223).
3. In moisture traps:
   a. The tape shall extend sufficiently past the joints to prevent bridging by water.
   b. Drain holes shall be provided wherever necessary subject to approval.

Figure 2-15. Dissimilar metal corrosion protection

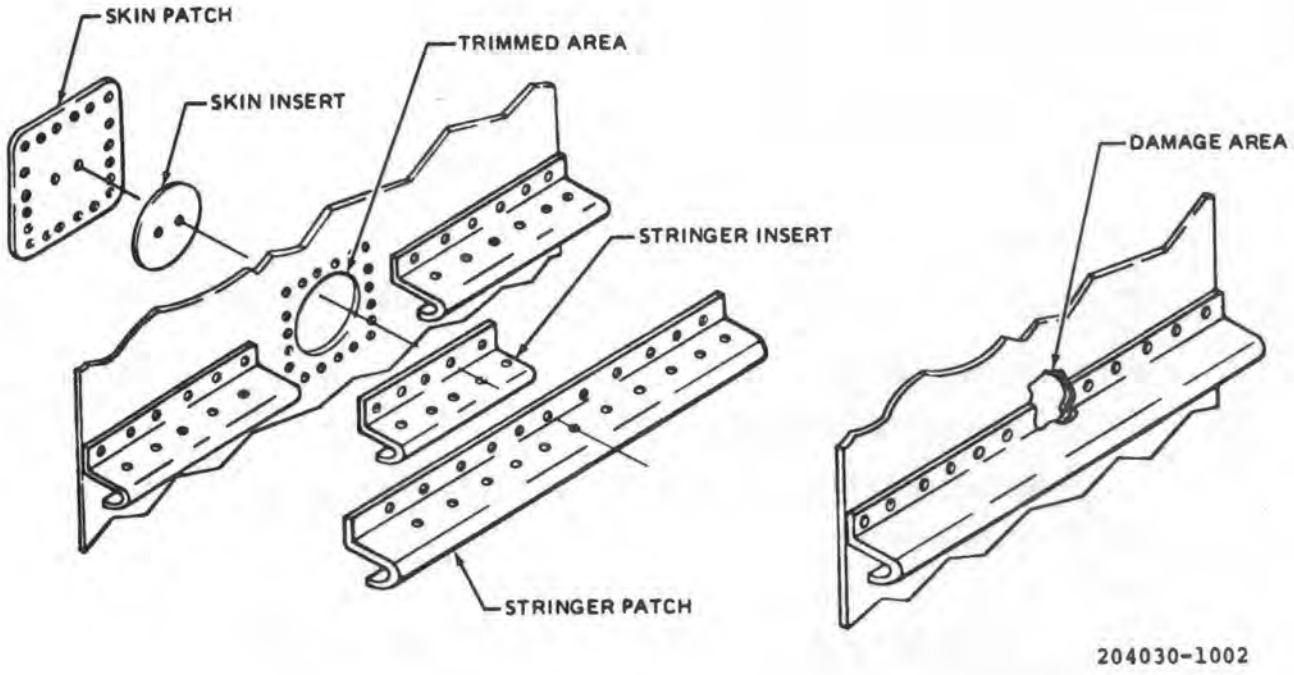
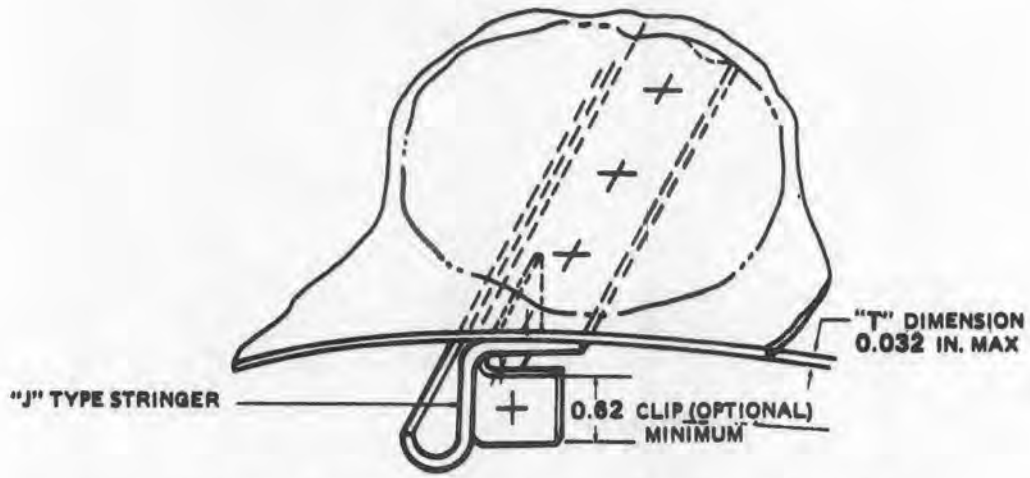


Figure 2-16. Combined skin and stringer repair



NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

OIL CAN REPAIR

APPLICATION A:

For components where excess metal exists between structure creating false contour or "Oil Can".

RESTRICTIONS A:

(1) Nonapplicable to skins that exceed 0.032 inch thick.

(2) Damage cannot extend into stiffeners or other supporting structure.

(3) No cracks allowed

REQUIRED A:

(1) "J" type stringer (Bell STD No. 120-021-32) or angle of like material grouping.
(2) Clip (optional) of like material grouping.
(3) Rivets compatible with material grouping and dissimilar metals. See procedure A(1) for diameter, spacing and edge distance.

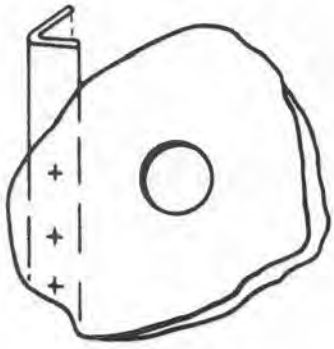
PROCEDURE A:

(1) Attach "J" stringer or angle, using rivets same size and pitch as surrounding area. Rivet edge distance equal to two times the diameter of the rivet. Locate "J" stringer or angle through center of "Oil Can" area.
(2) Gauge of clips must be the same gauge as the "J" stringer or angle. Use of clips is restricted to application where adjacent structure permits use, and where clips are needed to secure added members, otherwise not necessary.
(3) Attach clips with three rivets as shown. Rivet size and spacing same as used to attach the "J" stringer.

PRIOR APPROVAL — Qualified authorization required.

209030-166D

Figure 2-17. Oil can repair in skin



APPLICATION A

REPAIR BY REMOVING DAMAGED AREA

APPLICATION A:

For damaged internal aluminum webs and similar sheet structure.

RESTRICTIONS A:

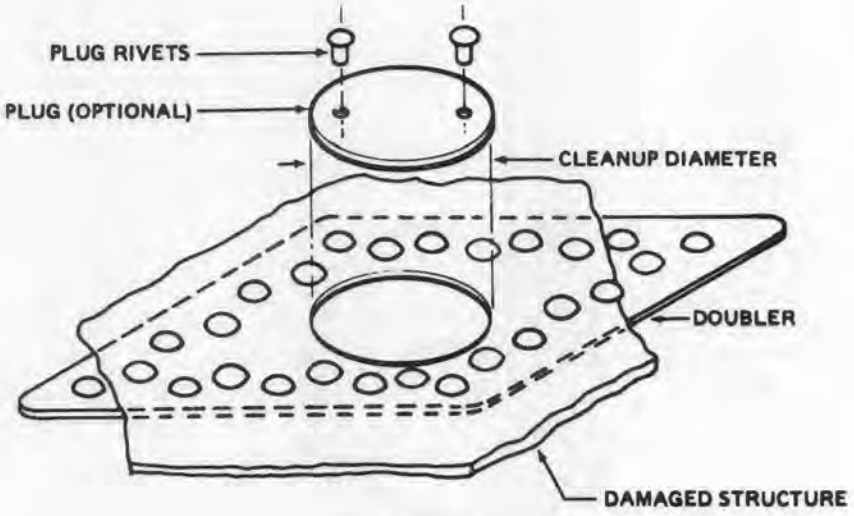
(1) Nonapplicable in areas susceptible to toxic or flammable fumes.
(2) Maximum cleanup to be 0.50 inch diameter.
(3) Location limited to one cleanup diameter from nearest adjacent structure.
(4) Nonapplicable to exterior skins and the tail boom assembly.
(5) Qualified authorization required.
(6) No cracks allowed.

PROCEDURE A:

(1) Stop drill with a No. 40 drill or rout out to minimum diameter (0.50 inch maximum) and deburr.
(2) Touch up raw edges.

209030-159-1E

Figure 2-18. Sheet metal patch (Sheet 1 of 7)



APPLICATION B

SHEET METAL INSERTION REPAIR

APPLICATION B:

For damaged aluminum webs and skins.

RESTRICTIONS B:

(1) Location limited to a minimum distance of 1.500 inches from edge of cleanup to nearest adjacent structure.
(2) Maximum cleanup area to be 2.0 inches in diameter.
(3) Two repairs toa skin bay section. Damage areas to be no closer than 4.0 inches apart after cleanup. A skin bay section is defined as that area of skin framed on four sides by supporting structure.
(4) No cracks allowed.

REQUIRED B:

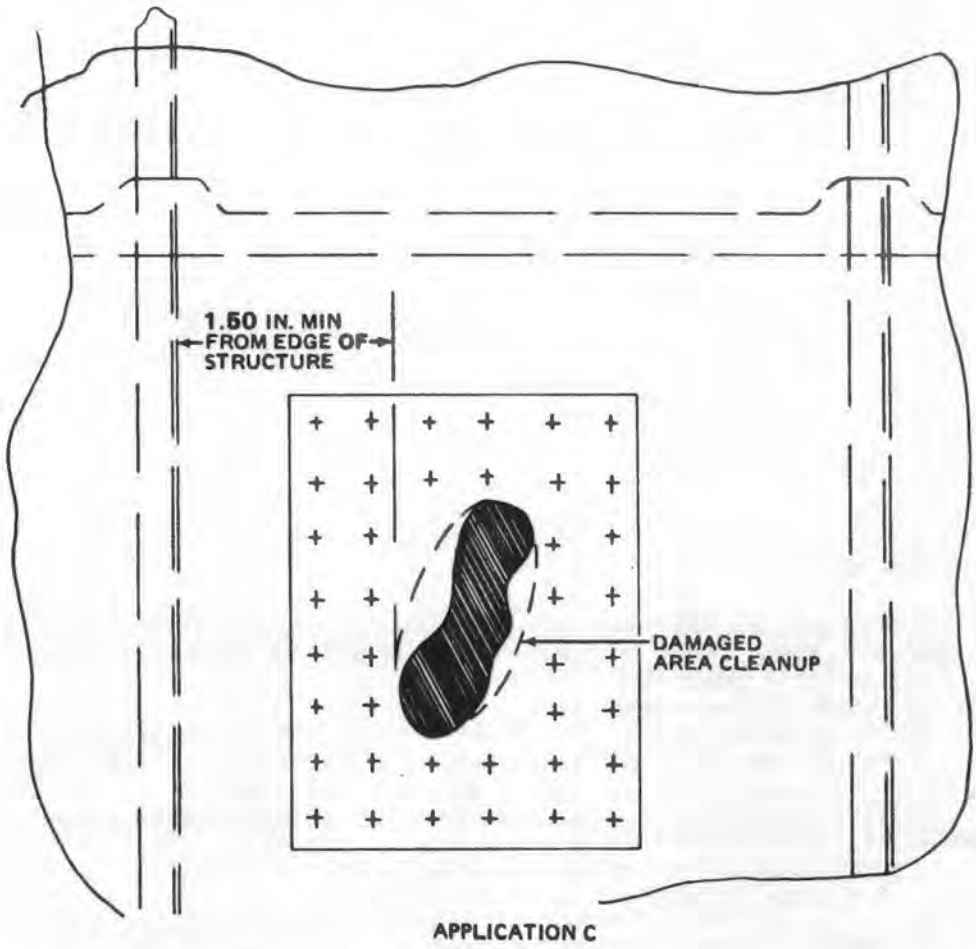
(1) One doubler of the same gauge material as damaged material. Size to be sufficient to allow standard edge distance around edges for double row of rivets or a minimum of 2.00-inch overlap on each edge.
(2) One plug same material and thickness as damaged material and same size as cleanout (Optional)
(3) Sealant (C188)
(4) Same type rivets installed in immediate area (0.125 inch minimum repair rivet diameter).

PROCEDURE B:

(1) Rout damaged area to minimum diameter.
(2) Touch up all raw edges.
(3) Center doubler over (or under) cleanup. Install two rows of rivets matching pattern and same type attaching damaged member to aircraft structure (minimal size repair rivets 0.125 inch diameter).
(4) If flush surface or appearance is required, install plug with 0.125 inch rivets to ensure conformance to contour.

209030-159-2C

Figure 2-18. Sheet metal patch (Sheet 2 of 7)



APPLICATION C:

For damaged aluminum webs and skins exceeding limits of application B.

RESTRICTIONS C:

(1) Damaged area is limited to a minimum distance of 1.50 inches from edge of cleanup to nearest adjacent structure.
(2) Damaged area is limited to a maximum of 20 percent of the skin area after cleanup.
(3) Overlapping repair doublers is not permitted.
(4) Minimum distance between repair cleanup os 4.0 inches.
(5) No cracks allowed.

REQUIRED C:

(1) One doubler of the same gauge and material as damaged material. Size to be sufficient to allow standard edge distance around edges for double row of rivets or a minimum of 2.0 inches overlap each edge.
(2) Sealant (C 188)
(3) Same type rivets installed in immediate area (0.125 inch minimum repair rivet diameter).

209030-159-3E

Figure 2-18. Sheet metal patch (Sheet 3 of 7)

PROCEDURE C:

(1) Rout out damaged area to remove minimum material and to provide a smooth oval or circular cleanup area in accordance with good sheet metal practices. Minimum cleanup corner radius is 0.5 inch.
(2) Deburr and refinish damaged area.
(3) Center doubler over cleanup area. Install two rows of rivets around outer parameter of repair doubler. Using same type rivets and matching rivet pattern as rivets in the immediate area. (0.125 inch minimum diameter rivet for repair)
(4) If repair is made on external surface, add bead to Sealant (C188) to all external edges.

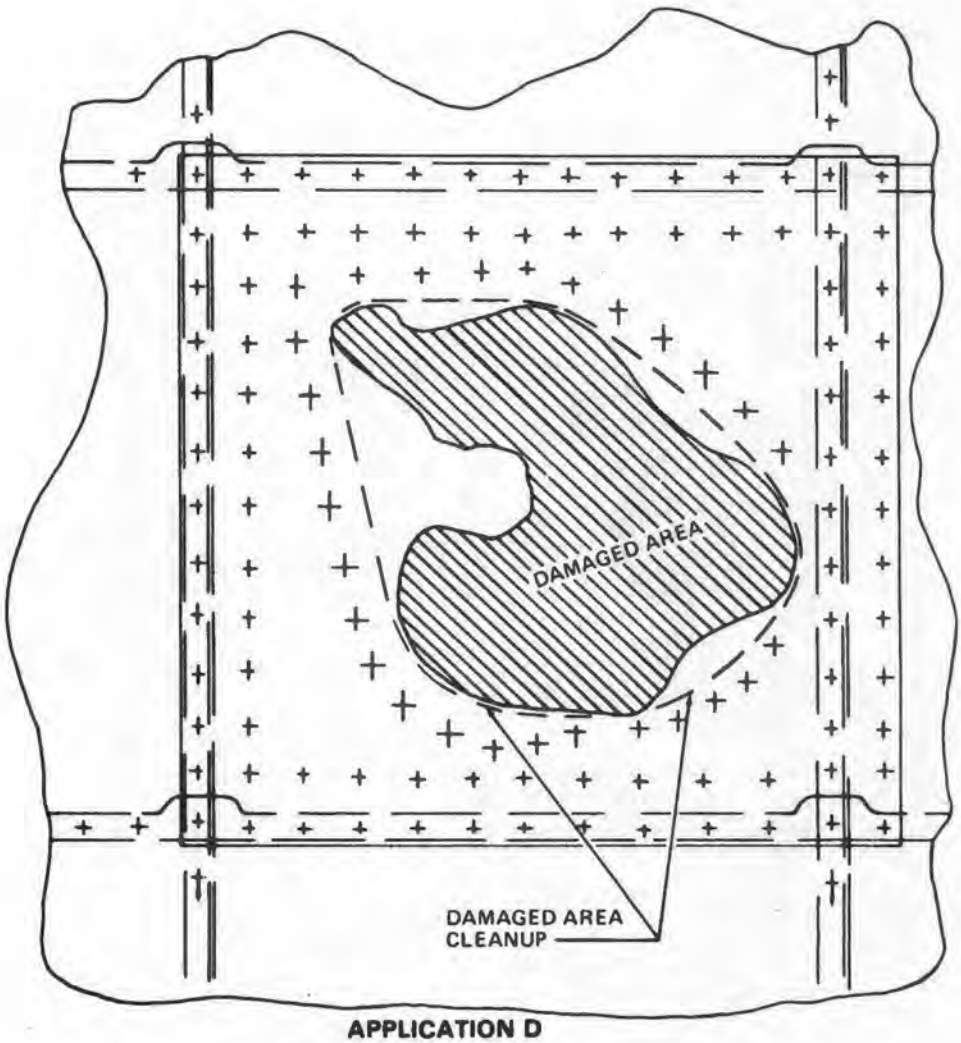
NOTE: As a minimum, use two rivets to attach plugs up to one inch in diameter; three rivets for greater than one inch but less than 1.5 inches in diameter; and four rivets for plugs 1.5 inches to 2.0 inches in diameter.

(5) If repair is made on external surface, add bead of Sealant (C188) to all external edges.

NOTE: Doubler is to be installed on external surfaces if plug is omitted on external skins.

209030-159-4D

Figure 2-18. Sheet metal patch (Sheet 4 of 7)



APPLICATION D

SHEET METAL PATCH

APPLICATION D:

For damaged aluminum webs and skins in area of bulkheads and stiffeners.

RESTRICTIONS D:

(1) Damaged area is limited to a maximum of 20 percent of the skin panel (between any two bulkheads) after cleanup.
(2) Overlapping repair doublers is not permitted.
(3) No additional skin repair doublers are permitted in the same bay section with this repair.
(4) On sight engineering review is recommended.
(5) When 50% of the skin is removed for cleanup in bay section, the repair doublers is to pick up the supporting structure rivet pattern on all four sides of the bay section. Install doubler row of rivets around the outer parameter of the repair doubler and where possible install one row of rivets around parameter of the damaged skin area. Maximum one repair between any two bulkheads.

(6) No cracks allowed.

209030-159-6D

Figure 2-18. Sheet metal patch (Sheet 5 of 7)

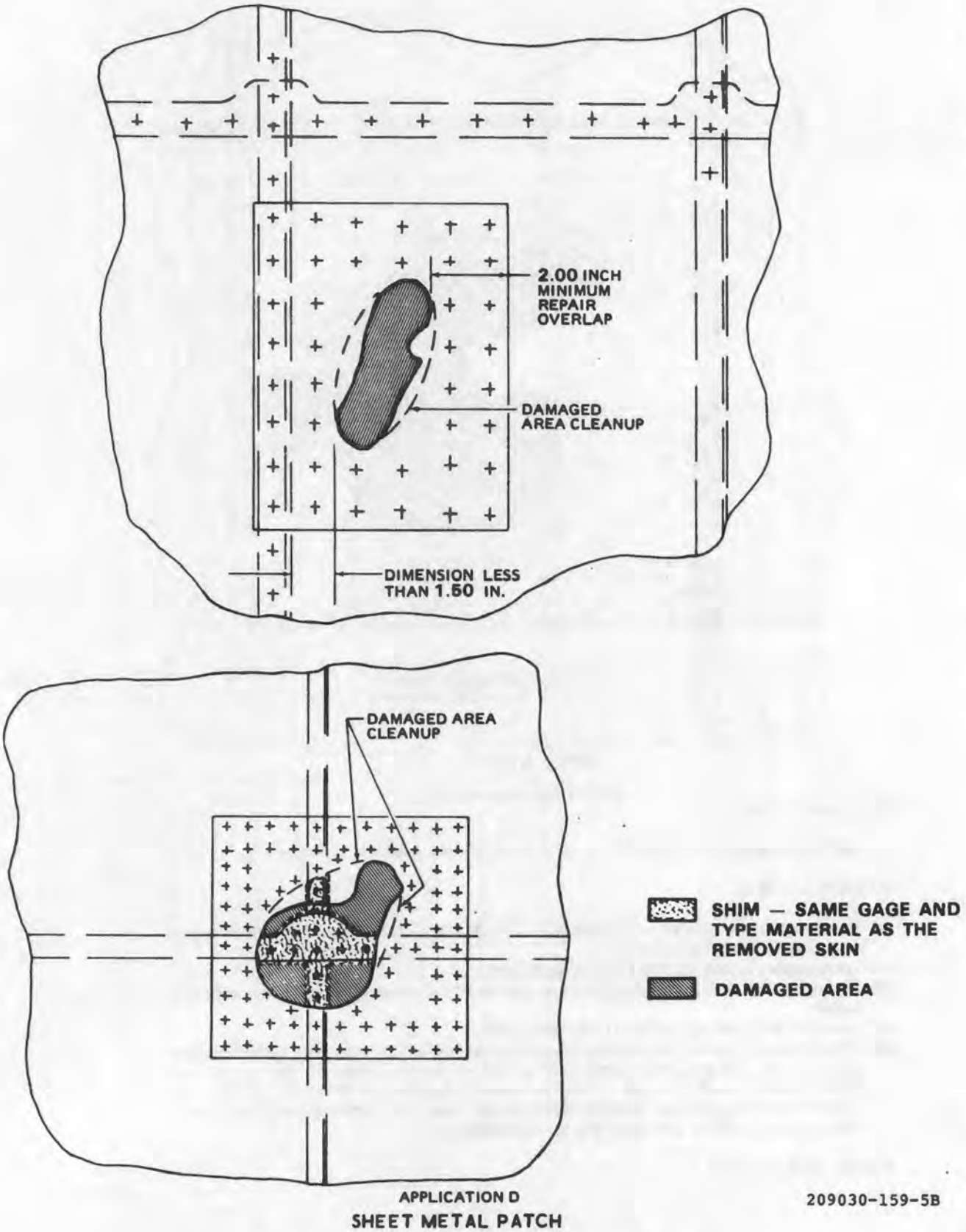


Figure 2-18. Sheet metal patch (Sheet 6 of 7)

REQUIRED D:

(1) One doubler the same gauge and type material as the damaged skin or web. Size to be sufficient to allow standard edge distance around edges for double row of rivets, or a minimum of 2.00 inches overlap each edge.
(2) Sealant (C188).
(3) Same type rivets installed in immediate area (0.125 inch minimum diameter rivet for repair).
(4) A filler the same gauge and type material as the damaged skin or web.
(5) No cracks allowed.

PROCEDURE D:

(1) Rout out damaged area to minimum diameter.
(2) Deburr and refinish damaged area.
(3) Fabricate skin to overlay the skin support structure in damaged area (same gauge as damaged skin).
(4) Fabricate doubler that is symmetrical with the shape of the damaged bay sections supporting structure, or oval in shape.
(5) Where more than 50% of the bay section skin is removed for cleaning, install double row of rivets around the outer parameter of doubler and one row of rivets where possible around parameter of damaged skin area cleanup.
(6) If repair is made on exterior surface, add bead of Sealant (C188) to all external edges.

209030-159-7C

Figure 2-18. Sheet metal patch (Sheet 7 of 7)

2-24. ACCESS COVERS AND DOORS.

2-25. Description — Access Covers and Doors. Removable access covers and doors are provided for inspection, replacement of parts, servicing and adjustment of parts. Screws are used to secure removable panels in stressed areas. Panels in stressed areas are identified in figure 2-19, Sheet 3 with an asterisk and shall be installed prior to towing, jacking, or flight.

NOTE

All fasteners shall be installed in structural panels before moving aircraft. Non-structural panels may have every third fastener missing. However, no panel shall have more than fifty percent of the total number of fasteners missing.

2-26. Inspection — Access Covers and Doors. Inspect access doors and covers for following conditions.

a. Smooth contoured dents, free from cracks that do not affect function of part are acceptable.

b. Missing or damaged fasteners.

c. Cracks or tears no longer than 25 percent of shortest cover dimension are repairable.

d. Corrosion damage not exceeding 10 percent of material thickness and less than 4.0 square inches after cleanup is acceptable.

2-27. Repair or Replacement — Access Covers and Doors. Repair access covers and doors as follows:

a. Replace all damaged, loose, or missing fasteners (TM 55-1500-204-25/1).

b. Repair cracks, holes, tears in accordance with TM 55-1500-204-25/1.

c. Remove and treat corrosion in accordance with TM 43-0105.

d. Replace any cover or door if damage is extensive or repair affects function of door or cover.

e. Paint repaired areas and replace any decals or stencils in accordance with TB746-93-2.

2-28. CABIN FLOOR PANELS.

2-29. Description — Cabin Floor Panels. The cabin floor (figure 2-20) consists of removable and fixed honeycomb or aluminum alloy panels and doors. Fittings installed in the floor panels incorporate studs or tie-down rings or a combination of both. The tie-down fittings provide a means of securing cargo. The studs provide a mounting point for troop seats or litters.

2-30. Removal — Cabin Floor Panels. a. Remove seats or other equipment, as necessary, to gain access to floor panel being removed.

NOTE

The fixed cargo floor is considered part of the load distribution system of the UH-1 airframe. In general, jigging is not required. However, it is recommended that only one fixed panel at a time be replaced and all static load removed from the airframe. This static load includes rotor, transmission, engine and tailboom. If replacement dictates removal of a multitude of fixed panels, replace one at a time. All floor panels attached by screws may be removed and replaced without special precautions. When the entire cargo floor must be removed, care must be exercised to avoid any action which would cause a shifting of the base airframe.

b. Remove panel attaching hardware and remove floor panel.

c. Remove sealant from mating surfaces of floor panel and cabin floor structure.

2-31. Inspection — Cabin Floor Panels. a. Inspect cabin floor honeycomb panels for damage (paragraph 2-17).

b. Inspect metal floor panels and doors for cracks, holes, or other damage.

c. Inspect tie-down rings or studs for damage.

2-32. Repair-Cabin Floor Panels. a. Repair cabin floor honeycomb panels (paragraph 2-18).

b. Repair floor panels and doors in accordance with TM 55-1500-204-25/1. Repairs shall not interfere with the fit or function of the panel.

c. Replace tie-down ring (11, figure 2-20) as follows:

(1) Remove cotter pin and remove pin (10) and ring (11).

(2) Remove pin (13) and washer (12).

(3) Place washer (12) on pin (13) and insert pin through floor panel.

(4) Attach ring (11) with pin (10). Secure with cotter pin.

(5) Apply sealant (C186) around head of pin (13).

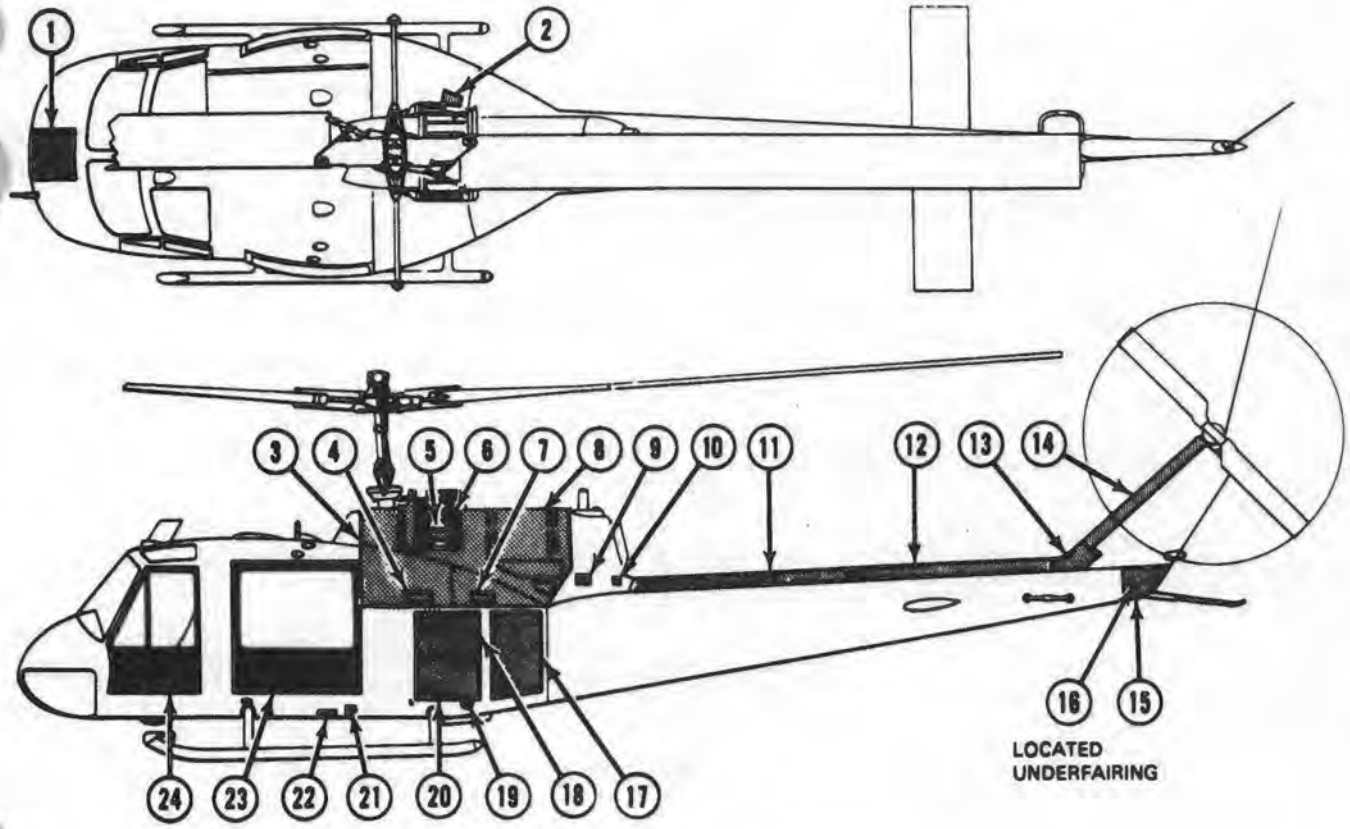
d. Replace stud (9) as follows:

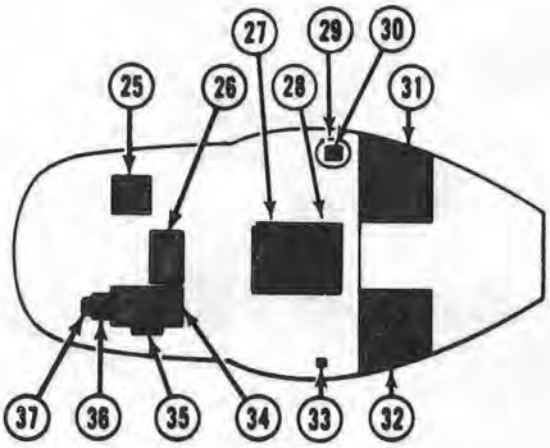
(1) Remove nut (14) and washer (15). Remove stud (9).

(2) Place stud (9) through floor panel and install washer (15) and nut (14).

(3) Apply sealant (C186) around nut (14).

2-33. Installation — Cabin Floor Panels. a. Apply a bead of sealant (C186) to mating surfaces of panel and aircraft structure.

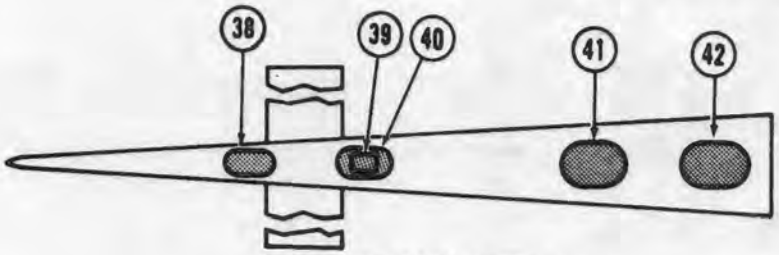




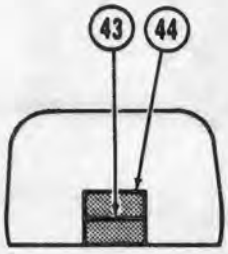
CABIN FLOOR AND SERVICE DECK VIEWED FROM TOP

204900-1035-1B

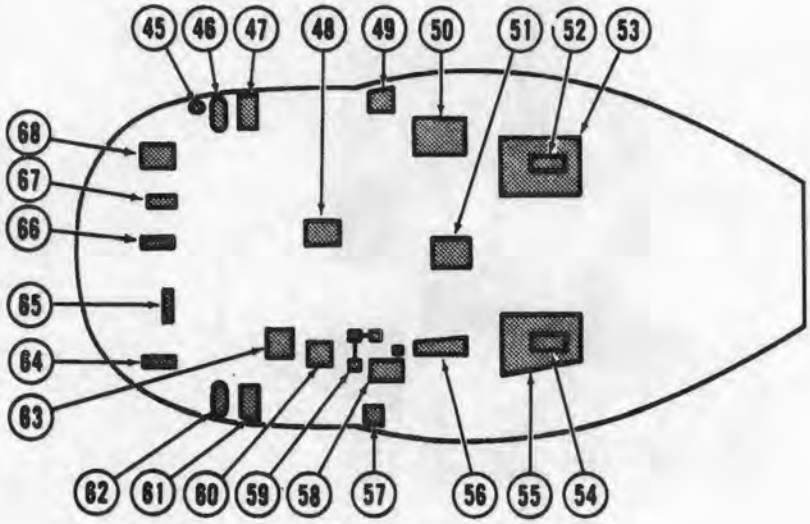
Figure 2-19. Access and inspection provisions (Sheet 1 of 3)



TAIL BOOM - BOTTOM VIEW



CABIN AFT BULKHEAD



BOTTOM FUSELAGE SECTION VIEWED FROM BELOW

204900-1035-2

Figure 2-19. Access and inspection provisions (Sheet 2 of 3)

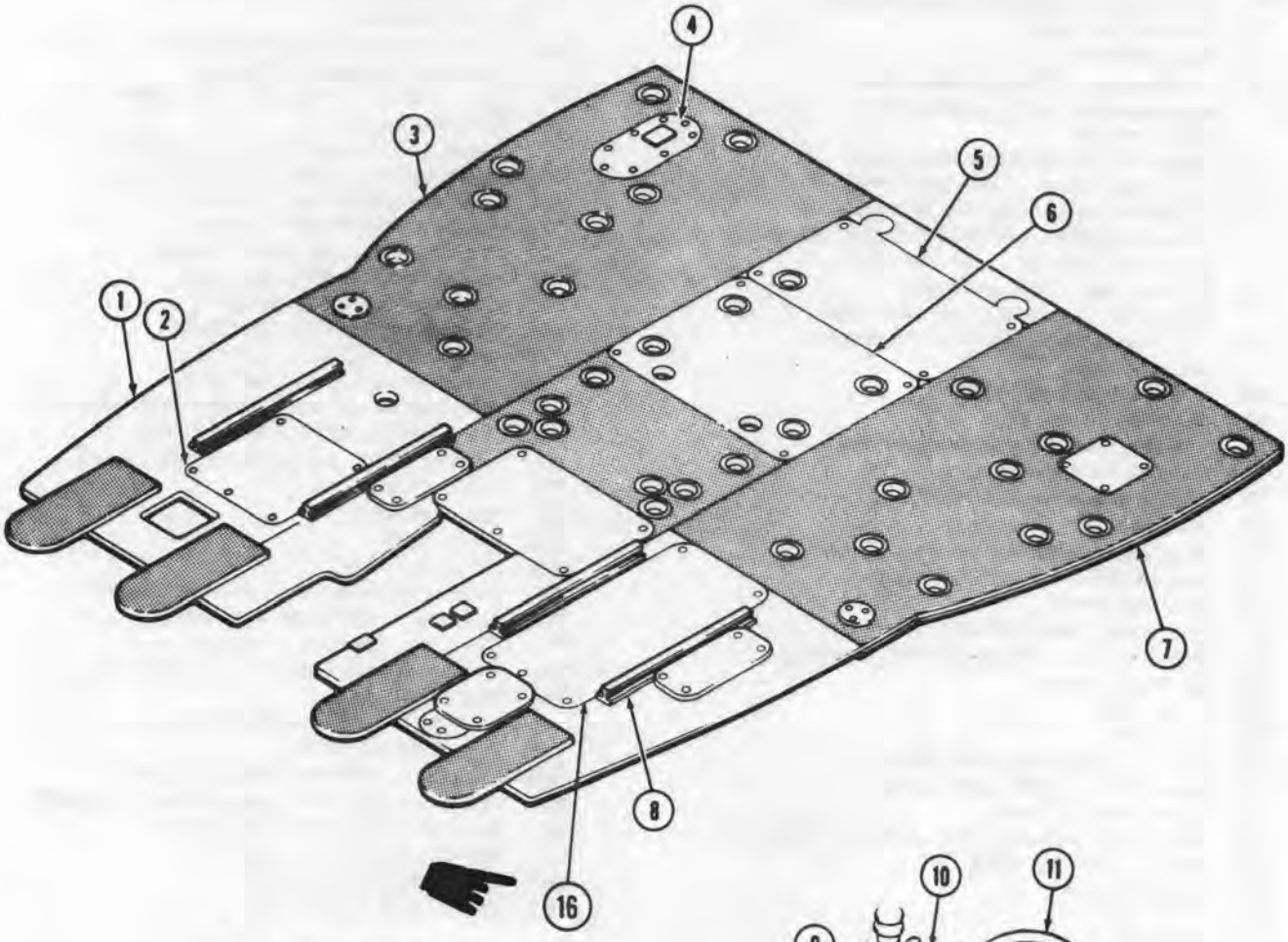
1. Nose communications compartment
2. Oil tank filler cap
3. Transmission
4. Transmission compartment and miscellaneous visual inspection — left and right
5. Engine to transmission driveshaft
6. Induction screen — left and right
7. Engine compartment fire extinguisher nozzle insertion and miscellaneous visual inspection access — left and right
8. Engine area — left and right
9. Driveshaft coupling — left and right
10. Tail rotor control cable and pulleys — left and right
11. Forward tail rotor shaft
12. Aft tail rotor shaft
13. Intermediate (42-degree) gearbox
14. Vertical fin driveshaft
15. Tail skid and vertical fin
*16. Tail skid
17. Baggage compartment door — right
18. Equipment compartment door
19. External power
20. Equipment compartment door
21. Armament provisions quick-disconnect
22. General access
23. Cargo door
24. Crew door
*25. Control tubes and pedal adjuster
*26. Control tubes and heater ducts
*27. Cyclic mixing lever
*28. Heater components and control tube boots
29. Heater duct and lines
30. Ammo chute
*31. Fuel cell
*32. Fuel cell
33. Ammo chute
*34. Pedal adjuster, force gradient, and magnetic brake
35. Dual collective control stick cover
36. Dual cyclic control stick cover
37. Cyclic control stick electrical access
*38. Tailboom panel
39. Tailboom and elevator control tube
*40. Tailboom and elevator control tube
*41. Tailboom and elevator control tube
*42. Tailboom and elevator control
*43. Boost cylinder and flight controls
*44. Boost cylinder and cargo hook
*45. Anti-torque interconnect rod
*46. Wiring and collective jackshaft
*47. Wiring and copilot collective
*48. Electrical wiring and heater duct
*49. Electrical wiring and heater components
*50. Electrical wiring and heater ducts
*51. Control tubes, wiring and bleed air valve
52. Sump drain
*53. Fuel cell sump
54. Sump drain
*55. Fuel cell sump
*56. Electrical wiring and control bellcrank
*57. External stores quick disconnect
*58. Electrical wiring and heater valve
*59. Heater valve and electrical wiring (3)
*60. Electrical wiring
*61. Heater duct and door jettison cable
*62. Collective jackshaft
*63. Magnetic brake and force gradient
*64. Control tubes, bellcrank and pedal adjuster
*65. Control tubes and bellcrank
*66. Wiring and force gradient
*67. Cyclic stick connections
*68. Wiring and control tubes

CAUTION

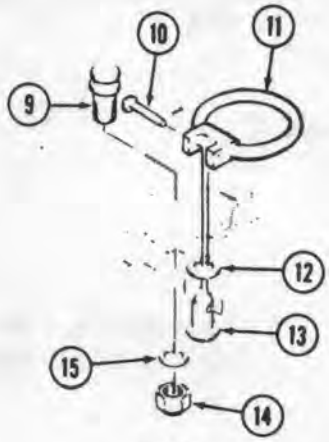
***Installation of structural panels/doors is required prior to jacking, towing hoisting or flight.**

204900-1035-3B

Figure 2-19. Access and inspection provisions (Sheet 3 of 3)



1. Floor assembly
2. Door assembly
3. Floor assembly
4. Cover
5. Floor assembly
6. Floor assembly
7. Floor assembly
8. Seat tracks
9. Stud
10. Pin
11. Ring tie-down
12. Washer
13. Pin
14. Nut
15. Washer
16. Door assembly



DETAIL

(TYPICAL TIE-DOWN AND STUD INSTALLATION)

204031-1001

Figure 2-20. Cabin floor

b. Lay floor panel in place and align holes in panel with holes in structure.

c. Install attaching hardware.

d. Install equipment removed to gain access to panel.

2-34. Painting — Cabin Floor Panels. Refer to TB 746-93-2.

2-35. COWLINGS AND FAIRINGS.

2-36. Description — Cowlings and Fairings. Cowlings and fairings are used to enclose, protect and provide easy access to engine compartment, intake and exhaust tailpipe areas, and top of main transmission.

2-37. TRANSMISSION COWLING.

2-38. Description — Transmission Cowling. The transmission cowling (1, figure 2-21) consists of a right and left section. The cowling is secured in closed position with latches and fasteners in the air inlet screen, a frame attaches the cowling to the cabin structure and acts as a hinge to swing the cowling forward (over the aft section of the cabin) to open position.

2-39. Removal — Transmission Cowling.
a. Release fasteners (3, figure 2-21).

b. Disengage cowling latches and swing cowling to forward position.

c. Support cowling and remove cotter pin (7), washers (9 and 12), spacers (8, 10 and 11), and pin (6) from tube assembly (13).

d. Remove cotter pin (16), washers (15), and pin (17) from legs of frame assembly (14).

e. Lift cowling from frame.

NOTE

The following procedure is for removing left cowling frame (figure 2-22). The procedures for removing right cowling frame (figure 2-23) are the same except as noted.

f. Remove frame (16, figure 2-22) as follows:

(1) On left frame, remove lockwire securing pin (19) to fitting (18) and remove pin (19).

(2) Remove retaining pin (35). Rotate tube (36) to release from fitting (37).

(3) Pull tube (36) outboard until frame assembly is disengaged from attaching points.

(4) Lift frame assembly from helicopter.

2-40. Inspection — Transmission Cowling.
a. Inspect cowling for dents, cracks, or damage.

b. Inspect frame (16, figure 2-22 or 8, figure 2-23) for damage, cracks, or wear in rod ends (30 and 32, figure 2-22 or 5 and 24, figure 2-23) and bushings.

c. Inspect latches, hinges, and fittings for wear, damage, and serviceability.

2-41. Repair — Transmission Cowling.
a. Repair damage to cowling in accordance with TM 55-1500-204-25/1. Ensure repairs do not interfere with fit of cowling.

NOTE

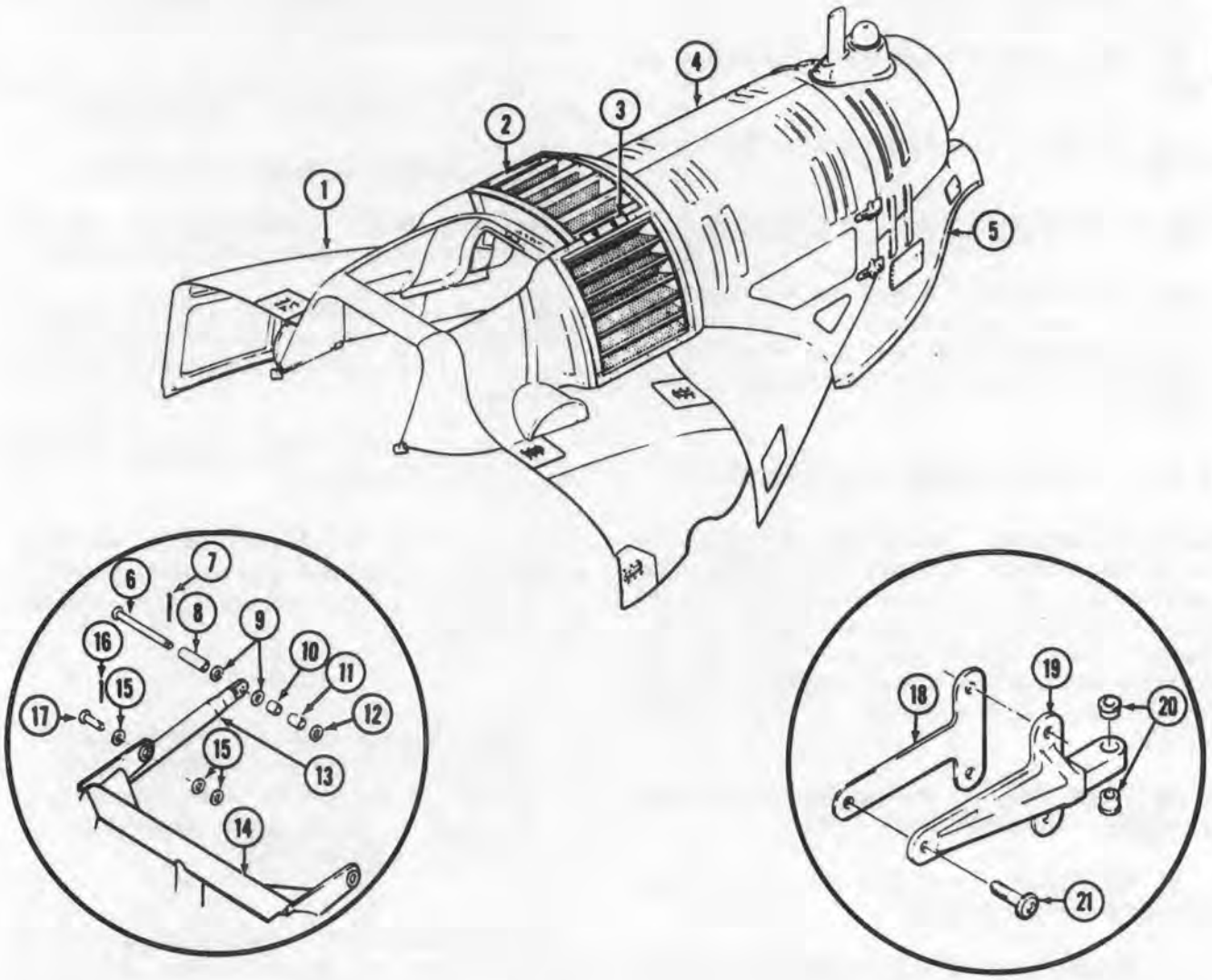
The following repair and replacement procedures are for left cowl frame (figure 2-22). The same procedures can be used to repair or replace parts on the right cowl frame (figure 2-23).

b. To replace cam follower bearing (6 or 24, figure 2-22), remove nut and washers and remove cam follower bearing. Install replacement bearing using same quantity of washers and nut. Washer quantity and position may have to be adjusted during cowling installation.

c. To replace fitting (5), remove cotter pin (2), washer (3), and pin (1). Remove fitting (5) and spring (4). Position replacement fitting (5) and spring (4) to leg of frame (16). Install pin (1), washer (3), and cotter pin (2).

d. Replace rod end (3), sleeve (29), or insert (27) as follows:

(1) Remove retaining rings (21 and 28) and remove sleeve (29) and insert (27). Loosen nut (22) and remove rod end (30) from frame (16).



1. Transmission cowling
2. Air inlet screen
3. Fastener
4. Engine cowling
5. Tailpipe fairing
6. Pin
7. Cotter pin
8. Spacer
9. Washers
10. Spacer
11. Spacer
12. Washer
13. Tube
14. Frame assembly
15. Washer
16. Cotter pin
17. Pin
18. Shim
19. Hinge fitting
20. Bushings
21. Screw

204060-1033

Figure 2-21. Transmission and engine cowl

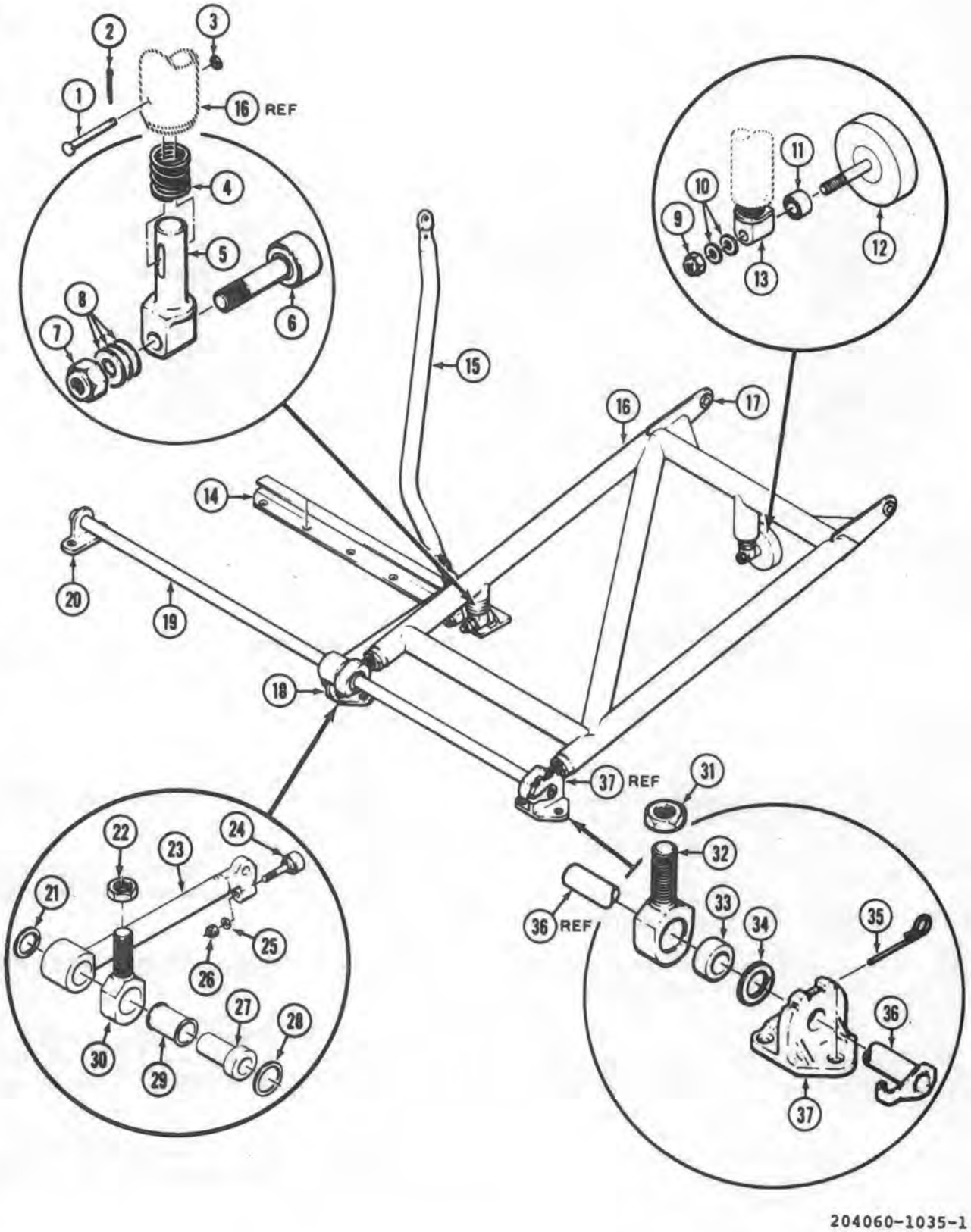


Figure 2-22. Transmission cowling frame — left side (Sheet 1 of 2)

1. Pin
2. Cotter pin
3. Washer
4. Spring
5. Fitting
6. Roller
7. Nut
8. Washers
9. Nut
10. Washers
11. Spacer
12. Wheel assembly
13. Fitting
14. Track
15. Tube assembly
16. Frame
17. Bushing
18. Fitting
19. Pin
20. Fitting
21. Retaining ring
22. Nut
23. Arm
24. Cam follower bearing
25. Washer
26. Nut
27. Insert
28. Retaining ring
29. Sleeve
30. Rod end
31. Nut
32. Rod end
33. Insert
34. Retaining ring
35. Retaining pin
36. Tube
37. Fitting

204060-1035-2

Figure 2-22. Transmission cowling frame — left side (Sheet 2 of 2)

(2) Install nut (22) and rod end (30) on frame (16). Align rod end (30) with hole in arm (23) and install sleeve (29) and insert (27). Install retaining rings (21 and 28).

e. Replace rod end (32) or insert (33) as follows:

(1) Loosen nut (31) and remove rod end (32) from frame (16). Remove retaining ring (34) and insert (33) from rod end.

(2) Position insert (33) in rod end (32). Install retaining ring (34). Install nut (31) and rod end (32) on frame (16).

f. Replace bushings (17) as follows:

NOTE

Bushings are line reamed, if one bushing is worn, both bushings should be replaced.

(1) Support arm of frame (16) and press out bushings (17).

(2) Coat replacement bushings with primer (C253) and press into arm of frame (16) while primer is still wet.

(3) Line ream bushings **0.1895 TO 0.1900** inch.

g. To replace fittings (18, 20, or 37), remove attaching screws and remove fitting. Position replacement fitting over mounting holes and install screws.

2-42. Painting — Transmission Cowling. Touch-up paint cowling as needed in accordance with TB 746-93-2.

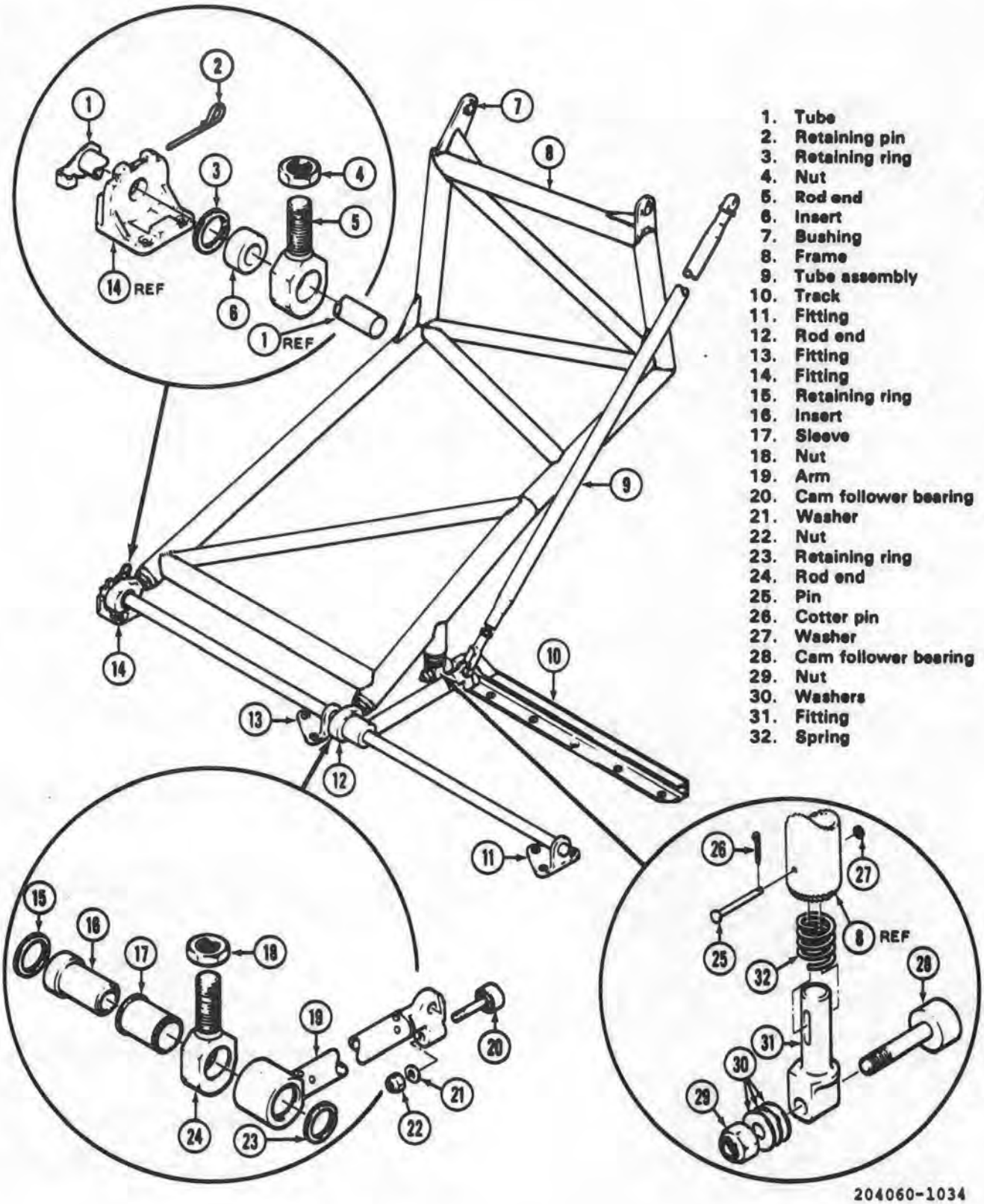


Figure 2-23. Transmission cowling frame — right side

2-43. Installation — Transmission Cowling.

NOTE

The following procedure is for installing left cowling frame (figure 2-22). The procedures for removing right cowling frame (figure 2-23) are the same except as noted.

a. Position frame (16, figure 2-22) over fittings on deck and align cam follower bearings with track (14). If necessary position of washers (8 or 25) can be changed to align cam follower bearings with track.

b. Install tube (36) through fittings and rod ends on frame. Rotate tube to position locking lug of tube on side of fitting (37). Install retaining pin (35).

c. On left cowling frame, insert pin (19) through fitting (18 and 20). Lockwire (C127) pin (19) to hole in fitting (18).

d. Position cowling over mounting legs of frame assembly (14, figure 2-21) and tube assembly (13).

e. Install pins (17) with washers (15) and cotter pin (16) to attach cowling to each leg of frame assembly (14).

f. Attach tube assembly (13) using pin (6), spacers (8, 10, and 11) and washers (9 and 12). Washers (9) can be positioned as needed for proper fit. Install cotter pin (17).

CAUTION

Do not pin rubber strip or cargo door between cowling and air frame. Fasten left, right, and lower center latches prior to fastening upper center latch.

g. Swing cowling aft and down to closed position and check for proper closing. Rod ends (30 and 32, figure 2-22) can be adjusted, if needed, for fit of cowling.

CAUTION

Adjustment of latch mating fittings may be necessary to ensure proper closing of latches. Hand force only shall be used to close latch, and slight tension shall remain on latch in the closed position.

h. Check cowling latches for proper closing without excessive force. Loosen latch mounting screws and adjust latch position if necessary. Retighten latch mounts screws.

i. Close all latches and secure fastener (3, figure 2-21) in air inlet screen.

2-44. ENGINE COWLING.

2-45. Description — Engine Cowling. The engine cowling (4, figure 2-21) consists of a left and a right section. Each section is mounted on two hinges attached to the aft firewall. The forward is held in position by a latch and the transmission cowling, which overlaps the engine cowling.

2-46. Removal — Engine Cowling. a. Open transmisison cowling.

b. Disengage forward latch on engine cowling and open cowling.

c. Disconnect fire detector connector.

d. Pull pin from hinges on aft side of cowling and lift from helicopter.

2-47. Inspection — Engine Cowling. a. Inspect cowling for dents, cracks, or damage. Refer to Table 2-1. Damage limits same as fuselage skin.

b. Inspect latches and hinges on cowling for wear, damage, and serviceability.

2-48. Repair — Engine Cowling. a. Repair damage to cowling in accordance with TM 55-1500-204-25/1. Ensure repairs do not interfere with fit of cowling.

CAUTION

Do not use blind type rivets in the engine air inlet.

b. Replace cowling latch if unserviceable.

c. To repair or replace hinge fitting (19, figure 2-21) proceed as follows:

(1) Remove screws (21) and remove fitting (19) and shim (18).

(2) Replace bushings (20) as follows:

(a) Support fitting (19) and press out bushings (20).

(b) Coat replacement bushing with primer (C253) and press into fitting (19) while primer is still wet.

(c) Ream bushing **0.251 TO 0.253** inch.

(3) Position shim (18) and fitting (19) to cowling. Install screws (21). Thickness of shim (18) may have to be adjusted during installation of cowling.

2-49. Painting — Engine Cowling. Touch-up paint cowling as needed in accordance with TB746-93-2.

2-50. Installation — Engine Cowling. a. Position cowling with hinge fitting (19, figure 2-21) aligned with hinge fitting on aft firewall. If fittings do not align remove hinge fitting (19) and adjust thickness of shim (18) as needed. Install pins through hinge fitting.

b. Connect fire detector connector and lockwire (C126.1).

c. Close cowling and check for proper engagement of forward latch. The amount of washers between the forward latch and cowling skin can be as necessary for proper engagement of latch.

d. Close transmission cowling and fasten latches.

2-51. TAILPIPE FAIRING.

2-52. Description — Tailpipe Fairing. A metal fairing (5, figure 2-21) encloses the engine tailpipe and supports an antenna and anti-collision light. The fairing is attached with turn lock fasteners.

2-53. Removal — Tailpipe Fairing. a. Open forward access door on left side of fairing.

b. Disconnect antenna and anti-collision light wiring at deck.

c. Open forward section to tail rotor driveshaft cover.

d. Release turnlock fasteners around fairing and lift fairing from tailpipe.

2-54. Inspection — Tailpipe Fairing. a. Inspect fairing for dents, cracks, and damage.

b. Inspect fasteners for damage and serviceability.

2-55. Repair — Tailpipe Fairing. a. Repair damage to fairing in accordance with TM 55-1500-204-25/1. Ensure repairs do not interfere with fit of cowling.

b. Replace unserviceable turnlock fasteners.

2-56. Painting — Tailpipe Fairing. Touch-up paint fairing as needed in accordance with TB 746-93-2.

2-57. Installation — Tailpipe Fairing. a. Position fairing over tailpipe and close turnlock fasteners.

b. Connect antenna and anti-collision light wiring at deck.

c. Close access door on left side of fairing and forward section of tail rotor driveshaft cover.

2-58. LIFT BEAM.

2-59. Description — Lift Beam. The lift beam is located at Fuselage Station 132.00 under the pylon structure. The beam is attached to the main structure beams at Butt Line 14.00. Fittings are installed on the beam to provide attachment points for the lift link and cargo hook. Beam construction consists of aluminum alloy web, stiffeners, and extensions.

2-60. Inspection — Lift Beam (figure 2-24).

a. Inspect lift beam for installation of radius blocks located on lower surface of upper beam cap assemblies, forward and aft sides.

b. If radius blocks are not installed, inspect beam cap and adjust structure of beam for cracks.

c. Inspect fittings on beam for cracks and security.

2-61. Repair or Replacement — Lift Beam. (AVIM) a. Remove main rotor hub assembly (paragraph 5-16).

b. Remove transmission and mast assembly (paragraph 6-31).

c. Remove hydraulic servo cylinders, hydraulic lines, and servo cylinder supports from lift beam. (paragraphs 7-159, 7-160, and 7-164).

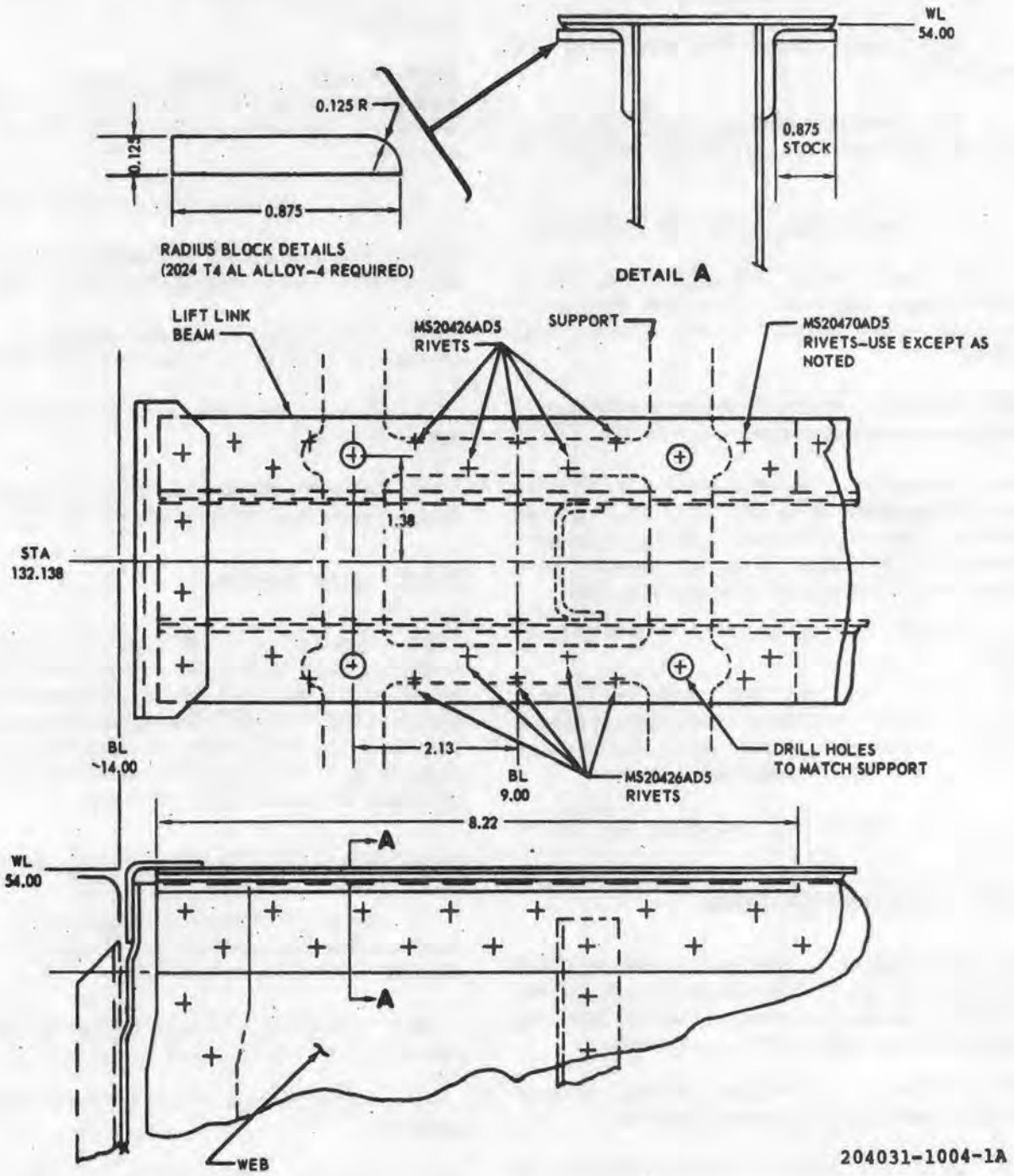
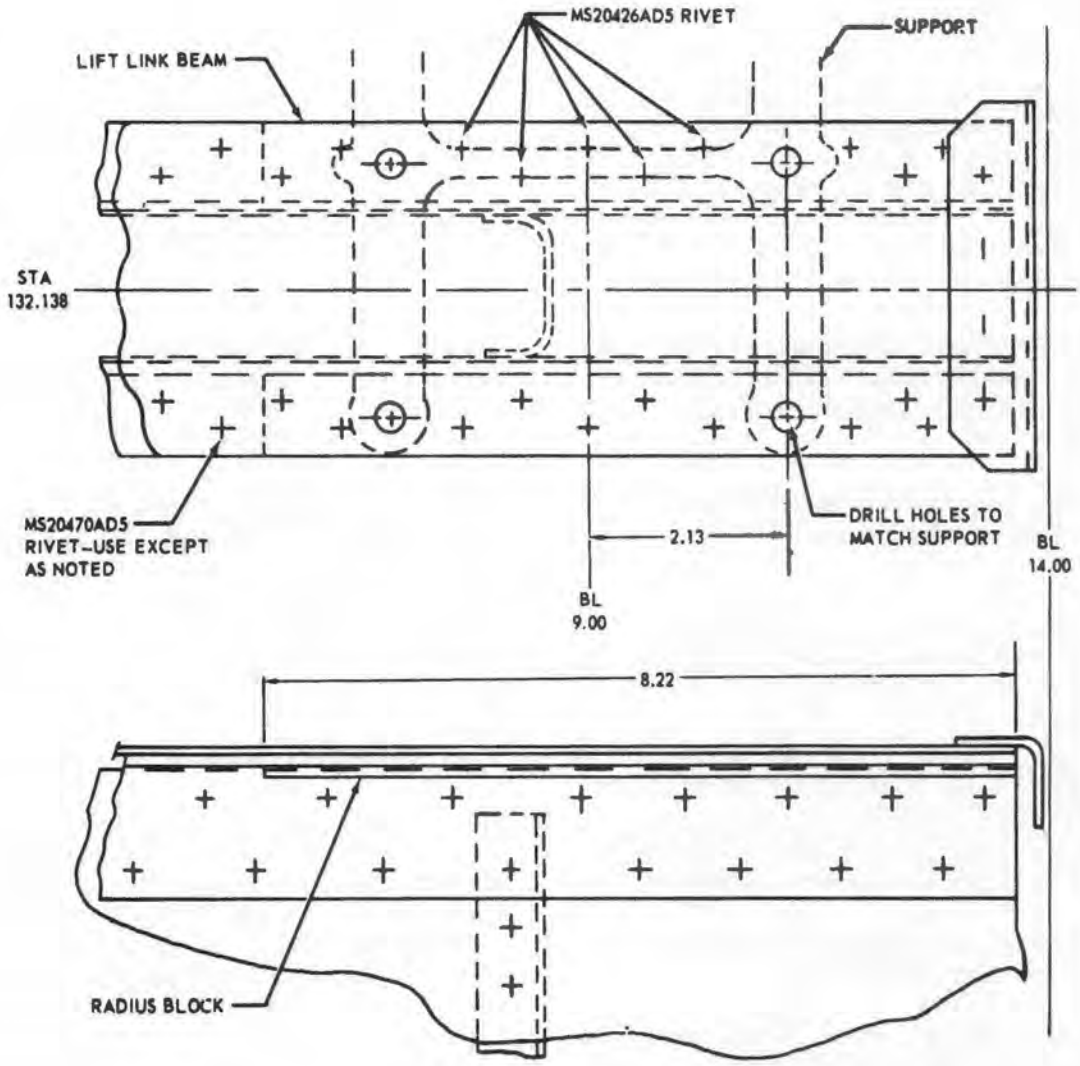


Figure 2-24. Lift beam repair (Sheet 1 of 2)



NOTE: 1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
2. NO CRACKS ALLOWED.

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Figure 2-24. Lift beam repair (Sheet 2 of 2)

d. Repair beam cap in following manner:

(1) Drill out rivets and remove bolts retaining affected beam cap. Use care in drilling rivets to prevent elongating holes. Remove cap from beam assembly.

(2) Using cap as pattern, fabricate new cap from AND10134-1205 extrusion 7075-T6 aluminum alloy. Cut to proper length; drill holes for rivets, support retention, and lift link attach fitting bolts.

(3) Clean, deburr, and coat new beam cap with primer (C253).

(4) Position and clamp beam cap in place and secure with rivets, Part No. MS20470AD5, except in area of servo support assembly as indicated in figure 2-24.

e. Repair of cracks in web of beam assembly may be repaired by standard sheet metal repairs as follows:

(1) Isolated cracks of short length (one to three inches) may be stop-drilled and patched using 7075-T6 aluminum alloy, **0.040** inch thick, overlapping length of crack.

(2) Cracks **3.0** inches or more in length or concentrated within a small area may be repaired by cutting out damaged area and using an overlapping patch of 7075-T6 aluminum alloy, **0.050** inch thick.

f. Fabrication and installation of radius blocks shall be accomplished as follows:

(1) Fabricate four radius blocks from 2024-T4 aluminum alloy; **0.125** inch thick, **0.875** inch wide, and **8.22** inches long, with **0.125**-inch radius milled on one edge as shown in figure 2-24, Detail A.

CAUTION

When drilling rivets, avoid elongating holes.

(2) Drill out and remove rivets only in locations where radius blocks are to be installed.

(3) Position and clamp fabricated radius blocks in place. Drill holes for rivets and servo cylinder support retention holes.

(4) Remove radius blocks; clean, deburr, and coat with primer (C253).

(5) Install radius blocks, using rivets, MS20470AD5 and MS20426AD5, as indicated in figure 2-24.

(6) Install hydraulic supports, cylinders and lines (paragraphs 7-150, 7-167, and 7-140).

(7) Install transmission (paragraph 6-40).

(8) Install main rotor hub assembly (paragraph 5-24).

2-62. SUPPORT PYLON FIFTH MOUNT.

2-63. Description — Support Pylon Fifth Mount. The fifth mount support is located at center aft area of the pylon and installed on the support fitting bridged across aft side of the pylon supports (figure 2-25.)

2-64. Classification of Damage — Support Pylon Fifth Mount. a. Negligible Damage. Cracks in the fifth mount support, less than **1.25** inches may be considered negligible and will not require repair. However, if the support beam must be removed for another maintenance purpose, and if cracks (of any length) are discovered, the beam shall be repaired.

b. Reparable Damage. Reparable damage is as follows:

(1) Strip cadmium plating from support in area of repair, using ammonium nitrate solution (C27.1). Clean area with sand blast or wire brush. If ammonium nitrate solution is not available, perform entire operation with sand blast or wire brush.

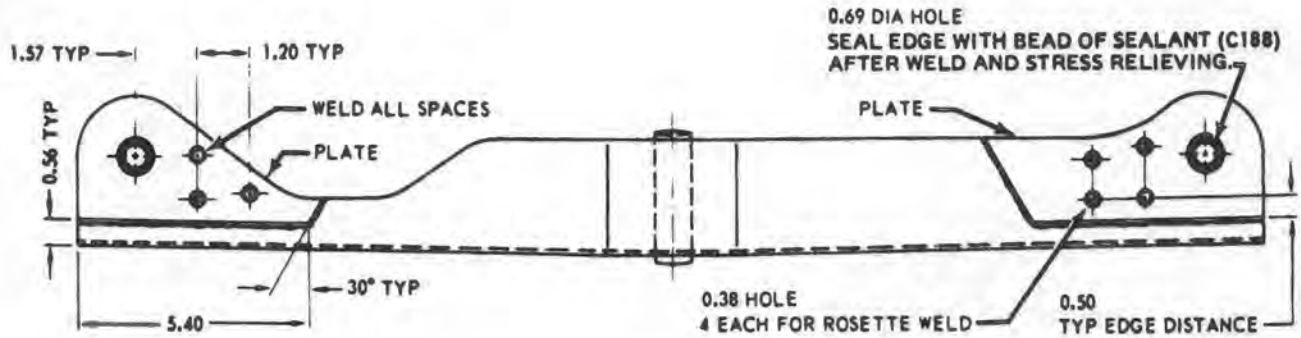
(2) Repair cracks in upper and lower surfaces of support prior to addition of repair plates to assembly. Weld cracks, using process noted in step (5). Grind or file weld flush with surface before installing repair plates.

(3) Fabricate two plates from steel sheet (item 56, table 2-1), **70 x 3.50 x 0.63** inches. Trim plates to contour of upper surface of support for right and left side (figure 2-25). Do not install plates on lower surface of support.

CAUTION

Drill holes in repair plate only and not in mount support.

(4) Clamp bolts in position and locate holes for transmission mount bolts. Drill hole in plate only,



SUPPORT MATERIAL:

4130 ALLOY STEEL
SPECIFICATION MIL-S-18729
THICKNESS 0.063 INCH

NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-25. Fifth mount support — typical repair

0.125 inch larger in diameter than hole in support. Drill four 0.38-inch holes in right plate and three 0.38-inch holes in left plate, maintaining 0.50 edge distance.

(5) Weld plates in place with a continuous weld around edge and rosette weld in 0.38-inch drilled holes. Use heliarc class A welding in accordance with MIL-W-5611.

(6) After repair, stress-relieve part, using any of the following methods:

(a) Slow-cool part by covering with a thick asbestos cloth immediately after welding.

CAUTION

Do not overheat part. If metal reaches glowing stage, part must be cooled and reheated to desired range.

(b) Heat part 1100 TO 1250 degrees F (593.3 TO 676.7 degrees C) for 1 hour in furnace and allow part to cool slowly.

(7) After stress-relieving operation is completed, clean repair area thoroughly, using sandblast or wire brush and apply an even spray coat of zinc chromate primer coating (C253) and finish coat. Do not apply primer to ID of spacer.

c. **Damage Necessitating Replacement.** Damage greater than practical to repair is cause for replacement.

2-65. AFT CROSSTUBE ATTACHMENT POINTS. (AVIM)

2-66. Repair — Aft Crosstube Attachment Points.

WARNING

Ensure that helicopter is properly supported and safe before attempting any repairs on landing gear attachment points.

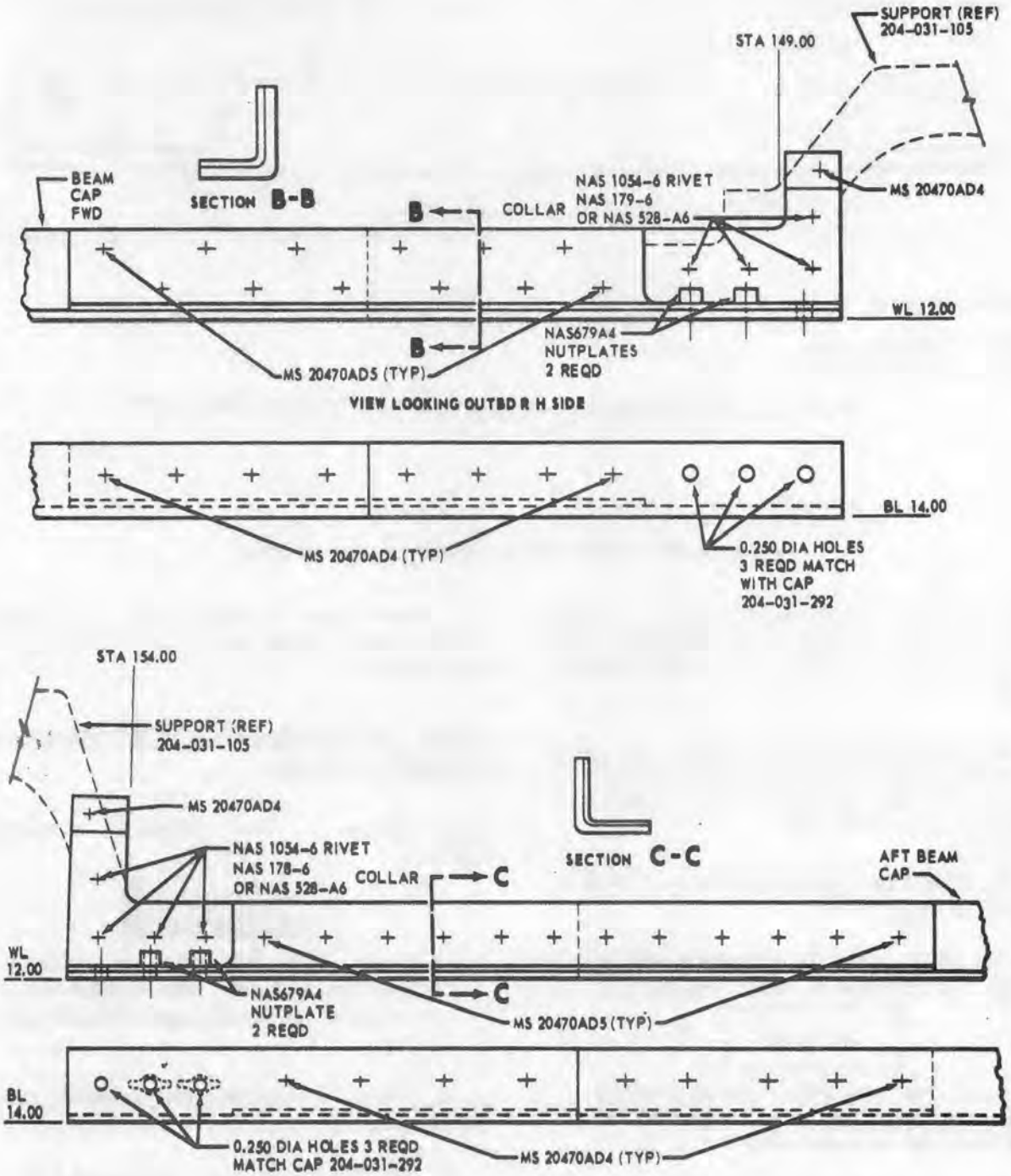
a. Place helicopter on suitable supports (paragraph 2-8).

b. Remove landing gear (paragraph 3-3).

c. Remove access doors in area of aft landing gear attachment points.

d. Remove external skin rivets as required to provide access to damaged area.

e. Remove rivets attaching support fitting in beam cap (figure 2-26).



NOTE: 1. NO CRACKS ALLOWED.
2. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-26. Installation of forward and aft splices and straps

f. Fabricate forward and aft straps and strap splices (figure 2-26). Refer to Appendix D for material and fabrication instructions.

g. Cut and remove enough beam cap to match with splice.

h. Clean and primer reworked area.

i. Install splices and strap splices as shown in figure 2-26.

j. Reinstall external skin and access panels.

k. Refinish repaired area in accordance with TB 746-93-2.

l. Install landing gear (paragraph 3-4) using new bolts and washers.

2-67. BULKHEAD ASSEMBLY.

2-68. Description — Bulkhead Assembly. The bulkhead is located at Fuselage Station 195.00 and provides attachment fittings for the tailboom. The two lower fittings provide for installation of jacking and mooring fittings. The bulkhead is constructed of aluminum alloy webs and stiffeners (figure 2-27).

2-69. Inspection — Bulkhead Assembly. a. Inspect bulkhead for cracks in web, cap angles and stiffeners.

b. Inspect tailboom attachment fittings for cracks, hole elongation, and wear. Refer to figure 2-63, for wear limits.

2-70. Repair or Replacement — Bulkhead Assembly (AVIM). a. Cracks in the bulkhead skin (5, figure 2-27) or cap angle (3) may be repaired by standard sheet metal repair methods. Outboard attaching doubler angles, (8) and (13) may be replaced as required. Repairs or replacement of damaged parts may be accomplished as described in the following steps:

(1) Remove tailboom from helicopter (paragraph 2-278).

(2) Small cracks, less than **1.50** inches long, may be repaired as described in steps (3) and (4).

(3) Stop drill small cracks in bulkhead skin (in area of tailboom attachment fittings) and return bulkhead to service.

(4) Stop drill small cracks in cap angle (3). Fabricate a small reinforcement angle from **0.040** inch thick 2024-T3 aluminum alloy. Install reinforcement angle on cap angle (3), using standard repair methods (refer to TM 55-1520-204-25/1). See figure 2-28 for typical repairs on frame members.

b. Cracks in bulkhead skin, longer than **1.50** inches, may be repaired as follows:

(1) If crack extends under spacer pad (4, 6, 9 or 11, figure 2-27) drill out attaching rivets and remove spacer pad.

(2) Stop drill ends of crack.

(3) Fabricate a repair patch from 0.032 inch thick 2024-T3 aluminum alloy.

(4) Lay out rivet pattern on patch, using **1.0** inch spacing.

(5) Pick up existing rivet holes in bulkhead, attachment fittings, and spacer pad, and drill in repair patch.

(6) Remove burrs, clean patch and coat it with primer (C253).

(7) Install repair patch to aft side of bulkhead, using MS20426AD4, MS20426AD5, NAS 1055-6-10 high shear rivets and NAS179-6 collars.

NOTE

Thickness of repair patch will take place of removed spacer pad. Discard removed spacer pad.

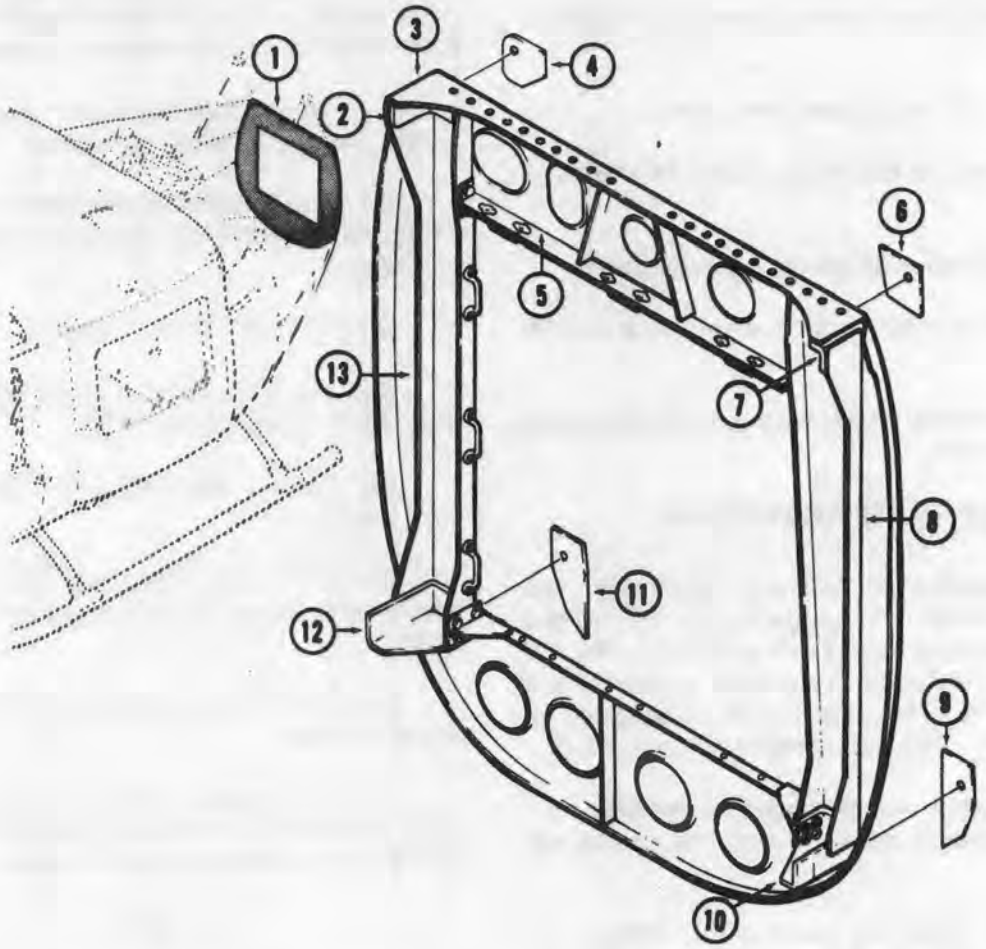
c. Cracks in bend radius of outboard attaching doubler angles, LH (8) and RH (13), require that bulkhead (1) be removed and damaged angles replaced. Before removing bulkhead, to provide access to area of repair and to relieve structure load, remove the following components:

(1) Remove the engine (paragraph 4-13).

(2) Remove aft firewall (paragraph 2-75).

(3) Remove tri-pod engine mount (paragraph 2-271).

(4) Remove elevator and tail rotor control tubes (paragraph 11-173).



ITEM	NAME	MATERIAL	SPECIFICATION	COND.	THICKNESS
1	Bulkhead				
2	Fitting UR	2014 Al Aly	QQ-A-367	T6	
3	Cap Angle	7075 Al Aly	QQ-A-250/13	T6	0.032
4	Spacer Pad	7075 Al Aly	QQ-A-250/13	T6	0.032
5	Skin	7075 Al Aly	QQ-A-250/13	T6	0.025
6	Spacer Pad	7075 Al Aly	QQ-A-250/13	T6	0.032
7	Fitting UL	4140 Steel	MIL-S-5626		
8	Angle LH	7075 Al Aly	QQ-A-250/13	T6	0.090
9	Spacer Pad	7075 Al Aly	QQ-A-250/13	T6	0.032
10	Fitting LL	2014 Al Aly	QQ-A-367	T6	
11	Spacer Pad	7075 Al Aly	QQ-A-250/13	T6	0.032
12	Fitting LR	2014 Al Aly	QQ-A-367	T6	
13	Angle RH	7075 Al Aly	QQ-A-250/13	T6	0.032

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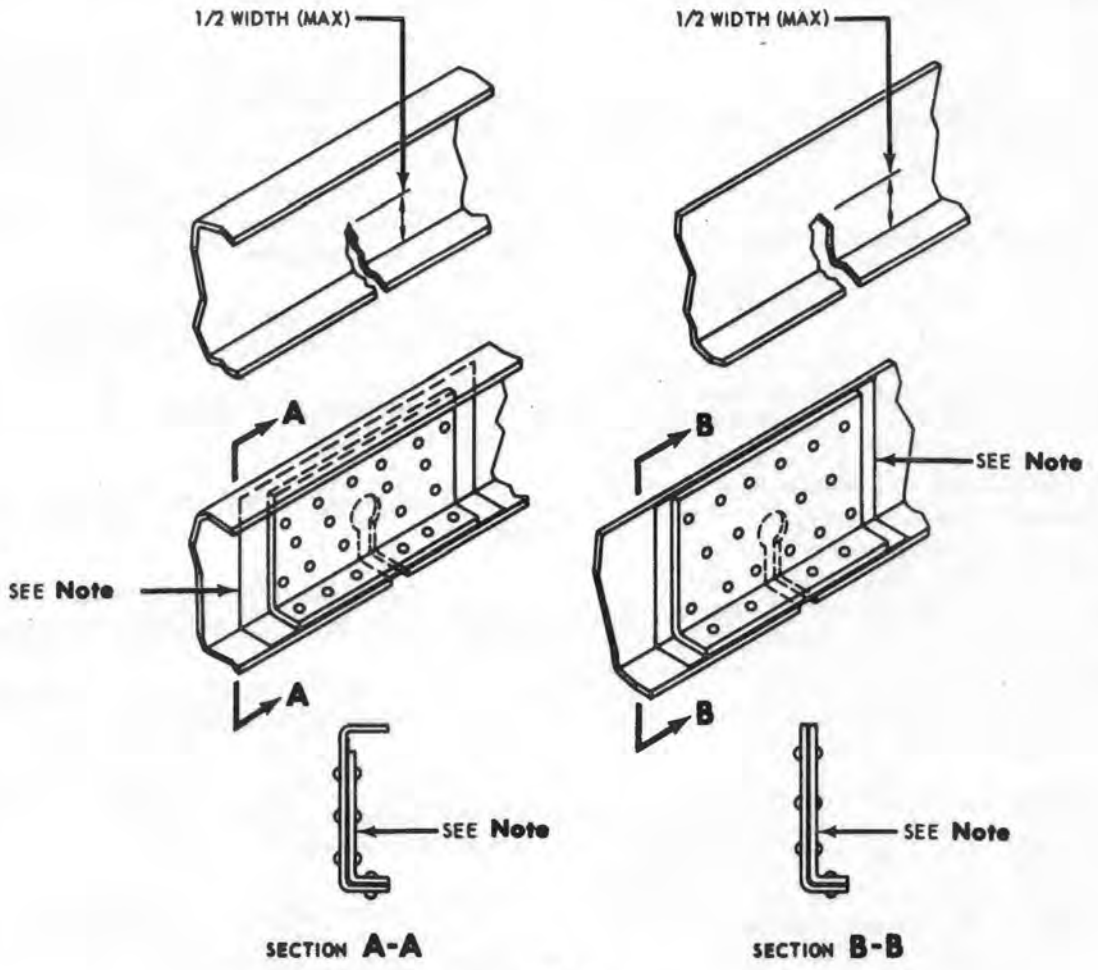
Figure 2-27. Bulkhead assembly (FS195.00) repair



Note

Reinforcing metal to be one gage heavier than original metal.

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Figure 2-28. Damaged frame members repair by patching

(5) Remove electrical and communication cables, wiring, attaching clamps and hardware from work area. Temporarily retain cables and wiring clear of area.

(6) Open compartment doors and remove electrical equipment and drain lines at aft end that will interfere with repair work.

(7) Retain all removed parts for reinstallation.

d. Removal of bulkhead (1, figure 2-27).

(1) An alignment tool is required to prevent movement of fuselage structure members and tail boom attachment fittings (2, 7, 10 and 12) after aft bulkhead is removed. Fabricate alignment tool from 0.250 inch thick material of sufficient width to pick up the four tailboom attaching points (2, 7, 10 and 12). Provide two legs to extend from alignment tool to pads on floor or ground surface. Position alignment tool in place and clamp to aft bulkhead (1). Use an undersize drill (to prevent elongating holes in fittings) and back drill alignment tool through tailboom attachment bolt holes. Remove clamps, remove alignment tool, and place tool to one side for later use.

(2) Remove all bulkhead retaining hardware. Drill out and remove rivets attaching bulkhead of fuselage and tailboom fittings (2, 7, 10, and 12). Tailboom attachment fittings will remain attached to structure members of forward fuselage. Lift aft bulkhead from end of forward structure.

CAUTION

Use extreme care in drilling high shear rivets in tailboom attachment fittings (2, 7, 10, and 12), to prevent elongation of holes or damage to fittings. Where it is possible, cut off high shear rivets and punch rivets out of fittings.

(3) Install previously fabricated alignment tool on tailboom attachment fittings (2, 7, 10, and 12), to prevent movement of fuselage structure members.

e. Drill out rivets and remove cracked outboard attaching doubler angle or angles (8 and 13) from removed bulkhead.

f. Fabricate new RH outboard attaching doubler angle (13) from 0.032 inch thick 7075-0 aluminum alloy. Use removed angle as a pattern for length, radius, shape and joggle. Locate new angle on bulkhead, clamp in place and back drill rivet holes. Remove new angle from bulkhead. Remove burrs from angle, clean and coat with primer, (C253).

g. Install new RH outboard attaching angle (13) to bulkhead, using MS20426AD4 rivets. Rivet holes in RH angle (13) matching with rivet holes in upper and lower RH attachment fittings (2 and 12) may be back drilled through attachment fittings, after alignment tool is removed and bulkhead is clamped in place on cabin structure.

h. LH outboard attaching angle (8) is made from 0.090 inch thick 7075-0 aluminum alloy.

i. To replace LH outboard attachment angle (8) proceed as follows:

(1) Drill out rivets and remove angle from bulkhead.

(2) Fabricate a template, from 0.012 inch thick aluminum alloy T3, to fit each leg of angle (8).

(3) Clamp templates in removed angle and back drill rivet holes in templates.

(4) Mark each template for identification, remove clamps, transfer templates to new angle (8) and drill rivet holes.

(5) Remove templates from angle (8). Remove burrs, clean and install new angle to bulkhead, using MS20426AD4 and MS20426AD5 rivets.

j. Remove alignment tool from position on fuselage.

k. Place bulkhead in position on fuselage, and install tailboom attachment bolts through fittings (2, 7, 10, and 12) and bulkhead, with washers or spacers behind bolt heads, and tighten nuts temporarily (finger tight). Align rivet holes in fuselage and bulkhead, and hold in position with metal fasteners.

l. Back drill rivet holes in RH outboard attaching angle (13) to match tailboom attachment fittings (2 and 12). Remove burrs and clean chips from parts and area.

m. Rivet and bolt bulkhead onto fuselage and fittings (2 and 12), using MS20426AD4, MS20426AD5, and MS20470AD4 rivets where required.

n. Install the following parts and components (refer to step c.).

(1) Tailboom (paragraph 2-281).

(2) Engine (paragraph 4-16).

(3) Aft firewall (paragraph 2-77).

(4) Engine mount (paragraph 2-274).

(5) Elevator and tail rotor controls (paragraphs 11-204 and 11-176).

(6) Electrical components and drain lines if removed.

2-71. FIREWALLS AND HEAT SHIELD.

2-72. Description — Firewalls and Heat Shield. The firewalls and tail rotor driveshaft head shield are installed in the engine compartment. The forward firewall is a single unit and the aft firewall consists of an upper and lower unit. The firewalls and heat shield are constructed of MIL-T-7993 titanium alloy and reinforced with MIL-S-6721 corrosion resistant steel and aluminum alloy stiffeners and channels (figure 2-29).

2-73. Inspection — Firewalls and Heat Shield (Installed). a. Inspect for cracks, tears, holes, and dents.

b. Inspect seals for tears and deterioration.

c. Inspect for loose or missing fasteners.

2-74. Classification of Damage — Firewalls and Heat Shield. a. Negligible Damage. Surface scratches and dents are considered negligible and can be ignored unless the dents are deep enough to interfere with other installations. If this condition exists, it is necessary to bump out the dents until proper clearance is obtained or firewall is restored to its original shape.

b. Repairable Damage for Firewalls.

(1) Cracks 3.0 inches or less, repair by welding. Cracks exceeding 3.0 inches in length, repair by patching.

(2) Stiffeners, seal retainers, etc., repair by insertion. If damage warrants, replace parts.

c. Repairable Damage for Heat Shield. Damage not exceeding 2.0 inch diameter after clean-up, no closer than 1.0 inch to flange, or bead on forward end and a minimum 6.0 inches from similar type repair. Heat shield is not repairable by insertion repairs.

d. Damage Requiring Replacement.

(1) Damage so extensive that time expended would warrant replacement.

(2) Torn or deteriorated seals and gaskets.

2-75. Removal — Firewalls and Heat Shield. a. Remove power plant (paragraph 4-13).

b. If forward firewall (1, figure 2-29) is to be removed, remove air particle separator (paragraph 4-28).

c. Remove forward section of tail rotor driveshaft (paragraph 6-206).

d. Remove aft lower firewall (3) as follows:

(1) Remove screws (32, figure 2-29) and washers (31) attaching heat shield (30) and fireshield (2) to firewall (3).

(2) Remove screws (14) and washers (13) attaching firewall to service deck. Remove screws from forward and aft legs of firewall.

(3) Remove firewall from helicopter.

(4) If firewall is to be replaced, remove cowling mounting brackets and hardware not furnished on replacement firewall, for reuse on replacement firewall.

e. Loosen clamp (34) securing fireshield (2) to firewall (1). Remove fireshield.

f. Remove forward firewall (1) as follows:

(1) Remove lower left access panel from pylon island.

(2) Disconnect all fuel and oil lines, bleed air, and electrical from forward firewall.

(3) Remove mounting screws (23) and washers (22) along both sides and bottom of forward firewall (1). Remove firewall from helicopter.

2-76. Repair or Replacement — Firewalls and Heat Shield. a. Replace damaged or worn seals.

(1) Drill out rivets securing retainer and seal to firewall. Remove seal.

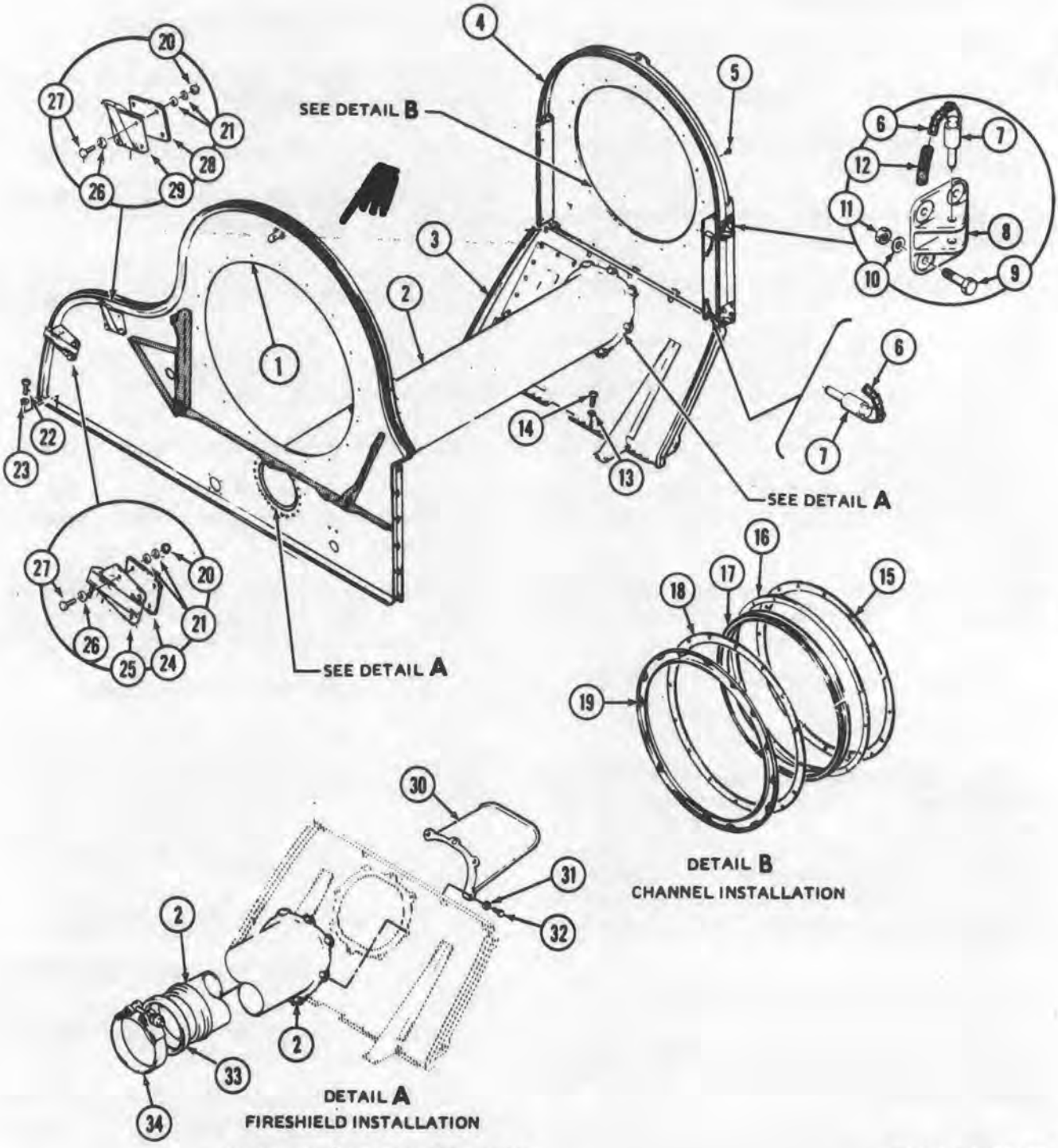

Figure 2-29. Firewall Installation (Sheet 1 of 2)

1. Forward firewall
2. Fireshield
3. Aft firewall lower
4. Aft firewall upper
5. Screw
6. Chain
7. Pip pin
8. Hinge fitting
9. Bolt
10. Washer
11. Nut
12. Tube
13. Washer
14. Screw
15. Gasket
16. Ring
17. Ring
18. Gasket
19. Channel
20. Nut
21. Washer
22. Washer
23. Screw
24. Plate
25. Latch fitting
26. Washer
27. Bolt
28. Plate
29. Latch fitting
30. Heat shield
31. Washer
32. Screw
33. Gasket
34. Clamp

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Figure 2-29. Firewall installation (Sheet 2 of 2)

(2) Position replacement seal and retainer on firewall and secure with metal fasteners. Check that seal is positioned to make proper contact with cowling.

(3) Drill holes through seal and install MS20435M-3-4 rivets.

b. Replace latch fittings and hinge fittings if broken or unserviceable.

c. Repair firewall webs that are cracked, torn, or hole damage.

(1) Stop drill cracks. If damage is a hole or tear, cut a round or elongated hole according to shape of damage (figure 2-30). Remove only a sufficient amount of material to clean-up damage. Deburr hole.

(2) Fabricate a patch of the same material and gage or next heavier gage. Allow approximately 0.750 inch overlap around cleaned area. The 0.75 inch overlap will give the required edge distance for riveting.

(3) Drill holes through firewall and patch maintaining a minimum four diameter spacing and a two diameter edge distance. Remove patch and deburr holes.

(4) Cut a piece of firewall fabric J-M89, (Item 30, Table 2-1) same size of patch or coat patch with sealing compound (C-187).

(5) Position patch and rivet in place with monel rivets, MS20615M.

d. Replace damaged or broken fasteners.

e. Replace damaged or worn gaskets on firewall and fireshield.

(1) Remove gasket and aged adhesive from firewall.

WARNING

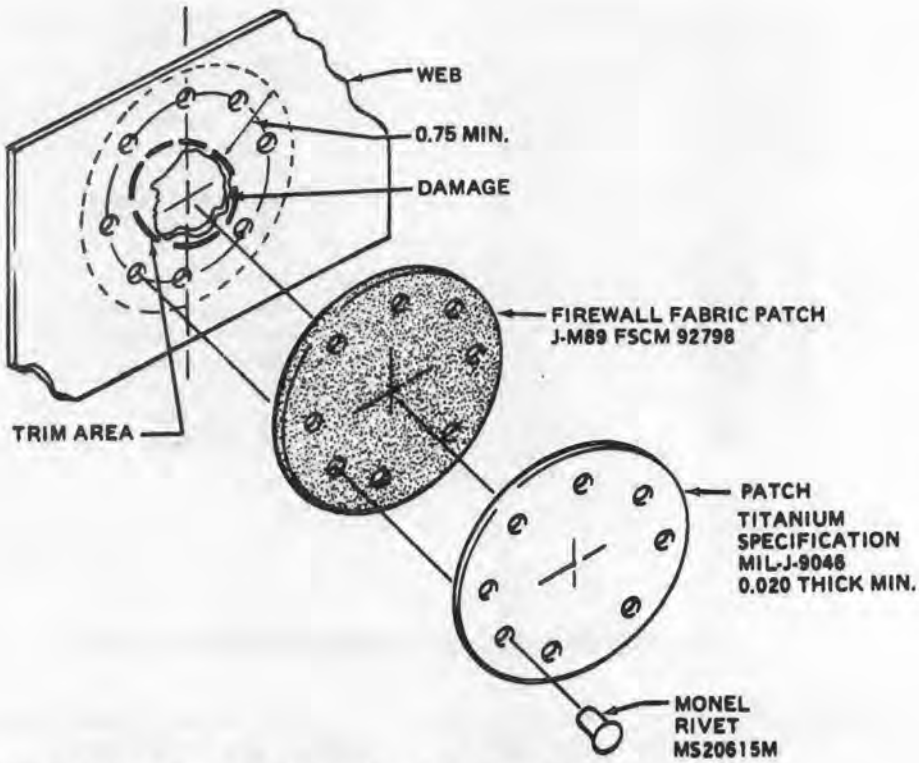
Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(2) Abrade metal surface with 180 grit abrasive paper (C1.2). Clean abraded areas with toluene (C230). Wipe dry with clean cloths.

WARNING

Use adhesive in well ventilated area. Do not use near open flame or heat and avoid prolonged breathing of vapors.

(3) Apply adhesive (C23) to gasket and metal surface. Position gasket on metal surface and air dry minimum four hours.



NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 2-30. Firewall repair

WARNING

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

(4) Remove adhesive squeeze-out with MEK (C142).

f. Repair fireshield.

(1) Clean up damage area not to exceed limits of paragraph 2-74, step c. Stop drill cracks.

(2) Fabricate a patch of same gage and type material. Patch must overlap cutout by 0.50 inch. Patch should be of uniform shape according to shape of damage. Shape patch to contour of fireshield.

(3) Apply sealant (C187) to mating surfaces of patch and heat shield.

(4) Install patch using MS20615M rivets at approximately 0.75 inch spacing.

2-77. Installation — Firewalls and Heat Shield.

a. Install forward firewall (1, figure 2-29) as follows:

(1) Coat surfaces of firewall which mate with service deck and side structure with sealant (C187).

(2) Position firewall in place and install screws (23) and washers (10) along sides of bottom of firewall. Install all screws before tightening.

(3) Install and connect all fuel, oil, bleed air and electrical connections.

b. Position gasket (33) and clamp (34) on fireshield (2). Tighten clamp (34). Support driveshaft fireshield until aft lower firewall if installed.

c. Install aft lower firewall (3) as follows:

(1) Position aft firewall (3) in place and install sufficient shims (as required) under forward and aft legs to prevent legs from bending when mounting screws are tightened.

(2) Install screws (14) and washers (13) through firewall lower flange and through forward and aft legs. Install all screws before tightening.

(3) Position heat shield (30) on firewall and install screws (32) and washers (31) to secure driveshaft heat shield (2) to aft firewall (3).

d. Install forward section of tail rotor driveshaft (paragraph 6-202).

e. Install firewall (4) on engine. Install power plant in helicopter (paragraph 4-16).

f. Install air particle separator (paragraph 4-32).

g. Functionally check all firewall connections for security and leaks.

2-78. INDUCTION BAFFLE ASSEMBLY.

2-79. Description — Induction Baffle Assembly. The baffle assembly forms the bottom and forward areas of the engine air induction system. The baffle in conjunction with the forward firewall provides a mounting surface for the air inlet filters.

2-80. Removal — Inducation Baffle Assembly. (paragraph 4-13.)

2-81. Repair — Inducation Baffle Assembly. Use standard repair methods (TM 55-1500-204-25/1). Do not use blind type fasteners in baffle assembly repairs.

2-82. Installation — Induction Assembly. (paragraph 4-16.)

2-83. NOSE DOOR.

2-84. Description — Nose Door. The cabin nose door is constructed of aluminum alloy honeycomb core with glass fabric inner and outer skins. The door is mounted on two hinge assemblies and secured in the locked position by spring loaded latches (figure 2-31).

2-85. Removal — Nose Door. a. Remove screws (2, figure 2-31) and washers (1) attaching door to hinge bracket (11). Release latches and remove door.

b. Remove hinge (8) and stay installation (7).

(1) Remove pin (5), nut (6), bolt (3) and washers (4).

(2) Remove bolt (15, detail A,) nut (13), washers (14, 16, 19) and spacer (17). Remove hinge and stay.

(3) Separate hinge and stay by removing nut (26) and saddle washers (25).

(4) Remove screws (10), nut (12) and saddle washers (9) to separate bracket (11) from hinge (8).

(5) Remove pin (23, detail A), pin (21) washers (22) and eyebolt (24).

c. Disassemble plunger assembly (20).

(1) Remove nut (18).

(2) Separate plunger (27) and spring (29) from retainer (28).

2-86. Inspection — Nose Door. a. Inspect door for cracks, holes or damage. Refer to table 2-4 for limits. Inspect seal for damage.

b. Inspect latches for damage and security.

c. Inspect hinge and plunger for damage. Replace if damaged.

d. Inspect mounting brackets for damage.

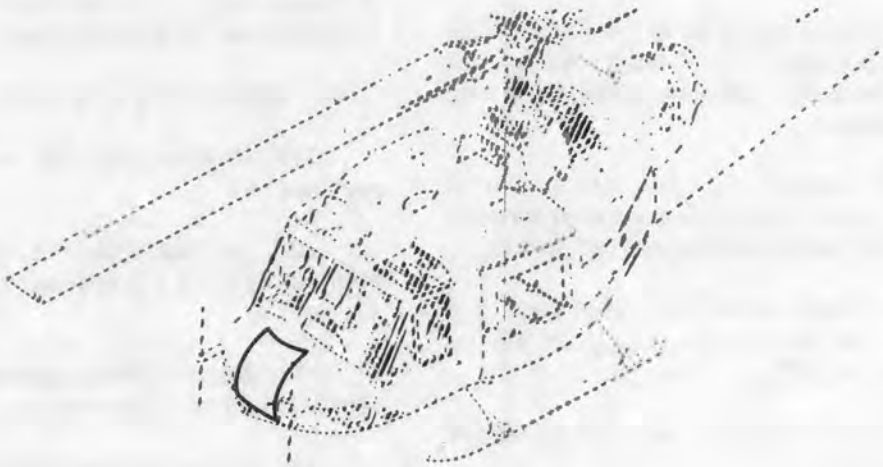
2-87. Repair or Replacement — Nose Door. a. Repair door panel in accordance with paragraph 2-18.

b. Replace hinge (8, figure 2-31) and plunger (20) if unserviceable.

c. Repair mounting brackets by standard repair methods. (TM 55-1500-204-25/1).

d. Replace damaged seal (30, detail C). Bond replacement seal with (C7.1) or (C7.2).

2-88. Installation — Nose Door. a. Assemble plunger (20, figure 2-31, detail B).



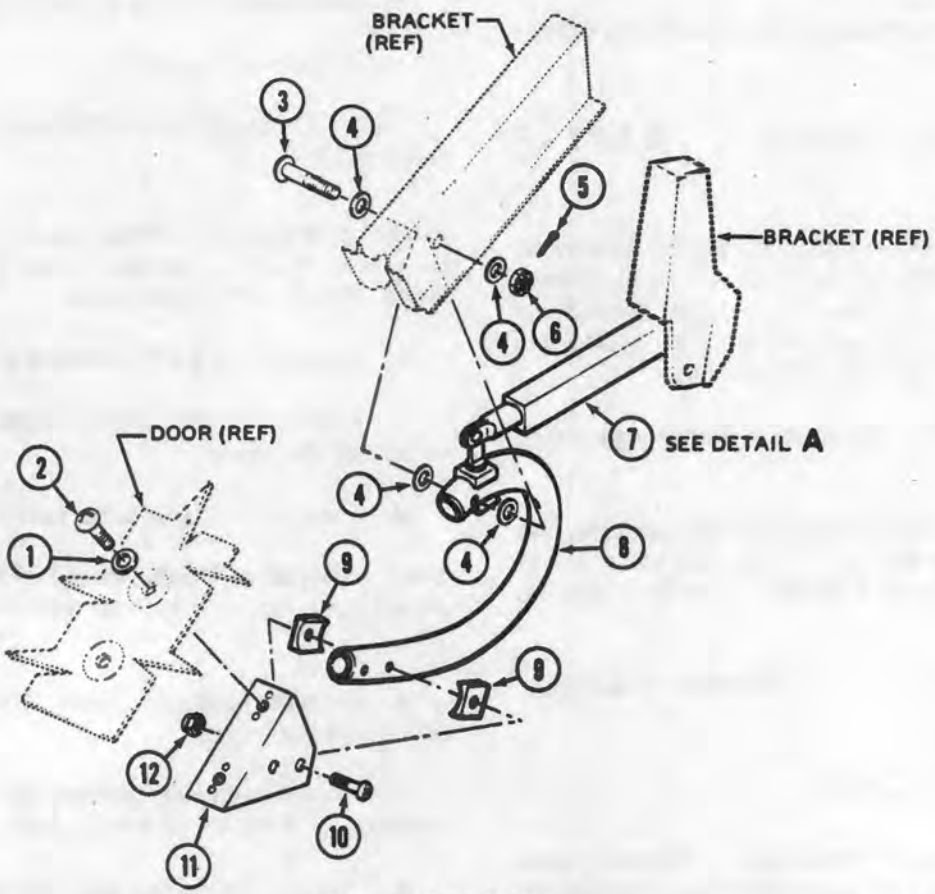
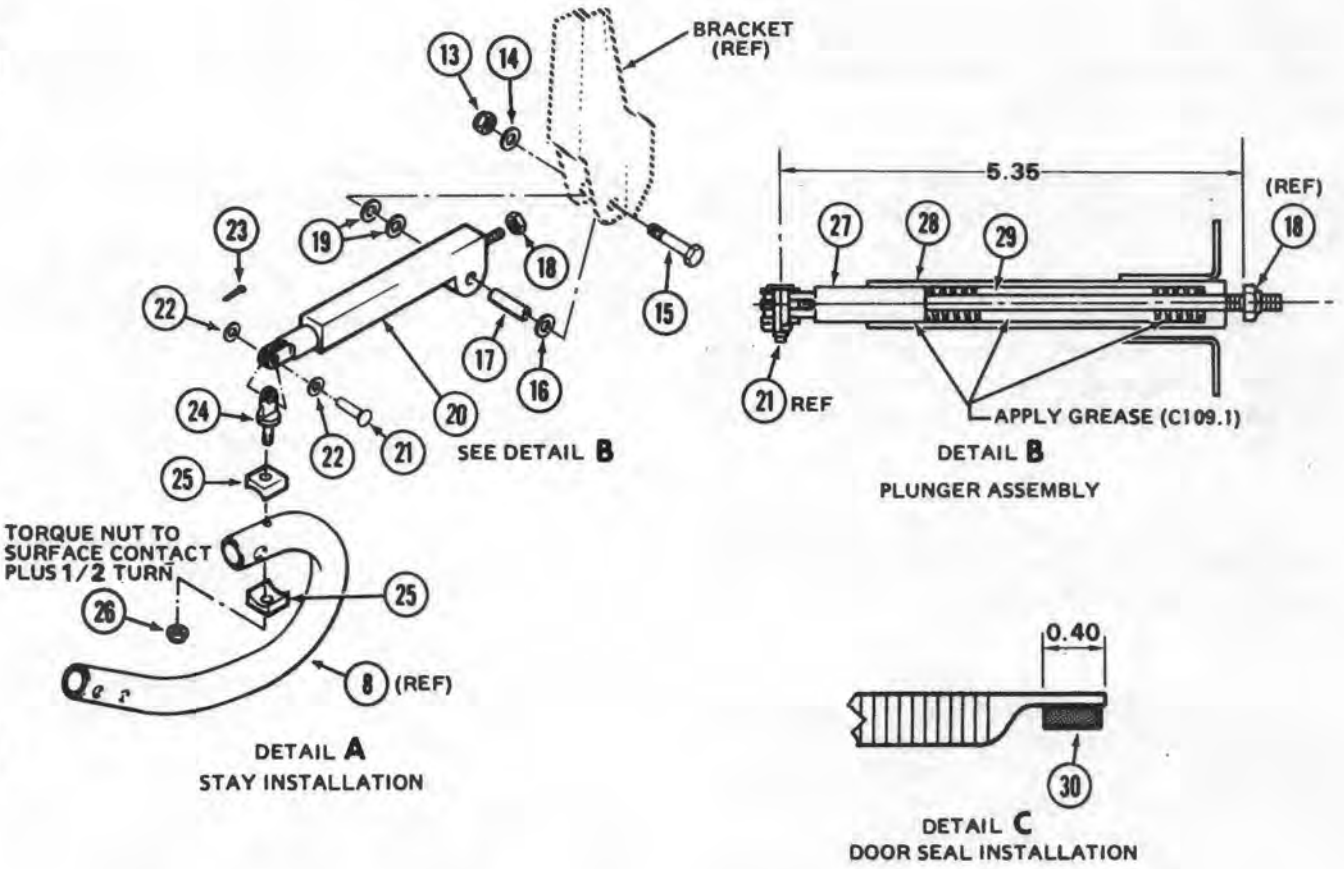


Figure 2-31. Nose door installation (Sheet 1 of 2)



NOTE: 1. NO CRACKS ALLOWED.
2. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

1. Washer
2. Screw
3. Bolt
4. Washers
5. Cotter pin
6. Nut
7. Stay installation
8. Hinge assembly
9. Saddle washers
10. Screw
11. Bracket
12. Nut
13. Nut
14. Washer
15. Bolt
16. Washer
17. Spacer
18. Nut
19. Washers
20. Plunger assembly
21. Pin
22. Washers
23. Cotter pin
24. Eye bolt
25. Saddle washers
26. Nut
27. Plunger
28. Retainer
29. Spring
30. Seal

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Figure 2-31. Nose door installation (Sheet 2 of 2)

(1) Apply film of grease (C109) to plunger (27), and retainer (28).

(2) Position spring (29) on plunger shaft and insert spring and plunger in retainer (28). Install nut (18) and adjust to dimension shown in detail B. Final adjust is made at installation.

b. Position eye bolt (24, detail A) in clevis end of plunger (20) and install pin (21) washers (22) and pin (23).

c. Insert spacer (17) in plunger (20). Position plunger (20) in mounting bracket with one washer (16) and two washers (19) located between spacer ends and bracket. Install bolt (15), washer (14) and nut (13).

d. Position saddle washers (25) on each side of hinge (8) and insert eyebolt (24) through washers and hinge. Install nut (26). Tighten nut to surface contact plug 1/2 turn.

e. Position saddle washers (9) on each side of hinge (8) and install bracket (11) with screw (10) and nut (12). Align hole in hinge with hole in bracket and install bolt (3), washers (4), and nut (6). Install pin (5).

f. Position nose door on frame and align holes in door with bracket (11). Install screws (2) and washers (1).

g. Functionally check door and latches. If required, adjust nut (18) to limit or extend travel length of plunger (20).

2-89. Painting — Nose Door. (Refer to TB 746-93-2).

2-90. CREW DOORS.

2-91. Description — Crew Doors. The two crew doors (13, figure 2-1) are hinged on the forward side and are equipped with a latch assembly, which may be operated from either side of the door. Each door incorporates three transparent acrylic plastic windows, which may be termed the forward, upper, and adjustable windows. In an emergency, doors may be jettisoned by pulling the EMERGENCY RELEASE handle mounted inside the cabin forward of each door.

2-92. Inspection — Crew Doors (Installed).

NOTE

The following inspections should be performed, to determine serviceability, prior to removing door.

a. Visually inspect seal strips around inner edge of door for deterioration and damage.

b. Examine door hinges (10, figure 2-32) for cracks, condition of spring assemblies, rubber bumper, and shim. Door hinges may be inspected by fluorescent penetrant method (TM 43-0103).

c. Visually inspect sliding window stop assembly, located at forward end of lower window channel.

d. Check roller assemblies (2) for smoothness of operation in channel and for condition of threads.

NOTE

With door in locked position, tops of roller assemblies (2) should clear channel by 0.08 inch.

e. Visually inspect all components of the ejection mechanism. Adjust emergency jettison device so rounded end of pins are visible above the upper hinge and below the lower hinge.

NOTE

Actuate emergency jettison device to make certain pins clear hinges and door can be properly jettisoned. If door does not jettison, readjust as necessary.

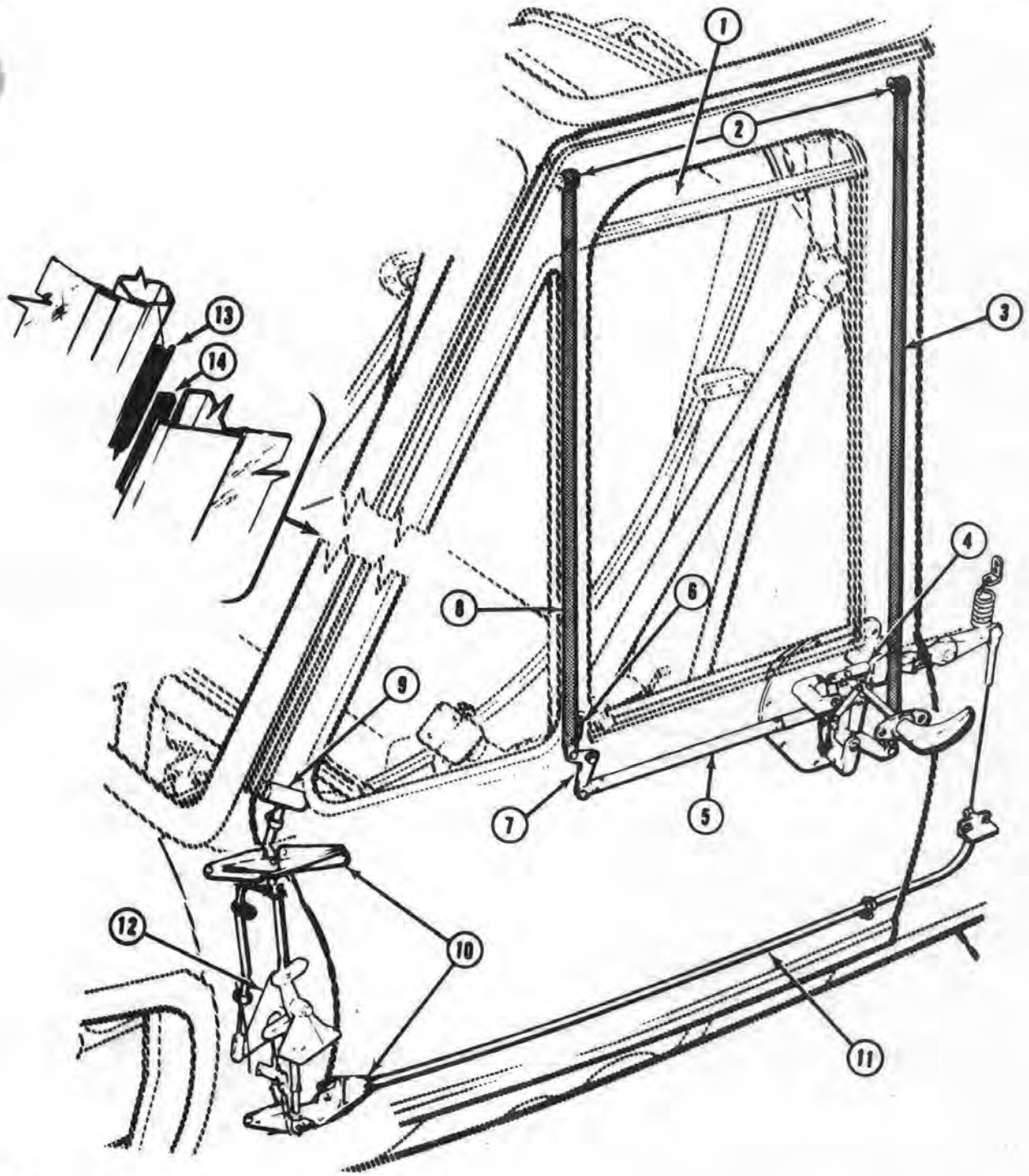
f. Inspect door for cracks, dents and damage.

2-93. Classification of Damage — Crew Doors. Refer to table 2-5, skin damage limits.

2-94. Removal — Crew Doors. a. Open crew door and hold in open position.

b. Pull EMERGENCY RELEASE ejection handle assembly (9, figure 2-32) and lift door from helicopter.

2-95. Repair or Replacement — Crew Doors. a. Replace seal strips around inner edge of door if deteriorated or damaged. Attach new seal with adhesive (C8).



1. Acrylic plastic panels
2. Door roller assemblies
3. Aft vertical latch tube
4. Door latch
5. Lower horizontal latch tube
6. Latch release spring
7. Bellcrank
8. Forward vertical latch tube
9. Ejection handle assembly
10. Door hinges
11. Striker ejection cable
12. Ejection mechanism
13. Seal
14. Seal

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Figure 2-32. Crew doors

b. Replace door hinges, spring assemblies, rubber bumper, or shim if unsuitable for continued use. Bond rubber bumper in place with cement (C39). Shim is to be bonded with adhesive (C10) or with adhesive (C11).

c. Replace any part of sliding window stop assembly located at forward end of lower window channel which appears to be unsuitable for continued use.

d. Replace components of latching mechanism if unserviceable (paragraph 2-102).

e. Replace components of ejection mechanism assembly if unserviceable (paragraph 2-108).

f. Repair skin and structure using standard repair methods. (TM 55-1500-204-25/1.) (AVIM)

2-96. Painting — Crew Doors. Refer to TB 746-93-2.

2-97. Installation — Crew Doors. a. Lift door to position, pull ejection handle to retract hinge pins align hinge halves, and release handle to engage hinge pins.

b. Close door slowly, observing action of latch. Slowly move handles to lock position, observing engagement of latch rods with upper strikers and for clearance above each rod when fully extended.

c. Check adjustment of latching and ejection mechanism (paragraph 2-98) and (2-99).

2-98. Adjustment — Crew Doors. a. With door handle in locked position, adjust latch tubes as follows:

(1) Adjust aft vertical latch tube so a clearance of **0.08** inch is obtained between top of door roller assembly (2, figure 2-32) and bottom of channel.

(2) Adjust forward vertical latch tube so a clearance of **0.08** inch is obtained between top of door roller assembly and bottom of channel.

b. Loosen screws and adjust strikers located on upper door structure as necessary for proper engagement with rollers (2).

c. Adjust ejection mechanism as follows:

(1) Adjust linkage of ejection mechanism so rounded ends of pins are visible above the upper hinge and below the lower hinge.

(2) Support door and pull ejection handle (9). Ensure pins clear hinges and door can be jettisoned. Adjust ejection linkage as necessary.

(3) Safetywire ejection handle with **0.020** inch copper wire (C246.1) after adjustments are complete.

d. If hinge halves, located on cabin nose, are replaced, adjust shims as neeced for proper alignment.

2-99. LATCHING MECHANISM — CREW DOORS.

2-100. Description — Latching Mechanism. The latching mechanism (figure 2-33) consists of a latch assembly, with inside and outside handle, rods, and bellcrank. Actuation of either handle will release rollers on vertical rods and latch catch from strikers mounted on cabin structure.

2-101. Removal — Latching Mechanism. a. Remove crew door (paragraph 2-94).

NOTE

Remove latch mechanism only to extent necessary for parts replacement.

b. Disconnect latch rod (15, figure 2-33) from latch arm by removing cotter pin (20) and pin (18).

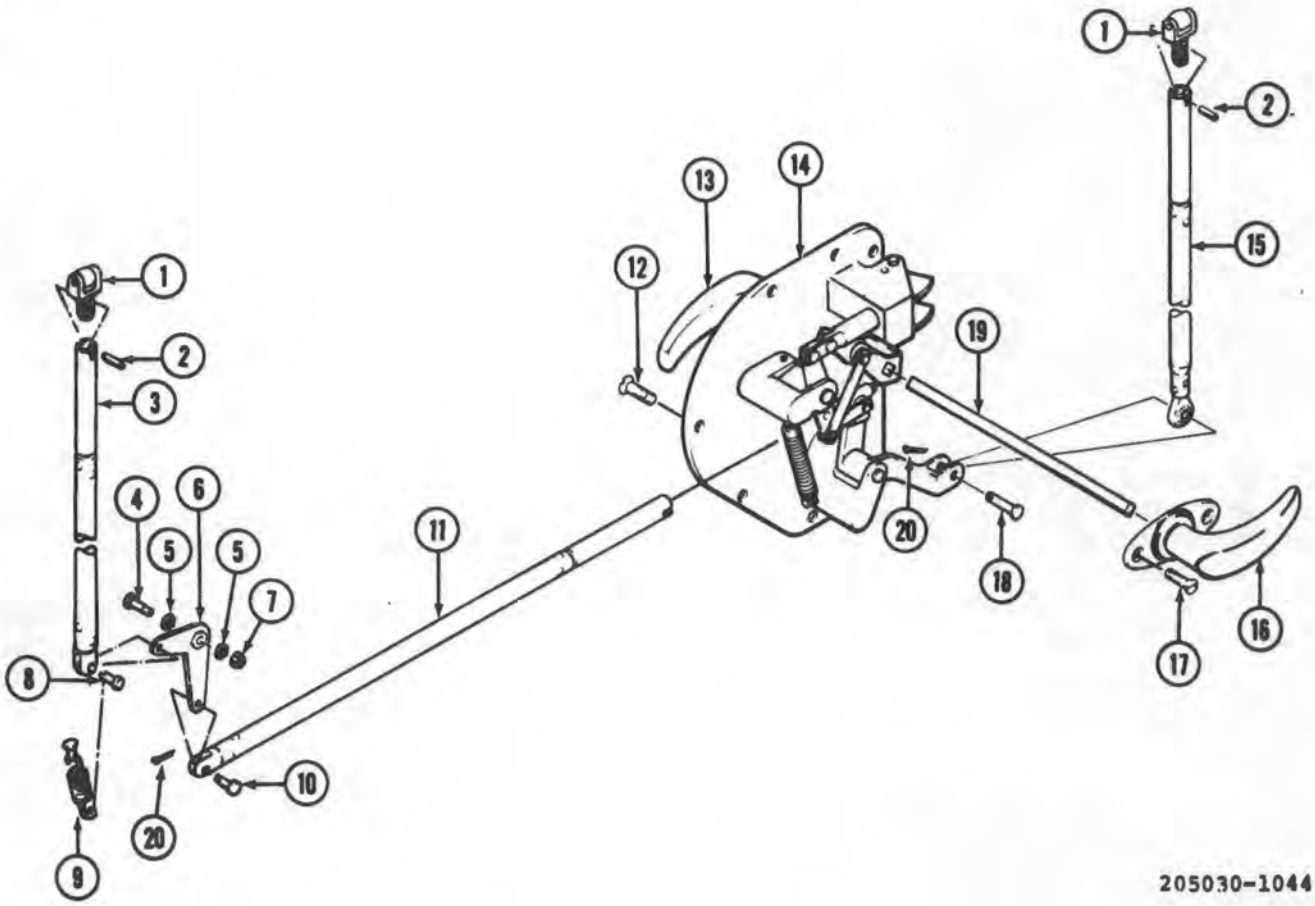
c. Remove inner access door and lower plug bottom from inner face of door.

d. Disconnect rod (11) from bellcrank (6) by removing cotter pin (20) and pin (10). Unscrew aft end of rod from rod-end on latch assembly (14). Remove rod through inboard side of door.

e. Remove attaching screw and remove inner handle (13).

f. Remove nine screws (12) to detach latch plate form inner face of door. Hold latch shaft (19) while sliding latch assembly (14) off inboard end.

g. To disassemble latch proceed as follows:



1. Roller
2. Pin
3. Latch rod
4. Shouldered bolt
5. Washer
6. Bellcrank
7. Nut
8. Pin
9. Spring
10. Pin
11. Rod
12. Screw
13. Inner handle
14. Latch assembly
15. Latch rod
16. Outer handle
17. Screw
18. Pin
19. Latch shaft
20. Cotter pin

Figure 2-33. Crew door latching mechanism

(1) Remove cotter pin and pin (2, figure 2-34) holding latch spring (3) in catch (6). Remove pin (5) fastening roller assembly to ram (29) and unscrew roller assembly from ram assembly.

(2) Remove cotter pin and pin (28) attaching ram assembly (29) to lever assembly (27) and remove ram assembly.

(3) Back off setscrew (18) attaching spindle (8) to arm assembly (17) and remove spindle.

(4) Unhook and remove latch centering spring (15), spacer (14), and pin (7).

(5) Remove cotter pin and pin (24) attaching arm assembly (17) to upper latch links (26) and remove arm assembly. Remove snap rings (30) attaching upper latch links (26) to latch lever (27) and remove links.

(6) Remove cotter pin and pin (22) attaching lower latch links (23) and rod end (25) to jackshaft (21), and remove links and rod end.

(7) Remove cotter pin and pin (20) attaching jackshaft (21) and remove jackshaft.

(8) Remove cotter pin and pin (19) attaching lever assembly (27) and remove lever.

h. Remove outer handle (16, figure 2-33) by removing two screws (17) attaching escutcheon to door. Loosen set screw in handle (11, figure 2-34) and separate handle from spindle (8). Remove ring (10) and separate handle and escutcheon plate (9).

i. Disconnect latch rod (3, figure 2-33) from bellcrank (6) by detaching spring (9) and removing pin (8). Remove upper plug from inner face of door and remove shouldered bolt (4) with nut (7) and washers (5) to detach bellcrank from its support.

j. To remove either latch rod (3 or 15), remove spring pin (2), unscrew latch rod roller (1), and remove rod downward through door.

2-102. Inspection — Latching Mechanism. a. Inspect rollers (1, figure 2-33) for roughness and wear.

b. Inspect rods (3, 11, and 15) for wear in clevis pin holes, damage to internal threads or damage to rod which would hinder proper operation.

c. Check bellcrank (6) for bushing wear. If bushing appears worn, and is loose or shouldered bolt (4), bushing should be replaced.

d. Inspect components of latch assembly as follows:

(1) Inspect roller assembly (4, figure 2-34), ram assembly (29), latch links (23 and 26), spindle (8), pins (19 and 20), jackshaft (21), and lever assembly (27) for damage, wear, and serviceability.

(2) Inspect internal threads of ram (29), arm assembly (17), and threads of rod end (25) for damage.

(3) Check arm assembly (17) for spindle fit.

(4) Inspect links (23 and 26) for damage or wear of end pin, hole elongation or distortion.

(5) Inspect latch centering spring (15) for initial tension of **1.66** pounds, spring rate of **9.15** pounds per inch, and a load of **15.39** (plus or minus **1.5**) pounds at **2.96** inches extended length.

(6) Inspect latch release spring (3) for initial tension of **0.30** pound, spring rate of **3.54** pounds per inch, and a load of **2.0** pounds ((plus or minus **0.30** pound) at **1.75** inches extended length.

2-103. Repair or Replacement — Latching Mechanism. Replace components that fail to meet inspection requirements.

2-104. Installation — Latching Mechanism.

NOTE

Lubricate hinge and pivot points with a light coat of grease (C107) during assembly.

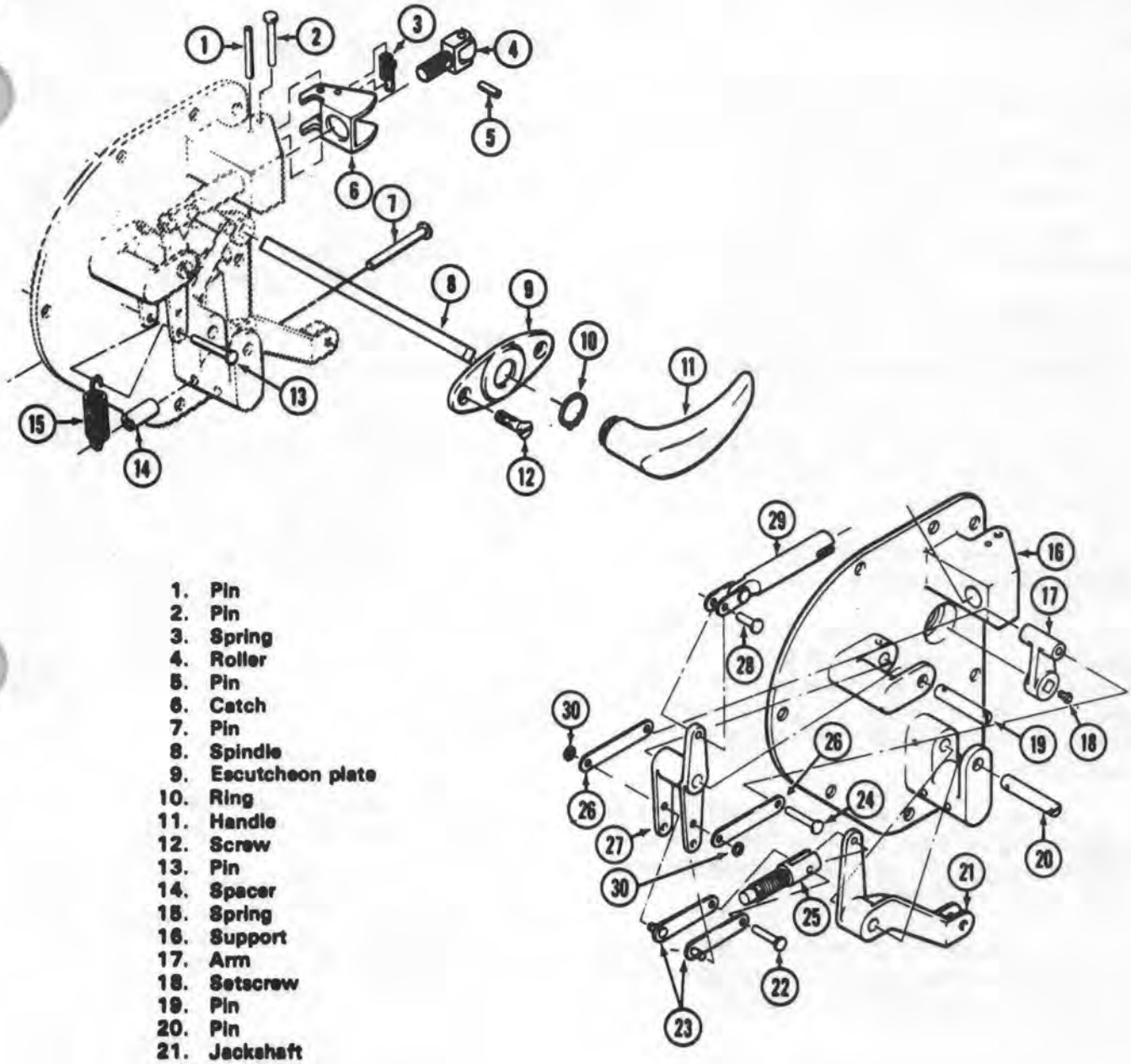
a. Assemble latch as follows (figure 2-34):

(1) Install jackshaft (21) with pin (20) and cotter pin.

(2) Position ram assembly (29) in latch housing of support.

(3) Position lower latch links (23) and upper latch links (26) on lever assemlby (27) and secure with snap rings (30).

(4) Position lever assembly (27) on support (16) and secure with pin (19) and cotter pin.



1. Pin
2. Pin
3. Spring
4. Roller
5. Pin
6. Catch
7. Pin
8. Spindle
9. Escutcheon plate
10. Ring
11. Handle
12. Screw
13. Pin
14. Spacer
15. Spring
16. Support
17. Arm
18. Setscrew
19. Pin
20. Pin
21. Jackshaft
22. Pin
23. Links
24. Pin
25. Rod end
26. Link
27. Lever
28. Pin
29. Ram
30. Rings

Figure 2-34. Crew door latch disassembled view

(5) Connect rod end (25) and lower latch links (23) to arm of jackshaft (21) with pin (22) and cotter pin.

(6) Connect forward end of upper latch links (26) to arm assembly (17) with pin (24) and cotter pin.

(7) Install spindle (8) through arm assembly (17) and secure with set screw (18).

(8) Attach ram assembly (29) to arm of lever assembly (27) with pin (28) and cotter pin.

(9) Insert pin (7) in support (16) and position spacer (14) on pin. Insert pin (13) in lever (27) and install cotter pin. Connect latch centering spring (15) to hole in pin (7) and on pin (13).

(10) Position catch (6) and spring (3) in latch housing. Install pin (2) and cotter pin. Install pin (1) engaging loops in ends of spring (3).

(11) Screw roller assembly (4) into ram assembly (29) and install pin (5) to secure in place.

b. Insert latch rods (3 and 15, figure 2-33) up through door structure, forward and aft of sliding window opening, until ends pass through guides at top of door. Install a latch rod roller (1) into end of each rod with not less than **0.30** inch thread engagement. Install spring pin (2).

c. Position bellcrank (6), with longest arm down, in support. Install shouldered bolt (4) inboard side with washers (5) under head and nut (7), using access hole in inner face of door.

d. Connect spring (9) to end of pin inserted through hole in window frame. Connect latch rod (3) to short arm of bellcrank (6) with pin (8) and cotter pin. Hook spring into end of pin.

e. Position latch assembly (14, figure 2-33) on inboard end of latch shaft. Attach plate of latch to door with nine screws (12).

f. Position handle (11, figure 2-34) on escutcheon plate (9) and install ring (10). Position handle (11) on spindle (8), and tighten setscrew. Attach escutcheon (9) to door with two screws (12).

g. Install inboard handle (13, figure 2-33) with screw.

h. Position rod (11) horizontally in door and screw threaded end on mating rod-end on latch assembly until bottomed. Adjust by backing off rod to connect to lower arm of bellcrank (6) with pin (10) and cotter pin, with rod (3) fully extended. Final adjustment will be made with door installed.

i. Connect latch rod (15) to arm on latch assembly (14) with pin (18) and cotter pin.

j. Install door (paragraph 2-97). Check adjustment of latching mechanism (paragraph 2-98).

k. Install access doors and plug buttons on door after adjustment of latching mechanism.

2-105. CREW DOOR EJECTION JETTISON MECHANISM.

2-106. Description — Crew Door Ejection Jettison Mechanism. The crew door ejection mechanism consists of an ejection handle, hinge pins and a cable assembly. When the ejection handle is pulled the hinge pins (8 and 11, figure 2-35) are retracted and allow the door hinge halves to separate. The cable assembly will cause the door post latch striker (21) to pivot upward and release from latch on door.

2-107. Removal — Crew Door Ejection Jettison Mechanism.

NOTE

Remove ejection mechanism only to extent necessary for parts replacement.

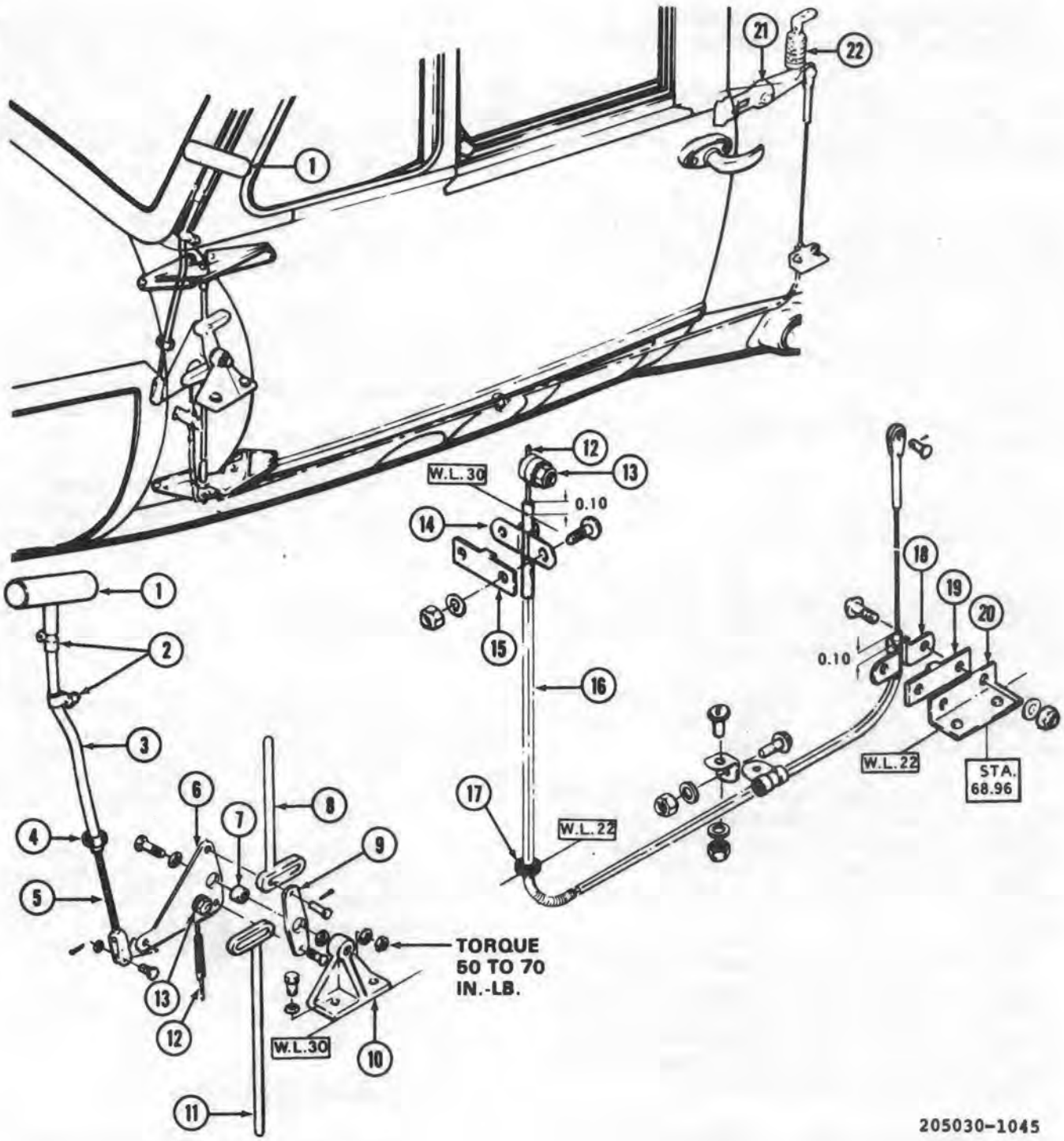
a. Remove cotter pin, washer, and headed pin to detach cable assembly (5, figure 2-35) from plate (6). When required, detach two clamps (2) which secure tube (3) to support angle and pull handle assembly up through grommet (4) to remove.

b. Detach swivel (13) from plate (6) by removing nut and washer. Pull swivel from end of ejection cable (12). Keep nut and washer with swivel.

c. Remove two bolts and washers to detach support (10) from structure. Pull hinge pins (8 and 11) free of hinge bushings, and remove assembled ejection mechanism from inboard side of nose structure.

d. Disassemble ejection mechanism as follows:

(1) Remove cotter pins and headed pins to detach upper and lower hinge pins (8 and 11) from plate (6) and link (9).



1. Ejection handle
2. Clamps
3. Tube
4. Grommet
5. Cable assembly
6. Plate
7. Spacer
8. Upper hinge pin
9. Link
10. Support
11. Lower hinge pin
12. Ejection cable
13. Swivel
14. Clamp
15. Spacer
16. Flex tube
17. Grommet
18. Clamp
19. Spacer
20. Bracket
21. Latch striker
22. Spring

Figure 2-35. Crew door ejection (jettison) mechanism

(2) Remove bolt with nut, washers, and spacer (7) to separate plate and link from support (10).

e. To remove ejection cable, disconnect aft end fork of ejection cable (12) from latch striker (21) by removing cotter pin and headed pin. Pull cable aft out of flex tube (16) leaving tube in place.

2-108. Inspection — Crew Door Ejection Jettison Mechanism. a. Inspect cable assembly (5, figure 2-35) and tube (3) for kinks or damage which would prevent operation.

b. Inspect hinge pins (8 and 11) and link (9) for damage and wear.

c. Inspect plate (6) and support (10) for damage and wear.

d. Inspect ejection cable (12) for kinks which would prevent operation.

2-109. Repair or Replacement — Crew Door Ejection Jettison Mechanism. Replace components that fail to meet inspection requirements.

2-110. Installation — Crew Door Ejection Jettison Mechanism. a. Check ends of ejection cable flex tube for proper installation.

(1) Aft end of flex tube (16, figure 2-35) should be positioned vertically at Station 68.96 in door post, secured between clamp (18) and spacer (19) attached to bracket (20) on structure with two screws, washers and nuts. End of tube should extend **0.10** inch above clamp.

(2) Forward end of flex tube should pass up through grommet (17) in nose structure forward of door opening, and be secured between clamp (14) and spacer (15) attached to structure with two screws, washers and nuts. End of tube should extend **0.10** inch above horizontal angle at W.L. 30.

b. Thread plain end of ejection cable (12) through flex tube (16) from aft end. Attach ejection cable fork terminal to aft end of latch striker (21) with headed pin secured by cotter pin. Check that spring (22) is attached between striker and bracket in door post. Forward end of cable will be attached during installation of ejection mechanism.

c. Install ejection handle and hinge pins as follows:

(1) Insert spacer (7) through pivot holes of plate (6) and link (9). Place standard steel washer on bolt, and insert bolt from plate side through spacer. Place thin aluminum alloy washer on bolt next to spacer, and insert bolt through support (10). Install nut and aluminum alloy washer on outboard end of bolt and torque **50 TO 70** inch-pounds.

(2) Position slotted ends of hinge pins (8 and 11) between plate and link, align holes, and install headed pins secured by cotter pins.

(3) Position assembly in nose structure, with hinge pins inserted in hinge bushings and support (10) resting on horizontal structural member at W.L. 30. Align support to holes with plate nuts, and install two bolts with aluminum alloy washers. Torque bolts **20 TO 25** inch-pounds.

(4) Position ejection handle (1) with cable tube (3) inserted through grommet (4). Align tube clamps (2) to mounting holes in angle and attach with two screws, washers and nuts.

(5) Connect fork terminal of cable (5) to forward end of plate (6) with headed pin, washer and cotter pin.

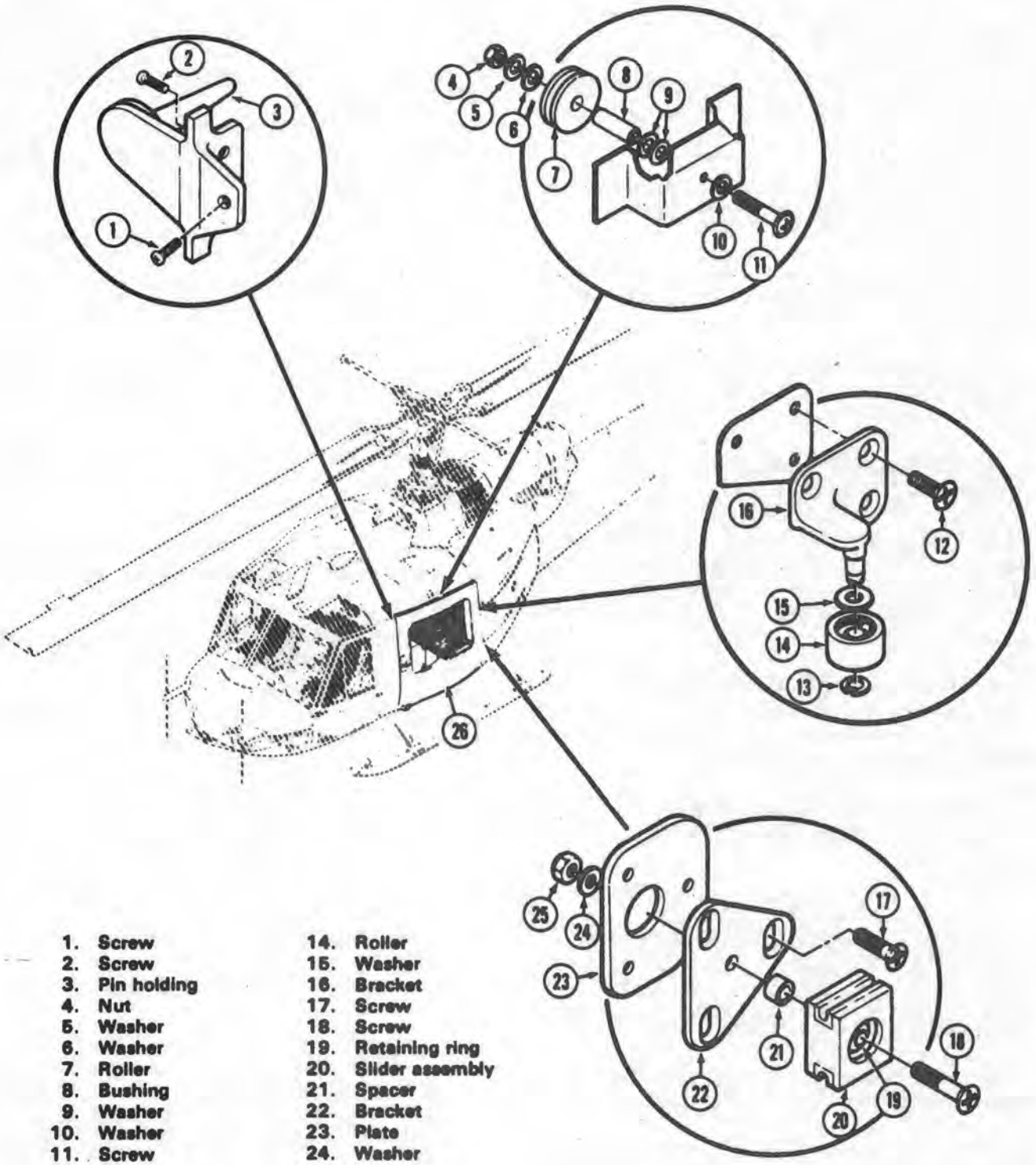
d. Connect ejection cable (12) with swivel (13) to hole with bushing in middle of plate (6). Adjust cable length to remove slack with hinge pins extended and latch striker (21) held in latching position, and tighten nut on swivel to hold end of cable securely.

e. Pull ejection handle and check for smooth operation, with hinge pins retracting and latch striker moving up to release position. Allow handle to return to normal position, observing that hinge pins extend and latch striker moves down to latching position.

f. Safetywire ejection handle with **0.020** inch copper wire (C246.1).

2-111. CARGO DOORS.

2-112. Description — Cargo Doors. Two sliding doors (12, figure 2-1) are provided for access to the passenger-cargo compartment. One door is located on each side of the aft cabin section, aft of the crew doors. A large plexiglass window is incorporated into each cargo door. The doors are attached to and slide on rollers in metal tracks. On helicopters 64-14035 and subsequent, the lower rollers are replaced by slider assemblies. Doors slide aft to open.



1. Screw
2. Screw
3. Pin holding
4. Nut
5. Washer
6. Washer
7. Roller
8. Bushing
9. Washer
10. Washer
11. Screw
12. Screw
13. Retaining ring
14. Roller
15. Washer
16. Bracket
17. Screw
18. Screw
19. Retaining ring
20. Slider assembly
21. Spacer
22. Bracket
23. Plate
24. Washer
25. Nut
26. Cargo door

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Figure 2-36. Cargo door installation

2-113. Inspection — Cargo Doors (Installed).

a. Check door latch for freedom of movement and operation (figure 2-38.)

b. Check operation of door rollers and slider assembly for smooth operation and security. (Figure 2-36.)

c. Check condition of strap (18, figure 2-37) and strap (7) located at aft end of lower track.

2-114. Classification of Damage — Cargo Doors. Damage limits apply only to sheet metal parts and windows.

a. **Negligible damage.** Small isolated dents, nicks and scratches that are free of cracks, abrasions and sharp corners may be considered negligible.

b. **Repairable damage.** Cracks, holes or tears in the skin, and holes or cracks in the transparent windows may be repaired by patching. Cracked or bent stiffeners and hat angles may be repaired by patching. Holes in the transparent plastic windows may be repaired by insertion. Damage to the frame members may be repaired by insertion if deemed feasible.

c. **Damage requiring replacement.** Damage that causes distortion or misalignment of doors or damage to extensive to repair. Damage to windows that exceed limits of figure 2-42.

2-115. Removal — Cargo Doors. a. Remove cargo door holding-pin (3, figure 2-36) by removing screws (1 and 2).

NOTE

Pin is located on upper forward inboard side of cargo door.

b. Remove bumper (3, figure 2-37) and straps (7 and 18).

c. Slide door aft on tracks and guide rollers and sliders through cutouts at aft end of tracks.

2-116. Inspection — Cargo Doors (Removed). a. Inspect rollers (7 and 14, figure 2-36) and slider (20) for wear and security. Inspect mounting brackets for damage. Replace rollers, brackets, or slider if damaged.

b. Inspect seals for damage and deterioration.

2-117. Repair or Replacement — Cargo Doors. (AVIM) a. Repair sheet metal damage using standard repair methods (TM 55-1500-204-25/1). Repairs shall not interfere with fit or function of door.

b. Repair windows (TM 55-1500-204-25/1).

c. Replace damaged rollers (7 and 14, figure 2-36) and slider (20). If slider is worn on one side only, slider may be rotated 180 degrees with unworn side in contact with door track.

d. Replace damaged or cracked roller brackets.

e. Replace damaged or deteriorated seals using adhesive (C8).

2-118. Installation — Cargo Doors. a. Position door against helicopter with forward edge of door in line with aft end of door tracks.

b. Pass roller and slider through cutouts at aft end of door tracks. Push door forward on tracks until door is partly closed.

c. Install bumper (3, figure 2-37) and strap (7) on aft end of lower track. Install strap (18) on forward edge of door.

d. Position cargo door holding-pin (3, figure 2-36) and attach with screws (1 and 2).

e. Slide door aft and check alignment of holding pin (3) with matching hole bracket.

2-119. Adjustment — Cargo Doors.

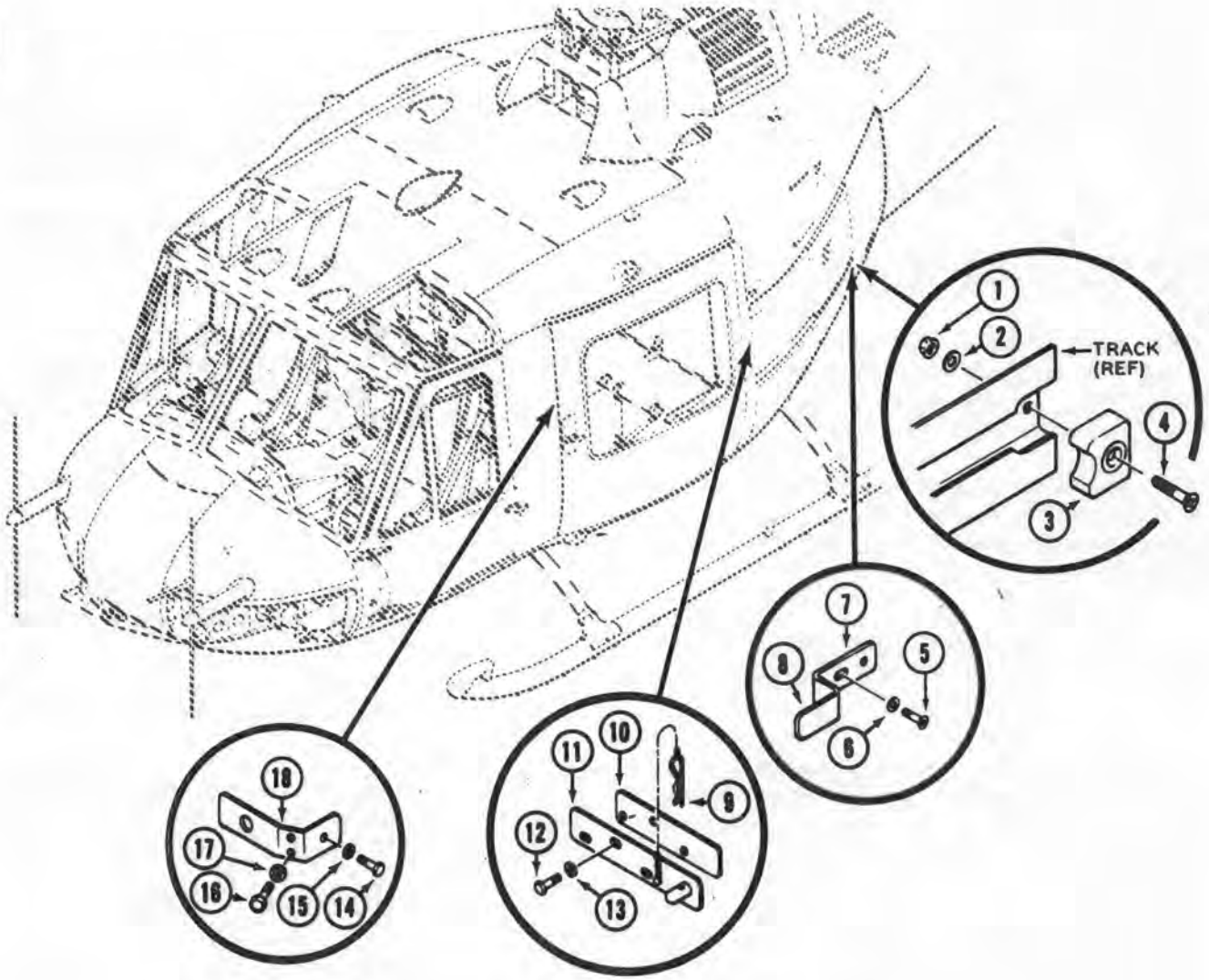
CAUTION

Ensure positive engagement of slider (20, figure 2-36) on cabin door tracks.

a. Position cargo door in full closed and locked position.

b. Check upper door track for engagement in airframe-mounted rollers. If necessary, loosen screws attaching roller and raise or lower door as necessary to engage upper door track. Tighten screws.

c. Check lower door track for proper engagement in cabin door channel. Minimum engagement of **0.25** inch is required. If necessary, loosen screws attaching cabin door channel to airframe and raise or lower channel to ensure



1. Nut
2. Washer
3. Bumper
4. Screw
5. Screw
6. Washer
7. Strap
8. Bumper
9. Lockpin
10. Spacer
11. Catch pin
12. Bolt
13. Washer
14. Bolt
15. Washer
16. Bolt
17. Washer
18. Strap

204030-1024

Figure 2-37. Cargo door stop installation

maximum engagement of cargo door track and door channel without restricting door travel from full closed to full open position. Retighten door channel attaching screws to standard torque, or hand tight, as applicable to screws.

d. After door adjustment, check cargo door latch for operation and full locking engagement. Adjust door latch as required (paragraph 2-129).

2-120. Painting — Cargo Doors. (Refer to TB746-93-2.

2-121. CARGO DOOR LATCH.

2-122. Description — Cargo Door Latch. Each cargo door is equipped with a latch assembly. The latches are spring loaded and may be operated from either side of the door. (Figure 2-38.)

2-123. Removal — Cargo Door Latch. a. Remove retaining ring (19, figure 2-38) and washer (18). Remove cover plate from inside door. Disconnect springs (2 and 14).

b. Loosen setscrew (17) and remove bushing (16), hook (15), handle (5), spacer (12), and washers (11).

c. Remove screws (8) and remove handle (9), plate (7), and spindle (10) from door. Remove retaining ring and washer from handle and remove plate (7). Loosen setscrew (6) and separate handle and spindle.

2-124. Inspection — Cargo Door Latch. a. Check spring (2, figure 2-38) for initial tension of 0.30 pounds, spring rate of 3.54 pounds per inch, and load of 2.0 pounds (plus-or minus 0.30 pound) at 1.75 inches extended length.

b. Check spring (14) for initial tension of 1.66 pounds, spring rate of 9.15 pounds per inch, and a load of 15.39 pounds (plus-or-minus 1.5 pounds) at 3.125 inches extended length.

c. Inspect parts for damage and serviceability.

2-125. Repair or Replacement — Cargo Door Latch. Replace all parts that do not meet inspection requirements or parts that are cracked or damaged.

2-126. Lubrication — Cargo Door Latch. Lubricate moving parts with grease (C 107).

2-127. Assembly — Cargo Door Latch. a. Insert spindle (10, figure 2-38) in handle (9) and install setscrew (6). Position plate (7) on handle and install washer and retaining ring.

b. Install setscrews (3 and 13) on handle (5).

2-128. Installation — Cargo Door Latch. a. Insert handle (9, figure 2-38), plate (7), and spindle (10) through outside of door. Install screws (8).

b. Assemble washers (11), spacer (12), handle (5), hook (15), and bushing (16), on spindle (10). Tighten setscrew (17).

c. Install spring (2) to pin (1) and handle (5). Install spring (14) on hook (15) and door structure. Insert handle (5) through cut-out in cover plate and attach cover plate to door with screws.

d. Install washer (18) and retainer ring (19) on end of bushing (16).

2-129. Adjustment — Cargo Door Latch. a. Check engagement of hook (15, figure 2-38). Adjust screw (3) as required into nut (4) to raise or lower hook.

b. Adjust setscrew (13) as required to position handle (5).

c. Add or remove washers (11) as required to remove lateral movement of handle (9). Minimum clearance of 0.010 inch is required.

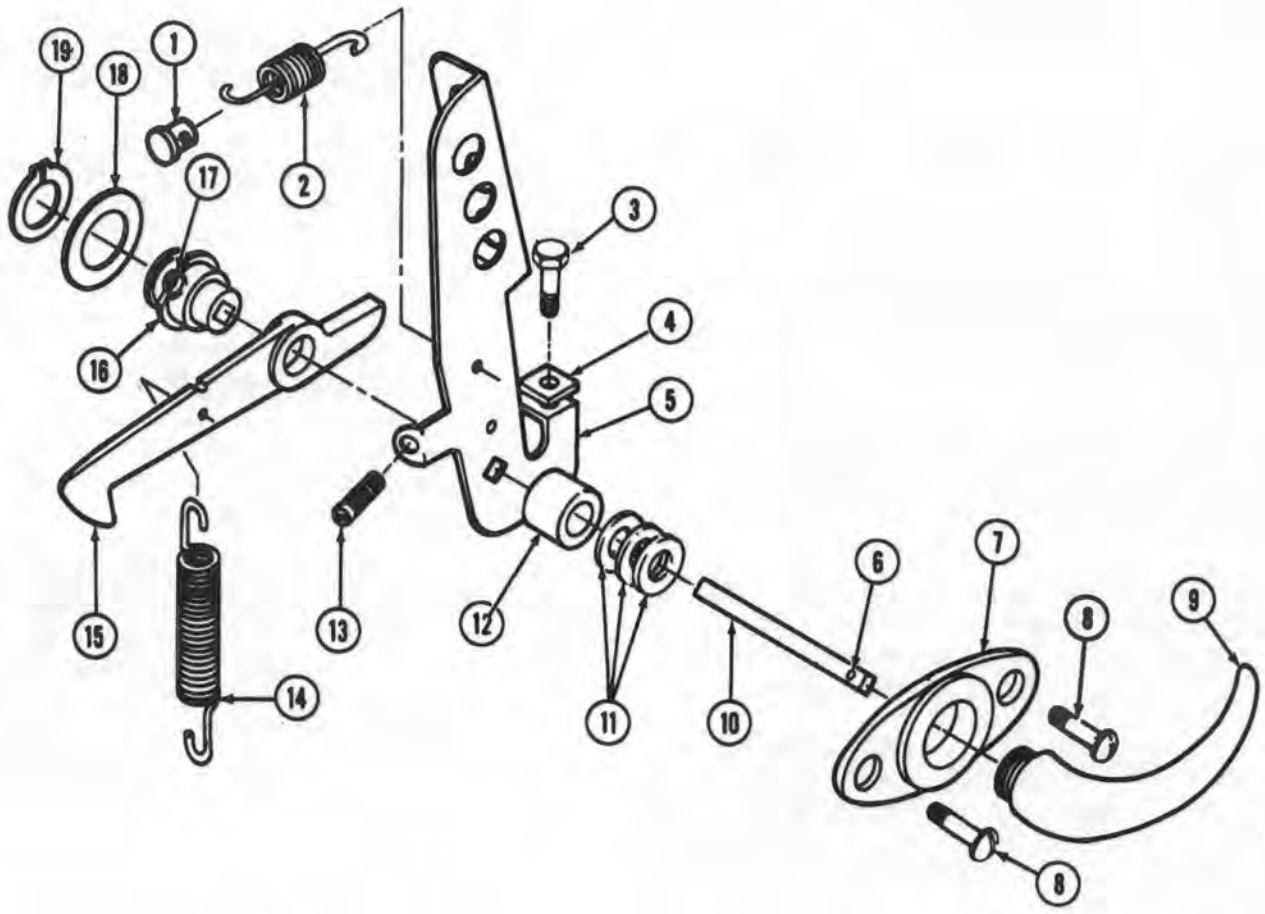
2-130. CARGO DOOR TRACKS.

2-131. Description — Cargo Door Tracks. Two cargo door tracks are installed on each side of the aft fuselage and provides support of the cargo door in the open position. The tracks are constructed of aluminum alloy extrusion.

2-132. Inspect — Cargo Door Tracks. a. Inspect tracks for damage or wear caused by roller or slider vibration.

b. Inspect inboard and lower surface of track for wear in roller areas when cargo door is full open and full closed. Wear pads should be installed when wear is evident.

c. Inspect hinged panel latch hole in upper track for damage or wear. Hole can be repaired by installation of bushing.



1. Pin
2. Spring
3. Screw
4. Nut
5. Handle
6. Screws
7. Escutcheon plate
8. Screw
9. Handle
10. Spindle
11. Washers
12. Spacer
13. Setscrew
14. Spring
15. Hook
16. Bushing
17. Setscrew
18. Washer
19. Retaining ring

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Figure 2-38. Cargo door latch installation

d. Inspect hinged panel latch hole in lower track for damage or wear. Repair can be made by installation of striker plate.

2-133. Repair of Cargo Door Tracks by Patching (AVIM). a. Using a suitable tool, clean up damaged area of door track, caused by roller or slider vibration (figure 2-39). Radius corners of cleaned up area and break all sharp edges.

b. Fabricate patch from **0.032** inch stainless steel material. Length and width of patch will be determined by amount of cleanup required to remove damage to track.

c. Drill out rivets retaining skin to track, in damaged area. Install patch in position as shown in figure 2-39, drill holes in patch picking up existing rivet holes.

d. Remove patch, clean, deburr; and install, using MS20470AD4 or MS20470AD5 rivets, depending on condition of rivet holes. Where flush rivets are required, use MS20426AD4 or MS20426AD5 rivets.

e. Should damage to the cargo door track be found on the forward section in the fuel cell area, it will be necessary to drain the fuel and open fuel cell compartment by removing work deck panel.

f. Fuel cell should be unlaced and moved back from fuel cell bulkhead, and provisions made to catch and retain chips and rivets during installation of patch. After installation of rivets in patch, exposed rivets inside fuel cell bulkhead should be covered with sealant (C188) to protect fuel cell.

g. Where blind rivets are required, or can be more conveniently installed, use CR2249-4 or CR2249-5 depending on rivet hole condition.

h. After installation of patch on track, fill any existing gaps between track and ends of patch with adhesive (C12) or adhesive (C19). Smooth flush and refinish as necessary.

2-134. Repair of Cargo Door Tracks — Installation of Wear Pads (AVIM).

NOTE

At the first indication of wear (0.010 to 0.020 inch) on the cargo door tracks, stainless steel wear pads should be installed.

a. Remove cargo door (paragraph 2-115).

b. Defuel helicopter (paragraph 1-4) and remove fuel cell (paragraphs 10-4 or 10-12) on side of helicopter that wear pads are being installed.

c. Fabricate wear pads from **0.016** inch stainless steel, quarter hard **3.0** inch length and wide enough to cover the inboard and lower track surface where roller or slider would rest (figure 2-40).

d. Form wear pad to shape, place in track at aft end cut out. Move into position, lay out and mark for rivets. Drill rivet holes, using No. 30 drill, through wear pad material and door track. Use care in drilling to that end of drill bit does not damage parts on inboard side of track.

WARNING

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

e. Countersink or dimple wear pad, countersink door track if wear pad is dimpled. Remove wear pad, clean and deburr. Clean door track, apply adhesive (C12) (metal set) to wear pad location. Slide wear pad into location, install with MS20426AD4 rivets. Clean excessive adhesive from pad and door track with cloth moistened with MEK (C142). Clamp or wedge wear pad to lower surface of track for **24** hours to allow adhesive to cure.

f. Repeat above steps for each door track and location of door track.

g. Install cargo door and functionally check to ensure that it operates properly in the track.

h. Clean fuel cell cavity and install fuel cell. (paragraphs 10-7 or 10-15).

i. Service helicopter (paragraph 1-3).

2-135. WINDSHIELD.

2-136. Description - Windshields. Two types of windshields are used. The original type is a single sheet of formed acrylic sheet. The replacement type consists of two sheets of tempered optical quality glass laminated to an interlayer of polyvibyl butyral and is scratch and shatter resistant. Both types are set in weathertight sealer and

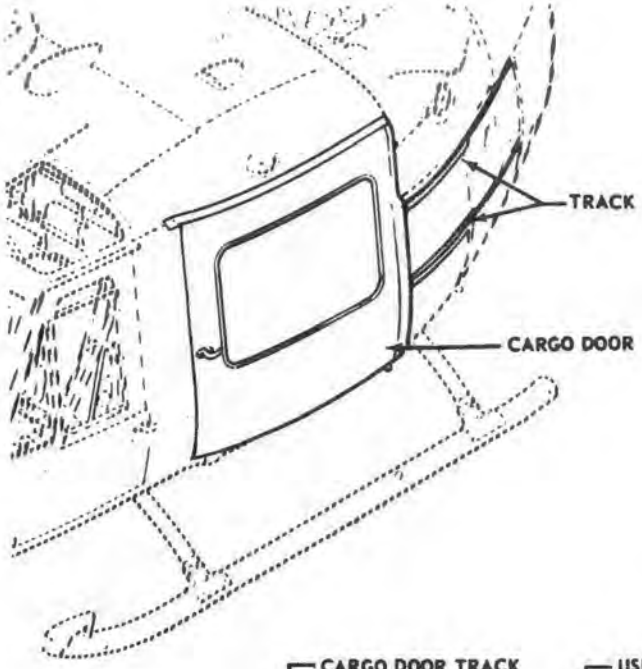
are mounted to the cabin structure with dural screws, washers and nuts.

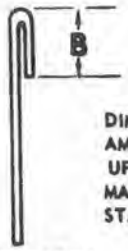
2-137. Inspection - Windshield. a. Inspect plastic windshield for damage (figure 2-42).

b. Inspect glass windshield for cracks and scratches (figure 2-42.1).

2-138. Removal — Windshield. a. Loosen ten screws (13, figure 2-41) and remove cover (10) from center windshield post.

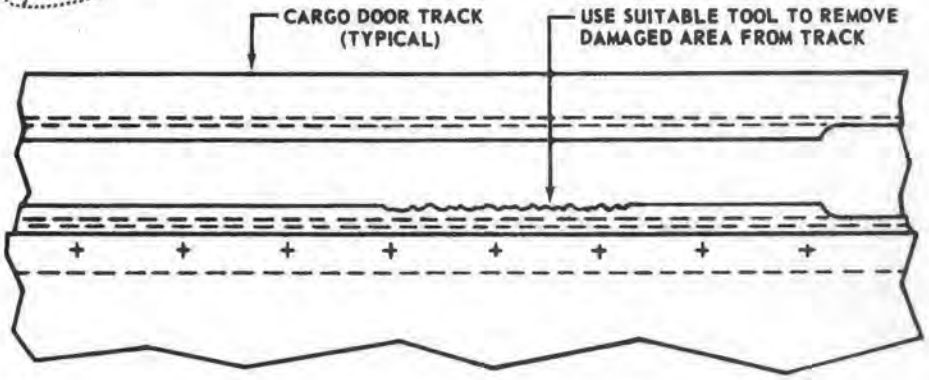
b. Pull wire bundle from channel (9) and remove three screws (11) with washers (12) attaching channel (9) to clips (8) and remove channel from center windshield post.





DIMENSION **B** WILL BE DETERMINED BY AMOUNT OF METAL REMOVED TO CLEAN UP DAMAGE OF CARGO DOOR TRACK. MAKE PATCH FROM 0.032 INCH STAINLESS STEEL.

INSERT PATCH (TYPICAL)



SECTION **A-A**
TRACK WITH PATCH INSTALLED

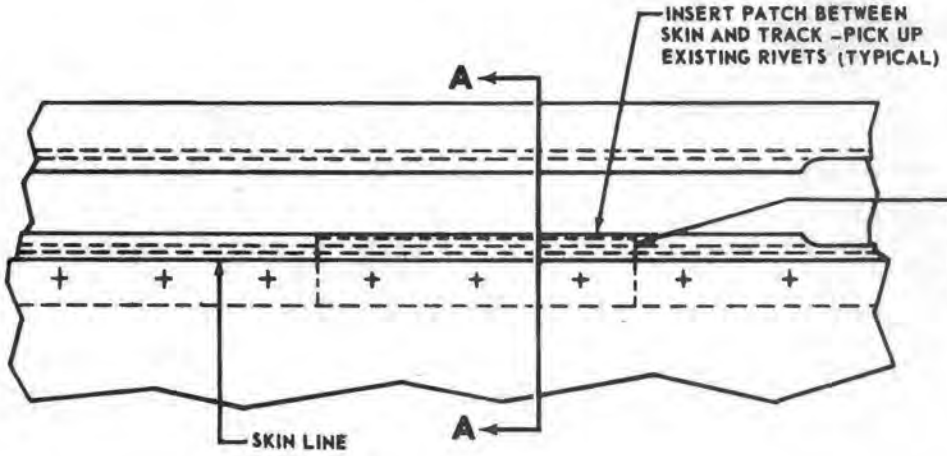


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Figure 2-39. Cargo door track — patching

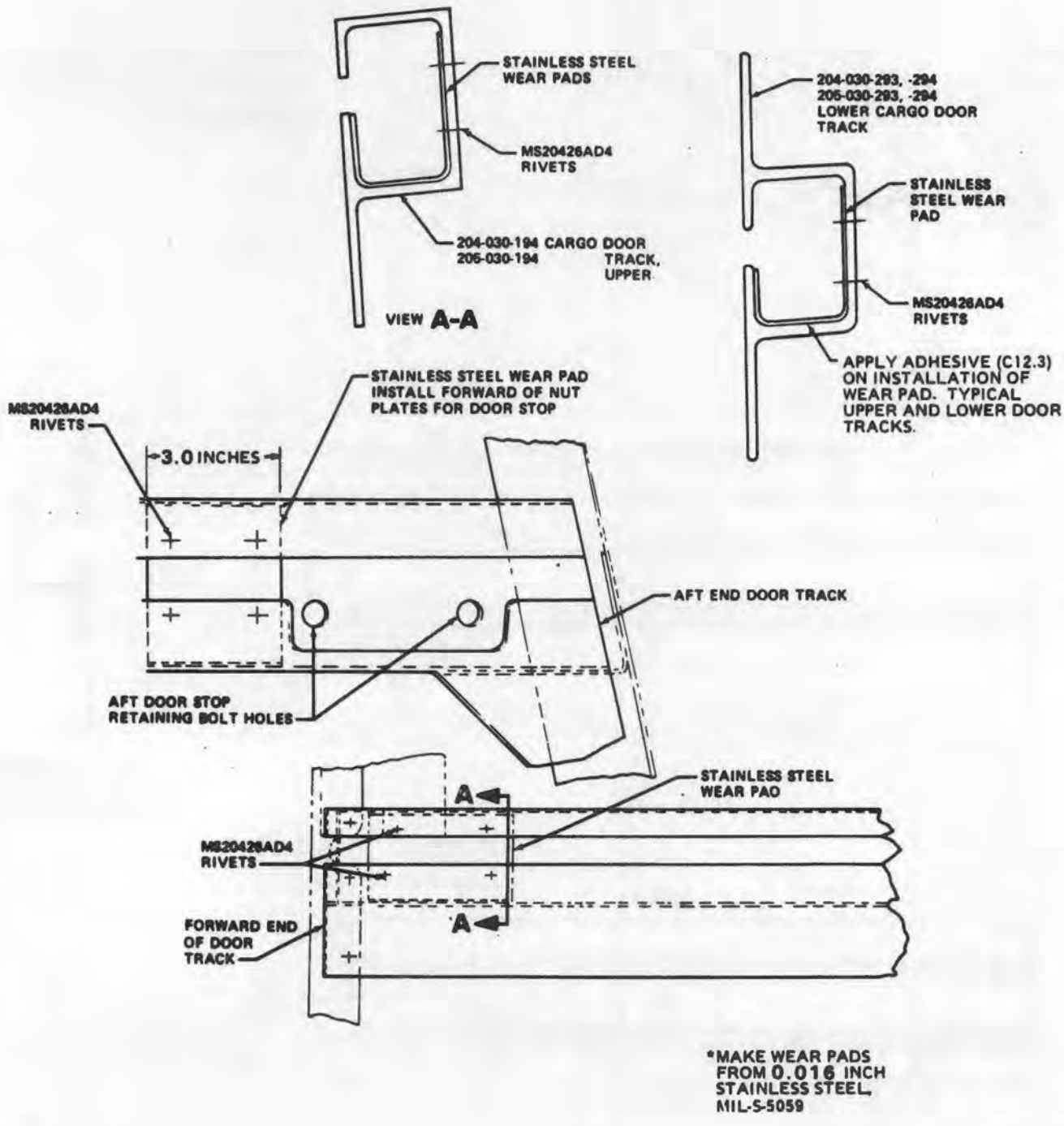


Figure 2-40. Cargo door track — installation of wear pads

c. Lift windshield wiper arm to the up position and install a suitable pin in hole of arm (refer to paragraph 12-9) to relieve spring pressure. Remove nut and washer attaching wiper arm to serrated end of shaft of wiper motor and remove arm and blade assembly.

d. Mark location of stop (4) to adjacent structure and remove stop from windshield.

e. Mark location fitting (5) on adjacent structure and remove two screws (6), washers and nuts from (instrument panel brace) fitting.

f. Remove FAT gage (7) (if removing pilot windshield).

g. Remove sealant from around cabin air drain hose, located at upper outboard corner of windshield, and pull hose from windshield.

h. If both windshields are being replaced at the same time, observe and mark location of three clips (8) to adjacent structure and remove clips.

i. Remove screws (1), washers (2), and nuts (3) from windshield.

j. Using a plastic scraper, separate and remove windshield from structure.

WARNING

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

k. Remove aged sealant from structure with a rag saturated with MEK (C142).

l. Prime outer surface of structure (by spray method) with primer (C167) or primer (C253).

2-139. Cleaning - Windshield. (Refer to TM 55-1500-204-25/1 and Chapter 1).

2-140. Repair or Replacement — Windshield. Replace if damage is greater than practical to repair. Repair damage in accordance with TM 55-1500-204-25/1.

2-141. Installation — Windshield.

CAUTION

Do not trim windshield to final size until all mounting holes have been drilled.

CAUTION

Glare shield may contact windshield when glass windshield is installed. Adjust glare shield to provide clearance.

NOTE

Bottom of windshield will not lay flat against structure.

NOTE

Changing from acrylic plastic to glass or glass to acrylic plastic windshield requires weight and balance action.

a. Position windshield to cavity of structure. Apply a mark at top and bottom edge (inboard side that overlaps adjacent windshield). Remove and trim excess from windshield to clear adjacent windshield.

b. Position windshield against structure. While maintaining equal clearance (see Sections B-B and C-C) from structure (minimum **0.125** inch clearance) and using a wooden block as a backup, back drill two **0.190 TO 0.196** inch holes approximately **12** inches apart in top center edge of windshield and install two 3/16 metal fasteners.

c. Using 1/2 inch rotary sanding drum, trim lower end of windshield **0.030 TO 0.180** inch clearance from top edge of nose skin as shown in Section D-D.

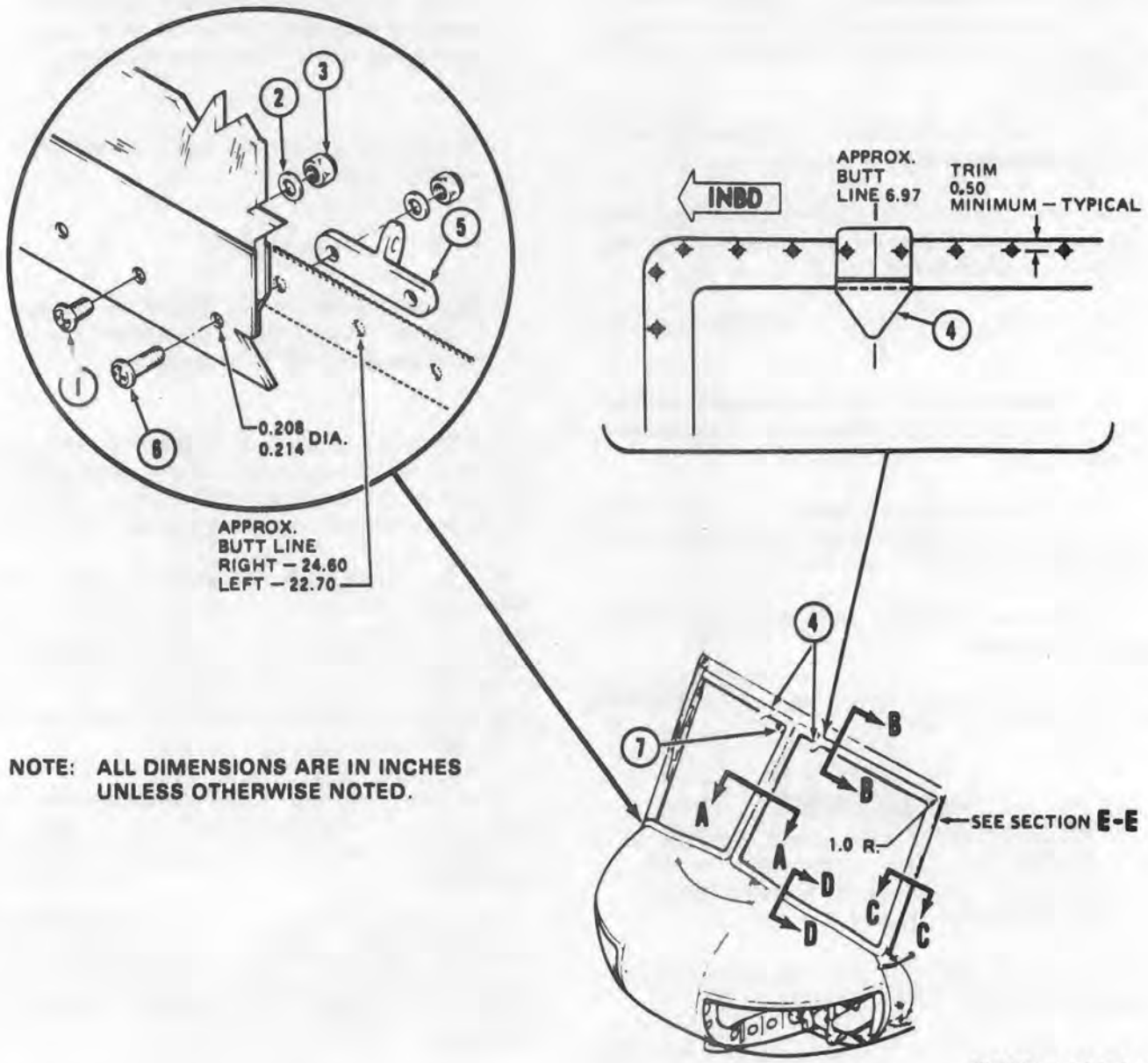
d. Starting at center (top and lower end) of windshield and working in toward inboard and outboard directions, back drill every third hole and install a 3/16 metal fastener. Back drill remainder of holes in windshield.

e. Remove metal fasteners and windshield from structure.

f. Drill holes to final size, **0.208 TO 0.214** inch. Deburr holes, both sides.

g. Apply a mark **0.50** inch from outer edge of all holes in windshield, draw a line adjoining all marks and trim windshield.

h. Radius, by trimming, lower outboard corner (approximately **2.0** inches) of windshield maintain **0.50** inch edge distance from outer edge of holes.



NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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1. Screw
2. Washer
3. Nut
4. Stop
5. Fitting
6. Screw
7. Thermometer
8. Clip
9. Channel
10. Cover
11. Screw
12. Washer
13. Screw

Figure 2-41. Windshield Installation (Sheet 1 of 2)

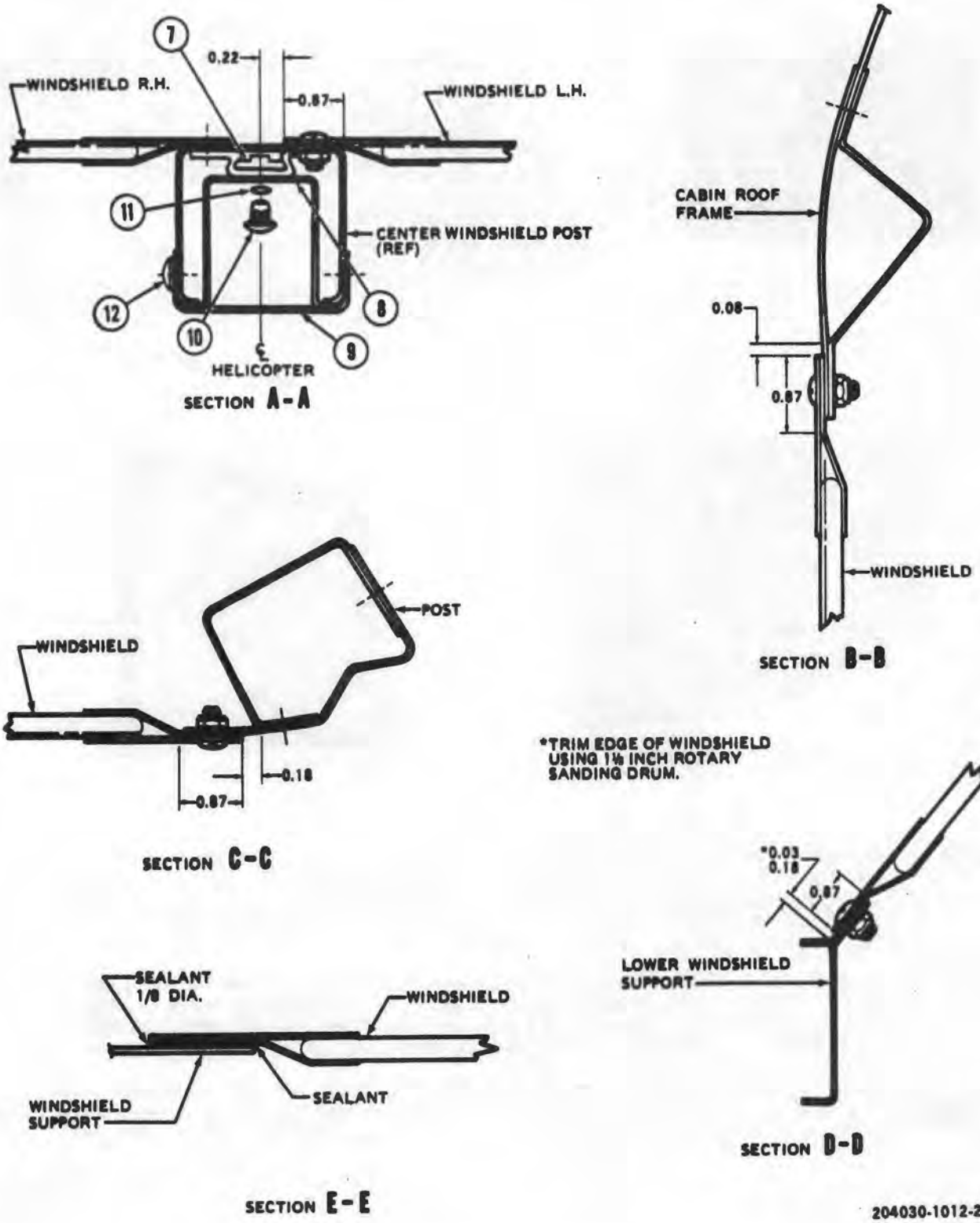
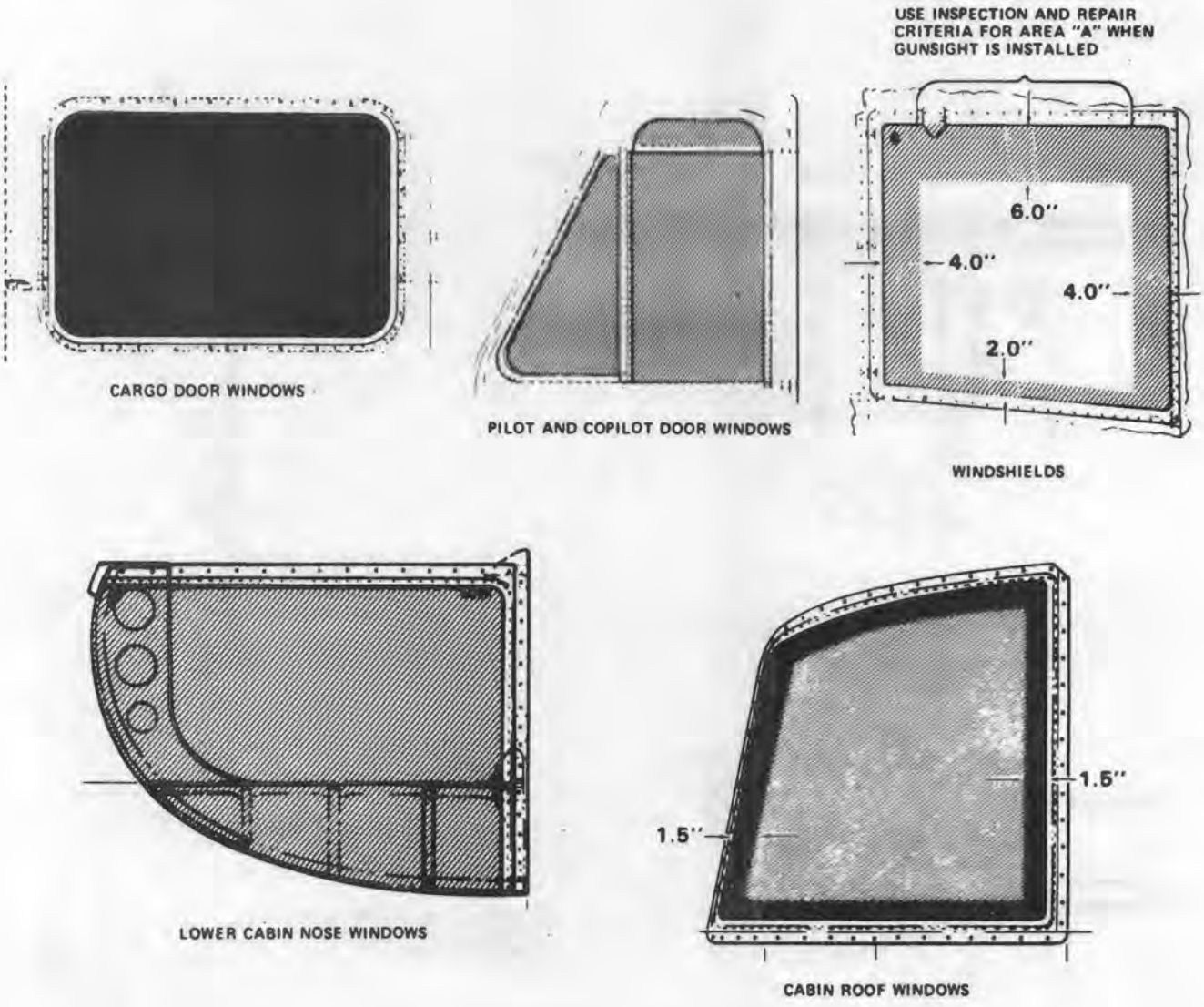


Figure 2-41. Windshield installation (Sheet 2 of 2)



AREA "A": Scratches and pits may be polished out to the extent that vision is not distorted. Distortion of vision is cause for replacement. Cracks, holes or other damage may be temporarily repaired, if vision of crew members will not be impaired, by stop drilling, patching or other approved methods (refer to TM 55-1500-204-25/1), but window must be replaced at the earliest opportunity.

AREA "B": Scratches and pits are permitted in this area provided they are not so numerous or form such a pattern as to be objectionable to the viewer. Cracks, holes or other damage may be temporarily repaired by stop drilling, patching or other approved methods (refer to TM 55-1500-204-25/1), but window must be replaced at the earliest opportunity.

AREA "C": Scratches and pits are permitted in this area, providing the structural integrity of the window is not impaired. Cracks, holes or other damage may be repaired by stop drilling, patching or other approved methods provided structural integrity is not impaired (refer to TM 55-1500-204-25/1).

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Figure 2-42. Windshields and windows critical areas and repair limits.

i. Trim two inboard corners of windshield to approximately **1.50** inch radius. Radius upper outboard corner as required to maintain minimum **0.50** inch hole edge distance.

j. Using a hand file, around all windshield edges approximately **0.015** inch radius.

k. Wipe file dust from windshield. Apply a **0.125** inch bead of watertight sealing compound (C63) on mating surface along inboard and outboard side of holes of windshield and structure.

l. Install two 3/16 metal fasteners in top of windshield, approximately **24.0** inches apart. Position windshield to structure and secure with metal fasteners. Install metal fastener in every other hole.

NOTE

Observe locations of stop (4, figure 2-41) and fitting (5). If clips (8) have been removed, do not install screws in holes at three locations at this time.

m. Install screws (1), washers (2), and nuts (3) in all open holes in windshield with the exception of mounting points for stop (4) and fitting (5). Remove fasteners and install hardware in remainder of holes.

n. Install stop (4).

o. Position fitting (5) at approximately Buttock Line 24.60 and install two screws (6), washers and nuts.

p. If three clips (8) section A-A have been removed, install clips with screws (1), washer (2), and nuts (3) in same locations from which they are marked, then removed.

q. Position channel (9) section A-A to clips (8) and install three screws (11), and three washers (12).

r. Install wire bundle (hanging from overhead console) into channel (9). Position cover (10), while engaging slots over screws (13) and washers, and tighten screws.

s. Back drill hole, located at upper outboard corner and inside of cabin, through windshield for cabin air (water drain) hose. Deburr hole.

t. Install cabin air (water drain) hose to penetrate through window approximately **0.50** inch. Apply sealant (C188) around hose, fair and smooth sealant.

WARNING

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

u. Clean excess sealant from around inboard edge of structure and outer edge of windshield using naphtha (C143).

v. If right windshield (pilots side) is being replaced, install free air temperature gage (7). Apply sealant (C188) around nut and washer (outside of cabin), fair and smooth sealant.

w. Mask and paint fiberglass area of windshield, refer to TB 746-93-2.

x. Remove protective film from inner and outer surface of windshield. Clean and polish inner and outer surface of windshield. (Refer to TM 55-1500-204-25/1.)

y. Install windshield arm and blade assembly (paragraph 12-18) to shaft of wiper motor at same position from which it was removed. Install bolt, washer and nut. Remove pin from arm.

2-142. UPPER DOOR WINDOW — CREW DOOR.

2-143. Description — Upper Door Window. A small, fixed, transparent acrylic plastic window (7, figure 2-43, detail B) is located at top of both pilot and copilot crew door. The window is secured to crew door with screws, washers, and nuts.

2-144. Removal — Upper Door Window. a. Remove nuts (5, figure 2-43, detail B), washers (6) from window (7).

b. Separate window (7) from sealing compound and remove window from door (3).

c. Remove old sealant from mounting flange of door (3) with flat bladed non-metallic tool.

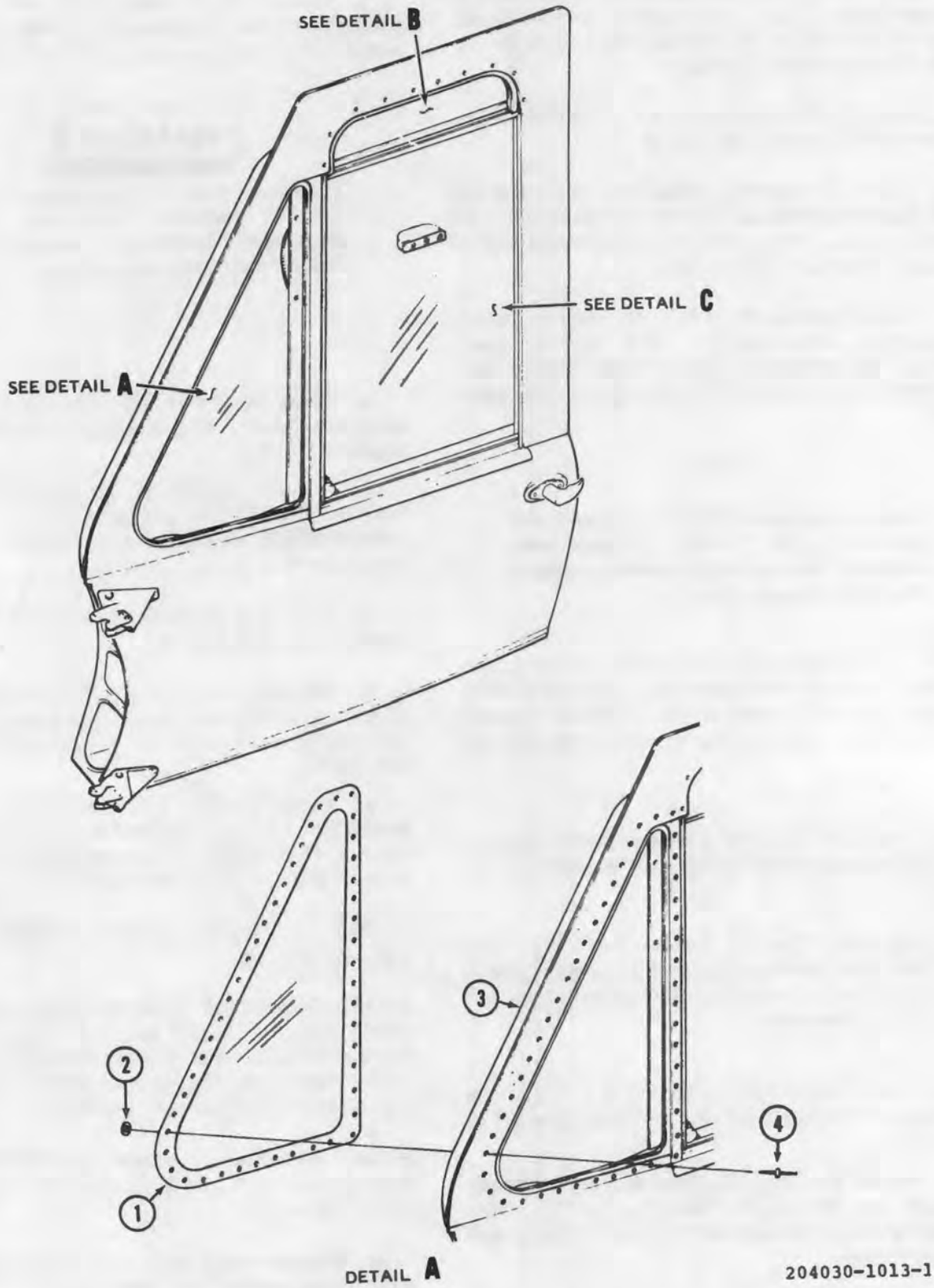
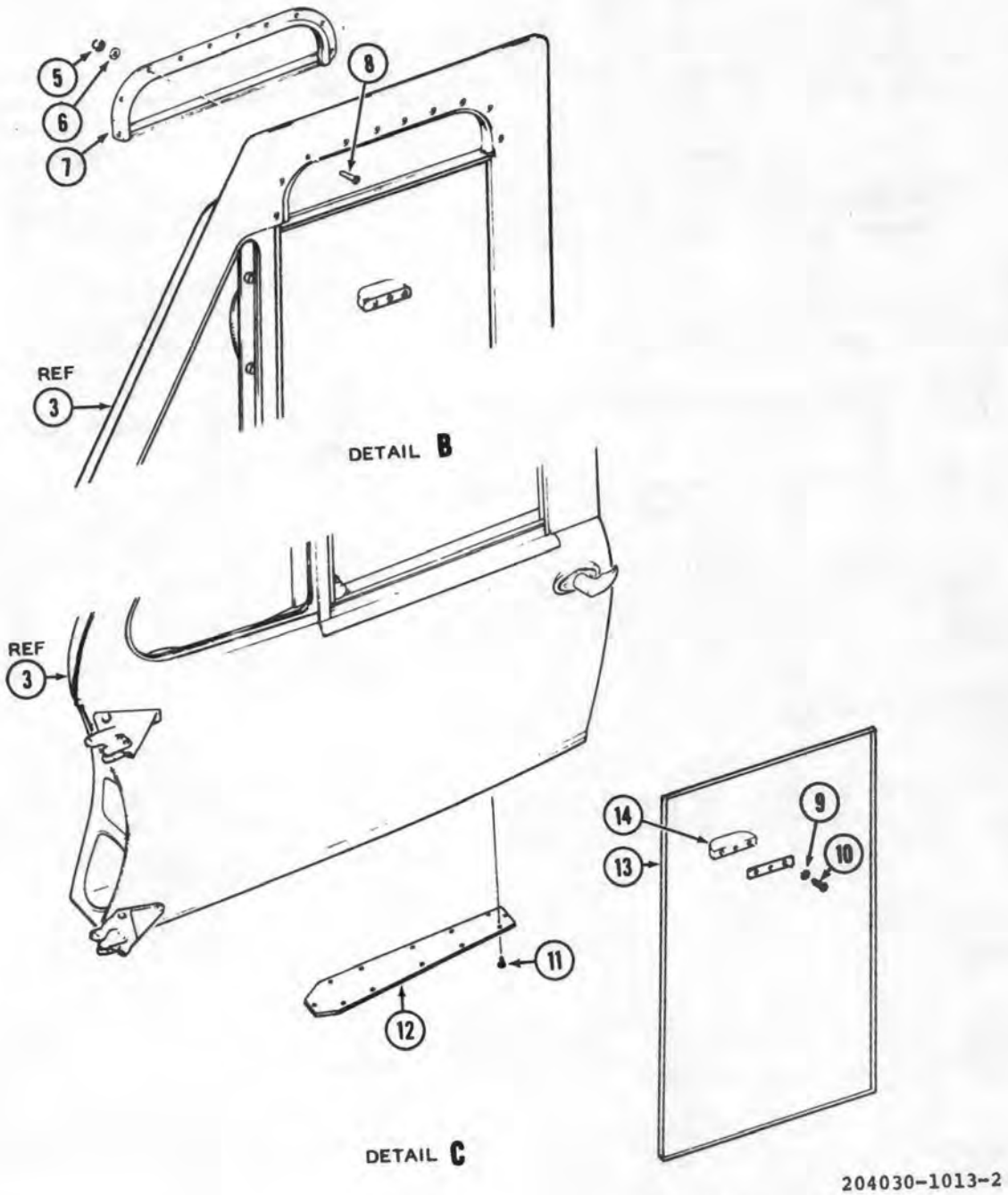


Figure 2-43. Crew door windows — remove/install (Sheet 1 of 2)



1. Window
2. Rivet washer
3. Door
4. Rivet
5. Nut
6. Washer
7. Window
8. Screw
9. Washer
10. Screw
11. Screw
12. Door
13. Window
14. Handle

Figure 2-43. Crew door windows — remove/install (Sheet 2 of 2)

WARNING

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

CAUTION

When cleaning mounting flange and window, use only aliphatic naphtha, type 2.

d. Wipe and clean mounting flange and edge of window (7) with naphtha (C143).

2-145. Cleaning — Upper Door Window. (Refer to TM 55-1500-204-25/1.)

2-146. Inspection — Upper Door Window. Inspect in accordance with figure 2-42.

2-147. Repair or Replacement — Upper Door Window. Replace window if damage is greater than practical to repair. Repair window damage in accordance with TM 55-1500-204-25/1.

2-148. Installation — Upper Door Window.

NOTE

Do not trim replacement window to final size until all mounting holes have been drilled.

a. Position replacement window (7, figure 2-43) over opening. Trim surplus edge to permit window to mate against mounting flange.

b. Position window against mounting flange. Using a No. 23 drill, back drill two **0.146 TO 0.156** inch holes on each edge of window.

c. Secure window to mounting flange with four metal fasteners or screws, washers, and nuts. Lightly tighten nuts. Drill remainder of holes.

d. Remove window. Mark a line **0.50** inch from outer edge of holes and trim window.

e. Using a suitable file, radius edge of window. Deburr rivet holes on both sides of window.

f. Remove all dust and foreign matter from mating area of window and mounting flange of door.

g. Apply a **0.125** inch bead of sealing compound (C63) along each side of holes of mating surface of window and mounting flange of door.

h. Position windows (1) to mating flange and install screws (8), washers (6), and nuts (5).

CAUTION

When cleaning window, use only aliphatic naphtha, type 2 (C143).

i. Remove exceed sealing compound from around window using naphtha (C143). Remove protective film from window. Clean and polish window. (Refer to TM 55-1500-204-25/1.)

2-149. FORWARD DOOR WINDOW — CREW DOOR.

2-150. Description — Forward Door Window. A triangle shape transparent acrylic plastic window (1, figure 2-43, detail A) is located at the forward side of pilots and copilots crew door. The window is secured to crew door with rivets and rivet washers.

2-151. Removal — Forward Door Window. a. Using a No. 41 drill, drill rivet shanks from rivets.

NOTE

If steel (blind) rivets with a locking collar is installed, use No. 27 (0.144) drill. If aluminum (blind) rivets are installed, use No. 30 (0.128) drill.

b. Drill rivets (4) and rivet washers (2) from windows (1).

c. Using a spatula or putty knife, separate window (1) from selaing compound and remove window from door (3).

d. Remove old sealant from mounting flange of door (3) with flat bladed non-metallic tool.

2-152. Cleaning — Forward Door Window. (Refer to TM 55-1500-204-25/1.)

2-153. Inspection — Forward Door Window. Inspect in accordance with figure 2-42.

2-154. Repair or Replacement — Forward Door Window. Replace window if damage is greater than practical to repair. Repair window damage in accordance with TM 55-1500-204-25/1.

2-155. Installation — Forward Door Window.

NOTE

Do not trim window replacement window to final size until all mounting holes have been drilled.

a. Position replacement window (1, figure 2-43, detail B) over opening. Trim surplus edge to permit window to mate against mounting flange.

NOTE

If steel (blind) rivets with a locking collar was removed, use No. 27 (0.144) drill. If aluminum (blind) rivets were removed, use No. 30 (0.128) drill. Radius of window must not foul mounting flange. Check for equal clearance.

b. Position window (1) against mounting flange. Back drill four holes and secure window to door with 5/32 metal fasteners or screws, washers, and nuts and lightly tighten nuts. Drill remainder of holes.

c. Remove window. Mark a line approximately 0.50 inch from outer edge of holes to clear radius of mounting flange of door. Trim window.

d. Using a suitable file, radius edge of window. Deburr rivet holes on both sides of window.

e. Remove all dust and foreign matter from mating area of window and mounting flange of door.

f. Apply a 0.125 inch bead of sealing compound (C188) along each side of holes of mating surfaces of window and mounting flange of door.

g. Position window (1) to door (3) and install a 5/32 metal fastener in every other hole.

h. Install steel (blind) rivet (4) with washer (2) on inboard side of window. While holding washer against window with a piece of 3/16 tubing or suitable tool, secure rivet. Remove metal fasteners and install remainder of rivets.

WARNING

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

CAUTION

When cleaning window, use only aliphatic naphtha, type 2.

i. Remove excess sealing compound from around window using naphtha (C143). Remove protective film from window. Clean and polish window. (Refer to TM 55-1500-204-25/1.)

2-156. ADJUSTABLE WINDOW — CREW DOOR.

2-157. Description — Adjustable Window. The lower large transparent plastic window in the crew door is the adjustable window.

2-158. Removal — Adjustable Window. a. Remove screws (11, figure 2-43, detail C) and remove door (12).

b. Remove screws (10), washers (9), and handle (14).

c. Guide window downward through slot in bottom of door and remove window.

2-159. Cleaning — Adjustable Window. Clean window in accordance with TM 55-1500-204-25/1.

2-160. Inspection — Adjustable Window. Inspect in accordance with figure 2-42.

2-161. Repair or Replacement — Adjustable Window. Replace window if damage is sufficient to impair vision or greater than practical to repair. Repair window damage in accordance with TM 55-1500-204-25/1.

2-162. Installation — Adjustable Window. a. Guide window (13, figure 2-43, detail C) upward through slot in bottom of door and into window channels.

NOTE

Check progress through opening in aft edge of door.

b. Place window in partially closed position and install handle (14) with washers (9) and screws (10).

c. Install door (12) with screws (11).

2-163. CABIN ROOF WINDOWS.

2-164. Description — Cabin Roof Windows. Two transparent plastic windows are installed above the pilot and copilot in the cabin roof.

2-165. Removal — Cabin Roof Windows. a. Remove nuts, washers, and screws attaching window to cabin roof.

b. Separate window from sealant and remove window.

WARNING

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

c. Remove aged sealant from structure using a rag moistened with MEK (142).

2-166. Cleaning — Cabin Roof Windows. Clean in accordance with TM 55-1500-204-25/1.

2-167. Inspection — Cabin Roof Windows. Inspect in accordance with figure 2-42.

2-168. Repair or Replacement — Cabin Roof Windows. Replace window if damage is sufficient to impair vision, or greater than practical to repair. Repair window damage in accordance with TM 55-1500-204-25/1.

2-169. Installation — Cabin Roof Windows. a. Trim, fit, and drill window in accordance with instructions and dimensions in paragraph 2-148.

b. Apply a 0.125 inch of bead of sealing compound (C188) to mating flanges of windows and structure.

c. Position window to structure and install screws, washers, and nuts.

WARNING

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

CAUTION

When cleaning window, use only aliphatic naphtha, type 2.

d. Remove excess sealing compound using naphtha (C143).

e. Remove protective film from window. Clean window in accordance with TM 55-1500-204-25/1.

2-170. LOWER FORWARD CABIN WINDOWS.

2-171. Description — Lower Forward Cabin Windows. Two transparent plastic windows are located forward and below each set of the tail rotor control pedals.

2-172. Removal — Lower Forward Cabin Windows. a. Remove rear view mirror if removing right window (paragraph 2-179).

b. Remove nuts, washers, and screws attaching window to cabin structure.

WARNING

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

c. Remove aged sealant from structure using a rag moistened with MEK (C142).

2-173. Cleaning — Lower Forward Cabin Windows. Clean in accordance with TM 55-1500-204-25/1.

2-174. Inspection — Lower Forward Cabin Windows. Inspect in accordance with figure 2-42.

2-175. Repair or Replacement — Lower Forward Cabin Windows. Replace window if damage is sufficient to impair vision, or greater than practical to repair. Repair window damage in accordance with TM 55-1500-204-25/1.

2-176. Installation — Lower Forward Cabin Window. a. Trim, fit, and drill window in accordance with instructions and dimensions in pargraph 2-148.

b. Apply a 0.125 inch bead of sealing compound C188) to mating flanges of window and structure.

c. Position window to structure and install screws, washers, and nuts.

WARNING

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

CAUTION

When cleaning windows, use only aliphatic naphtha, type 2. (C143).

d. Remove excess sealing compound using naphtha (C143).

e. Remove protective film from window. Clean window in accordance with TM 55-1500-204-25/1.

f. If removed, install and adjust rearview mirror (paragraph 2-180 and 2-181).

2-177. REARVIEW MIRROR.

2-178. Description — Rearview Mirror. The helicopter is equipped with an adjustable rearview mirror located outside the forward cabin below the pilot lower window. This mirror, when properly adjusted, enables the pilot to visually check the operation of the external cargo suspension hook. When the helicopter is employed on missions which do not required use of the external cargo suspension, the rearview mirror may be covered or removed and stowed.

2-179. Removal — Rearview Mirror. a. Remove bolts, washers, nuts, and/or quick-release pins, which attach braces and supports to structure. Remove mirror assembly from helicopter.

b. To remove mirror from brace assembly, remove mirror cover, spring pins from adjustment handles.

2-180. Installation — Rearview Mirror. a. Install braces and supports to structure, using previously removed bolts, washers, nuts, and/or quick-release pins.

b. Position rearview mirror and align mounting holes.

c. Screw adjustment handles through mounting holes. Adjust mirror to desired angle, tighten adjustment handles. Insert spring pins in threaded ends of handles.

d. Slide protective cover over mirror and fasten holding snap.

2-181. Adjustment — Rearview Mirror. a. Remove spring pin and loosen adjustment handles.

b. Manually adjust mirror to desired angle.

c. Tighten adjustment handles. Insert spring pins.

2-182. SOUNDPROOFING BLANKETS.

2-183. Description: Soundproofing Blankets. Cabin interior is covered with blankets of soundproofing material to reduce noise level for crew and passengers during operation and also provides protection to main beam panels. Blankets are attached to structure by hook-and-pile and snap-type fasteners, and can be detached for maintenance access but should be securely installed for flight.

CAUTION

To preclude damage to aircraft bulkheads during flights, all sound absorbing blankets must be securely installed with the bulkhead tie-down fittings, straps, and rings extending outside of the sound absorbing blankets.

2-184. Removal — Soundproofing Blankets. Release snap fasteners and hook-and-pile attachments holding blankets to structure. Remove blankets.

2-185. Inspection — Soundproofing Blankets. Visually inspect blankets for cuts and tears. Inspect for missing and damaged buttons and sockets.

2-186. Repair or Replacement — Soundproofing Blankets. a. Repair cuts or tears.

(1) Cut a patch from cloth (C50) large enough to overlap all sides of the tear or cut.

(2) Apply a thin, even coating of adhesive (C15) to back of patch. Allow to dry until tacky.

(3) Center patch over tear or cut with adhesive side against blanket.

(4) Apply film, even pressure to patch in such a manner that it will adhere securely to blanket without wrinkles or irregularities.

b. Replace missing or damaged buttons and sockets.

(1) Cut a patch from cloth (C50) large enough to overlap all sides of the damaged area around button or socket.

(2) Center patch over damaged area and sew securely in place with thread (C228).

(3) Install new button or socket, using press and dies.

2-187. Installation — Soundproofing Blankets. Position blankets in helicoper and attach to structure with snap fasteners and hook-and-pile attachments.

2-188. BLACKOUT CURTAINS.

2-189. Description — Blackout Curtains. A blackout curtain may be installed behind pilot and copilot seats, between forward and aft cabin sections. Other blackout curtains may be installed over both cargo door windows and window in removal door post.

2-190. Removal — Blackout Curtains. Release fasteners and screws attaching curtains to structure. Remove curtains.

2-191. Inspection Blackout Curtains. Inspect curtain for cuts, tears, missing attachment buttons, and sockets. Inspect slide fasteners for operation and damage.

2-192. Repair or Replacement — Blackout Curtains. a. Repair cuts and tears in blackout curtains.

(1) Cut a patch of twill (C235) large enough to overlap all sides of the cut or tear.

(2) Center patch over cut or tear. Sew in place with thread (C229).

NOTE

All sewing shall be in accordance with Federal Specification DDD-S-751.

b. Replace damaged or missing buttons and sockets.

(1) Replace damaged or missing buttons and sockets.

(2) Repair area surrounding damaged or missing buttons and sockets.

(3) Install new button or socket, using suitable tool.

c. Repair damaged slide fasteners.

(1) Rip out stitching attaching slide fastener to curtain material. Remove damaged slide fastener.

NOTE

Visually inspect flap of blackout material attached to curtain back of slide fastener.

(2) Repair area to which new slide fastener and flap will be attached.

(3) Position new slide fastener and flap and sew in place with thread (C229).

2-193. Installation — Blackout Curtains. Position curtains. Attach with screws and fasteners.

2-194. PARATROOP STATIC LINE CABLE.

2-195. Description — Paratroop Static Line Cable. A paratroop static line cable may be installed on the center of the aft cabin bulkhead. This installation consists of a cable (6, figure 2-44), a compression tube (1), attach plates (3), fitting (4), and attaching hardware.

2-196. Removal — Paratroop Static Line Cable. a. Remove nuts, washers, and bolts securing attach plates (3, figure 2-44) to fittings (4).

b. Remove bolts and washers securing fittings (4) to canted bulkhead. Remove cable installation from bulkhead.

c. Remove cotter pins, washers, and pins (5) from fittings (4). Remove cable (6) from cable installation.

d. Remove nuts (2) and washers from compression tube (1). Remove compression tube (1) from fittings (4).

2-197. Inspection — Paratroop Static Line Cable. Inspect cable for wear, broken or frayed wires, and security of installation.

2-198. Repair or Replacement — Paratroop Static Line Cable. a. Replace cables that are worn.

b. Replace cables that have broken or frayed wires.

2-199. Installation — Paratroop Static Line Cable. a. Install nut (2, figure 2-44), lockwasher, and flat washer on compression tube (1). Position fittings (4) on compression tube. Align holes in tube (1), fittings (4), and cable (6) attach points; and insert pins (5). Secure with washers and cotter pins.

b. Install flat washer, lockwasher, and nut (2) on end of compression tube (1).

c. Position compression tube (1) and fittings (4) to canted bulkhead. Install attaching washers and bolts. Tighten both nuts (2) on compression tube against fitting.

d. Position attach plates (3) to fittings (4) and install bolts, washers, and nuts.

2-200. JACK AND MOORING FITTINGS.

2-201. Description — Jack and Mooring Fittings. The two jack pads are located just forward of front crosstube at each side and two jack pads are located aft of the aft crosstube. The jack fittings also provide a mounting point for mooring the helicopter. Figure 2-45.)

2-202. Removal — Jack and Mooring Fittings. Remove bolts (2 and 3, figure 2-45) to remove forward fittings (1). Remove quick release pins (6) to remove fittings (4 and 5).

2-203. Inspection — Jack and Mooring Fittings. Inspect jack fitting for wear, cracks, or elongated mounting holes.

2-204. Repair or Replacement — Jack Mooring Fittings. Replace jack fitting if worn, cracked, or mounting holes are elongated.

2-205. Installation — Jack and Mooring Fittings. a. Position jack fittings (1, figure 2-45) on fuselage, align bolt holes and install bolts (2 and 3). Torque bolts **50 TO 70** inch-pounds.

b. Install fittings (4 and 5). Insert fitting and install quick release pin (6).

2-206. MAP AND DATA CASE.

2-207. Description — Map and and Data Case. A case with a hinged, lock-down cover is installed on aft end of lower pedestal between crew seats.

2-208. Inspection — Map and Data Case. Inspect hinges, screws, and mounting brackets for security.

2-209. Removal — Map and Data Case. Remove four screws attaching case to mounting brackets.

2-210. Repair or Replacement — Map and Data Case. Replace hinges or case if broken.

2-211. Installation — Map and Data Case. Position case on brackets and install four screws.

2-212. STANDARD CREW SEAT.

2-213. Description — Standard Crew Seat. Seats are adjustable, nonreclining type, mounted on tracks fixed to the cabin floor. Height adjustment lever is on the right side of the seat. Fore and aft adjustment lever is on the left of the seat. Each seat is equipped with a lap type safety belt and an inertia reel shoulder harness. (figure 2-46).

2-214. Removal — Standard Crew Seat (figure 2-46). **a.** Remove the stops (3 or 4) at the aft end of the seat tracks.

b. Remove shoulder harness inertia reel support.

c. Lift the fore and aft seat adjustment handle and slide the seat aft until it is clear of tracks.

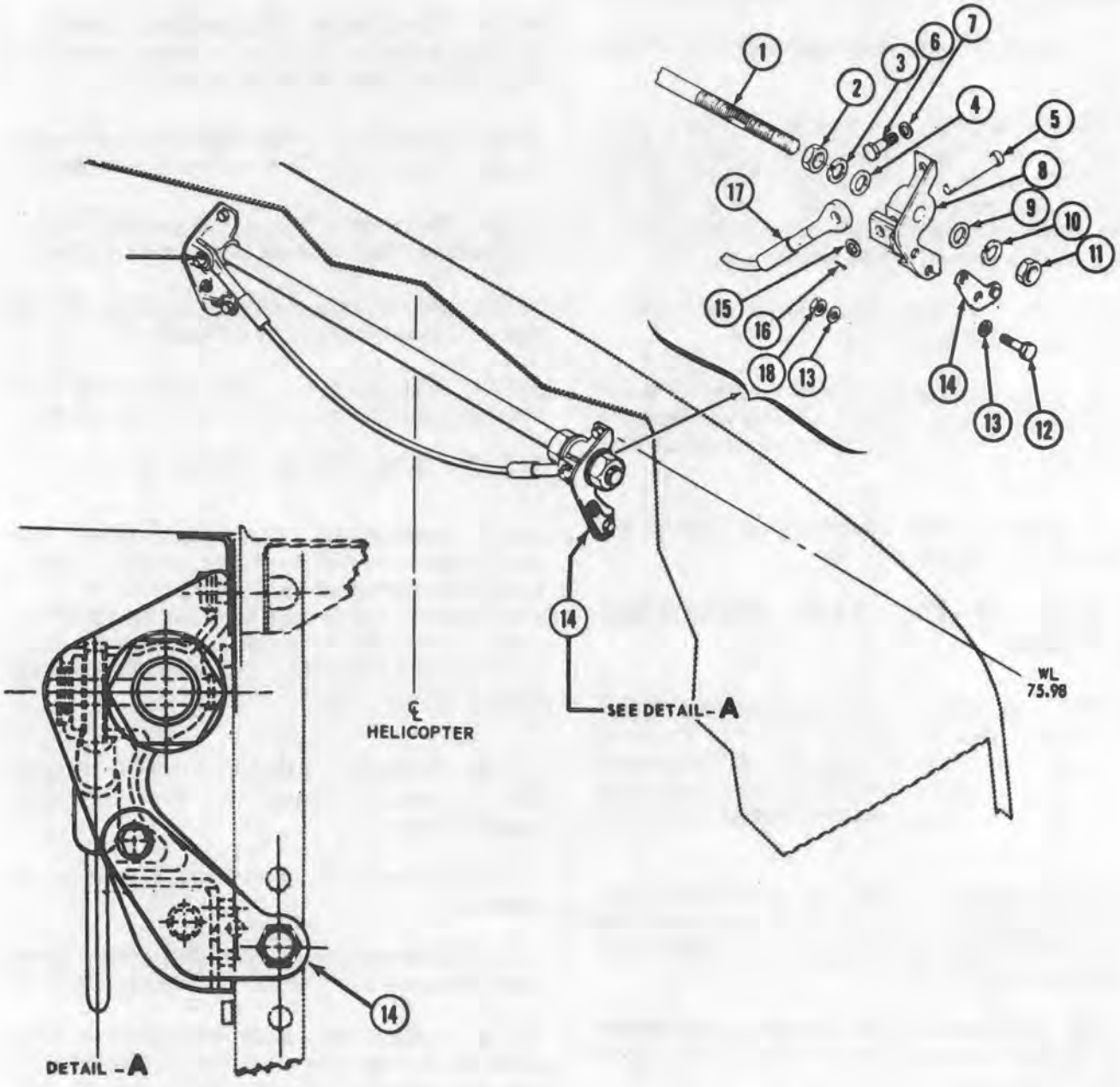
2-215. Inspection — Standard Crew Seat (figure 2-46). **a.** Forward and aft (6) seat attachment fittings may be inspected by fluorescent penetrant method (TM 43-0103).

b. Visually inspect vertical adjustment handle assembly for distortion and wear.

c. Visually inspect handle (9) for damage.

d. Check carriage assembly (7) for damage and operation.

e. Fittings (5) may be inspected by fluorescent penetrant method (TM 43-0103).



1. Compression tube
2. Nut
3. Lockwasher
4. Washer
5. Pin
6. Bolt
7. Washer
8. Fitting
9. Washer
10. Lockwasher
11. Nut
12. Bolt
13. Washer
14. Attach plate
15. Washer
16. Cotter pin
17. Cable
18. Nut

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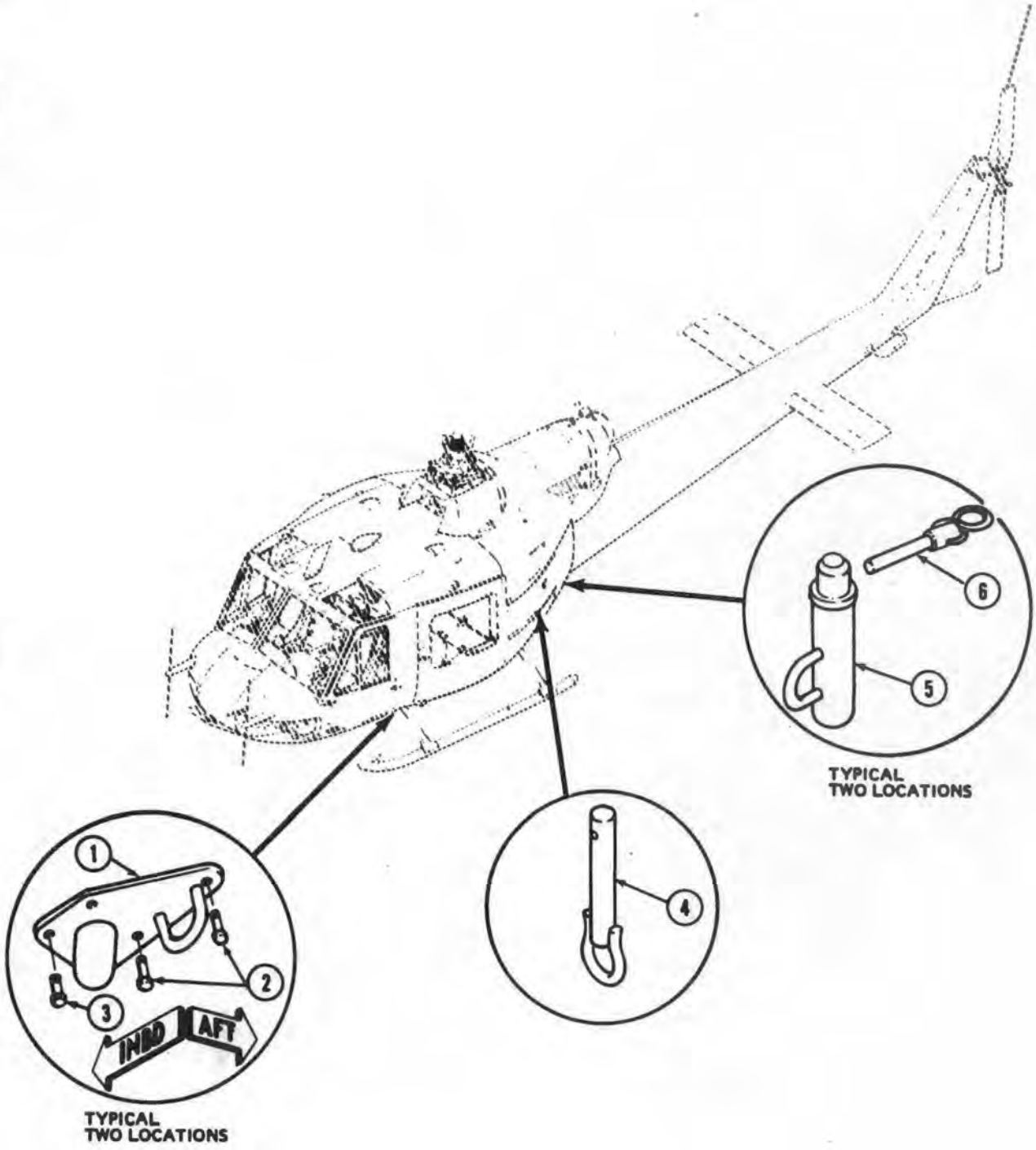
Figure 2-44. Paratroop static line cable



1. Jacking and mooring fitting
2. Bolt
3. Bolt
4. Mooring fitting
5. Jacking and mooring fitting
6. Quick release pin

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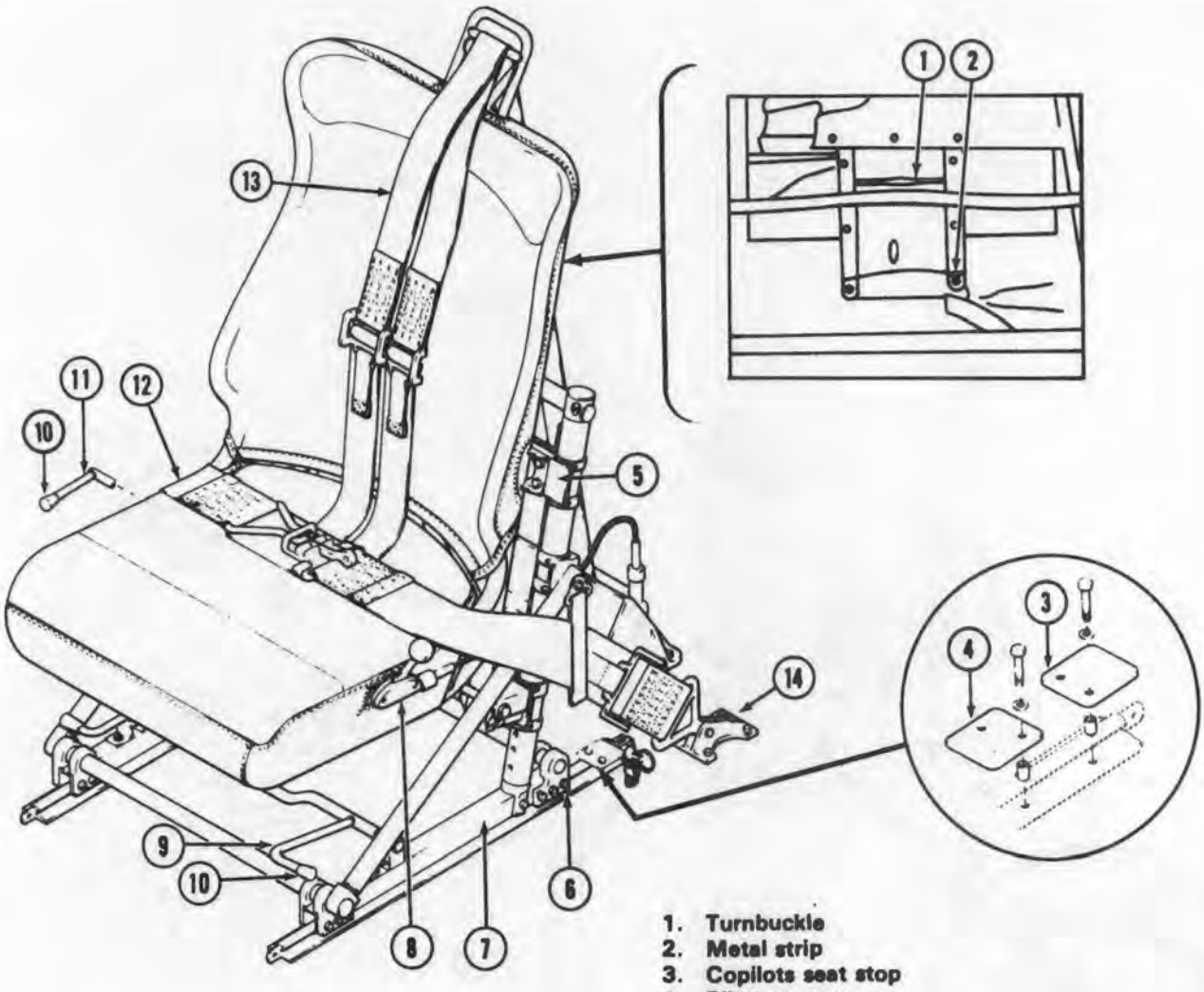
Figure 2-45. Jack and mooring fitting installation



1. Turnbuckle
2. Metal strip
3. Copilots seat stop
4. Pilots seat stop
5. Fitting
6. Aft seat attachment fitting
7. Carriage assembly
8. Manual control handle, inertia reel
9. Fore and aft adjustment handle
10. Tip
11. Vertical adjustment handle
12. Seat belt
13. Shoulder harness
14. Fitting

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Figure 2-46. Crew Seat

f. Inspect seat bottom and seat back cover assemblies for damage and serviceability. (Paragraph 2-221).

g. Inspect tubes for cracks, distortion, and serviceability.

NOTE

If necessary, clean seats in accordance with procedures contained in TM 55-1500-204-25/1.

2-216. Repair or Replacement — Standard Crew Seat. (figure 2-46). a. Replace seat attachment fittings if unserviceable.

b. Replace handle (9) if unserviceable.

c. Replace entire unit of carriage assembly (7) if damaged or operation is not satisfactory.

d. Replace fittings (5) that fail to meet inspection requirements.

e. Replace vertical adjustment handle assembly (11) if worn or damaged.

f. Replace seat bottom or seat back if damaged or unserviceable.

2-217. Installation - Standard Crew Seat (figure 2-46). a. Lubricate pilots and copilots seat rollers with lubricant (C115.1) as required.

b. Position seat rollers on aft end of tracks. Lift handle on left side of seat and slide seat forward on tracks.

c. Install stops (3 or 4) on aft end of tracks. Note that stops for pilots seat are positioned further forward than the copilots seat stops.

d. Install inertia reel support and seat belts.

e. Functionally check all seat controls.

2-218. CREW SEAT COVERS.

2-219. Description - Crew Seat Covers. Crew seat metal frames are covered with nylon mesh material. Metal eyes are provided in seat back cover for lacing with nylon cord (C67.1). Metal strips are attached to tabs of lower seat cover with eyelets for attachment of turnbuckles.

2-220. Removal — Crew Seat Covers.

NOTE

Seat covers made of nylon cloth, Raschel knit, shall have a service life of 24 months. Seat covers that are not marked with installation date shall be assumed to have the same date as the day of the acceptance of the helicopter. Repalcement seat covers shall be stenciled "INSTALLED" (day-month-year)" with contrasting stencil ink conforming to MIL-L-6903. The stenciled date is to be located as shown in figure 2-47.

a. Remove seat back cover as follows:

(1) Lift flap on aft side of seat back cover for access to nylon cord.

(2) Untie nylon cord and loosen it as necessary to remove cover.

b. Remove lower seat cover as follows:

(1) Cut lockwires and loosen turnbuckles underneath seat.

Figure 2-47. Crew seat cover stencil

(2) Disconnect turnbuckles for metal reinforcing strips in seat cover tap.

2-221. Inspection — Crew Seat Covers. a. Deterioration or discoloration which indicates as strength decrease to the point where it affects the integrity of the seat(s) is not allowed.

b. In the raschel knit cloth tears, cuts or holes greater than 1.0 inch in length or diameter are not allowed. Tears, cuts, or holes less than 1.0 inch in length or diameter may be repaired by a darning procedure which picks up at least 0.25 inch of good material adjacent to or surrounding the cut, tears, or hole. While mending, the thread tension should be maintained so as to produce a mend which disturbs as little as possible the natural lines of the seat netting adjacent to the mends. Nylon thread (16 pounds test) (C229) or equivalent to be used for repairs. Repair should be used as a temporary measure until new netting can be installed.

c. In the sine-mesh duct cloth on the side of seat covers, tears, cuts, and holes smaller than 0.037 inch in length of diameter are permissible without repair. Tears, cuts, and holes between 0.375 inch and 1.0 inch should be repaired as explained above for raschel knit cloth, and the cover need not be replaced. Tears, cuts, and holes greater than 1.0 inch are not allowed; the seat cover must be replaced.

NOTE

If necessary, clean seats in accordance with procedures contained in TM 55-1500-204-25/1.

2-222. Installation — Crew Seat Covers.

NOTE

Tool T72.1 may be used to install seat covers.

a. Install seat back covers as follows:

(1) Position cover on seat back.

(2) Use nylon cord laced through reinforcing eyes to tighten cover to desired tension.

b. Install lower seat cover as follows:

(1) Position cover on lower seat.

(2) Connect turnbuckles to metal reinforcing strips in seat cover tap.

(3) Adjust seat cover to desired tension by tightening burnbuckle. Lockwire (C127) turnbuckles together for security.

2-223. Adjustment — Crew Seat Covers. If turnbuckle has reached its extreme position and further tightening is desired, the seat cover may be tightened further as follows:

a. Cut lockwire securing turnbuckle.

b. Loosen and disconnect turnbuckles from metal reinforcing strip in seat cover tab.

c. Turn metal reinforcing strip one-half turn.

NOTE

Roll tab material evenly.

d. Connect turnbuckles to metal reinforcing strips through slots provided in material.

e. Adjust seat covers to desired tension by tightening turnbuckles.

f. Lockwire (C127) turnbuckles together for security.

2-224. SEAT BELTS AND SHOULDER HARNESS.

2-225. Description — Seat Belts and Shoulder Harness. Lap type seat belts and shoulder harness are provided on each crew seat. The seat belts are attached to floor mounted fittings and the shoulder harness is attached to the inertia reel strap. The manual control handle for the shoulder harness is located on left side of each seat (figure 2-46).

2-226. Inspection — Seat Belts and Shoulder Harness.

NOTE

Seat belts and shoulder harness are replaced after 60 months service life (TM 55-1500-204-25/1).

a. Inspect belts and harness for fraying, wear, and loose stitching.

b. Inspect all metal fittings for damage and function.

CAUTION

Hex wrench must be left in hex hole, reel shall be secured until new strap is installed. If reel is inadvertently released while strap is removed, replace the entire reel assembly.

CAUTION

If strap is dirty, do not attempt to clean. Liquids (solvents or water) will cause strap to swell rendering inertia reel inoperative.

2-237. Inspection — Inertia Reel Strap. Inspect strap for fraying, wear, and loosened stitches.

2-227. Removal — Seat Belts and Shoulder Harness. Remove bolts, nuts, and washers attaching belts and harness to fittings.

2-228. Repair or Replacement — Seat Belts and Shoulder Harness. a. Replace belts or harness if worn, frayed, or unserviceable.

b. Replace damaged or cracked fittings.

WARNING

Install seat belts with the release handle pointing left.

2-229. Installation — Seat Belts and Shoulder Harness. a. Position seat belts as shown in figure 2-46 and attach to fittings with bolts, washers, and nuts.

b. Position shoulder harness over seat back and attach to inertia reel strap with bolt, washers, and nuts.

2-230. INERTIA REEL.

2-231. Description — Inertia Reel. An inertia reel with a manually operated control handle is attached to fittings on cabin floor in back of pilot and copilot seat. The inertia reel is a mechanical restraining device that is designed to hold crew member in a normal seated position during any maneuver which would tend to pitch the crewmember forward. Each reel is connected to a shoulder harness with a web strap. An automatic locking mechanism, a webbing roller, and a manual control are incorporated in each unit (figure 2-48.)

NOTE

Inertia reel strap shall be replaced at 60 month intervals (TM 55-15200-204-25/1.)

2-232. Inspection — Inertia Reel. a. Inspect inertia reel for security of mounting and attachment to floor structure.

b. Place manual control handle to AUTO position. Disconnect shoulder harness from reel strap (3), attach spring scale to end of reel webbing and, while watching scale, slowly pull length of strap (3) out of inertia reel. The tension indicated shall not be less than **1.0** pound.

c. Cycle control handle from AUTO to MANUAL several times as the reel strap is being reeled in and out. The reel shall positively lock and hold each time the handle is moved to MANUAL.

d. Place contral handle in the unlocked position. Sharply pull shoulder harness, exerting a 2 to 3 "G" force, to check auto locking mechanism. Check that shoulder harness has locked and retracts into inertia reel. Cycle control handle to release auto locking mechanism.

e. Inspect floor fitting (14) for cracks and security.

2-233. Removal — Inertia Reel. a. Remove bolt, washer, and nut securing shoulder harness from inertia reel strap. Remove shoulder harness from seat.

b. Remove two screws, washers, spacers, and nuts securing control assembly to seat.

c. Remove four bolts (6), eight washers (2), and four nuts (8) securing reel assembly (2, figure 2-48) from support bracket (1). Remove control assembly from seat.

2-234. Repair or Replacement — Inertia Reel. a. Replace if failed inspection (paragraph 2-232).

b. Replace inertia reel strap if worn or frayed (paragraph 2-236).

2-235. Installation — Inertia Reel. a. Position inertia reel assembly (2, figure 2-48) on support bracket (1) using four bolts (6), eight washers (7), and four nuts (8).

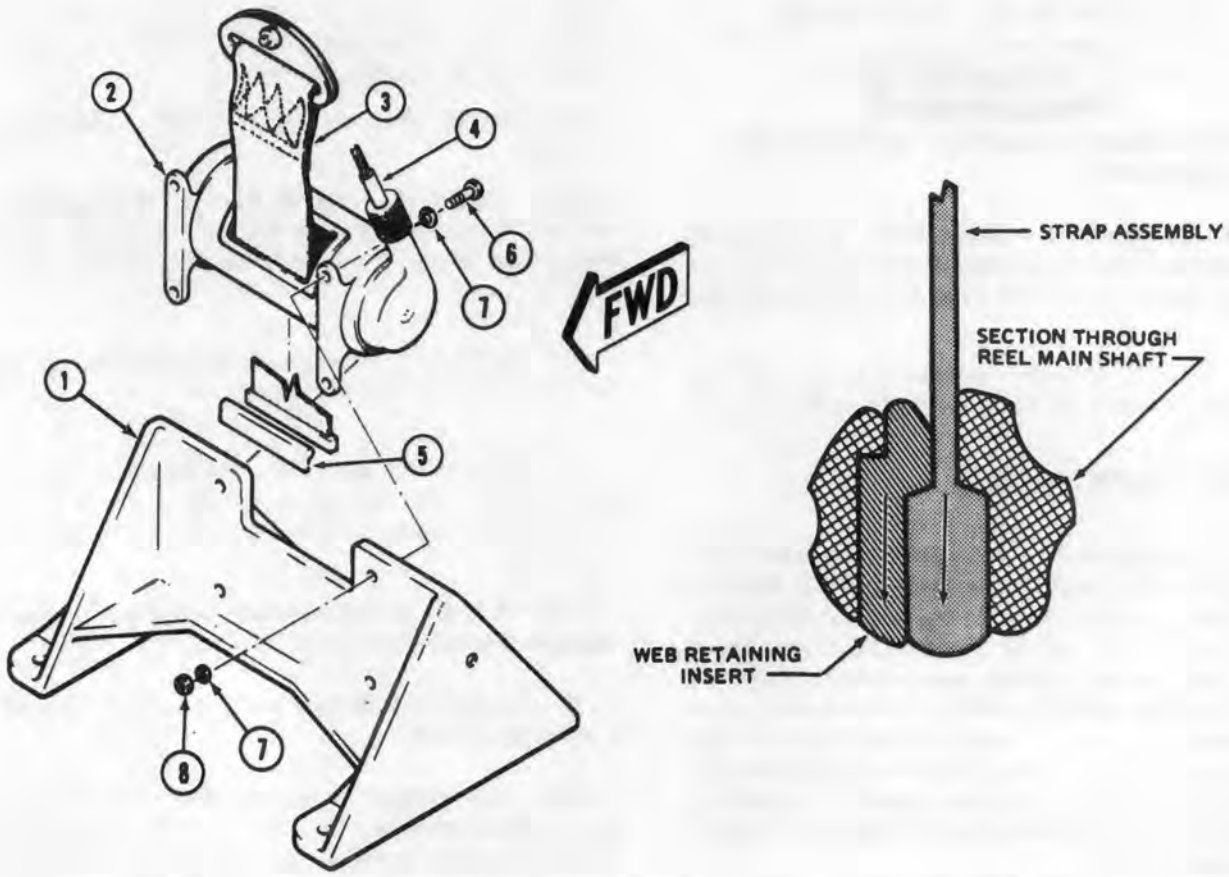
b. Attach control assembly to seat using two screws, washers, spacers and nuts.

c. Attach inertia reel strap to shoulder harness with bolt, nut, and washer.

2-236. Removal — Inertia Reel Strap. (Figure 2-48). **a.** Fully extend strap (3) and retain from further rotation by holding with a 0.2187 inch hex wrench in hex hole in reel assembly (2).

b. Move both strap (3) and insert (5) in direction of arrows.

c. Remove insert (5) and pull strap (3) back through opening.



1. Support bracket
2. Reel assembly
3. Strap
4. Control cable
5. Web retaining insert
6. Bolt
7. Washer
8. Nut

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Figure 2-48. Crew inertia reel — standard seat

2-238. Repair or Replacement — Inertia Reel Strap. Replace strap if frayed, worn or unserviceable.

2-239. Installation — Inertia Reel Strap. (Figure 2-48). **a.** Insert end of new strap through upper slot in reel housing and through slot in main shaft until end of strap (3) protrudes through lower slot in reel housing.

NOTE

Spring must be 1/2 to 1 1/2 turns back from tight.

b. Install strap retaining insert (5), then pull upward on strap (3) with at least **6.0** pounds force. Maintain force until reel is released by removing hex wrench, allowing strap (3) to rewind onto main shaft.

2-240. ARMORED CREW SEAT.

2-241. Description — Armored Crew Seat. The seat, constructed from a composite creamic-metal material, is designed to protect crew against small arms ball and armor piercing ammunition. A segmented construction is used to permit the replacement of any damaged components. Armored seats are equipped with a quick release; activating the quick release will recline seats to aid in removal of injured personnel (figure 2-49).

2-242. Removal — Armored Crew Seat. a. Remove bolt, nut, and washers securing seat belt to floor fittings.

b. Remove bolts securing stops (8 or 9, figure 2-49) from each side of tracks (4).

c. Lift the fore and aft seat adjustment handle and slide the seat aft until seat clears tracks.

d. Remove headguard (if installed) as illustrated on figure 2-50.

2-243. Inspection — Armored Crew Seat. a. Visually inspect armor panels for bonding separation, cracks, or any unserviceable condition.

b. Inspect quick release (figure 2-51) for condition and lockwire installation.

c. Inspect seat hardware, belts, shoulder harness for condition and security.

NOTE

If necessary, clean seats in accordance with procedures contained in TM 55-1500-204-25/1.

2-244. Repair or Replacement — Armored Crew Seat. a. Replace unserviceable parts.

b. Lockwire quick release handle using 0.020 inch copper wire (C246.1). Lubricate quick release mechanism with lubricant (C115.1).

2-245. Installation — Armored Crew Seat. (Figure 2-49.) **a.** Position seat rollers on aft end of tracks. Lift handle on left side of seat and slide seat forward on tracks.

b. Install stops (8 or 9) on aft end of tracks. Note that stops for pilots seat are positioned more forward than copilot seat stops.

c. Attach seat belts to floor fittings using bolts, washers, and new seat locking nuts.

d. Functional check all seat controls.

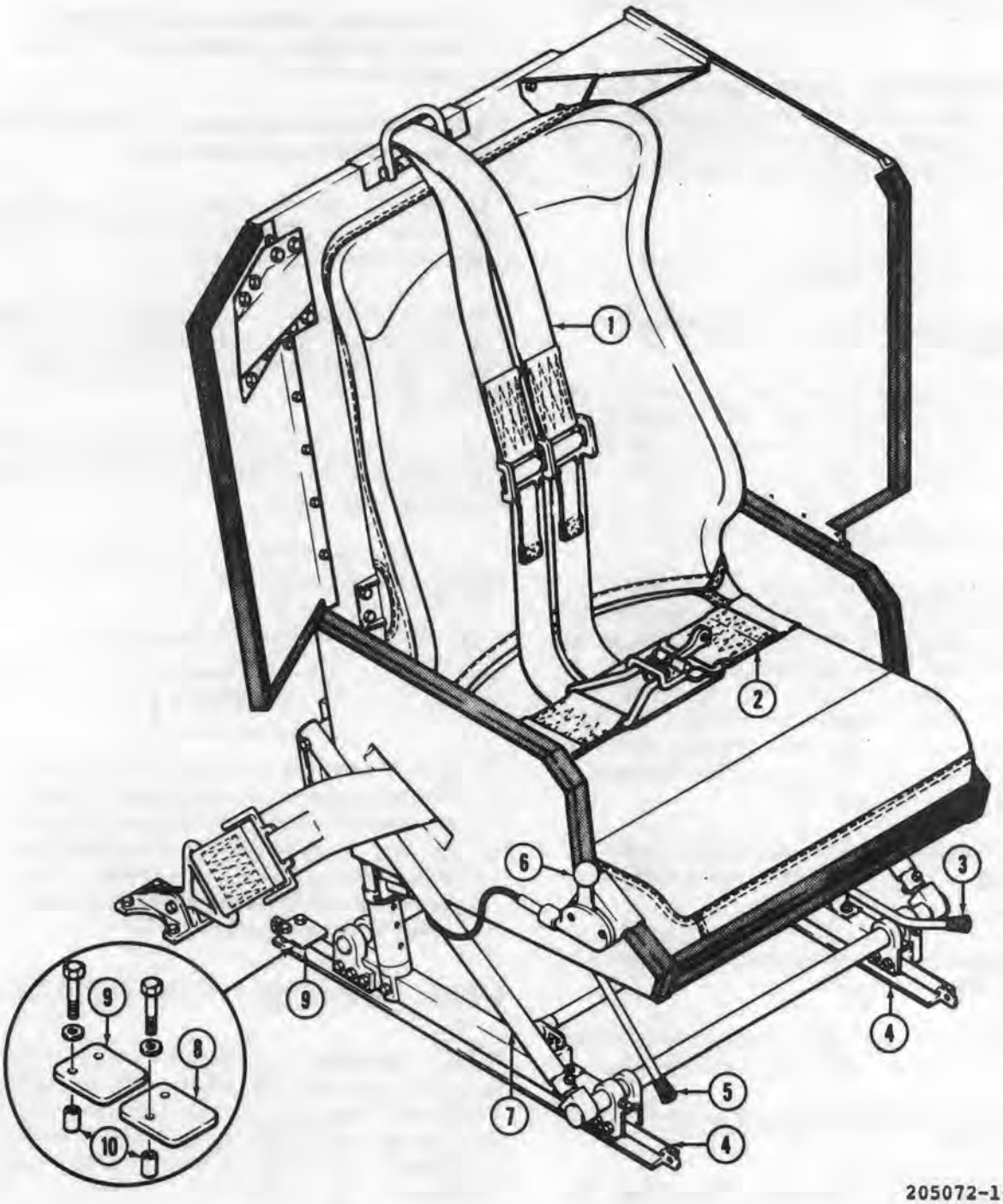
CAUTION

Ensure that the armored seat reclining mechanism is locked in position. The two red-painted handles at the lower aft of the seat must be positioned so that the telescoping tube (7) is locked. The handles must be restrained with copper shear-type lockwire (C246.1).

2-246. MEDICAL ATTENDANT SEATS.

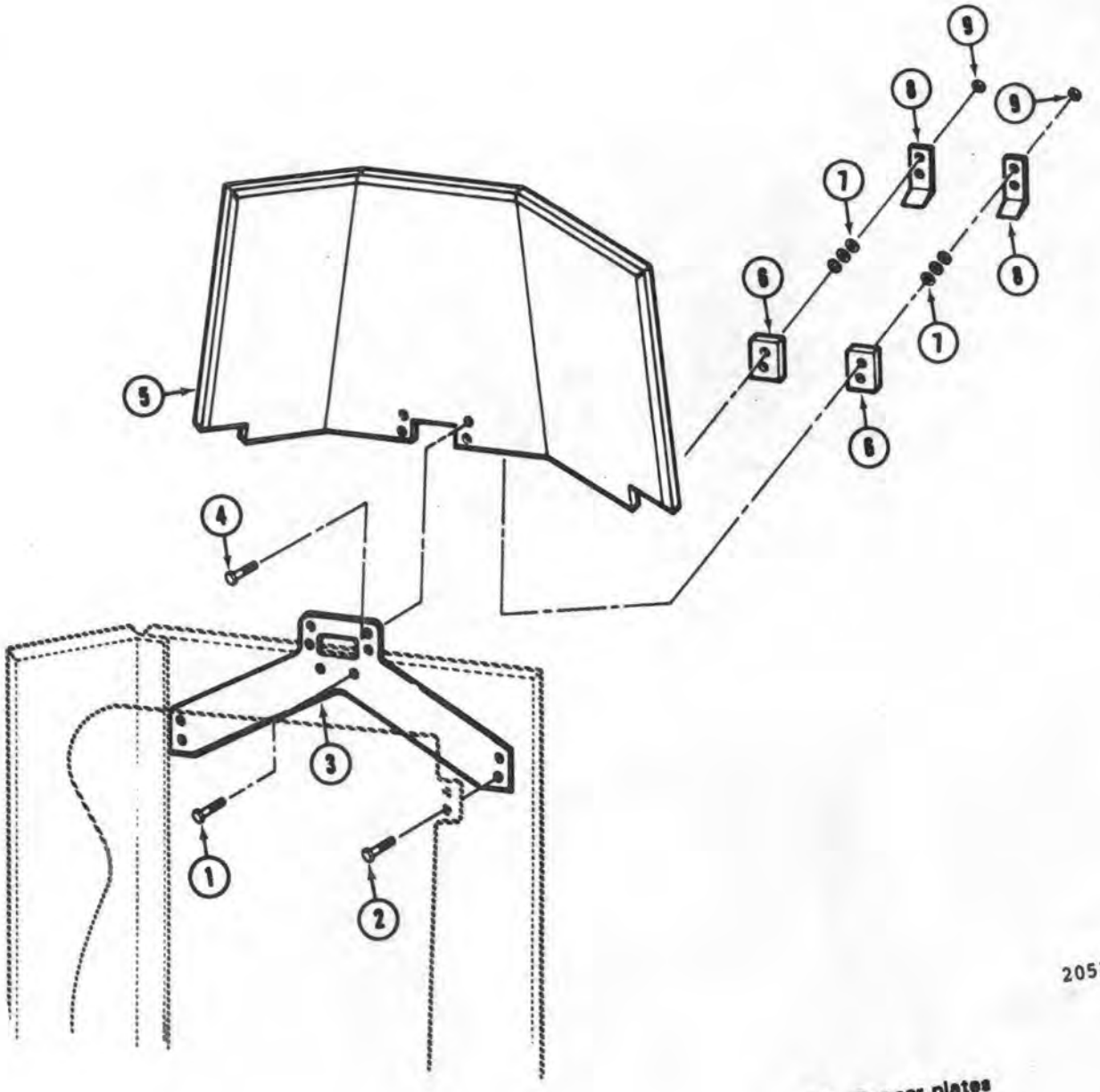
2-247. Description — Medical Attendant Seats. Two additional one-man seats may be installed. When installed, these seats are located between and aft of the pilot and copilot seats. One-man seats may be installed so occupant faces either forward outboard or aft. Seats are of tubular metal construction and can be folded for stowage. A medical attendant seat is provided for use when the aircraft is utilized seats facing aft. Individual lap type safety belts are provided for occupants of all seats.

2-248. Removal — Medical Attendant Seats. a. Slide collar of floor attachment fittings (15, figure 2-52) upward on each leg to release seat from floor.



1. Shoulder harness
2. Seat belt
3. Seat adjustment handle
4. Tracks
5. Seat adjustment handle
6. Shoulder harness release handle
7. Telescoping tube
8. Pilots seat stop
9. Copilots seat stop
10. Spacers

Figure 2-49. Armored crew seat



1. Screw
2. Screw
3. Support bracket
4. Bolt
5. Armor panel (head guard)
6. Spacer plates
7. Washers
8. Support clamps
9. Nut

Figure 2-50. Crew seat headguard

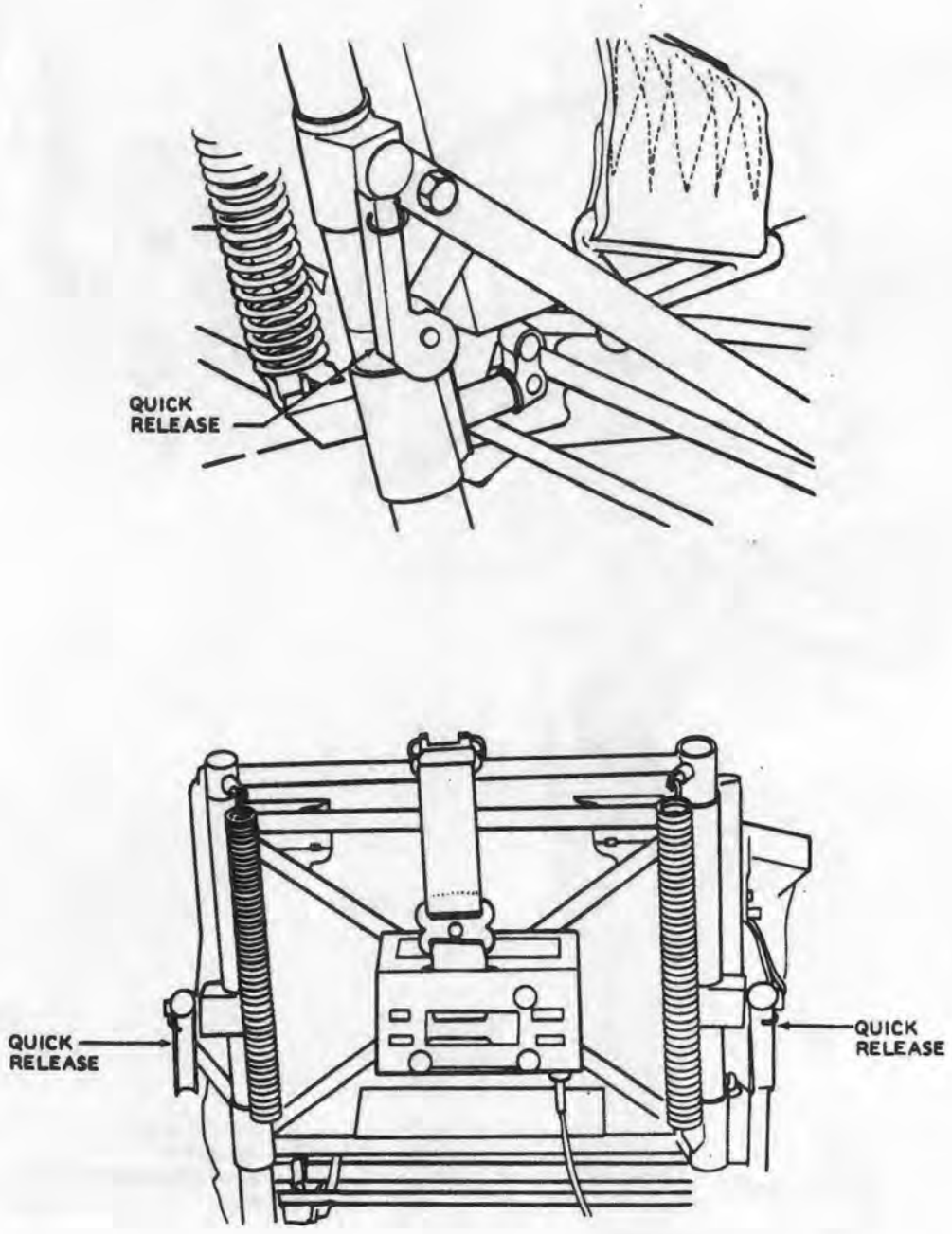


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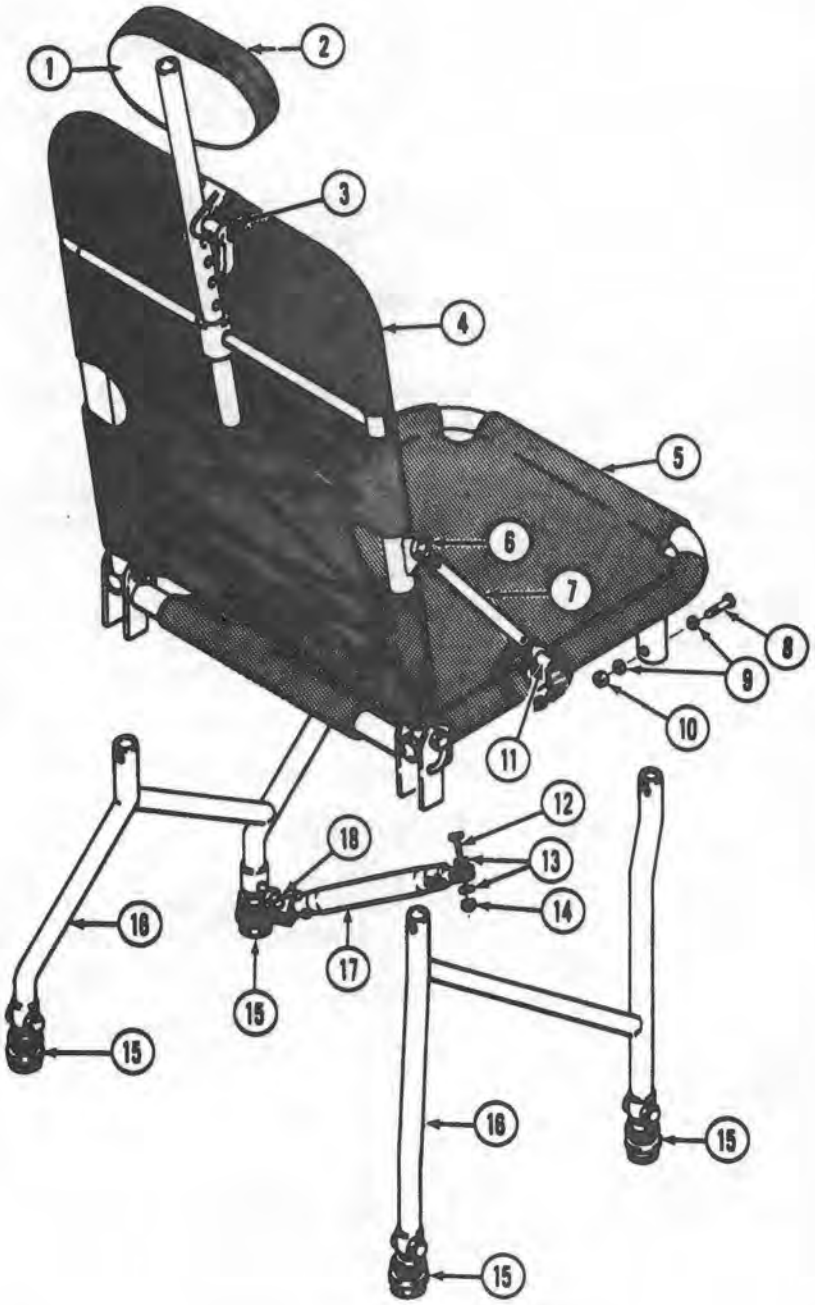
Figure 2-51. Crew armored seat reclining quick release



1. Headrest assembly
2. Headrest cover
3. Pin
4. Seat back cover
5. Seat pan
6. Seat back
7. Side braces
8. Bolt
9. Washer
10. Nut
11. Pin
12. Bolt
13. Washer
14. Nut
15. Fittings
16. Leg assembly
17. Brace assembly
18. Pin

204070-1019A

Figure 2-52. Medical attendants seat (typical)

b. Lift seat from position and remove from helicopter.

2-249. Disassembly — Medical Attendant Seats. a. Remove pin (3, figure 2-52) attaching headrest assembly (1) to back of seat and remove headrest assembly.

b. Remove bolts, washers, and nuts attaching fittings (15) to seat legs and remove fittings.

c. Pull pin (11) and remove bolts, washers, and nuts attaching side braces (7) to seat pan and seat back.

d. Remove seat back (6) and seat back cover (4).

e. Pull pin (18) and remove bolts (12), washers (13), and nuts (14), attaching brace assembly (17) to leg assemblies (16) and remove brace assembly.

f. Remove bolts (8), washers (9), and nuts (10) attaching leg assemblies (16) to seat pan (5) and separate leg assemblies from seat pan.

2-250. Inspection — Medical Attendant Seats. a. Visually inspect headrest cover for tears. Check headrest assembly and pin for damage.

b. Visually inspect fittings for general condition and operation.

c. Inspect side braces for damage and holes for elongation.

d. Visually inspect legs, braces, and seat pan for damage or bent tubing.

NOTE

If necessary, clean seats in accordance with procedures contained in TM 55-1500-204-25/1.

2-251. Repair or Replacement — Medical Attendant Seats. Replace all parts do not not meet inspection requirements.

2-252. Assembly — Medical Attendant Seats. a. Position leg assemblies (16, figure 2-52) to seat panel (5) and secure with bolts (8), washer (9), and nuts (10). Position brace assembly (17) and secure with pin (18), bolt (12), washers (13), and nut (14).

b. Position side braces (7) to seat pan and seat back and secure with pin (11), bolt, washers, and nut.

c. Install cover on seat back and seat pan. Position headrest assembly (1) to seat back and install pin (3).

d. Position fittings (15) to legs and install bolts, washers, and nuts.

2-253. Installation — Medical Attendant Seats. a. Open seat back to normal position and secure support tubes at each side of the seat with quick-release pins.

b. Unfold seat legs and position seat with legs over floor studs. Press down on seat.

c. Slide collar of each leg attachment fitting down to lock legs to floor.

d. Position diagonal leg brace tubes and secure with pip pins.

2-254. Stowage — Medical Attendant Seats. a. Pull quick-release pin attaching seat back support to each side of seat.

b. Fold seat back forward onto seat bottom.

c. Remove pip pins attaching diagonal braces to forward seat legs.

d. Fold legs inboard against seat bottom.

2-255. TROOP SEATS.

2-256. Description — Troop Seats. Two troop seats of tubular metal construction are secured to the cabin bulkhead and floor. Helicopter is equipped with one two-man, and one three-man seat. These seats can be stowed or removed for rescue or cargo missions as required (figure 2-53).

NOTE

If necessary, clean seats in accordance with procedures contained in TM 55-1500-204-25/1.

2-257. Inspection - Troop Seats. Visually inspect all parts of seat for damage; cracked or distorted tubes, torn or worn fabric (TM 55-1500-204-25/1).

2-258. Removal — Troop Seats.

a. Remove nuts, bolts, and washers attaching upper seat to bulkhead fittings.

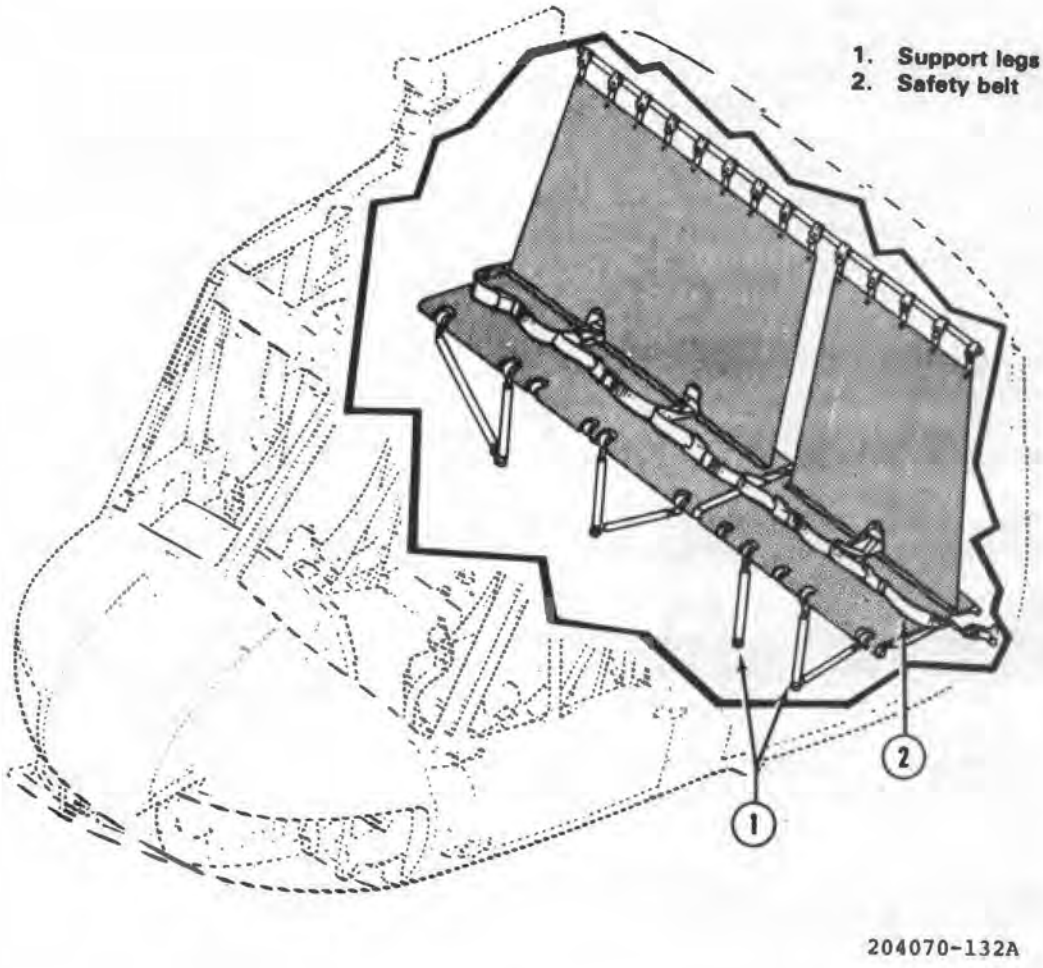


Figure 2-53. Troop seat

b. Slide collar of floor attachment fittings upward on each of forward seat support legs, and release legs from floor studs.

c. Remove nuts and bolts holding clamps on rear of seat and remove seat from aircraft.

2-259. Repair or Replacement - Troop Seats. Replace seat is damaged or unserviceable. Tears, cuts, and holes smaller than 3/8 inch in length or diameter in the fine-mesh duck cloth of the troop seat covers, are permissible without repair. Tears, cuts, or holes greater than 1 inch in

length or diameter are not allowed. Tears, cuts or holes less than 1 inch in length or diameter may be repaired by a darning procedure which picks up at least 1/4 inch of good material adjacent to or surrounding the cut, tears, or hole. While mending, the thread tension should be maintained so as to produce a mend which disturbs as little as possible the natural lines of the seat netting adjacent to the mends. Nylon thread (C229) or equivalent to be used for repairs.

2-260. Installation — Troop Seats. a. Unfold stowed seat and position seat back support tube to upper bulkhead fittings. Install attaching bolts, washer, and nuts.

b. Position aft seat bottom support tube in bulkhead clamps and install bolts and nuts.

c. Position forward seat support legs on floor studs. Secure legs to floor by sliding attachment fitting collar up on leg and then down as far as it will go.

2-261. Adjustment — Troop Seats. Adjust seat tension by use of buckles on upper back support straps.

2-262. Stowage — Troop Seats. a. Release forward seat support legs (1, figure 2-53) from floor studs.

b. Pull pip pins from seat leg braces and fold braces upward against seat legs. Fold seat legs aft under seat bottom.

2-263. TROOP SEAT BELTS.

2-264. Description — Troop Seat Belts. Individual lap-type seat belts are provided for all troop seats. The same belts, with web extensions, are provided for litter patients when helicopter is used for rescue missions.

2-265. Removal — Troop Seat Belts. a. To remove seat safety belts (2, figure 2-53) from seats, unsnap both ends of the belt from rings.

b. To remove safety belts and extension from litters, disconnect belt from extension.

2-266. Inspection — Troop Seat Belts. (TM 55-1500-204-25/1.)

2-267. Repair or Replacement - Troop Seat Belts. (TM 55-1500-204-25/1.)

WARNING

Seat belts are replaced after a service life of 60 months. (TM 55-1500-204-25/1).

NOTE

Assemble each belt with release handle pointing left.

2-268. Installation — Troop Seat Belts. To install seat safety belts on seats, position belt across seat bottom and attach both ends to rings or link assembly bolts.

2-269. ENGINE MOUNTS.

2-270. Description — Engine Mounts. Engine is supported at three points by supports made of steel tubing which are attached to fittings on service deck. Bipod at right and tripod at left have pillow blocks with hinged caps to hold bearings of two trunnion fittings installed on mounting pads at each side of engine diffuser housing. Left pillow block has a bracket for bellcrank in plower lever control system. Rear firewall brace rods attach on pillow block and aft deck fittings. A forward support tube is bolted to a trunnion fitting on left side of engine inlet housing. Two separate deck fittings are provided at this location. A flat spring is installed to hold bipod upright when engine is removed (figure 2-54).

2-271. Removal — Engine Mounts (figure 2-54). a. When any supporting parts of engine mounts are to be removed, either remove engine (paragraph 4-13) or support it in place by use of a suitable hoist using care to avoid possible damage. In such procedure, detach rear firewall brace rods (9) by pulling pins. Open pillow block caps (5) to release trunnion bearings (4) and detach forward support tube (11) from trunnion fittings (13) by removing retaining bolt and washer.

b. Remove forward support tube (11) and attaching bolt from deck fitting.

c. Remove bellcrank from bracket (6) on tripod pillow block. Detach fuel strainer bracket clamps from tripod (10) leg. Remove tripod (10) and attaching bolts from deck fittings.

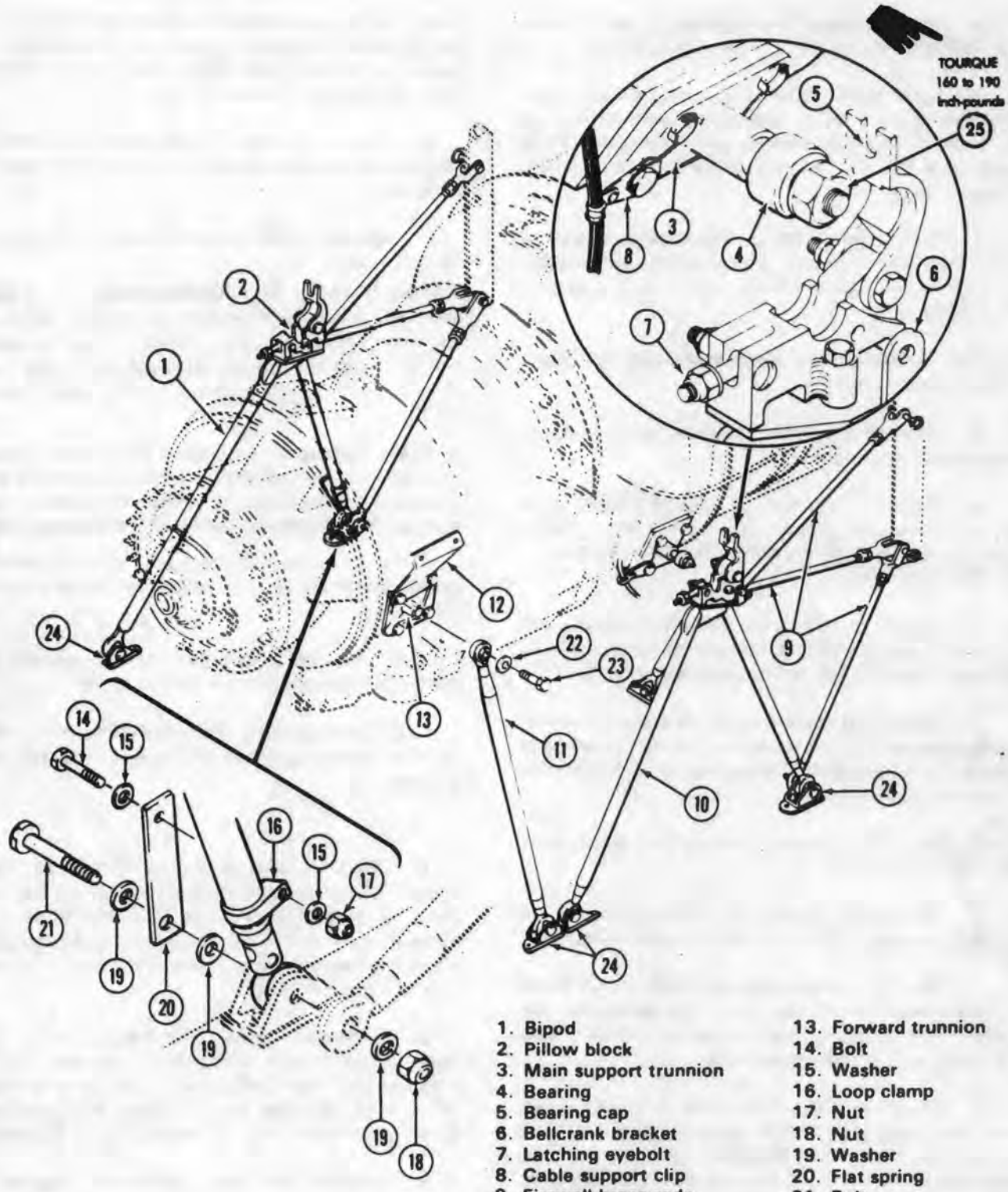


Figure 2-54. Engine mount installation

d. Remove bipod (1) supporting spring (20) and attaching bolts (14 and 21) from deck fittings.

e. Leave deck fittings (24) in place except when removal is required for inspection, replacement, or change of shims to correct engine alignment. To remove a filling or shim, remove bolts and screws through deck.

f. Remove any of the trunnions as necessary by removing four bolts with washers and any brackets supported on bolts, which secure trunnion to engine mounting pads.

2-272. Inspection — Engine Mounts. a. Open pillow block caps.

b. Remove trunnion mounts, with bearings attached, from engine.

c. Remove bearings (4, figure 2-54) from trunnion (3) and inspect for cracks, wear, heavy pitting, rust, and excessive play (**0.006** inch radial — **0.012** inch axial).

d. Inspect trunnion for security, scored, and damaged shaft; inspect tension bearing cap and bellcrank bracket for damage and security.

e. Inspect all support arms, brace rods, bipod, and tripod assemblies for bent, cracked, or damaged tubes and inspect welded areas for cracks. Inspect rod ends for loose rivets.

f. Scratches or dents adjacent to welded areas are not acceptable.

g. Permanent bends (bends which do not straighten after load is removed) are not permitted.

h. Scratches not exceeding **0.010** inch depth may be polished out with wet or dry sandpaper No. 400 (C185.1). Transverse scratches longer than **0.3125** inch are not acceptable.

i. Inspect all rod end bearings for cracks, wear, and excessive play (**0.005** inch radial, **0.010** inch axial). All Part No. 204-001-064-1/3 rod end bearings have a maximum axial play of **0.020** inch. Inspect upper rod end bearing on forward supprot tube (11) for maximum allowable radial wear of **0.003** inch and maximum allowable axial wear of **0.006** inch.

j. No sharp dents are permitted in the middle one-third of tube. Smooth dents of large diameter which do not cause bending of the tube (end to end), are permitted, provided there is no crimping or cracking in the dent and there is no visible deformation adjacent to the dent.

k. Inspect all engine floor mount deck fittings (24) and all brackets for security, cracks and general condition.

l. Loose or missing rivets in mounts is cause for replacement.

2-273. Repair or Replacement - Engine Mounts. Replace all engine mount parts which do not meet inspection requirements. Minor scratches and/or corrosion can be polished out using India stone (C207) and touch-up paint with primer (C171).

2-274. Installation — Engine Mounts. a. Install two rear trunnions (3, figure 2-54) on mounting pads of engine diffuser housing, each secured by four bolts and washers. Lockwire (item C127) bolt head in pairs.

(1) On lower forward bolt of left trunnion, install stand-off clip for electrical cable support clamp.

(2) On right trunnion, install bracket for starter cooling exit duct on two aft bolts.

(3) Install bearing (4) on shaft of main trunnion (3) with washer and nut (25). Torque **160 TO 190** inch- pounds.

b. Check installation of deck fittings (24). Place tripod (10) rod ends in three fittings at left and rear sides of deck. Install close tolerance bolts from outboard side, with washers under heads and nuts, attaching lower firewall brace under nut at inboard side of left rear fitting.

c. In similar manner, install bipod (1) on right deck fittings. Attach spring (20) under bolt head at outboard side of aft fitting, and attach upper end with bolt to clamp on bipod leg. Cracked or broken support spring shall be replaced to maintain bipod alignment.

d. Install support tube in left forward deck fitting.

e. Open hinged bearing caps (5) on pillow block. Lower engine to seat trunnion bearings in pillow blocks. Close bearing caps and secure with latching eyebolts (7). Torque eyebolts to **50-70** inch-pounds and lockwire (C127) pillow block bearing caps.

f. Align rod end of support tube (11) on forward left trunnion fitting (13) and install retaining bolt (23) with washer (22) torque **50-70** inch-pounds. Lockwire (C127) support tube retaining bolt to one of the trunnion bolts.

g. If shims under deck fitting have been changed or deck fitting or engine mount have been replaced, check main driveshaft alignment in accordance with paragraph 6-24.

h. Reinstall parts removed for access.

NOTE

When power lever torque tube. Part No. 204-060-705-17, is utilized, there is no requirement to use nut. Part No. NAS679A4, or washer, Part No. AN960PD416L.

(1) Attach two upper firewall brace rods (9) to lug on aft side of each pillow block, secured with pin and cotter pin. Adjust and attach rods to firewall with pip pins.

(2) Attach fuel strainer bracket to clamps on adjacent leg of tripod.

(3) Install bellcrank of power lever control system in bracket (6) on tripod pillow block.

SECTION II.— TAILBOOM

2-275. TAILBOOM ASSEMBLY.

2-276. Description — Tailboom Assembly. The tailboom is a semimonocoque structure that supports the elevator, tail rotor drive train components, and tail rotor. Four attachment fittings are provided for installation of the tailboom on the forward fuselage assembly.

2-277. Inspection — Tailboom Assembly (installed). Install tailboom structure (table 2-6).

2-278. Removal — Tailboom. (AVIM) a. Open access door in tailpipe fairing and disconnect electrical plug to rotating beacon. Release fasteners securing tailpipe fairing to fuselage and remove fairing.

b. Remove the tail rotor (paragraph 5-104) and the tail rotor drive system (paragraph 6-206).

c. Remove four access panels on bottom of tailboom.

d. Open access door on right, aft side of fuselage section.

e. Disconnect electrical harnesses and antenna cables.

f. Disconnect tail rotor and synchronized elevator control tubes from quadrant and bellcrank located in forward end of tailboom.

NOTE

If tailboom is being removed for replacement, observe steps g through k. If tailboom is being removed in order to accomplish other maintenance functions and is to be subsequently reinstalled, observe steps j and k.

g. Remove tailrotor control cables from tailboom (paragraph 11-138).

h. Remove synchronized elevator (paragraph 11-201) and control system (paragraph 11-173).

i. Remove electrical and avionics installation.

NOTE

If ship antenna base is removed, ensure antenna wedge spacer, Part No. 204-031-130-1, is retained.

j. Remove plug buttons from the four tailboom attachment points.

k. Support tailboom and remove nuts, bolts, and washers attaching tailboom to fuselage section.

l. Remove tailboom and place on a suitable support.

2-279. Inspection — Tailboom Assembly. Refer to paragraph 2-287 for classification of damage to

tailboom structure and paragraphs (2-284) and (2-285) for inspection of elevator assembly.

a. Inspect tailboom attach fittings and fuselage attach fittings for cracks, corrosion, wear. (Refer to table 2-6 and figure 2-63).

b. Inspect condition of sealing tape located on aft fuselage bulkhead.

2-280. Repair or Replacement — Tailboom Assembly. Refer to paragraph 2-285 for elevator repair and paragraph 2-288 for repair on tailboom structure.

a. If any of the following structural components are damaged beyond repairable limits, send tailboom to depot for replacement (jigs and fixtures are required).

(1) Tailboom longerons.

(2) Bulkheads.

(3) Bellcrank and quadrant support.

(4) Support fittings for 42° and 90° gearboxes.

(5) Vertical fin.

(6) Elevator support brackets BS 143.28.

b. Replace damaged seal on aft fuselage bulkhead as follows:

(1) Remove paint and clean surface of FS 195 bulkhead aft side only, 1.0 inches each side of aircraft centerline and from bottom edge of bulkhead web to 1.0 inch in height above WL 48.50.

(2) Fabricate rubbing strip 14.0 inches long and 7/8 inch wide of tape (C219) 0.125 inch thickness.

c. Replace attachment fitting as follows:

(1) Inspection.

(a) Inspect for scratches, nicks, gouges and corrosion.

(b) Blend out damage/corrosion using steel wool (C251). Maximum depth of damage allowable after cleanup is 10 percent of fitting thickness.

(c) Treat repaired area for corrosion control in accordance with procedures described in TM 55-1500-204-25/1.

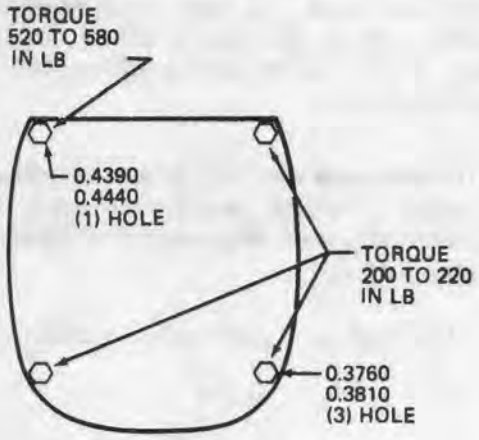


Figure 2-55. Tailboom attaching bolts

(d) Inspect fittings for tailboom attachment bolt hole elongation. Replace fittings if bolt hole exceeds maximum wear limitation as shown below:

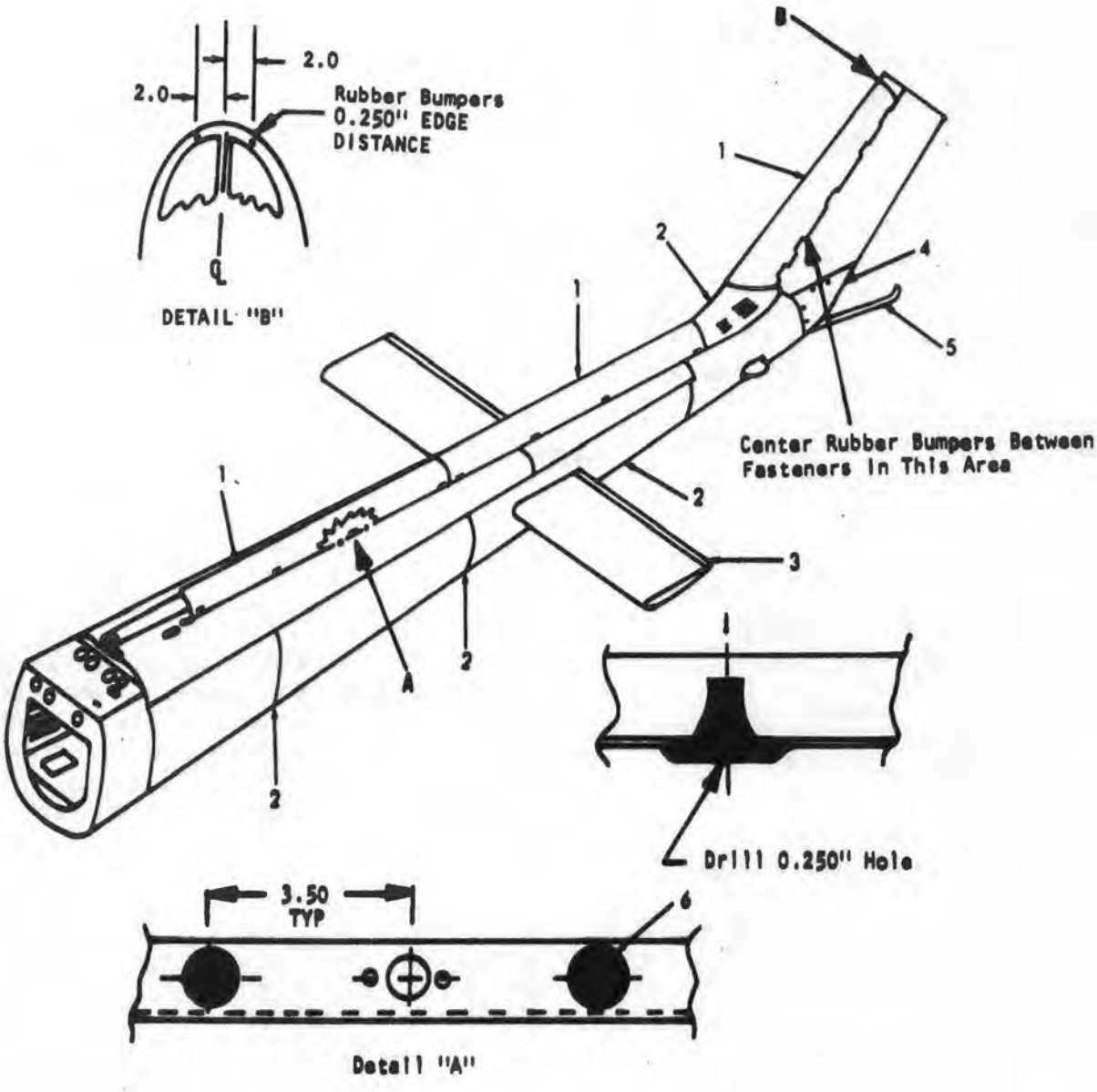
Location	Max Allowable Hole Elongation	Max Hole Dia After Cleanup
Upper L/H:	0.015 Inch	0.521 Inch
Upper R/H:	0.015 Inch	0.521 Inch
Lower L/H:	0.015 Inch	0.396 Inch
Lower R/H:	0.015 Inch	0.396 Inch

(e) Inspect for loose fitting fasteners. Replace as required for hole oversize/elongation with 1/64 in. oversize Hi-Loc bolts as follows:

Existing Fastener	1/64 In. Over size Fastener
HL2086	HL6475 or HL6487
HL2186	HL6575 or HL6587
HL3086	HL6679, HL6682 or HL6694

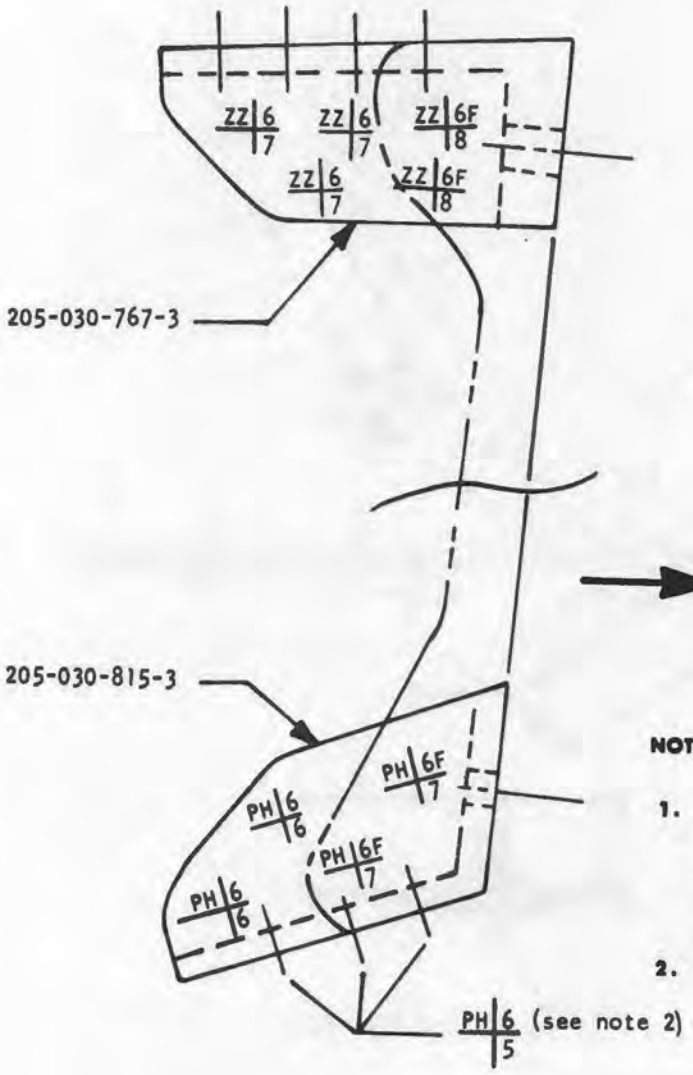
(2) Replacement

Fitting replacement requires the use of the locally manufactured alignment/drill fixture. See Figure 2-55.3.



1. Drive Shaft Covers
2. Access panels
3. Synchronized elevator
4. Vertical fin fairing
5. Tail skid
6. Rubber Bumpers

Figure 2-55.1. Typical tailboom



NOTES:

1. **An NAS1217-3-7, NAS14B-3-7 or NAS1403-7 Screw (head installed inboard), AN960-10 Washer and NAS679A3 Nut may be substituted for the Hi-Loc Bolt and Collar at the aft upper hole in the lower left side fitting.**
2. **Install with manufactured head to inside of fitting.**

FASTENER CODE

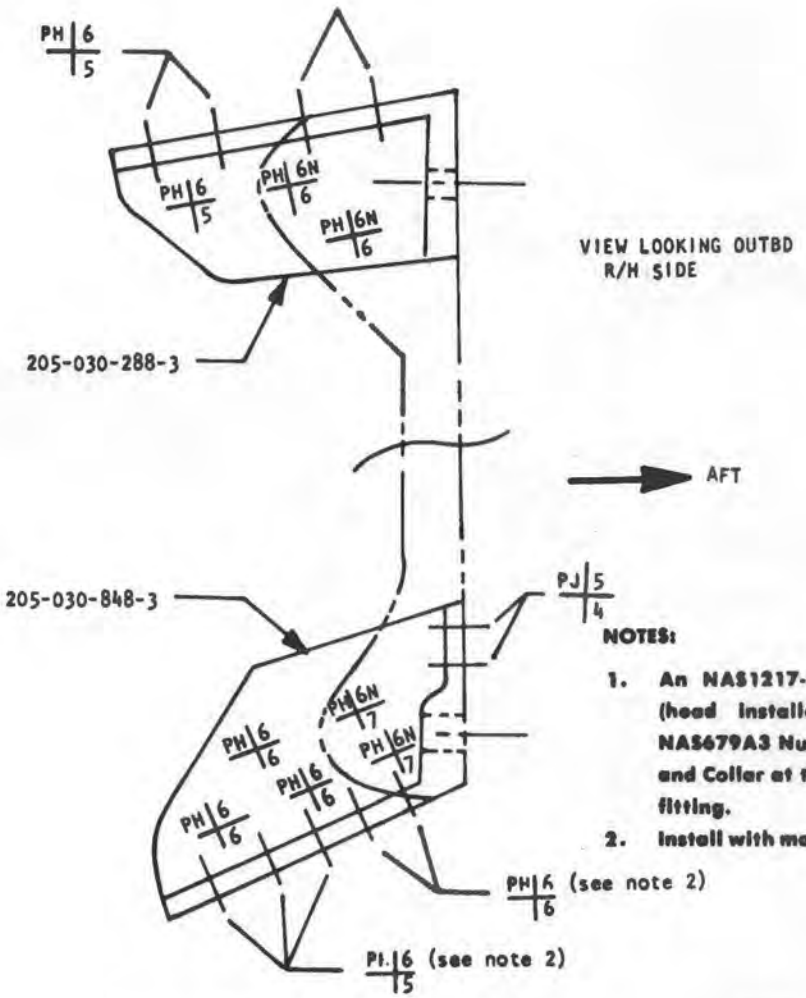
Example: PH 6N / 6

Description:

BASIC CODE	DASH NO. DIA N-MFG HEAD NEAR SIDE F-MFG HEAD FAR SIDE DASH NO. FOR LENGTH

BASIC CODE	BASIC PART NO.
ZZ	HL 3086
PH	HL 2085

Figure 2-55.2. Tailboom attach fitting replacement (Sheet 1 of 2)



NOTES:

1. **An NAS1217-3-7, NAS14B-3-7 or NAS1403-7 Screw (head installed inboard), AN960-10 Washer and NAS679A3 Nut may be substituted for the Hi-Loc Bolt and Collar at the aft upper hole in the lower right side fitting.**
2. **Install with manufactured head to inside of fitting.**

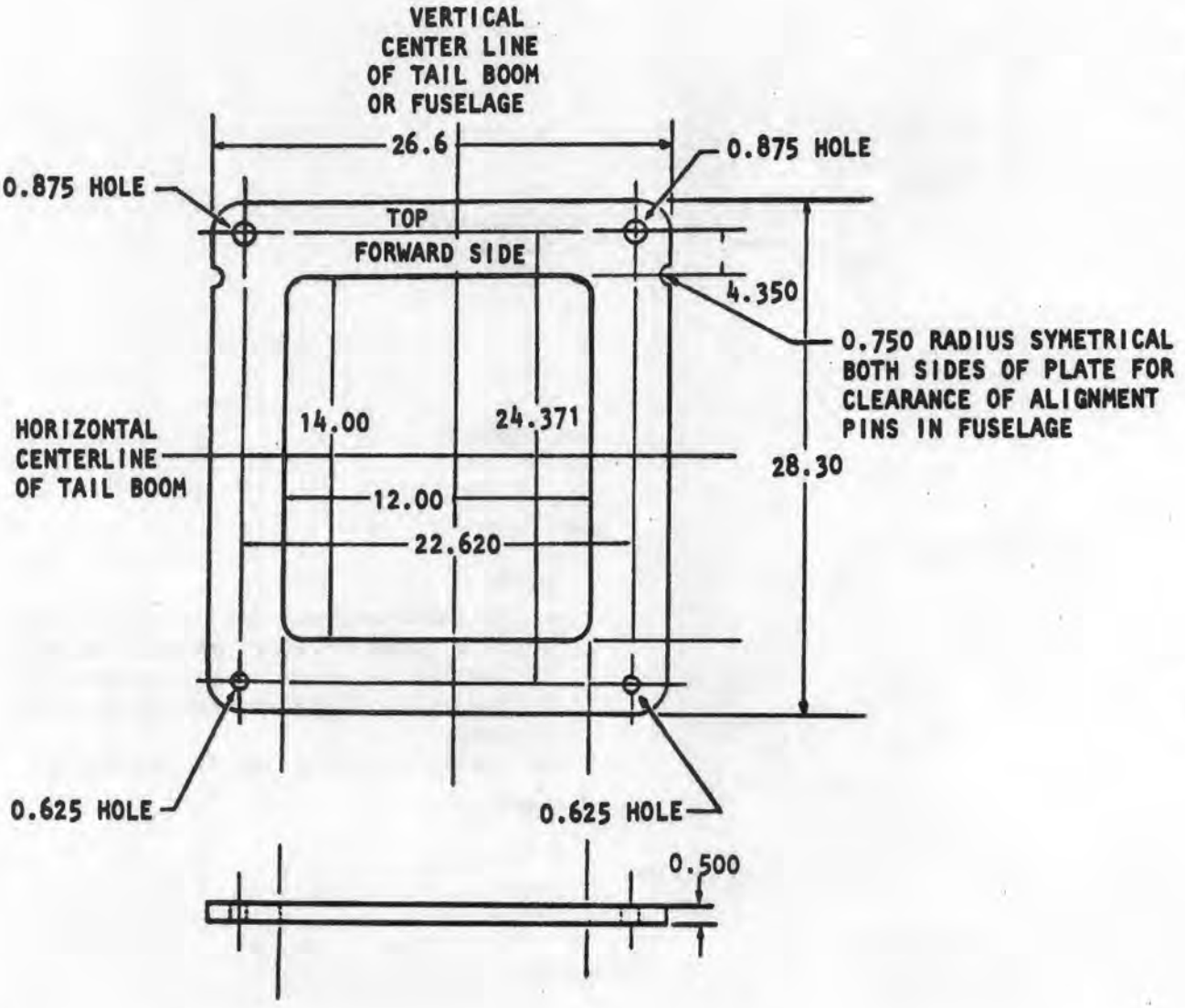
Fastener Code

Example: PH 6 / 5

DESCRIPTION: BASIC CODE | DASH NO. FOR DIA. | N-MFG HEAD NEAR SIDE | N-MFG HEAD FAR SIDE | DASH NO. FOR LENGTH

BASIC CODE	BASIC PART NO.
PH	HL 2086
PJ	HL 2186

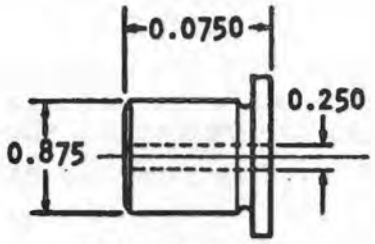
Figure 2-55.2. Tailboom attach fitting replacement (Sheet 2 of 2)



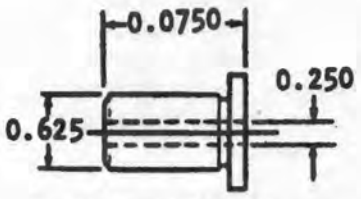
1. Fabricate alignment fixture 0.50 inch aluminum plate dimensions shown and drill four holes.

   The plane of the plate which contacts the tail boom must be true within 0.005 inch.
2. Fabricate bushings from steel (4130 or similar) and harden. Do not continue to use bushings which have become worn through use. It will not be necessary to fabricate all the bushings illustrated when only a upper left-hand longeron is to be replaced, refer to text.

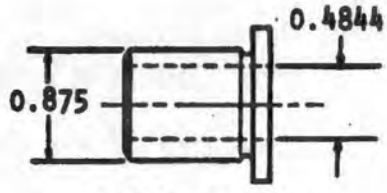
Figure 2-55.3. Work Aid - Alignment/Drill fixture for tailboom and aft fuselage (Sheet 1 of 2)



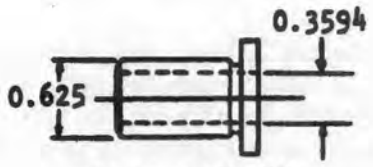
DRILL BUSHING



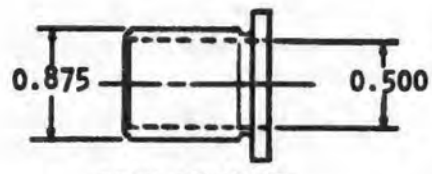
DRILL BUSHING



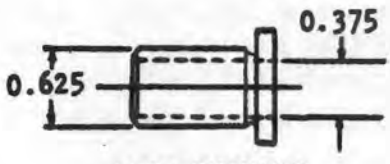
DRILL BUSHING



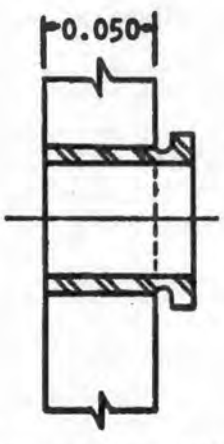
DRILL BUSHING



REAM BUSHING



REAM BUSHING



VIEW OF BUSHING INSTALLED
IN ALIGNMENT PLATE/DRILL FIXTURE

Figure 2-55.3. Work Aid - Alignment/Drill fixture for tailboom and aft fuselage (Sheet 2 of 2)

CAUTION

Replace only one fitting at a time. Three fittings must be in place to use the alignment/drill fixture. Fitting replacement requires removal of tailboom, engine, transmission and mast assembly and main rotor prior to commencing work.

(a) Note position and direction of existing fastener heads and collars to assure proper reinstallation configuration at time of reinstallation. Hi-Loc bolts should be substituted for Hi-Shear rivets.

(b) Remove fastener collars from fasteners. Take care to prevent damage to surrounding structure and fastener holes. (The Hi-Loc bolt collars can be removed using an Allen wrench and pliers). Push fastener pins out of holes.

NOTE

On the lower left fitting, one (1) MS20426AD4 rivet must be removed from the aft side of the fitting.

(c) Remove fitting from aircraft.

(d) Clean and inspect area where fitting was removed.

(e) Align new fitting with the main beam cap angle and aft fuselage bulkhead. (Fitting must butt flush against forward side of bulkhead)

(f) Clamp new fitting into position. Back drill fitting attachment holes with an undersize drill bit, then ream holes to correct size for close tolerance fit as follows:

(1) Upper left side fitting: 0.1895 - 0.1915 inch diameter.

(2) Upper right side fitting: 0.1895 - 0.1915 inch diameter.

(3) Lower left side fitting: 0.1895 - 0.1915 inch diameter for Hi-Loc bolt holes: 0.128 inch diameter for rivet hole through aft side of fitting.

(4) Lower right side fitting: 0.1635 - 0.1655 inch diameter for Hi-Loc bolt holes through aft side of fitting: 0.1895 - 0.1915 inch diameter for all other Hi-Loc bolt holes.

(g) Install Hi-Loc bolts and collars per Figure 2-55.2. Use same installation pattern and head direction as noted when old fitting was removed except as shown on Figure 2-55.2.

(h) Install alignment/drill fixture on the aft side of the aft fuselage bulkhead with correct size bolts through the remaining three fittings.

(i) Install the proper size drill bushing as shown in Figure 2-55.3. Drill fitting using correct size drill bit.

(j) Remove drill bushing.

(k) Install correct size ream bushings and carefully ream to size as follows:

(1) Upper L/H and R/H: 0.501 - 0.506 inch diameter

(2) Lower L/H and R/H: 0.376 - 0.381 inch diameter

(l) Spotface forward side of fitting hole as follows:

(1) Upper L/H fitting: 1.0 inch diameter, 0.030 inch corner radius, minimum remaining thickness 0.470 inch.

(2) Upper R/H fitting: 1.0 inch diameter, 0.030 inch corner radius, minimum remaining thickness 0.400 inch.

(3) Lower L/H and Lower R/H fittings: 0.88 inch diameter, 0.030 inch corner radius, minimum remaining thickness 0.330 inch.

(m) Install bolt through the new fitting and tighten the tool against the bulkhead. Selectively loosen each of the four attachment bolts one at a time to determine if the bulkhead is in the correct plane. If there is a discrepancy in the wear pad thickness the tool will spring out as one bolt is loosened.

(n) If a discrepancy exists, shim between the tool and the bulkhead as required at the location(s) where the tool does not seat properly so as to provide proper tool placement against the fuselage bulkhead.

(o) Fabricate and install new chafing plate(s) to reflect the additional thickness determined by the shim in Step (n).

(p) Remove alignment/drill fixture.

2-281. Installation — Tailboom Assembly. If a replacement tailboom is to be installed, remove serviceable parts from the tailboom for buildup of the replacement tailboom.

a. Raise tailboom. Support forward end on fuselage using support pins provided.

NOTE

If support pins do not align with pilot holes in tailboom, the support pins may be removed from the airframe.

b. Open access doors at right side of fuselage to gain access to four tailboom attachment bolt hole installation.

c. Align bolt holes between tailboom and fuselage and install bolts and washers as outlined in step d. and e. following.

d. Align attachment bolt holes. Place one special washer on each bolt, with countersink toward bolt head. Add one flat washer to each bolt and insert bolts through attachment holes with threads of bolt pointing aft (figure 2-55).

NOTE

A maximum elongation of 0.015 inch is allowable in any or all of the four tailboom fittings and/or the four fuselage fittings. See figure 2-55 for hole dimensions.

NOTE

To aid in tightening tailboom attachment bolts, a special torque wrench extension may be manufactured locally as shown in figure 2-56. Torque shall be true torque and shall not include friction of bolt.

e. Install sufficient washers on bolts, (may exceed three) so that not less than one thread nor more than three threads are showing after nuts are

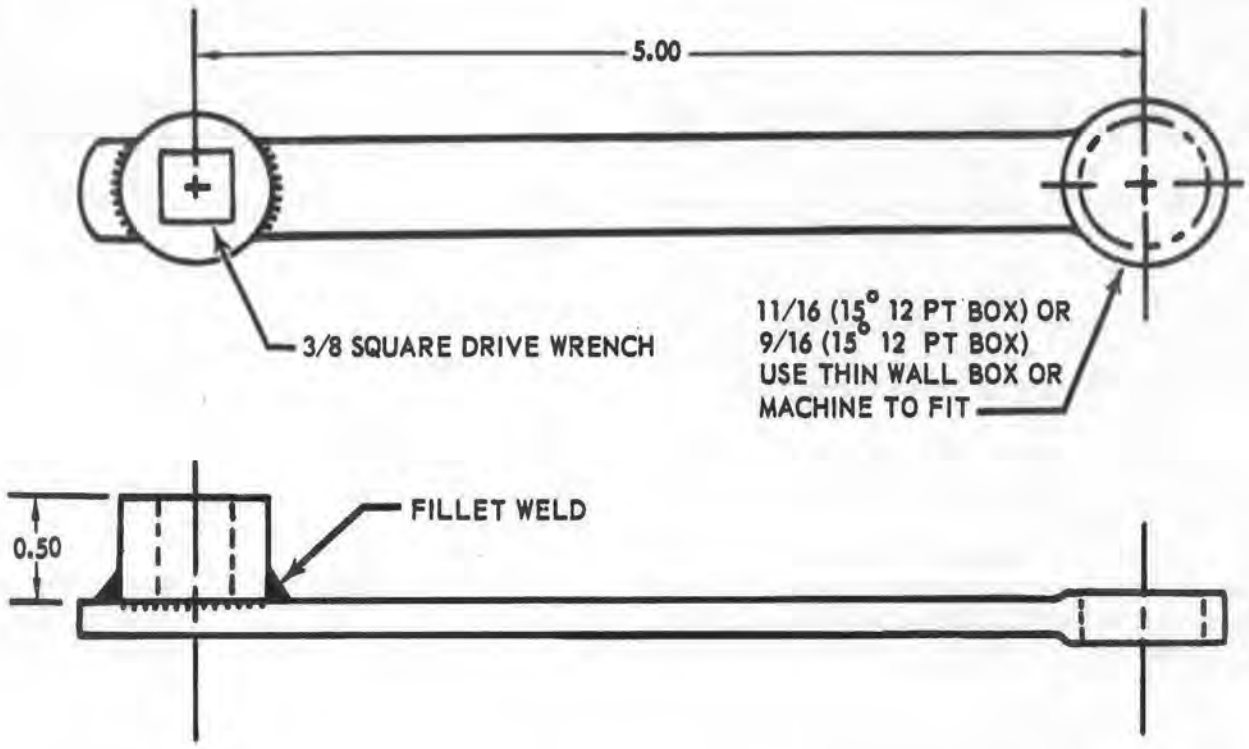


Figure 2-56. Tailboom wrench

torqued. Tighten upper left nut (viewed facing forward) to a torque of **520 TO 580** inch-pounds. Tighten other three nuts to a torque of **200 TO 220** inch-pounds.

f. Retorque (apply torque force in the tightening direction only) attachment bolts after the first flight. Apply slippage marks from the head of bolts to the fuselage attachment fittings.

NOTE

If a replacement tailboom is being installed, observe steps g through o. If a previously removed tailboom is being reinstalled, observe steps j through o.

g. Install electrical avionics installation.

NOTE

If whip antenna base was removed, antenna wedge spacer, Part No. 204-031-130-1, must be installed between whip antenna base and tail fin to tilt antenna away from tail rotor blades.

h. Install synchronized elevator (paragraph 11-204) and control system (paragraph 11-191).

i. Install tail rotor control cables (paragraph 11-140).

j. Install plug buttons in each of the four tailboom attachment point openings.

k. Install tail rotor drive system (paragraph 6-209 and tail rotor assembly. (Paragraph 6-109).

l. Connect and rig tail rotor (paragraph 11-120) and synchronized elevator controls (paragraphs 11-182 and 11-185).

m. Connect electrical, avionics, and antenna harnesses and cables. Install access panels on underside of tailboom.

n. Close and latch access door on right aft side of fuselage section. Position tailpipe fairing in place and secure fairing.

o. Connect rotating beacon and close access panel.

2-282. ELEVATOR ASSEMBLY.

2-283. Description — Elevator Assembly. The synchronized elevator is mounted near the aft end of the tailboom. It is constructed of aluminum alclad ribs, spar, stiffeners, and covered with magnesium alloy skins, refer to paragraph 11-201 for removal, installation, inspection and maintenance procedures.

2-284. Inspection — Elevator Assembly (Removed). a. Inspect elevator skins for mechanical and corrosion damage. Inspect skins to limits given for tailboom skins in table 2-6, Classification of Damage Tailboom Assembly.

b. Remove elevator skin as required to inspect spar. Refer to figure 2-57 for allowable damage limits and as follows:

(1) Negligible damage. Small scratches and smooth contour dents free from cracks, may be disregarded provided adjacent areas are not affected and that the damage is not on the spar. Refer to paragraph 11-200.

(2) Damage repairable by patching. Small scracks must be stop drilled and lay-on patch of like material and gage applied. If the elevator incurs damage which indicates that the spar may have been damaged, refer to paragraph 11-200.

(3) Damage repairable by insertion. Holes, tears or large cracks can be repaired by cutting out the damaged area and inserting a filler plate and backing patch of like material and gage. If the elevator incurs damage which indicates that the spar may have been damaged, refer to paragraph 11-200.

(4) Damage necessitating replacement. Damage greater than is practical to repair.

c. Inspect rivets through spar and rib flanges.

2-285. Repair or Replacement — Elevator Assembly.

Premaintenance requirements for repair of elevator assembly

Conditions	Requirements
Model	UH-1C/M
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C8), (C143), (C160), (C185), (C230), (C253)
Special Environmental Conditions	None

a. Polish out minor damage on spar which is within repairable limits (figure 2-57) with abrasive paper (C160), 400 grit or finer. Apply two coats of primer (C253) to cleanup areas with the exception of the portion of spar which mates with horn. Refer to paragraph 11-204 for instructions to apply corrosion preventive compound to this area of spar at installation.(AVIM)

b. Repair cracks, holes, tears, etc., which are within repairable limits in accordance with standard repair procedures (TM 55-1500-204-25/1 and table 2-6. Figure 2-58 illustrates internal structure of elevator assembly.

c. Replace elevator if repair limits are exceeded.

d. Replace tip cap (5, figure 2-58) 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 elevator tip area to where cap (5) is to be bonded with naphtha (C143).

(2) Clean inside area of cap (5) with toluene (C230).

(3) Brush a thin coat of adhesive (C8) approximately **0.010** inch thick on elevator tip (cleaned area) and inside of cap (5).

(4) Allow approximately **1** hour drying time until adhesive becomes tacky. Install cap (5) on elevator tip as shown.

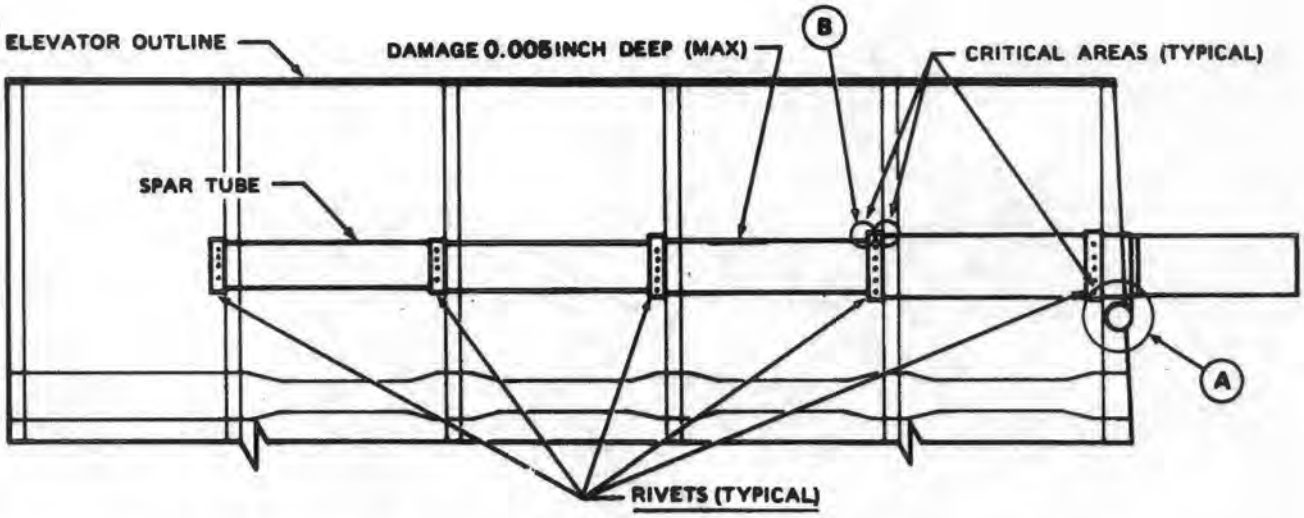
(5) Hold cap (5) in place for a minimum of **15** seconds.

(6) Allow a minimum of **24** hours drying time before releasing helicopter for flight.

2-286. TAILBOOM STRUCTURE (Figure 2-62).

NOTE

Refer to maintenance allocation chart, appendix B to determine maintenance responsibility for specific structural repairs.



NOTE

The entire elevator spar tube is critical in fatigue. The area where the elevator attaches to the horn (A) and the radii adjacent to the rib lands (B) are especially critical because these are the points where loads are transferred to the spar. If an elevator sustains damage, the elevator skin must be removed for inspection of the spar prior to repair of the internal damage.

LIMITS — REPAIRABLE DAMAGE

Pit, Scratches and Scoring damage is limited to 0.005 inch depth after clean-up with 400 grit or smoother abrasive paper to a polished smooth surface. Scratch and scoring damage is further limited as follows:

0.005 inch depth after clean-up limited to 0.50 inch Radially and/or 1.00 inch Longitudinally.

No dents which result in visible tube all depressions are permitted. No corrosion is permitted.

NOTE

Apply two coats of unreduced zinc chromate primer to spar in cleanup areas, but do not apply primer to portion of spar which fits inside horn.

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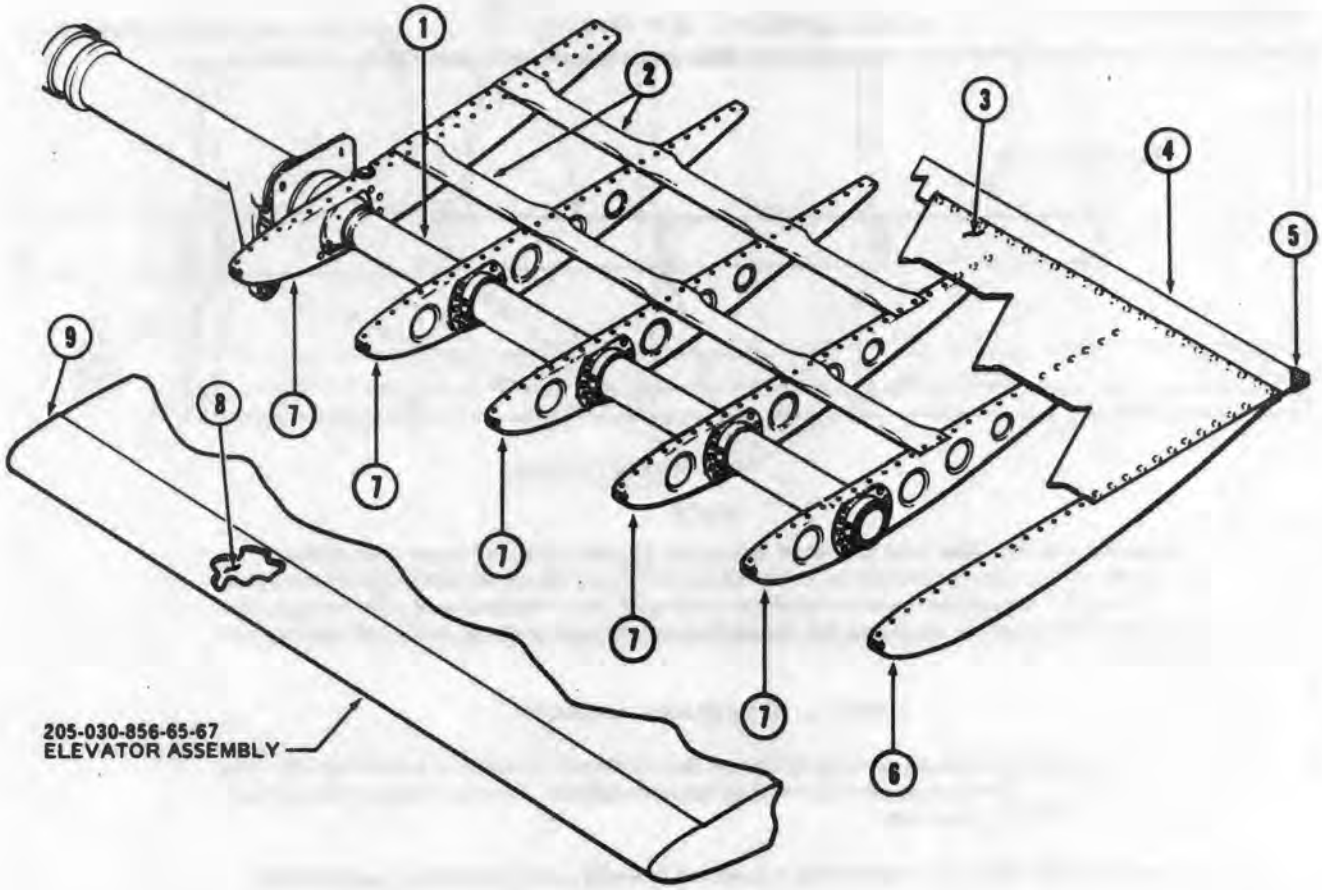
Figure 2-57. Synchronized elevator spar inspection/repair



ITEM	NOMEN-CLATURE	MATERIAL	SPECIFICATION	CONDI-TION	THICK-NESS
1	Spar	2024 Al Aly	WW-T-785	T3	
2	Stiffener	2024 Al Aly	QQ-A-250/5	T3	0.025
3	Skin	A231B Mag	QQ-M-44	H24	0.025
4	Plate	A231B Mag	QQ-M-44	H24	0.040
5	Tip	Rubber, Silicone			
6	Rib	2024 Al Aly	QQ-A-250/5	T42	0.040
7	Rib	2024 Al Aly	QQ-A-250/5	T42	0.020
8	Cushion	Rubber, Class II	MIL-R-6855		0.060
9	Shield	2024 Al Aly	QQ-A-250/5	T3	0.040

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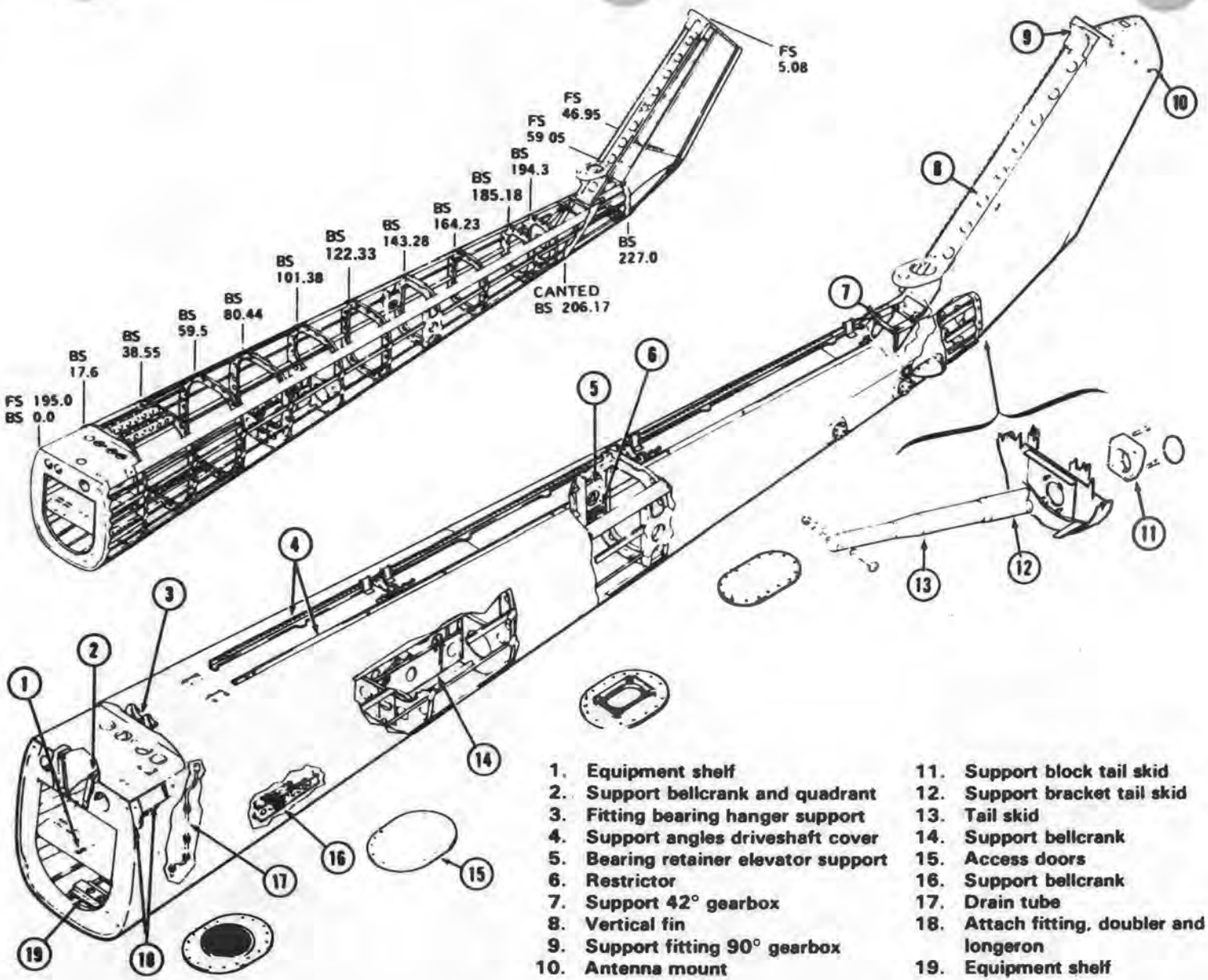
Figure 2-58. Elevator assembly structure



1. Equipment shelf
2. Support bellcrank and quadrant
3. Fitting bearing hanger support
4. Support angles driveshaft cover
5. Bearing retainer elevator support
6. Restrictor
7. Support 42° gearbox
8. Vertical fin
9. Support fitting 90° gearbox
10. Antenna mount
11. Support block tail skid
12. Support bracket tail skid
13. Tail skid
14. Support bellcrank
15. Access doors
16. Support bellcrank
17. Drain tube
18. Attach fitting, doubler and longeron
19. Equipment shelf

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Figure 2-59. Tailboom assembly

2-287. Classification of Damage — Tailboom Structure. Refer to table 2-6.

Table 2-6. Classification of Damage — Tailboom Structure.

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
a. Rivets: Missing, loose, sheared or improperly driven.		a. Replace as required.	
b. Fasteners and Nutplates: Broken, damaged or missing.		b. Replace as required.	
c. Access Doors: Inspect for cracks, holes, tears		c. Cracks or tears no longer than 25 percent of shortest cover dimension. Holes 3.0 inch max. dia. Cleanup no closer than 2.0 inch to supporting structure.	c. Damage exceeds repairable limits.
d. Miscellaneous Brackets, Clips and Supports: Cracks, holes, tears, and distortion.			d. Replace parts if damage is extensive and impractical to repair.
e. Hinges: Cracked, worn or missing loops. Check angles for cracks, holes, distortion and damaged or missing fasteners.	e. See figure 2-60 for damage limits.		
f. Bearing Hanger Support Fitting: Nicks, scratches, corrosion, hole elongation of wear.	f. See figure 2-61 for wear and damage limits.	f. A maximum 0.6875 inch spot-face with 0.06 inch radius may be used to clean up corrosion around four fitting to bulkhead holes, providing spot-face clears forging. See figure 2-61. Minimum wall thickness after clean-up is 0.150 in.	f. Fitting cracked or damage exceeds repairable limits

Table 2-6. Classification of Damage — Tailboom Structure (cont)

Defect	Negligible Damage Limits	Repairable Damage Limits	Damage Requiring Replacement
f.1 Intermediate gearbox support installation. See figure 2-61.1			
1. Cracks.			1. Any cracks are cause for replacement.
2. Distortion of support installation components.			2. Replace distorted components. Replacement of support fittings must be done by next higher maintenance level
3. Gearbox attachment hole damage		3. See figure 2-61.1	
4. Scratches, nicks, dents.		4. See figure 2-61.1	4. Treat deep scratches, nicks, and dents as cracks for inspection.
5. Corrosion.		5. See figure 2-61.1	5. Treat deep corrosion same as cracking for inspection.
6. Nutplates damaged.		6. Replaced damaged nutplates.	

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
g. Ninety Degree Gearbox Support Fitting: Nicks, scratches, corrosion, chaffing, wear, hole elongation and wear.	g. See figure 2-62 for wear and damage limits.	g. Figure 2-62 and paragraph 2-279.	
h. Tailboom Attachment Fittings; Nicks, scratches, corrosion, hole elongation and wear.	h. See figure 2-63 for wear and damage limits.	h. See figure 2-63	h. Fitting cracked or damage exceeding limits of figure 2-63 requires replacement of both the fitting and longeron. Evacuate to depot.
i. Skin: 1. Dents.	1. Smooth contour free of cracks, nicks or wrinkles. Depth and diameter not to exceed: DEPTH DIAMETER 0.015 1.0 inch 0.046 2.0 inch 0.062 3.0 inch 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.	1. Cracks or sharp nick in dent. Damage areas after cleanup (including prior repairs) shall not exceed 25 percent of total area for a single skin panel. Damage 6.0 inches minimum from similar repair.	1. Total Damage (including prior repairs) exceeds 25 percent of total area of a single skin panel, or damage spans entire distance between two longerons. **NOTE** Evacuate tailboom to depot if a skin panel requires replacement.
2. Cracks, holes, tears, nicks, scratches, corrosion and wrinkles.	2. Nicks and scratches no deeper than 10 percent material thickness and not exceeding 1.0 inch length by 0.25 inch width after cleanup. Corrosion damage less than 10 percent of	2. Damage exceeds negligible limits but does not exceed 25 percent (including prior repairs) of total area for a single skin panel.	2. Same as dents.

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
	material thickness and not exceeding 4.0 square inches after cleanup. Damage no closer than 1.0 inch to a supporting structure.		
i. Skin (Cont): 3. Trapped or stretched skin.	3. 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, 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. Creased dents not classified as oil can or stretched skin, not not exceeding 25 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. Figure 2-17 illustrated a typical oil can repair.	3. Stratched skin, oil cans, or creases dents that cannot be repaired by unloading, insertion repair or back up stiffeners.
j. Stringers: Dents, cracks, holes tears, corrosion and distortion.	j. Scratches or smooth shallow dents not extending into formed radius and less than 10 percent of material thickness and 0.50 inch length after cleanup. Damage in radius treat as a	j. **Damage Repairable by Patching:** Lateral cracks and smooth contour dents less than 0.10 inch depth that are less than 1/2 stringer width and do not extend into radius, stringer	j. Damage requires more than one insertion type repair between bulkheads. Damage exceed repairable limits or repair does not warrant time expended.

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
	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.	splice or bulkhead. Longitudinal cracks maximum 0.10 inch width and 1.0 inch length. **Damage Repairable by by Insertion:** Damage exceeds limits for patching, but does not exceed 12.0 inches length after cleanup. One repair per length bulkheads. Damage not to extend into splice or bulkheads. If combined stringer and skin damage is present, above limits and limits for skin damage shall not be exceeded.	
k. Longerons (Excluding Tailboom Attach Fittings): Cracks, corrosion, dents, holes, tears, nicks, scratches, buckle or wrinkled.	k. **Corrosion:** Less than 10 percent of material thickness and not exceeding an area 0.10 inch 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. (See figure 2-64, detail B.) **Nicks and Scratches:** Not to exceed 10 percent of material thickness, 0.010 inch width and 0.75 inch length after cleanup.	k. **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 dents limits are exceeded, treat as a crack. (See figure 2-64, detail A.) 2. Nick and scratch damage exceeds negligible limits but does not exceed 1.6 inch width by 0.38 inch height and does not extend into critical area after cleanup. (See figure 2-64, detail F, section F-F.) Damage in critical area does not exceed	1. Damage exceeds repairable limits or two or more repairs required in a single bay. 2. Damage other than negligible occurs in a bay containing either a splice joint or a previous repair. 3. Damage other than negligible in forward bay. 4. Splice required in second bay. 5. Damage other than negligible comes closer than 1.0 inch to a doubler, splice or bulkhead.

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
	Scratches in web area that extend into radius or at angle greater than 45 degrees into critical area, treat as a crack. (See figure 2-64, 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. (See figure 2-64, 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.	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 2-64 details D and E, and extending no closer than 1.0 inch to a splicer doubler or bulkhead after repair. **Damage Repairable by Insertion.** 1. Repairable by patching limits exceeding but less than 2.50 inch length after cleanup. (See figure 2-64, details F and G.) 2. Cracks or sharp nicks in dent or damage exceeds repair by patching, but less than 2.50inch after cleanup.	**NOTE** **Damage in forward bay area (other than negligible), required replacement of both the longeron and fitting. Evacuate tailboom to depot.**
I. Bulkheads: Corrosion, dents, cracks, holes, nicks and wrinkles.	I. Corrosion less than 10 percent of of web material thickness and not exceeding 4.0 square inch after cleanup. Damage no closer than 0.250 inch to former, stiffener or radius. Dents, scratches in bulkhead web, refer to skin damage limits, item i. Damage in a radius, treat as a crack.	**I. Damage Repairable by Patching.** 1. Corrosion damage greater than negligible but does not exceed 0.70 inch width of 1/3 of a cross section after cleanup. (See figure 2-65, detail B.) Damage no closer than 0.50 inch to a stiffener or attaching parts after cleanup. 2. Dents, cracks, holes and scratches greater than negligible but does not exceed	I. 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 2-64, detail D is required. Evacuate tailboom to depot for bulkhead replacement.

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
		limits of figure 2-64, 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. Damage Repairable by Insertion. 1. Corrosion damage exceeds repairable by patching but does not exceed limits of figure 2-65, detail C. 2. Dents, cracks or hole damage exceeds limits of figure 2-64, details A and B, but less than limits of detail C. Cracks or damage in radius of former on forward bulkhead including attach fitting area. Damage exceeding limits of detail C require full splice.	
m. Vertical Fin: 1. Forward and Aft Spars.	1. Surface scratches no deeper than 10 percent of material thickness after blending. Smooth dents free of cracks and gouges not exceeding 0.015 inch depth and 1.0 inch diameter	1. **Forward Spar.** Cracks, holes or cuts in cap flanges that do not extend inside rivet line. Minor separation in bond line of laminated angles which can be bonded and pulled back into position. Web damage not to exceed 3.0 square inches after cleanup may be repaired	1. Fractures in area fittings and bond separation in cap angles that cannot be bonded and pulled into place. Damage that exceeds repairable limits. Evacuate tailboom to depot.

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
		in areas clear of fitting attach points. **Aft Spar.** All damage except in area of bottom attach fitting.	
2. Trailing Edge.	2. Scratches, nicks and smooth dents which do not deform the air foil shape of fin. Scratches and nicks are acceptable after blending.	2. (See figure 2-67.)	2. Any damage which causes deformation of air foil or repairable limits exceeded.
3. Stringers.	3. Refer to stringer damage limits, item j.	3. Due to length of some stringers, replacement is more practical than repair.	
4. Bulkheads.	4. 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, **0.250** inch width and 10 percent material thickness after cleanup. Treat damage in radius as a crack.	4. Three holes maximum not exceeding **1.0** inch diameter in web area and **3.0** inch minimum distance between damage. Cracks in nutplate holes but not extending into radius. Cracks in web area not exceeding **1.0** inch length after cleanup. No damage to come closer than **0.250** inch to stringer, longeron or structure attaching point.	4. Cracks or holes in area of longeron and stringer attachment. Damage exceeds repairable damage limits.
5. Honeycomb Panels, Tailbooms. Corrosion, Holes, Cracks, Dents, Nicks, Scratches end Voids. Inspect for corrosion in core and skin with 10 power glass.	**NOTE** **Remove all previous installed patches and inspect area underneath patch.**	5. Refer to figure 2-66 for damage limits to panels.	

Table 2-6. Classification of Damage — Tailboom Structure (Cont)

Defect	Negligible damage limits	Repairable damage limits	Damage requiring replacement
n. Tail Skid and Support Block.	n. Smooth contoured dents, free of nicks or notches.	n. Corrosion, nicks, or scratches not to exceed 10 percent of tube wall thickness after cleanup.	n. Replace block if cracked or corroded. Replace tube if yielded in excess of 8 degrees about centerline or if cracked. (Figure 2-78.)

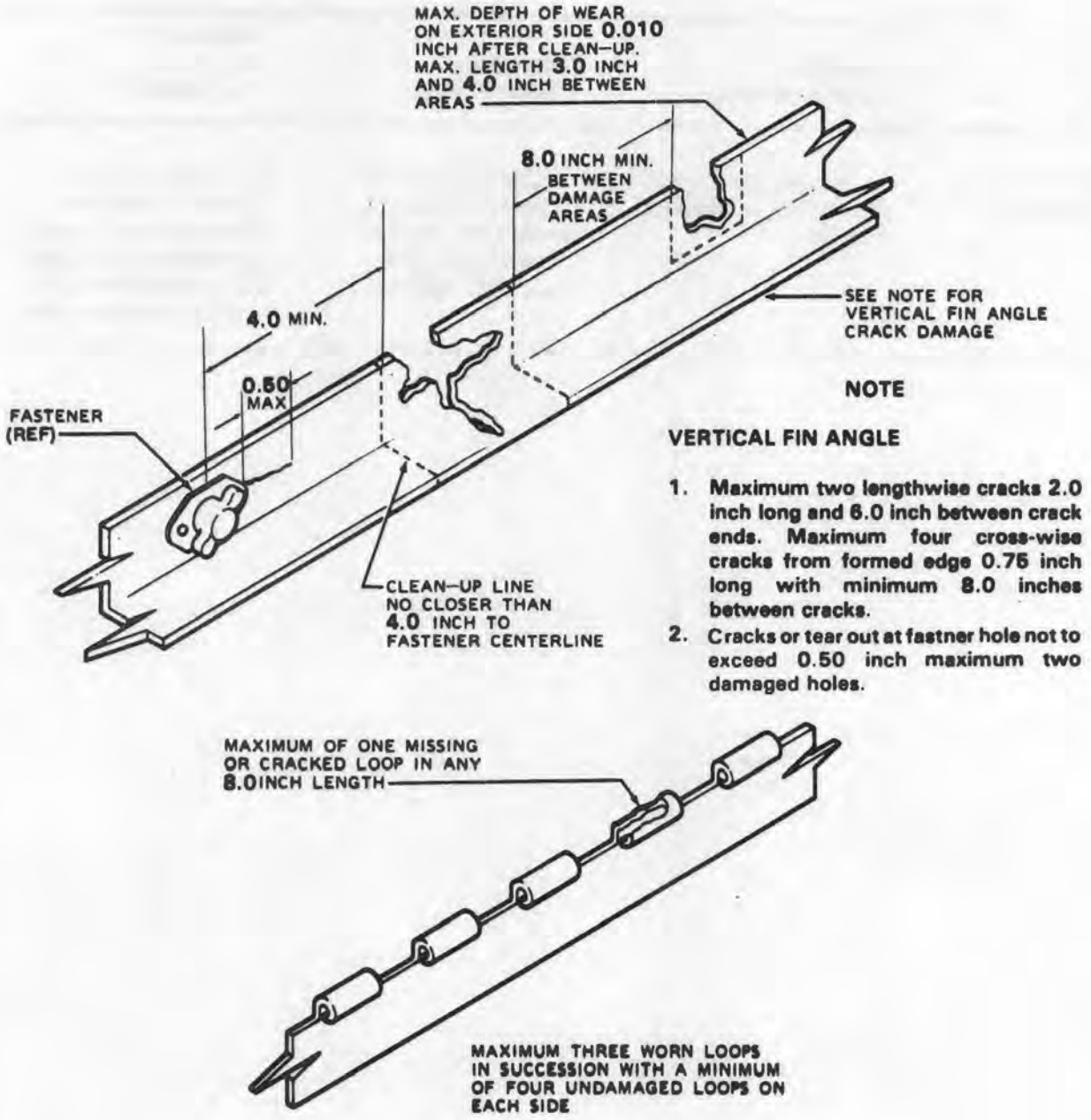
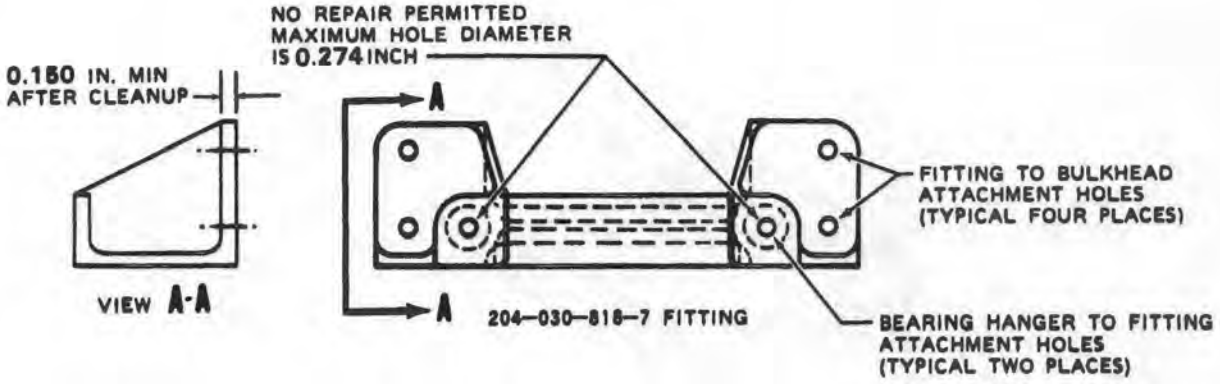


Figure 2-60. Driveshaft cover hinges and angles damage limits



DEFECT	NEGLIGIBLE DAMAGE	REPAIRABLE DAMAGE	DAMAGE REQUIRING REPLACEMENT
1. Scratches, Nicks, Dents and Corrosion on Hole Surfaces.	Maximum depth of 0.01 inch and total discrepant area of 40 percent after cleanup.	Maximum of one bulkhead attach hole exceeding negligible limits.	Two or more bulkhead attach holes and either bearing hanger attach hole exceeds negligible damage limits.
2. Wear or Elongation in Fitting to Bulkhead Attach Holes.	Maximum elongation not to exceed 0.198 inch for three holes and 0.212 inch for one hole.		Damage exceeding negligible.
3. Wear or Elongation in Hanger to Fitting Attach Holes.	Maximum diameter of 0.274 inch for one or both holes.	None.	Either hole diameter exceeds 0.274 inch.
4. Corrosion Around Fitting To Bulkhead Attach Holes.		A maximum 0.6875 inch spot-face with 0.06 inch radius may be used, providing spot-face clears forging. Minimum wall thickness after cleanup is 0.150 inch. (See View A.)	Damage exceeding repairable limits.

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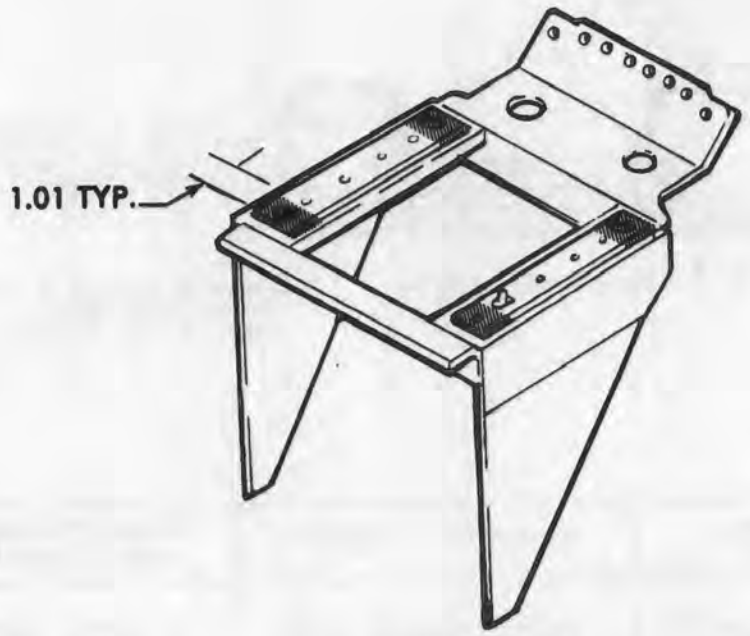
Figure 2-61. Bearing hanger support fitting damage limits



WARNING

NO REPAIRS PERMITTED ON GEARBOX MOUNTING SURFACE.

DAMAGE LOCATION SYMBOLS

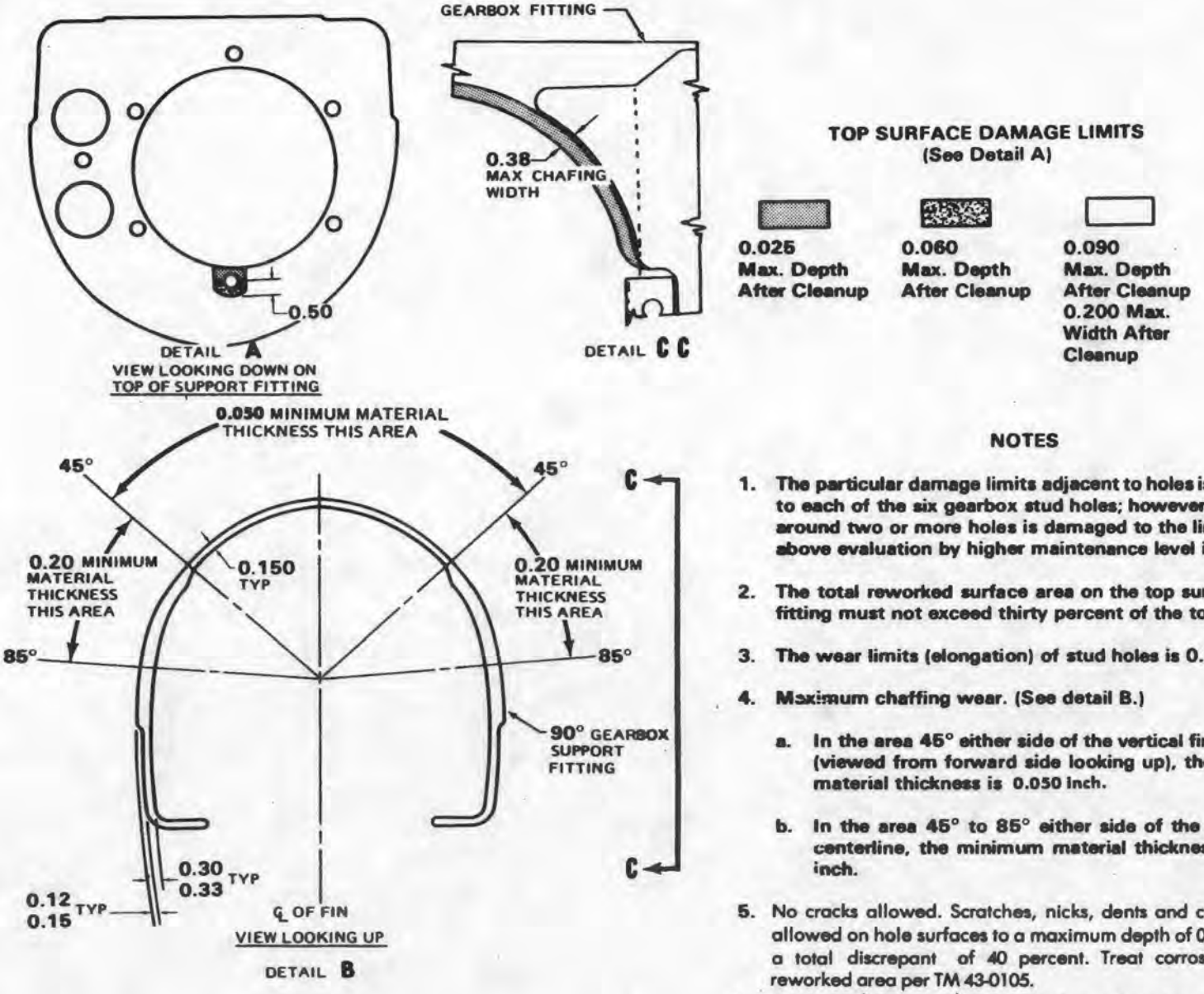
TYPE OF DAMAGE	MAXIMUM DEPTHS AND REPAIR AREAS ALLOWED	
CRACKS ALLOWED	None	None
MECHANICAL DAMAGE	None	0.020
CORROSION DAMAGE AFTER REPAIR	None	10 percent of thickness or 0.020. whichever is less.
MAXIMUM AREA PER FULL DEPTH REPAIR	None	20 percent of surface area after cleanup including prior repairs.

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.

Figure 2-61.1. Damage Limits - Intermediate Gearbox Support Installation

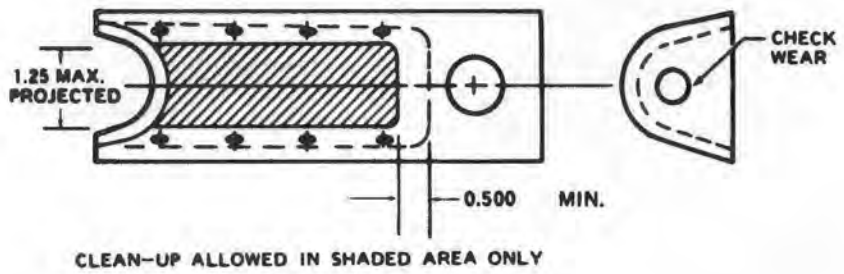


NOTES

1. **The particular damage limits adjacent to holes is applicable to each of the six gearbox stud holes; however, if the area around two or more holes is damaged to the limits shown above evaluation by higher maintenance level is required.**
2. **The total reworked surface area on the top surface of the fitting must not exceed thirty percent of the total area.**
3. **The wear limits (elongation) of stud holes is 0.329 inch.**
4. **Maximum chaffing wear. (See detail B.)**
   a. **In the area 45° either side of the vertical fin centerline (viewed from forward side looking up), the minimum material thickness is 0.050 inch.**
   b. **In the area 45° to 85° either side of the vertical fin centerline, the minimum material thickness is 0.200 inch.**
5. No cracks allowed. Scratches, nicks, dents and corrosion are allowed on hole surfaces to a maximum depth of 0.010 inch for a total discrepant of 40 percent. Treat corrosion and all reworked area per TM 43-0105.
6. **All dimensions are in inches unless otherwise noted.**

Figure 2-62. Ninety degree gearbox support fitting damage limits

204030-1011D



NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

1. Mechanical and corrosion damage limited to shaded area of above figure. Maximum depth after clean-up shall not exceed 10 percent of material thickness.
2. Inspect attach holes for wear.
3. Corrosion inspection per TM43-0105.

FITTING LOCATION	(NEW PART) MIN.	MAX.	WEAR LIMIT
LOWER LEFT/LOWER RIGHT/ UPPER RIGHT	0.376	0.381	0.396
UPPER LEFT	0.439	0.444	0.459

204030-1010B

Figure 2-63. Tailboom attach fitting wear and damage limits

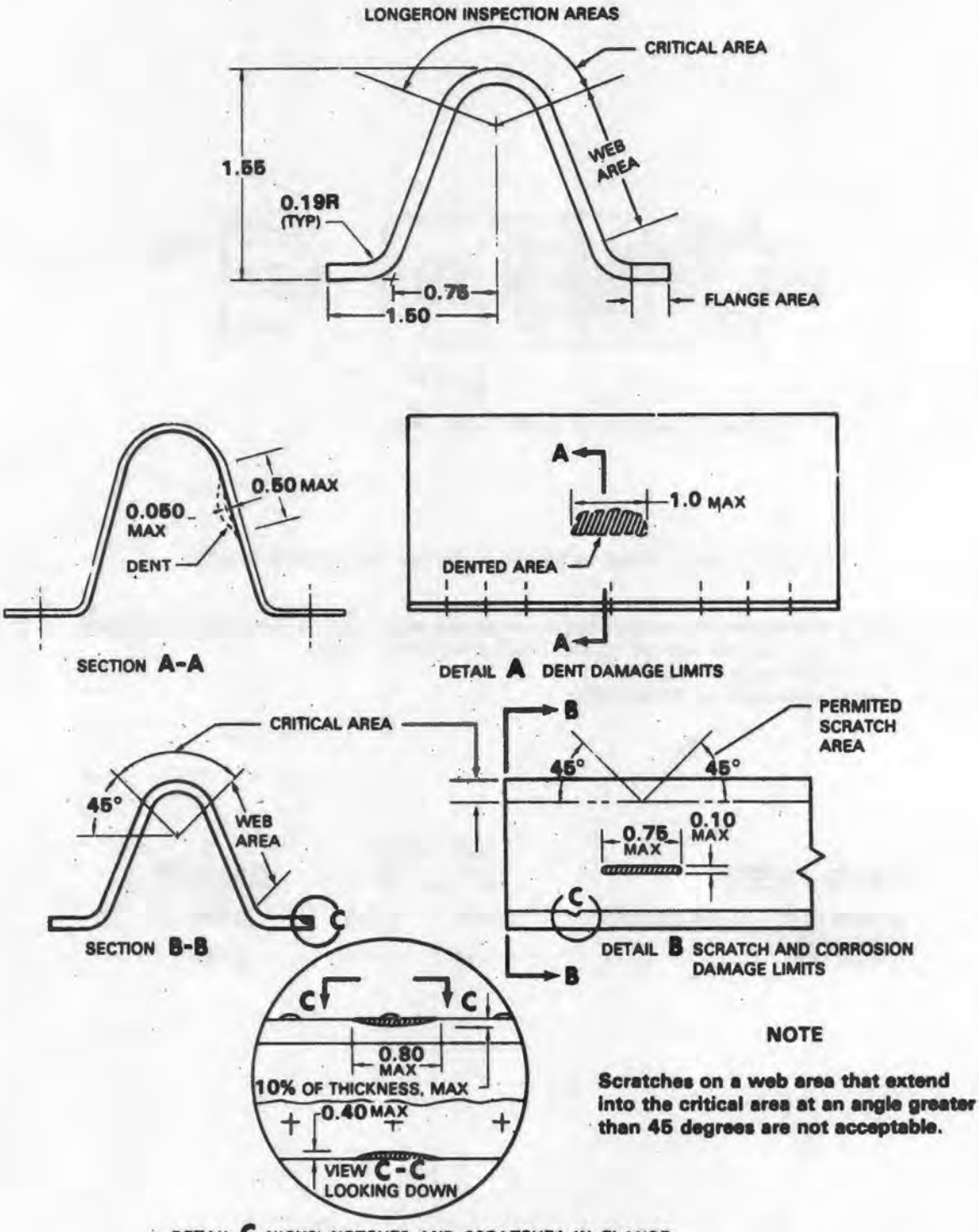
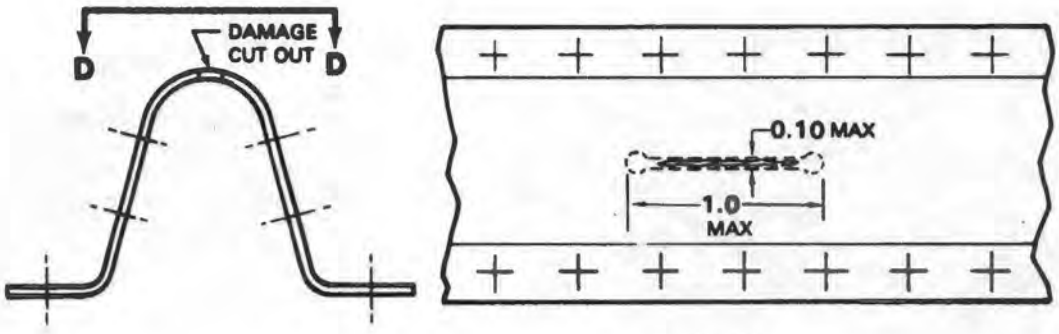
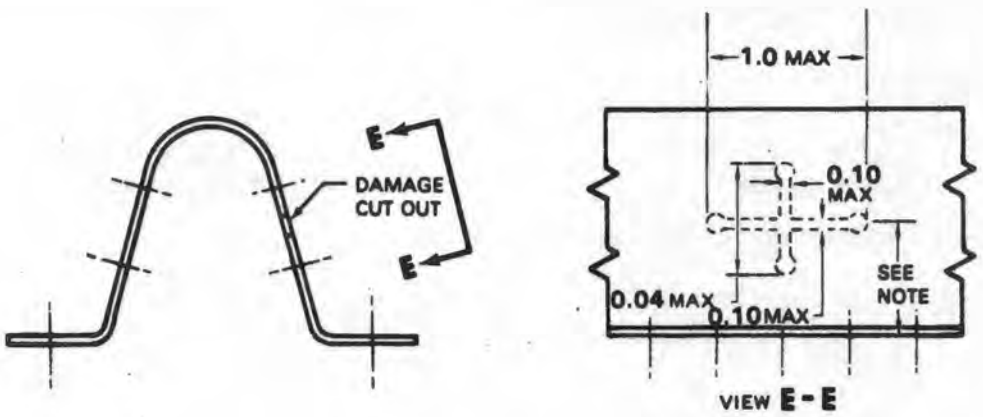


Figure 2-64. Longeron damage limits (Sheet 1 of 3)



VIEW **D - D**

DETAIL **D** LONGITUDINAL CRACKS IN CRITICAL AREA



VIEW **E - E**

DETAIL **E** LONGITUDINAL OR LATERAL CRACKS IN WEB AREA

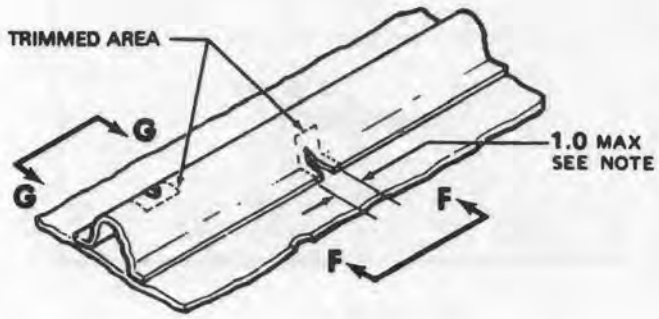
NOTE

All longitudinal cracks are repairable if they are located within the following limits: 0.45 inch minimum height from longeron flange, 1.04 inches maximum height from longeron flange.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

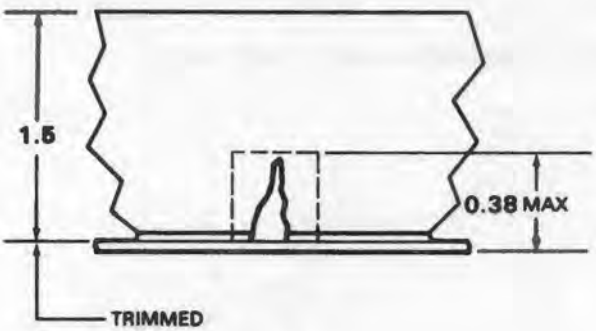
204030-183-2B

Figure 2-64. Longeron damage limits (Sheet 2 of 3)

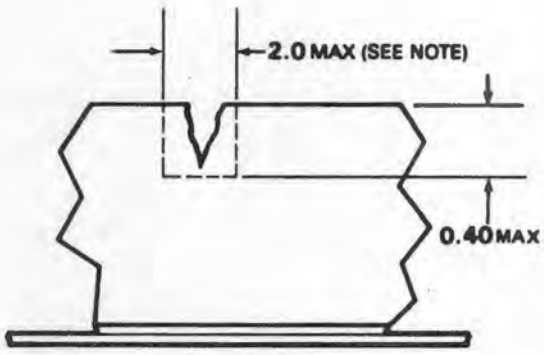


NOTE

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.

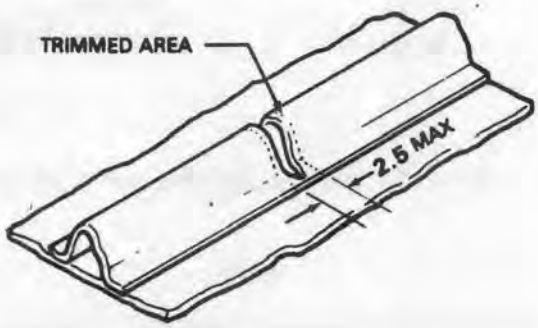


SECTION F-F
FLANGE AND WED



SECTION G-G
CRITICAL AREA

DETAIL F DAMAGE LIMIT TO CRITICAL AREA, FLANGE OR WEB

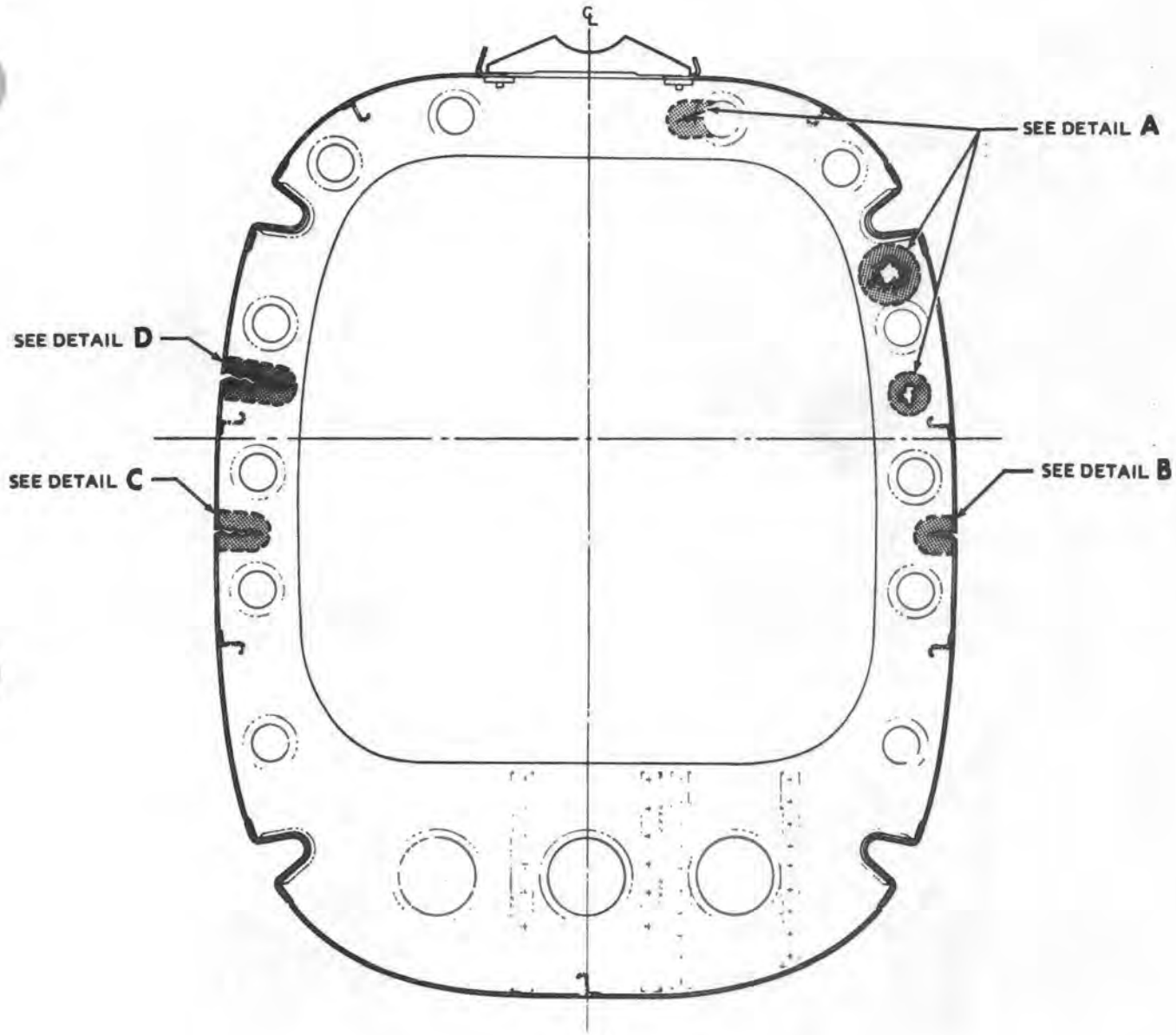


DETAIL G DAMAGE LIMIT TO CRITICAL AREA, FLANGE AND WEB

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

204030-183-3B

Figure 2-64. 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 required a full splice.

204030-184-1A

Figure 2-65. Typical bulkhead damage limits (Sheet 1 of 2)

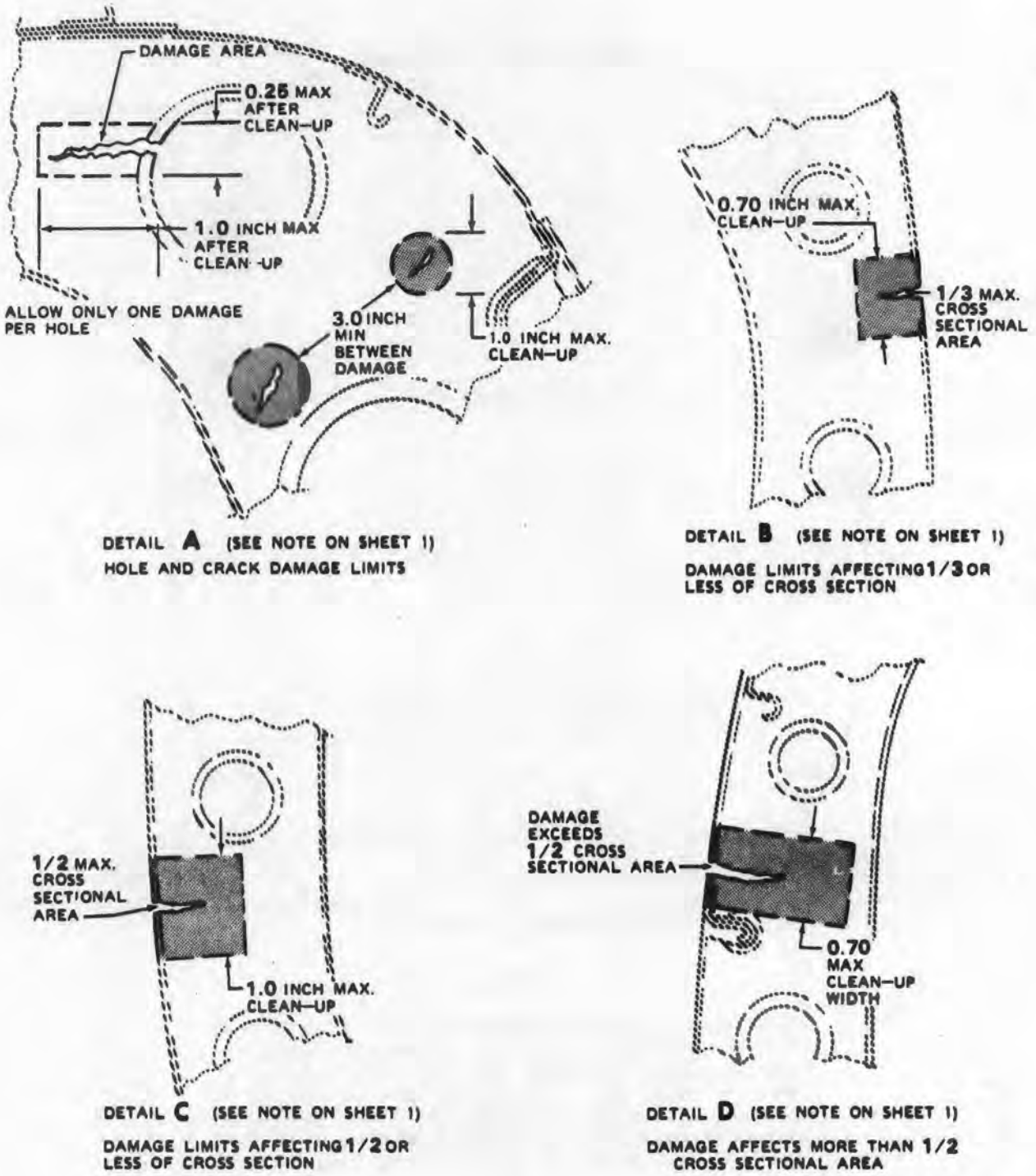
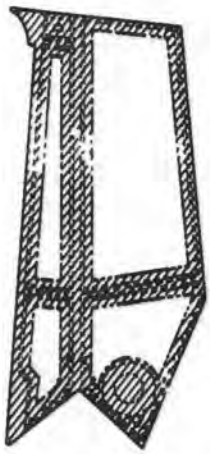


Figure 2-65. Typical bulkhead damage limits (Sheet 2 of 2)



FIN PANEL

REPAIR CODES

Repairable Areas. (See details A through E).

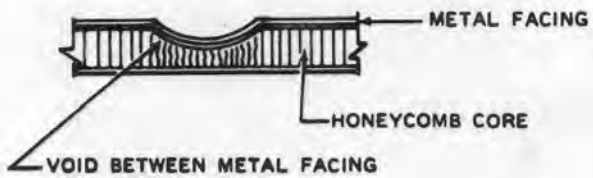
Critical Area. Repair only with qualified Engineering approval.

NOTES:

1. Minor surface scratches and smooth, scratch-free dents which does not crush core, may be classed as negligible.
2. Remove all previous installed patches and inspect repaired area.
3. Replace 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.

204030-186-1A

Figure 2-66. Vertical fin panel damage limits tailboom (Sheet 1 of 3)



DETAIL **A**

SURFACE DENT WITH CRUSHED CORE AND VOID BETWEEN SKIN AND CORE

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 stucture, inserts or beveled edge.

DETAIL **B**

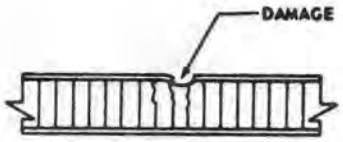
SURFACE DENT WITH CRUSHED CORE. NO VOIDS UNDER DENT

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.

204030-186-2A

Figure 2-66. Vertical fin panel damage limits (Sheet 2 of 3)

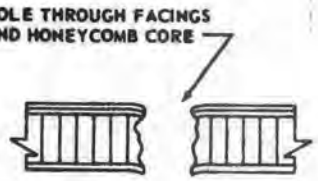


DETAIL C

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.

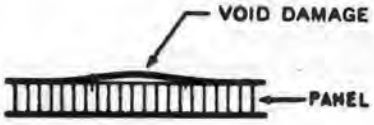


DETAIL D

DAMAGE PENETRATES THROUGH BOTH SKINS 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.



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 0.5 inch of a beveled edge or within 1.0 inch of an insert, hole or adjacent structure. Void in area of insert limited to 0.62 square inch with no damage to insert.

204030-186-3A

Figure 2-66. Vertical fin panel damage limits (Sheet 3 of 3)

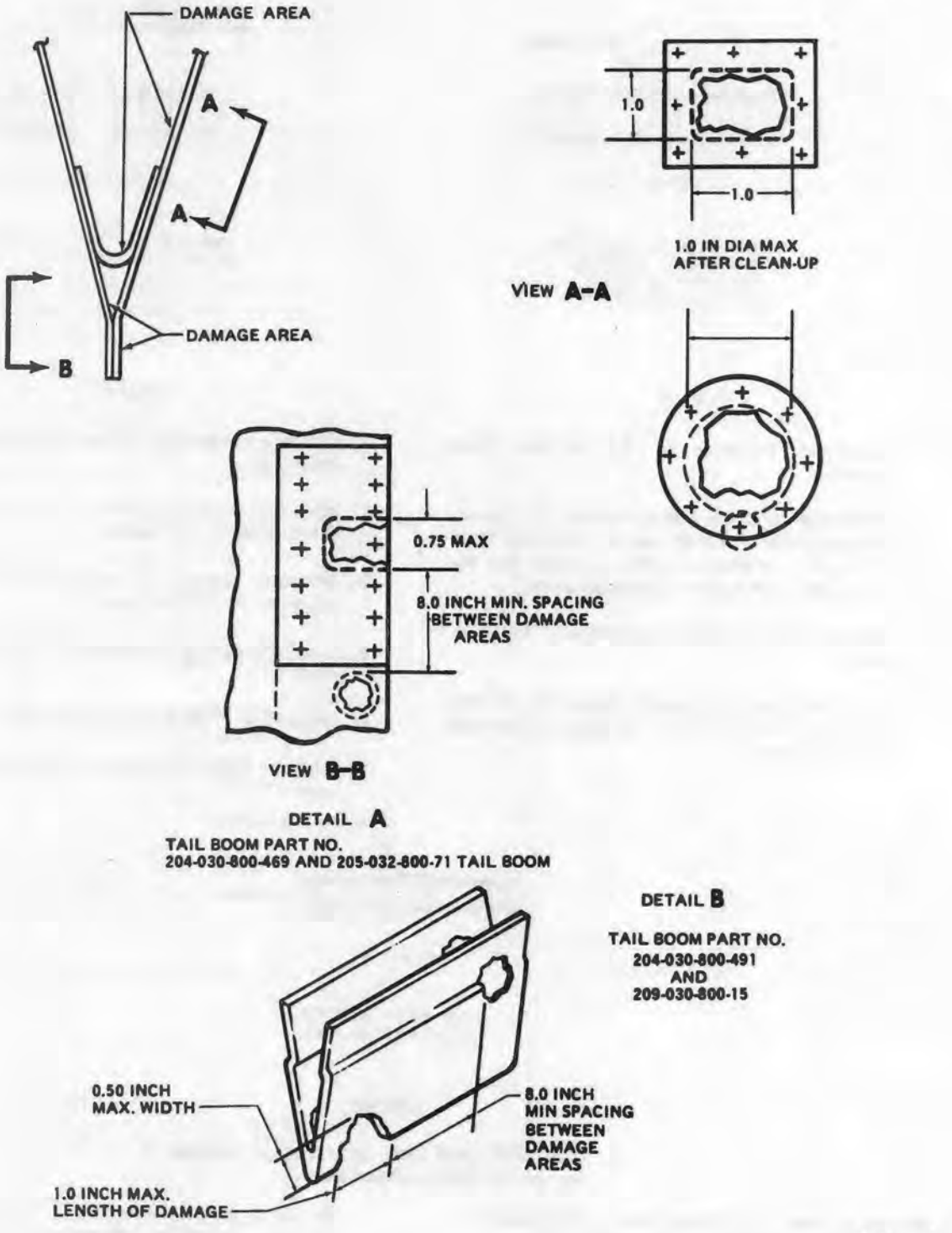


Figure 2-67. Fin trailing edge damage limits

2-288. Repair — Tailboom Structure. (AVIM)

Premaintenance requirements for repair of tailboom structure

Condition	Requirements
Model	UH-1C/M
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C14), (C3), (C93.1), (C143), (C146), (C137), (C185.1), (C188), (C253)
Special Environmental Conditions	Temperature/ Dust Free

NOTE

Standard type repairs (TM 55-1500-204-25/1) may be used when specified. However, standard repairs shall not be used where the accomplishment of the repair affects weight and balance, structural integrity, interchangeability, or operational characteristics of the helicopter. See figure 2-7 for tailboom skin identification.

a. Repair of combined skin and/or stringer damage (figure 2-17 and 2-68).

(1) Cut a round or elongated hole around puncture or tear in skin. Hole shall be large enough to include all ragged edges and any stretched metal. Allow generous radii in all corners.

(2) Trim edge of damage in stringer to allow at least one rivet space in skin beyond skin cut out.

(3) Cut skin and stringer inserts of same material and gage as original material. Inserts shall be of size to completely fill cut out areas.

(4) Cut a skin patch of same material and gage as damaged skin. Patch shall be of sufficient size to provide required overlap of cut out area.

(5) Provide stringer patch of size to over-lap undamaged portion of stringer to provide proper rivet distance for a minimum of four rivets. Use existing rivet spacing as a guide (figure 2-68, sheet 2).

NOTE

If damage to stringer is of a minor nature, repair may be made by "nested angle" method (figure 2-68, sheet 2, view A).

(6) Position inserts and patches and secure firmly in place. Drill rivet holes through patches inserts and original parts. Rivet holes shall be of same size and spacing as original pattern. Deburr all holes.

(7) Clean all paint and dirt from mating areas of skin and stringer, and from both sides of inserts and patches.

(8) Apply a coat of epoxy primer (C93.1) to all cleaned areas and allow to dry.

(9) Coat side of skin patch which will mate with skin with sealant (C188).

(10) Position inserts and patches and rivet in place.

(11) Apply epoxy primer (C93.1) to repaired areas. When dry, apply two coats of lacquer of color to match original finish. (Refer to TB 746-93-2.)

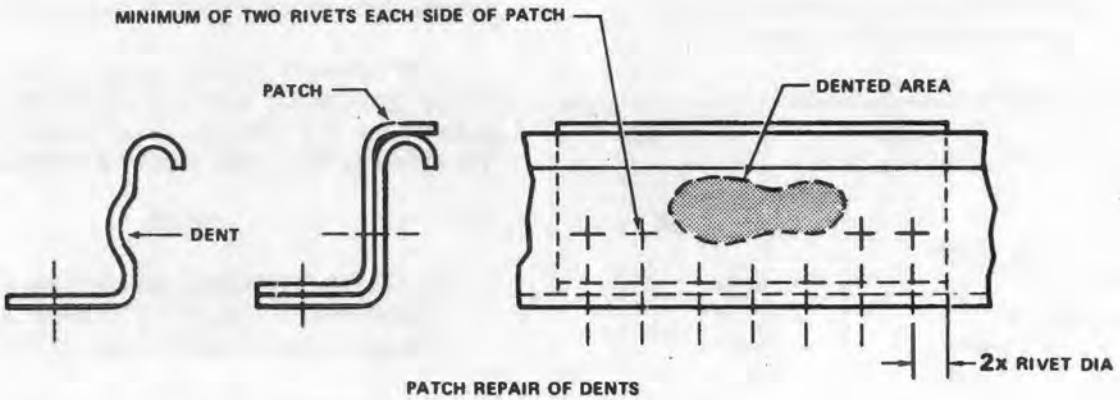
b. Repair damaged longerons (figure 2-69). (AVIM).

NOTE

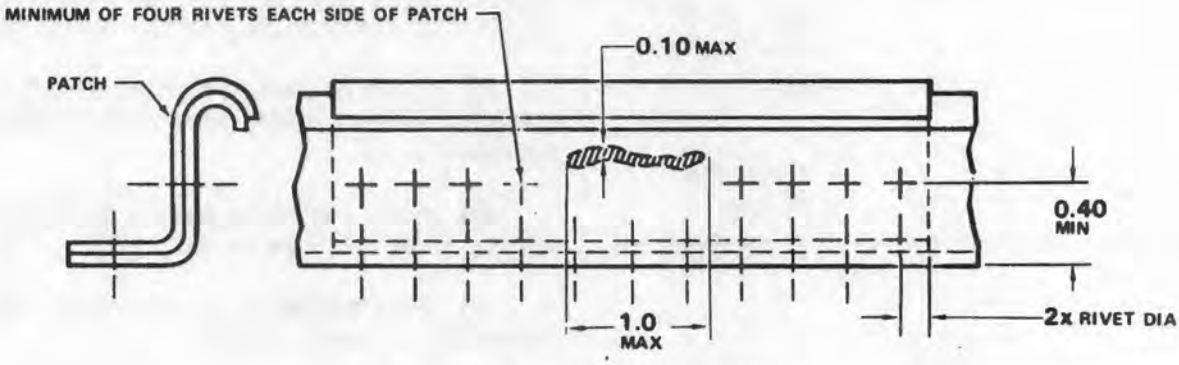
Only one repair may be made on each longeron in any tailboom bay. No repair allowed in forward bay. Refer to table 2-6 for repair limits and areas.

All splice areas or any bonded area should be repaired only with qualified engineering authority.

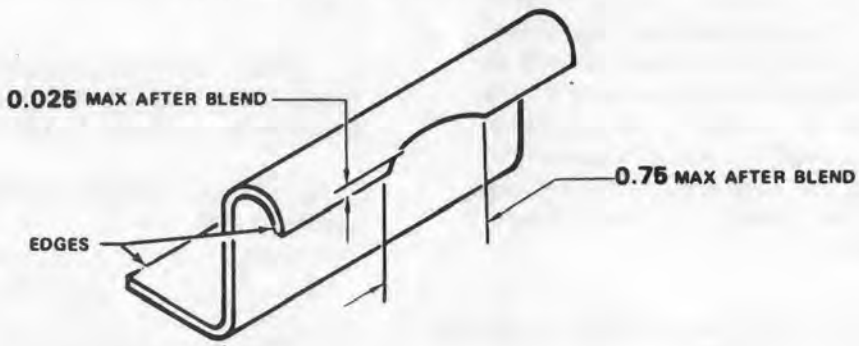
(1) Polish out acceptable nicks, notches, and scratches with No. 400 grit abrasive paper (C185.1).



PATCH REPAIR OF DENTS



PATCH REPAIR OF LONGITUDINAL CRACKS

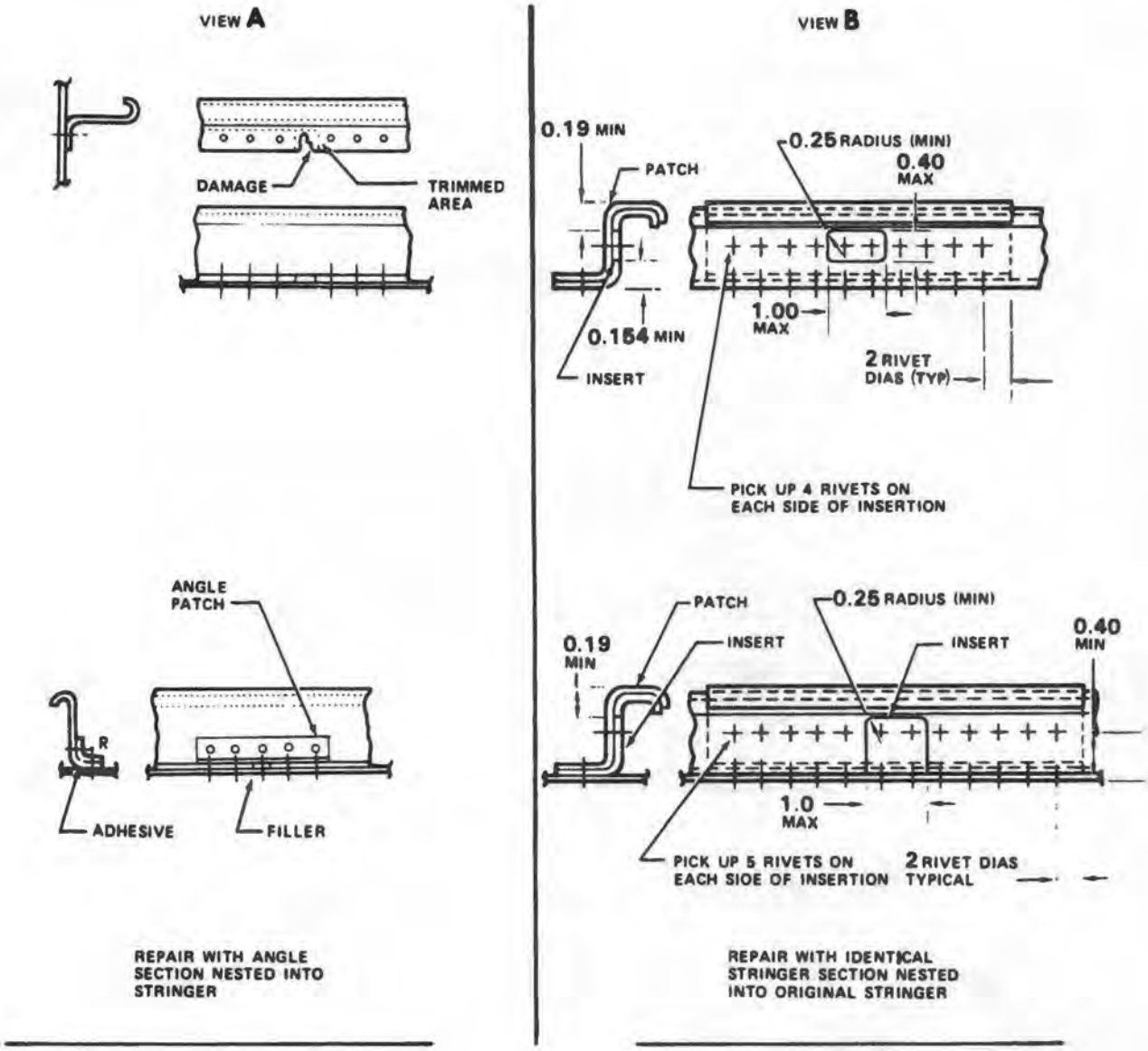


REPAIR OF EDGE DAMAGE

NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

204030-1037

Figure 2-68. Stringer repair (Sheet 1 of 2)

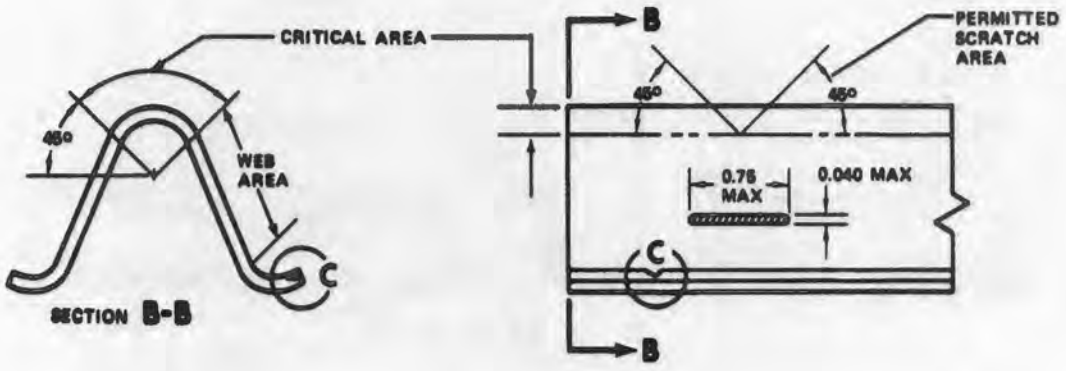


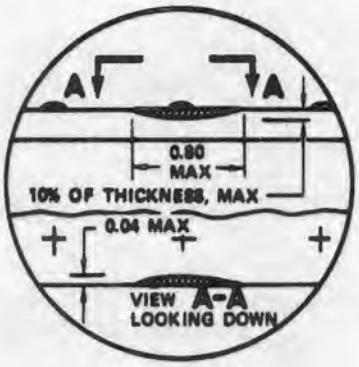
NOTES:

1. **Damage occurring to the crown of the stiffener (not shown) shall be repaired as shown in view "B", except there shall be a minimum of eight rivets on each side of damaged area.**
2. **Stiffener severed completely (not shown) shall be repaired as directed in Note 1.**

204030-S12A-2

Figure 2-68. Stringer repair (Sheet 2 of 2)

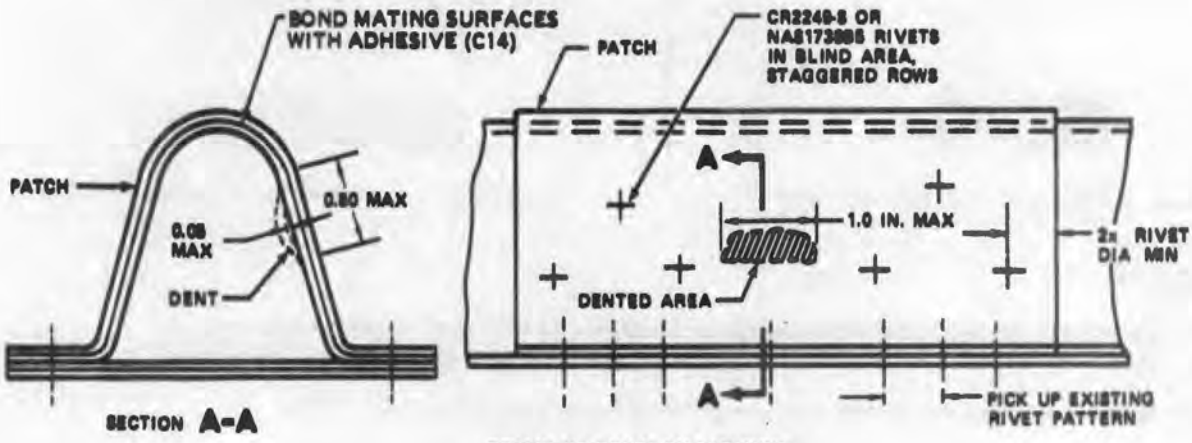




DETAIL C
NICKS, NOTCHES AND SCRATCHES

NOTES

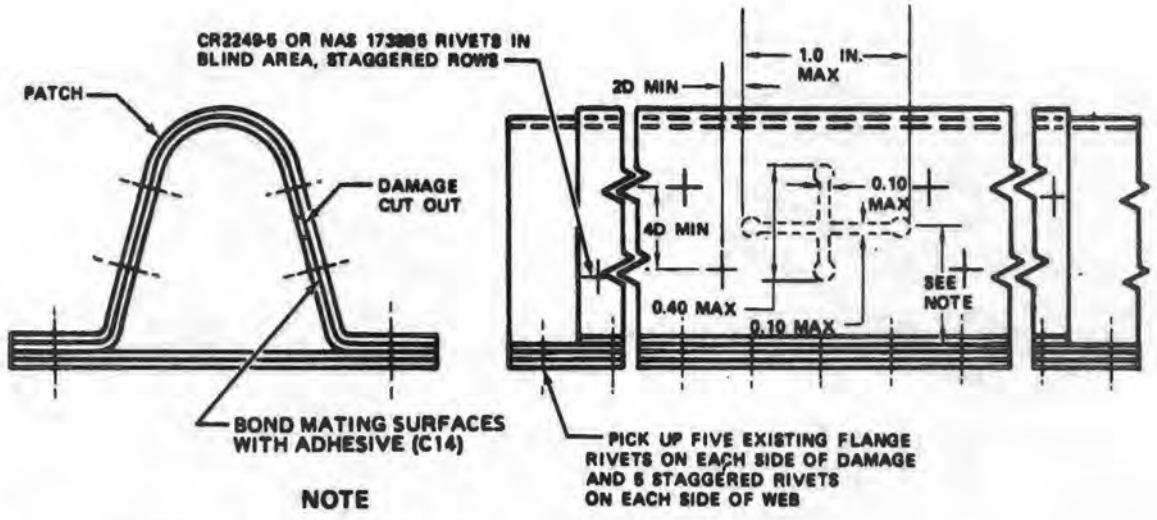
1. Scratches on a web area that extend into the critical area at an angle greater than 45 degrees are not acceptable.
2. All dimensions in inches unless otherwise noted.
3. Magnetic particle fluorescent penetrant inspection per TM 43-0103.
4. Corrosion inspection and repair per TM 43-0105.



REPAIR OF DENTS BY PATCHING

212030-54-1F

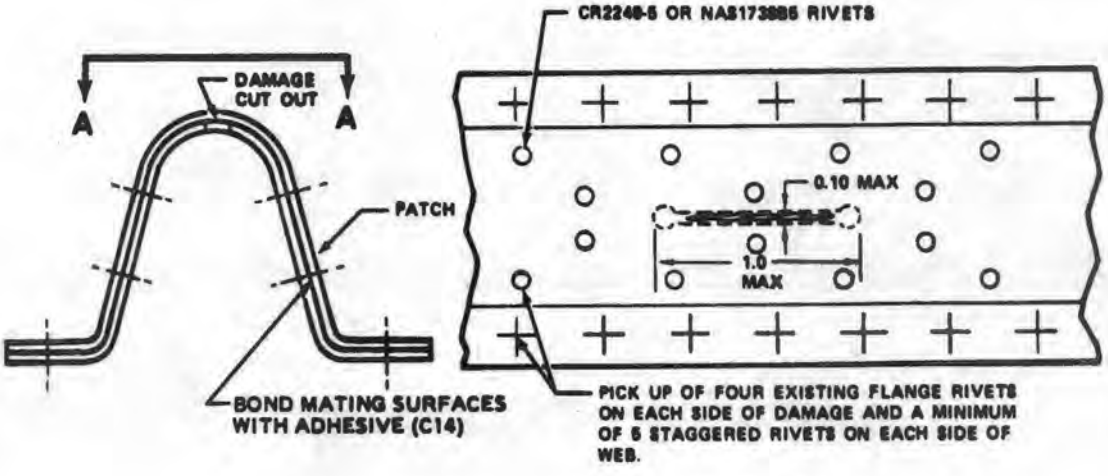
Figure 2-69. Longeron damage and repair criteria (Sheet 1 of 3)



NOTE

All longitudinal cracks are repairable if they are located within the following limits: 0.45 inch minimum height from longeron flange, 1.04 inches maximum height from longeron flange.

REPAIR OF LONGITUDINAL OR LATERAL CRACKS IN WEB AREA, BY PATCHING

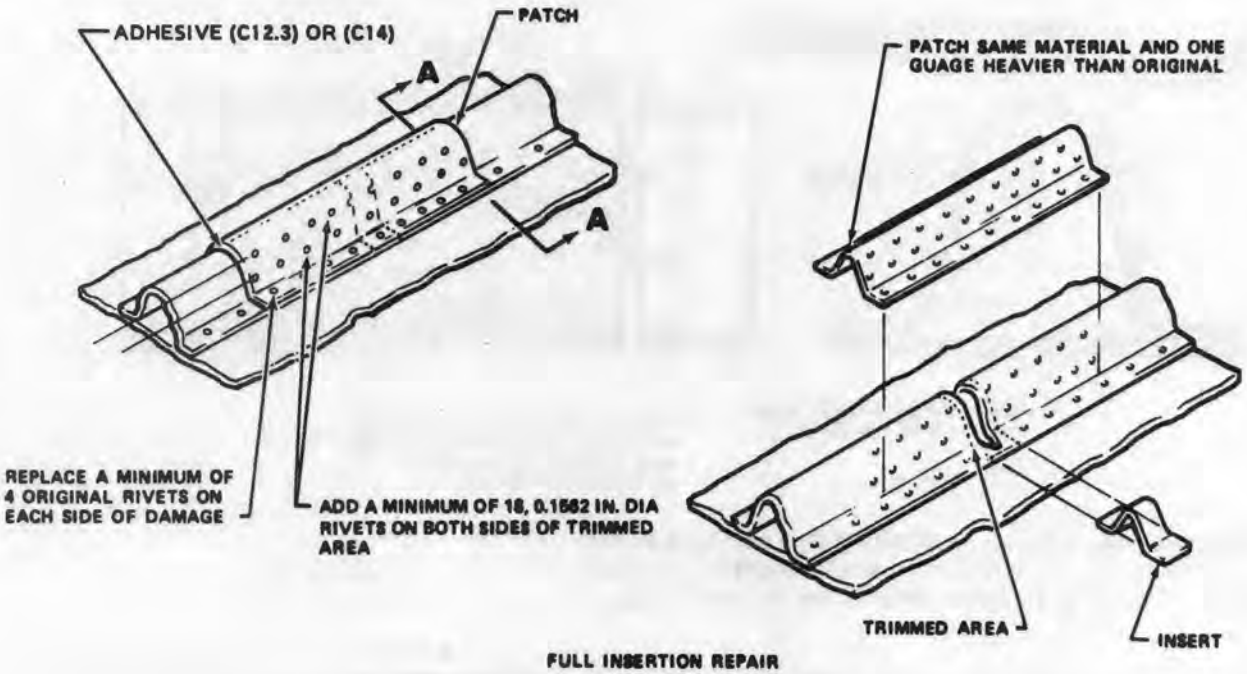


VIEW A-A

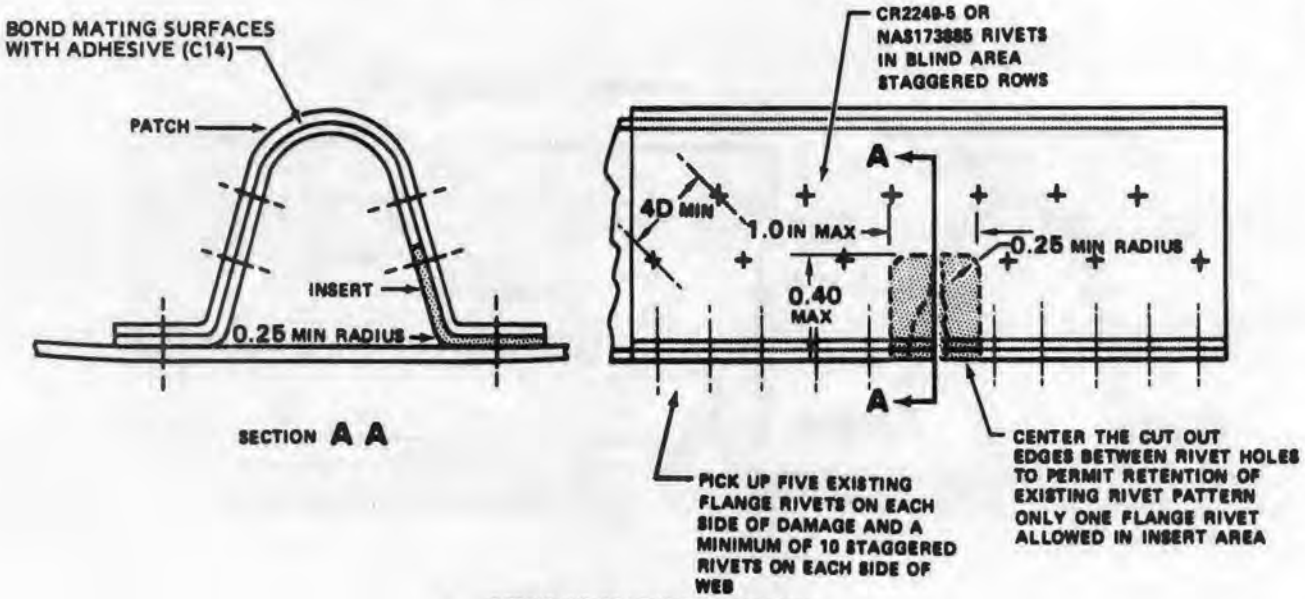
REPAIR OF LONGITUDINAL CRACKS IN CRITICAL AREA, BY PATCHING

212030-54-2F

Figure 2-69. Longeron damage and repair criteria (Sheet 2 of 3)



FULL INSERTION REPAIR



REPAIR OF CRACKS BY INSERTION

212030-54-3E

Figure 2-69. Longeron damage and repair criteria (Sheet 3 of 3)

NOTE

When removing corrosion, be sure to check pockets and hidden areas for indications of pitting.

(2) Refer to paragraph 2-14 for cleaning and treatment of corroded parts.

(3) Polish scratches on longeron web surfaces and acceptable scratches in critical area to a maximum length of **0.75** inch, maximum width of **0.04** inch and no deeper than **10** percent of material thickness No. 400 grit abrasive paper (C185.1).

(4) Polish nicks and notches on flanged edges of longerons to a maximum length of **0.80** inch, maximum width of **0.04** inch and to a depth not to exceed 10 percent of material thickness with No. 400 grit abrasive paper (C185.1).

(5) Longitudinal cracks in the critical and web areas may be repaired by patching provided the cleanup area does not exceed **1.0** inch long and **0.10** inch wide. Lateral cracks in web areas may be repaired by patching provided the cleanup area does not exceed **0.40** inch long and **0.10** inch wide. Lateral cracks in flange and web areas may be repaired by insertion within limits shown on sheets 2 and 3, figure 2-79.

(6) Smooth, contoured, non-sharp dents no deeper than **0.050** inch, not exceeding **0.500** inch wide and **1.0** inch long require repair by patching.

(7) Procedure for the repair of longeron cracks and dents by patching is as follows: (Refer to sheet 1 and 2, figure 2-69).

NOTE

A patch shall not overlap or come any closer than 1.0 inch from a splice member or fitting.

Longerons shall not be repaired by patching or insertion at any bulkhead when the patch extends into or beyond the bulkhead flanges.

(a) Check for loose, missing, sheared, damage rivets, or elongated rivet holes, and damage to skin.

(b) Stop drill ends of crack with a minimum stop drill diameter of **0.094** inch. Cleanup damaged area taking care not to cut away more material than necessary.

(c) Procure a patch of same material, shape and one gage heavier than the longeron being repaired. Patch to be of sufficient size to pickup the specified number of rivets called out on figure 2-69.

(d) Drill out existing flange rivets that will interfere with placement of patch.

(e) Secure patch in position and drill rivet holes of the required size and pitch as shown on figure 2-69. Back drill existing flange rivet holes to pick up patch flange holes. Remove patch and deburr all holes.

WARNING

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

(f) Clean paint and dirt from mating surfaces of damaged area by wiping mating surfaces with a clean cloth moistened with naphtha (C143). The paint shall be removed in the mating area by sanding lightly with No. 400 grit abrasive paper (C185.1). Remove the sanding residue with a clean cloth moistened with naphtha. The mating surfaces shall be wiped dry with a clean dry cloth before the naphtha evaporates.

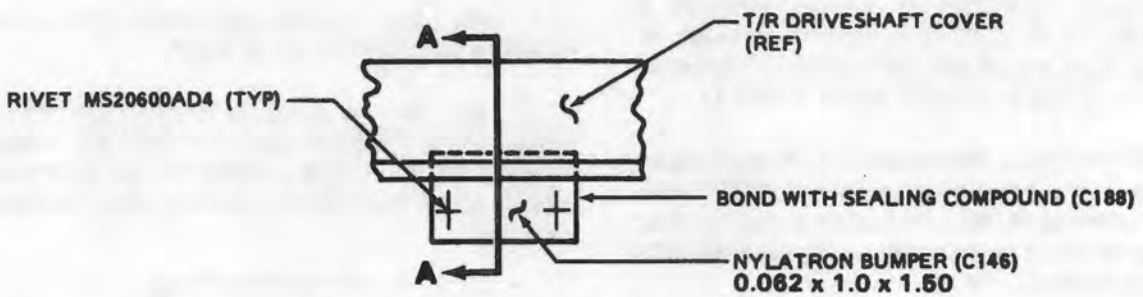
NOTE

Do not prime patch or longeron in area to be bonded.

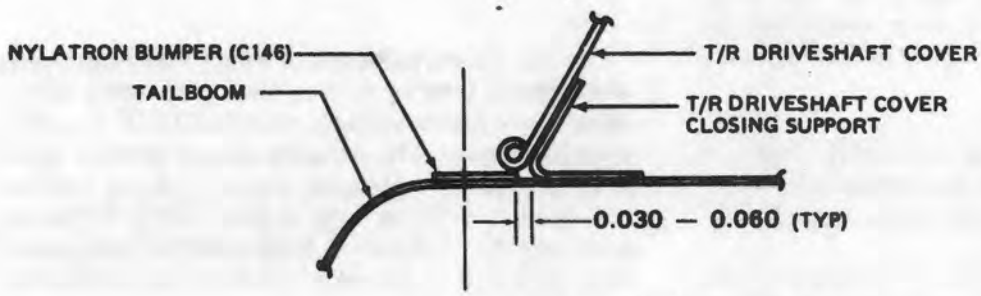
(g) Apply a smooth coat of adhesive (C14) to patch and longeron mating surfaces. Adhesive may be applied by spatula, notched trowel, wood applicator, or by flowing in place.

(h) Secure patch in position and rivet in palce while adhesive is still tacky.

(i) Wipe off excess adhesive and coat repaired area with epoxy primer (C93.1). Allow adhesive to cure for **24** to **48** hours at room temperature **70** to **72** degrees F (**21** to **23** degrees C).



TOP VIEW



SECTIONAL VIEW **A–A**

NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

205030-1022B

Figure 2-70. Tailboom chafing pad installation

(8) Procedure for the repair of longeron damage by insertion is as follows: (Refer to sheet 3, figure 2-69.)

NOTE

A patch shall not overlap or come any closer than 1.0 inch from a splice member or fitting.

Longerons shall not be repaired by patching or insertion at any bulkhead when the patch extends into or beyond the bulkhead flanges.

(a) Inspect longeron splice areas for separation of splice and longeron, cracks and breaks, missing or damage rivets, and other damage. Such damage is not repairable. Twisted, misaligned or deformed longerons are not repairable.

(b) Check for loose, missing, sheared or damaged rivets, torn or elongated rivet holes, and damage to skin.

(c) Cut out damaged material to remove all ragged edges and stretched metal. Center trimmed edges of cutout in such a manner as to permit retention of existing rivet pattern. Do not remove more material than necessary.

(d) Procure a patch of same material, shape and one gage heavier than the longeron being repaired. Patch to be of sufficient size to allow replacement of required number of flange rivets and placement of correct number of rivets on each side of insert.

(e) Procure an insert of same material, gage, and shape as original part. Insert shall be of size to completely fill cutout area.

(f) Drill out existing flange rivets as necessary.

(g) Position insert and patch and drill required rivet holes in suitable pattern, maintaining proper spacing and edge distance. Deburr as necessary.

WARNING

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

(h) Clean paint and dirt from mating surfaces of damaged area by wiping mating surfaces with a clean cloth moistened with naphtha (C143). The paint shall be removed in the mating area by sanding lightly with 400 grit abrasive paper (C185.1). Remove the sanding residue with a clean cloth moistened with naphtha. The mating surface shall be wiped dry with a clean cloth before the naphtha evaporates.

NOTE

Do not prime or patch longeron in area to be bonded.

(i) Apply a smooth coat of adhesive (C14) to patch, insert, and longeron mating surfaces. Adhesive may be applied by spatula, notched trowel, wood applicator, or by flowing into place.

(j) Secure patch and insert in position and rivet in place while adhesive is still tacky.

(k) Wipe off excess adhesive and coat repaired area with epoxy primer (C93.1). Allow adhesive to cure for **24** to **48** hours at room temperature **70 to 72** degrees **F (21 to 23** degrees C).

c. Chafing (bumper) pad installation on tailboom. (AVIM)

NOTE

Chafing damage to tailboom skin caused by tail rotor driveshaft doors may be prevented by installation of chafing (bumper) pads.

(1) Cut five bumper pads to dimensions shown in figure 2-70 from nylatron (C146).

(2) Install bumper pads on tailboom at stations 62.0, 100.00, 121.20, 163.00, and 193.00 in position shown in figure 2-70. Bond bumper pads to tailboom with proseal 890 (C188). Install two MS20600AD4 rivets outboard of tail rotor driveshaft cover as shown on figure 2-72.

d. Repair tail rotor driveshaft cover support angels and hinges. Repair angles and hinges in accordance with instructions in figure 2-71.

e. Repair tail rotor driveshaft access cover.

(1) Replace unserviceable hinges and fasteners.

(2) Repair skin using standard repair methods.

f. Repair damaged formers on forward bulkhead. Refer to repair procedures in figure 2-72.

g. Repair of bulkhead web damage.

(1) Nicks, scratches, and dents classified as negligible, may be polished out with pads (C3) or 400 grit abrasive paper (C185.1).

NOTE

When removing corrosion be sure to check pockets and hidden areas for indications. Refer to paragraph 2-14 for cleaning and treatment of corroded parts. Allow only one splice repair on each repairable bulkhead.

(2) Repair cracked lightening holes and web damage that can be repaired by a single patch and insert. (Figure 2-73, sheet 2.)

(a) Stop drill cracks which extend less than 1.0 inch between lightening holes or hole and flange angle.

(b) Prepare and install patch in accordance with step (5) below.

(3) Cracks between two lightening holes, or which extend at least one-half the distance between lightening holes or lightening hole and flange angle, shall be repaired as follows:

(a) Cut out damaged area to include all ragged edges and stretched metal.

(b) Fabricate patch of same material and gage as that or part being repaired. Patch shall be of sufficient size to extend at least one-half the diameter of both lightening holes in damage area and full flange width.

(c) Secure patch over damaged area, as shown on sheet 1, figure 2-73, and drill suitable rivet pattern, maintaining proper spacing and edge distance. Deburr rivet holes.

(d) Clean all paint and dirt from around damaged area and both sides of patch.

(e) Apply coat of primer (C253) to damaged area and to both sides of patch. Allow primer to dry.

(f) Secure patch in position and rivet in place.

(g) Apply coat of primer (C253) to repair area.

(4) Repair of web penetration damage is as follows: (Refer to sheet 1, figure 2-73.)

(a) Cut round or elongated hole according to shape of puncture or tear in order to clean up ragged edges and stretched metal. Allow generous radii at all corners.

(b) Cut and form a patch of same material and thickness as damaged web and flange.

(c) Remove paint and dirt from damaged area.

(d) Secure patch in position and drill rivet holes of same size and pitch as surrounding area. (Refer to sheet 1, figure 2-73.) Deburr all holes.

(e) Apply a coat of primer (C253) to both sides of patch and damaged area. Allow to dry.

(f) Secure patch in position and rivet in place.

(g) Apply a coat of primer (C253) to required area.

(5) Insert or splice repair of bulkhead, intercostal and rib webs is as follows: (Refer to sheets 2 and 3, figure 2-73.)

(a) Cut out damaged area to include all ragged edges and stretched metal. Allow generous radii at all corners. Deburr.

(b) Fabricate a patch of same material and gage as original part. Patch shall be of size sufficient to cover damage and provide edge distance in both members. If repair requires the use of an insert, fabricate insert of same material and gage as original part. Inserts shall be of size to completely fill cut out area. Patches and inserts shall include cut outs for lightening holes as necessary.

(c) Drill out existing rives which would interfere with repair.

(d) Position patch, and insert if used, and drill suitable rivet holes, maintaining proper spacing and edge distance as outliend on figure 2-73. Deburr as necessary.

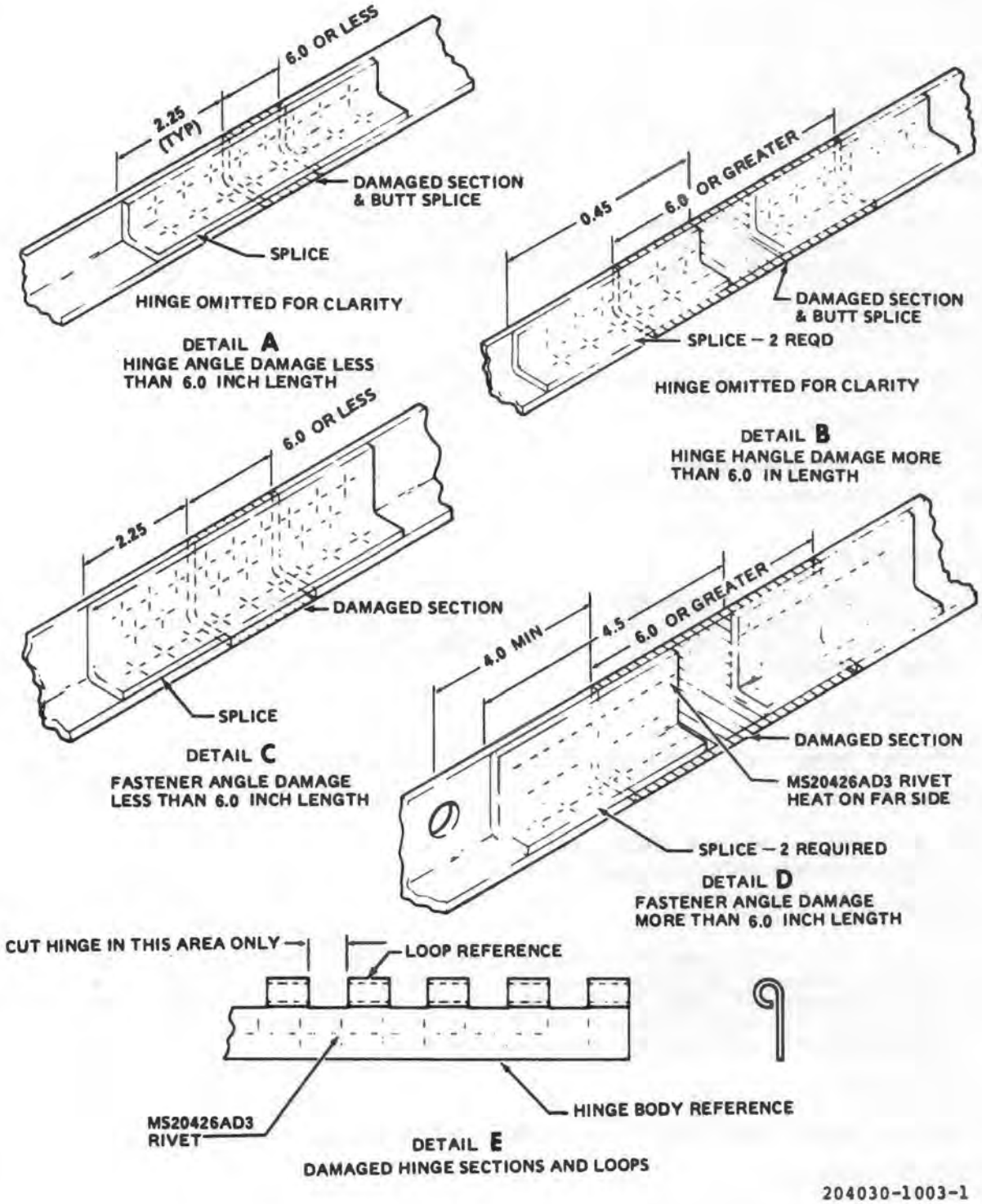


Figure 2-71. Repair of driveshaft cover support angles and hinges (Sheet 1 of 3)

APPLICATION A:

For damaged hinge angles with damage less than 6.0 inches in length.

PARTS REQUIRED A:

*(1) Like butt section same as removed section.
(2) Nesting like section splice angle long enough to overlap existing angle 2.25 inches each end.

PROCEDURE A:

*(1) Cut out and remove damaged section of angle. Replace with the like butt section.
(2) Install the nesting splice angle. Pick up all existing rivets.
(3) Add additional 0.0937 rivets through hinge and vertical flange centered between existing rivets.

APPLICATION B:

For damaged hinge angles with damage more than 6.0 inches in length.

PARTS REQUIRED B:

*(1) Like butt section same as removed section.
*(2) Nesting like section splice angle 4.5 inches long for each butt joint.

PROCEDURE B:

*(1) Cut out and remove damaged section of angle. Replace with the like butt section.
(2) Install the nesting splice angle centered over each butt joint. Pick up all existing rivets.
(3) Add three additional 0.0937 rivets in each splice through hinge and vertical flange centered between existing rivets.

APPLICATION C:

For damaged fastener angles with damage less than 6.0 inches in length.

PARTS REQUIRED C:

*(1) Like butt section same as removed section.
(2) Nesting like section splice angle long enough to overlap existing angle 2.25 inches at each end.

PROCEDURE C:

(1) Cut out and remove damaged section of angle. Do not cut within 4.0 inches of fastener centerline. Replace removed section with the like butt section.
(2) Install the nesting splice angle. Pick up all existing rivets.
(3) Add a double row staggered rivet pattern of 0.0937 flush rivets in the vertical flange maintaining 0.25 inch E.D. and approximately 0.85 inch spacing.

APPLICATION D:

For damaged fastener angles with damage more than 6.0 inches long.

PARTS REQUIRED D:

*(1) Like butt section same as removed section.
*(2) Nesting like section splice angle 4.5 inches long for each butt joint.

204030-1003-2A

Figure 2-71. Repair of driveshaft cover support angles and hinges (Sheet 2 of 3)

PROCEDURE D:

(1) Cut out and remove damaged section of angle. Do not cut angle within 4.0 of fastener centerline. Replace removed section with the like butt section.
(2) Install the nesting like section centered over each joint. Pick up all existing rivets.
(3) Add a double row staggered rivet pattern of 0.0937 flush rivets in the vertical flange overlap areas maintaining 0.25 edge distance and approximately 0.85 spacing.

APPLICATION E:

For bent hinge sections and hinge loops.

PROCEDURE E:

Hand form and check for cracks. If cracked, repair per application "F" or "G".

APPLICATION F:

For damaged hinge half section.

PARTS REQUIRED F:

Like butt section same as removed section.

PROCEDURE F:

(1) Cut out and remove damaged section. Replace with the like butt section.
(2) Pick up existing rivets and add additional 0.0937 rivets centered between existing rivets.

APPLICATION G:

For cracked and/or worn through hinge loops.

PROCEDURE G:

(1) Cut off hinge loop flush with hinge body.
(2) Radius edges and refinish.

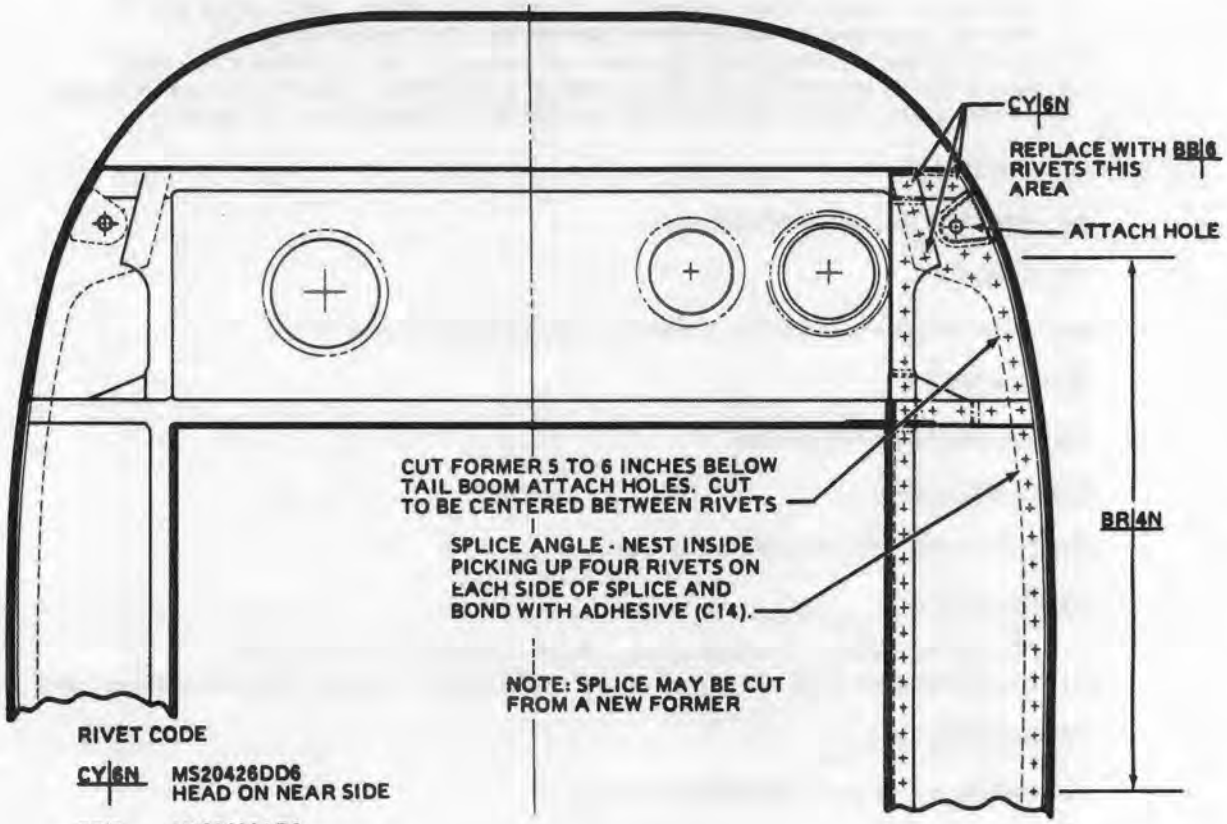
LIMITATIONS G:

No more than one loop may be removed in any 8.0 length. If exceeded repair per application "F".

* 2024-T42 Al Aly, 0.040 Thick

204030-1003-3

Figure 2-71. Repair of driveshaft cover support angels and hinges (Sheet 3 of 3)



REPAIR FOR DAMAGED TAILBOOM FRONT BULKHEAD FORMER

APPLICATION:

Repair of cracked former on forward bulkhead.

PARTS REQUIRED:

(1) Like section of portion of former which is being replaced.
(2) Nesting like section splice angle long enough to pick up four rivets on each side of butt joint in former.
(3) Original type rivets.

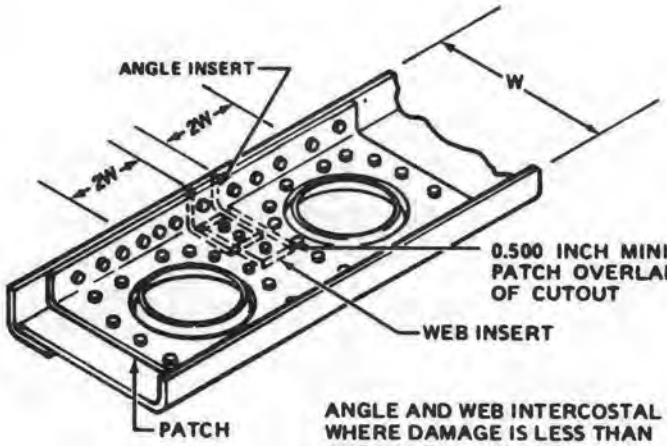
PROCEDURE:

(1) Remove the required number of rivets to allow the former to be cut as shown in illustration.
(2) Remove discrepant portion of former.
(3) Install new like section of former and splice angle as shown in illustration using existing type rivets and location. Bond splice angle with adhesive (C14).

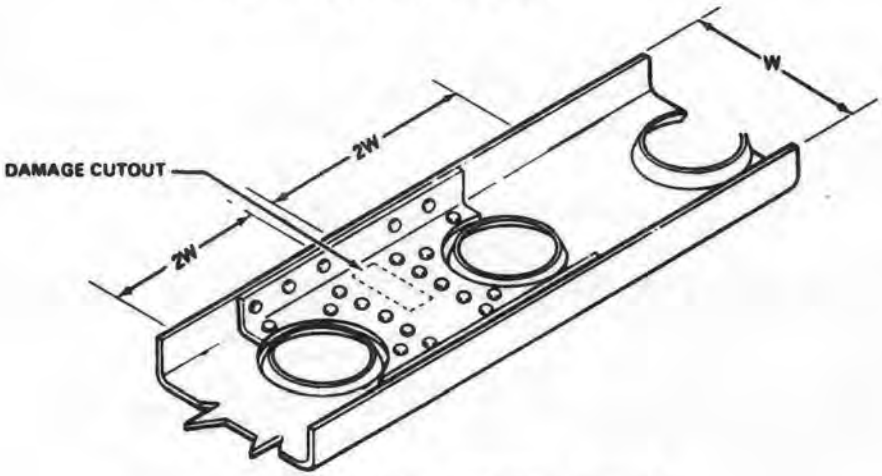
NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

204030-1017A

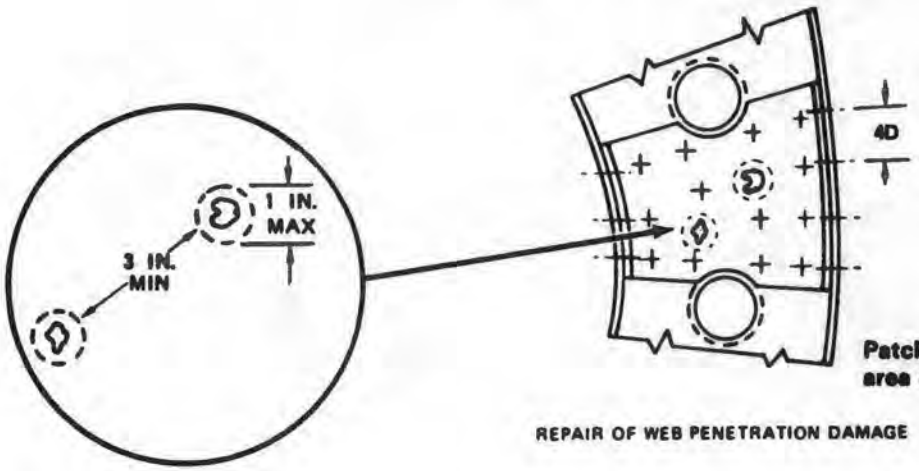
Figure 2-72. Repair for damaged tailboom forward bulkhead former



ANGLE AND WEB INTERCOSTAL DAMAGE
WHERE DAMAGE IS LESS THAN
ONE HALF OF CROSS SECTION



FLANGED INTERCOSTAL DAMAGE
WHERE DAMAGE IS ONE HALF OR
GREATER OF CROSS SECTION



NOTE

Patch should overlap cleanup area a minimum of 1.0 inch.

REPAIR OF WEB PENETRATION DAMAGE

212030-55-1B

Figure 2-73. Bulkhead, web damage and repair criteria (Sheet 1 of 3)

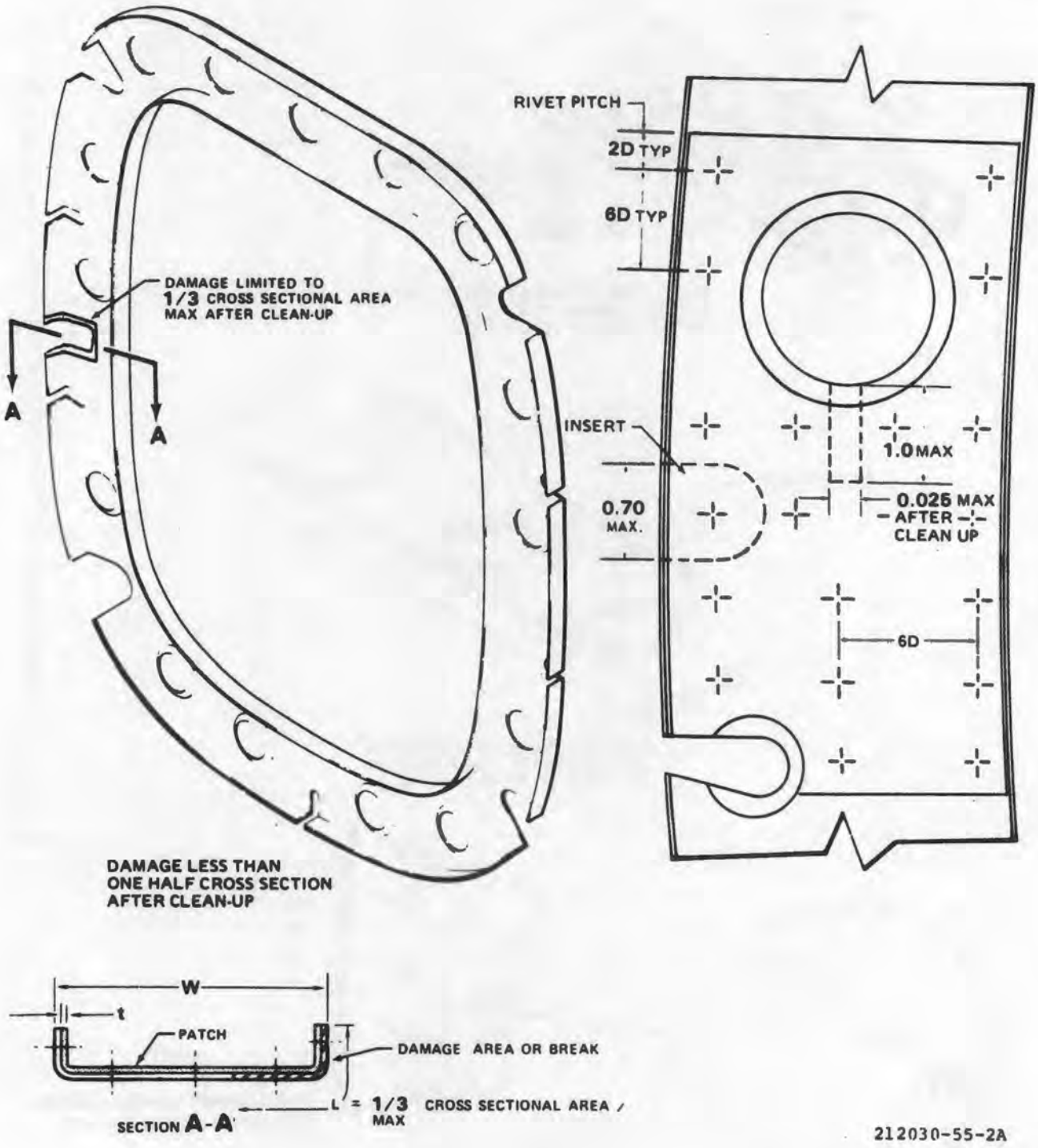


Figure 2-73. Bulkhead, web damage and repair criteria (Sheet 2 of 3)

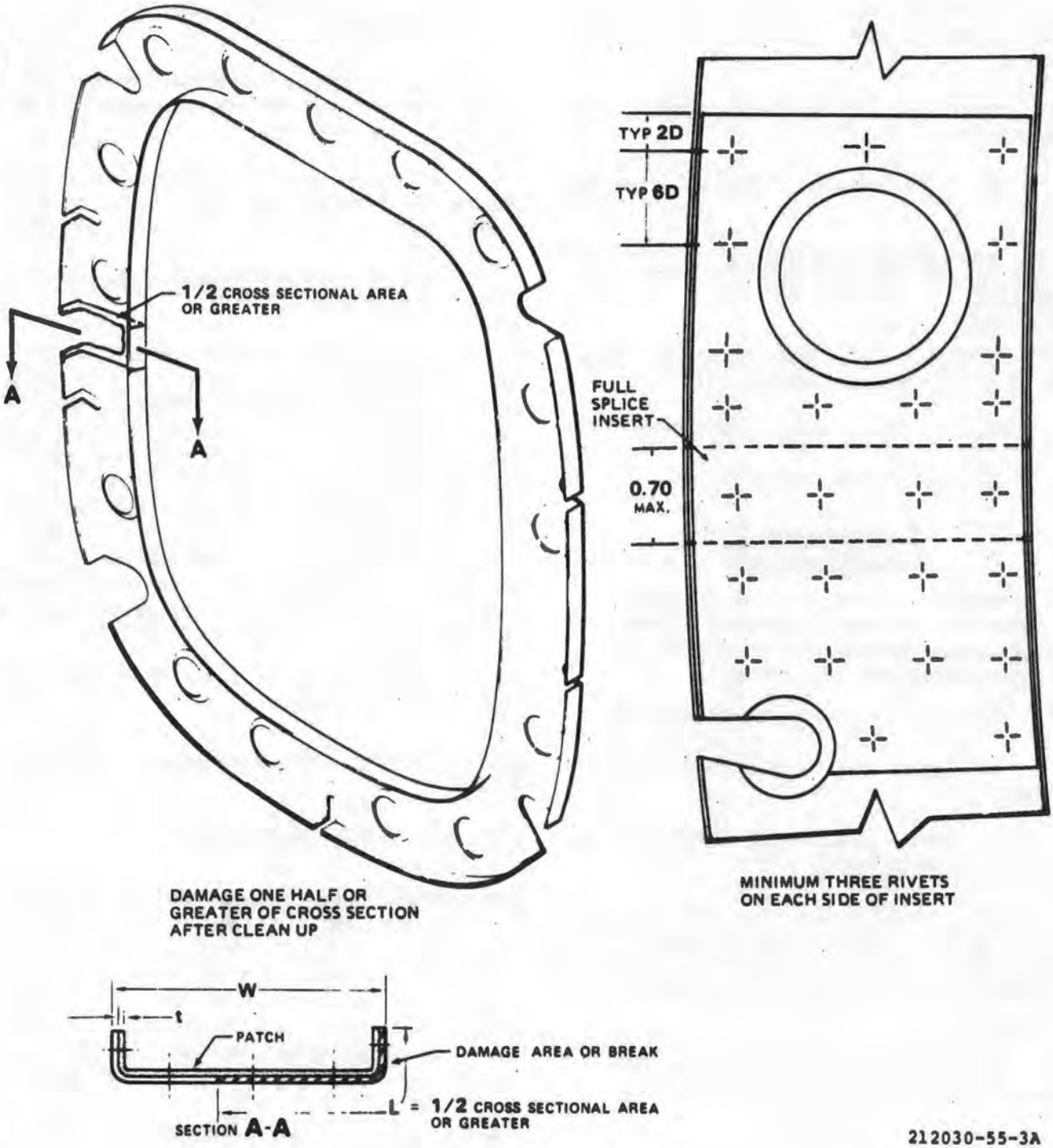


Figure 2-73. Bulkhead, web damage and repair criteria (Sheet 3 of 3)

(e) Clean paint and dirt from patch, insert and damaged area.

(f) Apply a coat of primer (C253) to both sides of patch, insert and damaged area. Allow primer to dry.

(g) Secure patch and insert in position and rivet in palce.

(h) Apply a coat of primer (C253) to repaired area.

h. Repair vertical fin trailing edge. See figure 2-67 for damage limits and figure 2-74 for repair instructions.

i. Repair worn skins caused by tail pipe fairing. See figure 2-75 for repair instructions.

j. Repair tail rotor gearbox support fitting.

(1) Repair chafing areas as follows:

WARNING

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

(a) Clean chafed area with MEK (C142).

(b) Abrade chafed area with 400 grit paper (C185.1).

(c) Clean chafed area with MEK (C142), and wipe dry with clean cloth.

(d) Immediately coat area with adhesive (C14) or equivalent. Build up area in excess of original surface by approximately **0.062** inch. Cure at room temperature of **70 to 72** degrees **F (21 to 23** degrees **C)** for **24** hours.

(e) File, sand or machine the affected area to meet the original contour of the support fitting.

NOTE

Above repair procedures shall be utilized only if casting remains on tail boom. If casting is removed, it shall be processed by application of HAE per MIL-M-45202, Type II, Class A, Grade 3. (Remove platenut prior to applying HAE, reinstall after completion of process.) Application of Devcon F not required. Tail boom jig is required to properly install support fitting. (Depot level maintenance.)

(2) Repair support fittings with gearbox hold down stud holes which are elongated beyond tolerance shown in figure 2-62.

(a) Ream out existing hole to a maximum diameter of **0.3594 plus 0.000, minus 0.001.** Maintain hole relationship as shown on figure 2-76.

(b) Treat machined surface per magnesium alloy process, type V1 (C137).

(c) Fabricate a bushing from 310 stainless steel (QQ-S-763, Class 310). Grind O.D. to provide an interference fit of **0.0001 TO 0.0003** with reamed hole in paragraph **(a)** above. Make I.D. **0.312 TO 0.319** inch and length **1.09 TO 1.08** inch. Identify bushing by Part No. UH-1-S0054-1. Heat support fitting in bushing replacement area with a heat gun for approximately 30 minuted (maximum temperature **275** degrees F) **(155** degrees C). Chill bushing in dry ice and alcohol for minimum of **30** minutes. Remove bushing from dry ice and install in magnesium casting using wet primer (C253).

(d) Ream bushing to final tolerance indicated in step (c) above.

2-289. Painting — Tailboom Structure. (TB746-93-2.)

2-289.1. Drive Shaft Doors.

2-289.2. Description - Drive Shaft Doors. The tail rotor drive shaft is enclosed by three doors (1, figure. 2-55.1), two of which are located between the tail pipe fairing and the 42-degree gearbox. The third door encloses the drive shaft between the 42-degree gearbox and the 90-degree gearbox. These doors are hinged along the right side and are secured in the closed position by snap fasteners on the left side.

2-289.3. Removal - Drive Shaft Doors. Remove drive shaft doors as follows:

a. Disconnect snap fasteners along left side of door and swing door to open position.

b. Pull hinge pin on right side of door and remove door from tailboom.

2-289.5. Inspection - Drive Shaft Doors. Inspect drive shaft doors as follows:

a. Inspect doors for cracks, dents, or damage.

b. Inspect hinges and fasteners for wear and damage.

2-289.5. Repair or Replacement. Replace worn or damaged hinges and fasteners.

2-289.6. Installation - Drive Shaft Doors. Install drive shaft doors as follows:

a. Position door on tailboom and install hinge pin on right side.

b. Close door and secure swap fasteners.

c. To prevent the tail rotor drive shaft doors from chafing the tailboom install rubber bumpers (6) as shown in figure 2-55.1.

2-290. TAIL SKID.

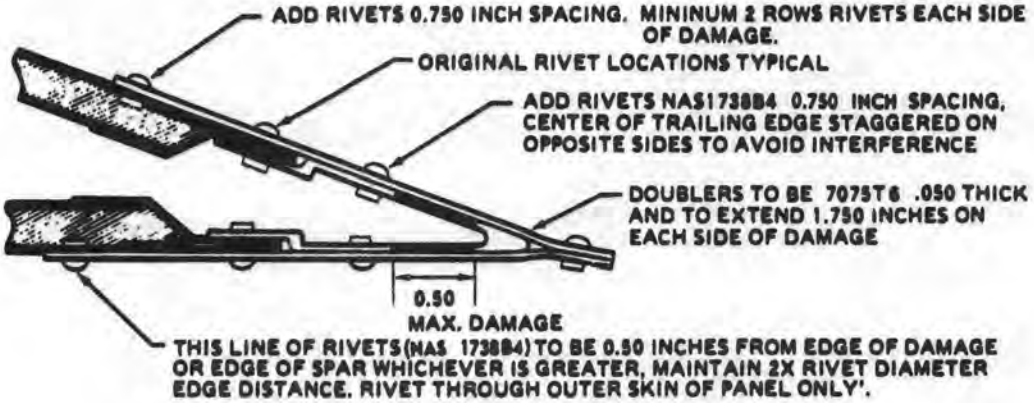
2-291. Description — Tail Skid. A tubular steel tail skid is attached on lower aft section of tailboom.

2-292. Removal — Tail Skid. a. Remove screws attaching two covers to lower tailboom fin, at aft end of tailboom. Remove covers.

b. Remove nut, washer, and screw attaching forward end of skid tube to tailboom structural member. Pull tube out through support block.

2-293. Inspection — Tail Skid. a. Inspect tail skid for deflection beyond maximum limit due to tail low landings or other causes. The painted strips illustrated in figure 2-77 may be applied at aft end of tailboom for quick release to determine whether tail skid is bent beyond limits.

Description	Limits — Repairable Damage
Tears, cracks, gouges, dent, and holes penetrating through one or both sides of the trailing edge.	Tears, cracks, gouges, dents, and holes that are less than 1.0 inch in length and 0.50 inch in width through one or both sides of spar, can be repaired by patching. Maximum distance between damaged areas, 8.0 inches.



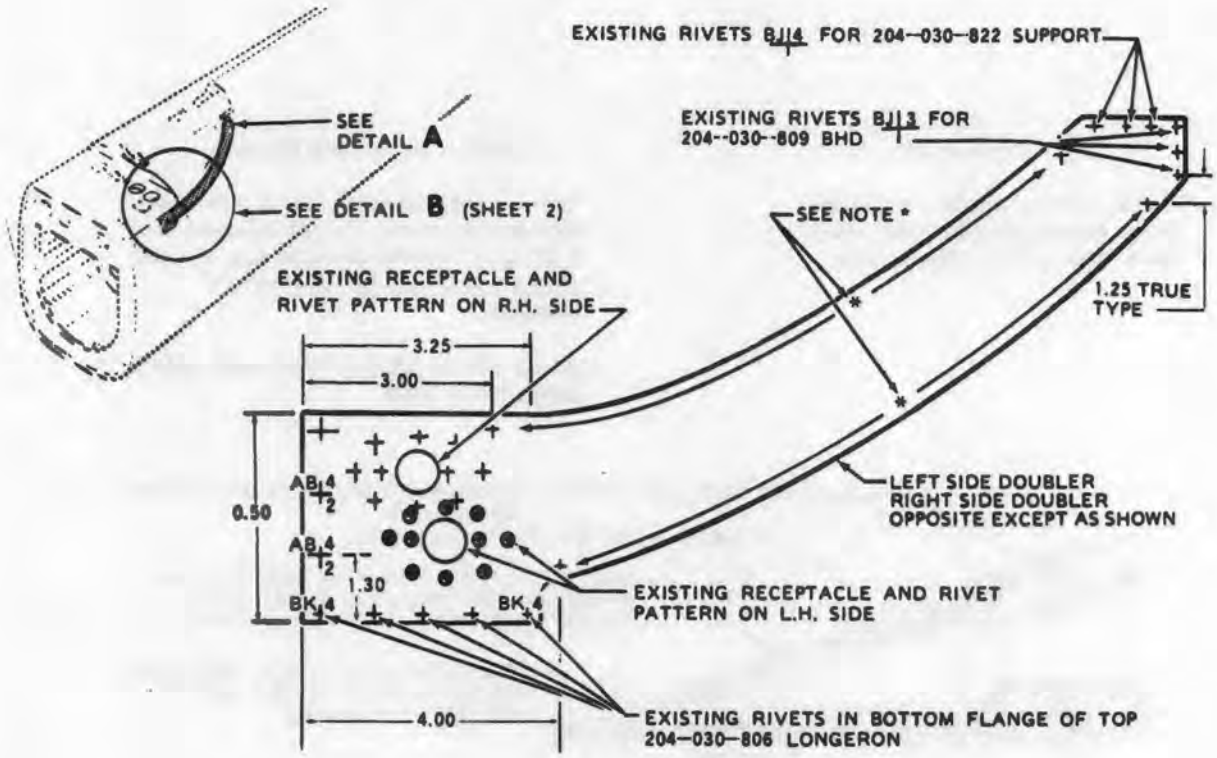
NOTES

1. Bond doublers with adhesive (C14). Fill and fair all edges of doublers after riveting. Touch up refinish.
2. 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).
3. All dimensions are in inches unless otherwise noted.

TAILBOOM PART NO. 204-030-800-491

204030-1020-2A

Figure 2-74. Vertical fin trailing edge repair



DETAIL A

TYPICAL DOUBLER INSTALLATION FOR R.H. AND L.H. SIDE EXCEPT AS SHOWN

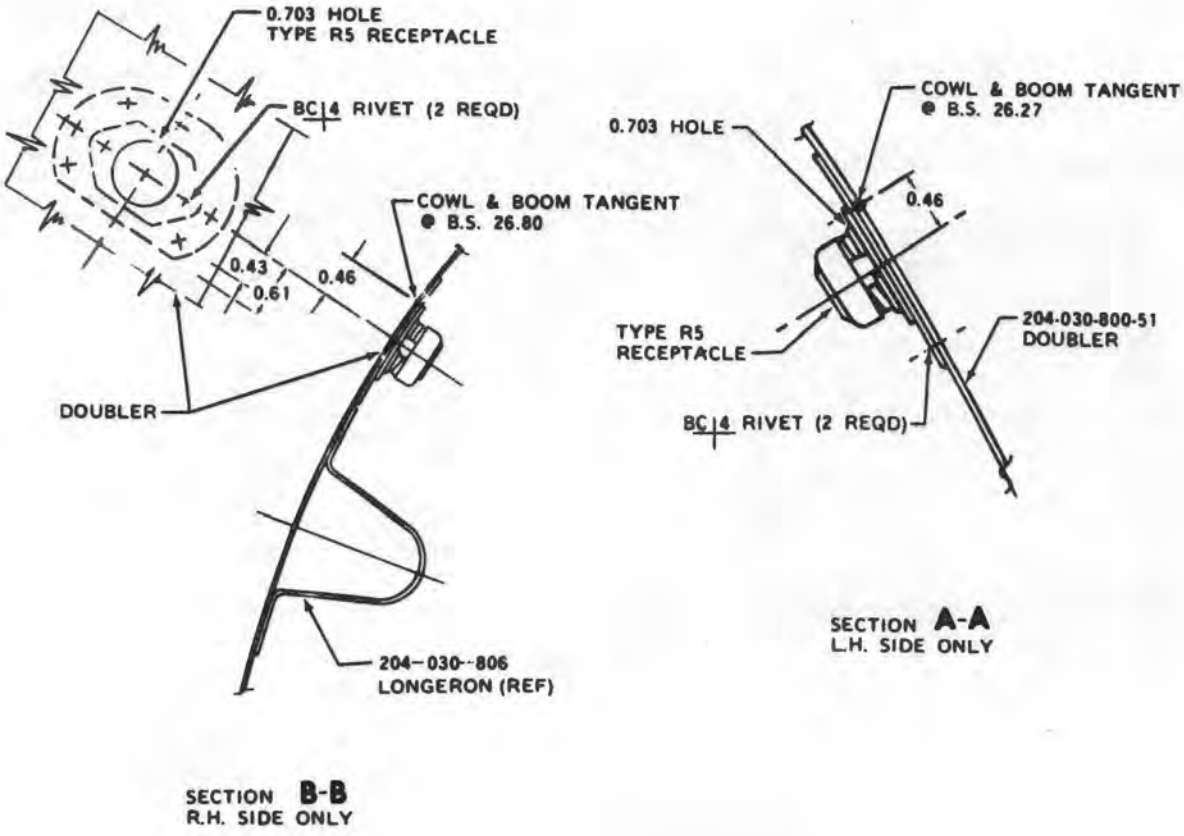
NOTE

* **Rivet spacing to be 1.25 inch maintaining standard edge distance. All added rivets to be MS20426AD3.**

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

204030-46-1B

Figure 2-75. Repair of worn skins on tailboom caused by tail pipe fairing (Sheet 1 of 4)



CODE	RIVET
AB 4 / 2	MS20600B4-2
BC 4	MS20126B4
BK 4	MS20470B4
BJ 3	MS20470AD3
BJ 4	MS20470AD4

204030-46-2A

Figure 2-75. Repair of worn skins on tailboom caused by tail pipe fairing (Sheet 2 of 4)

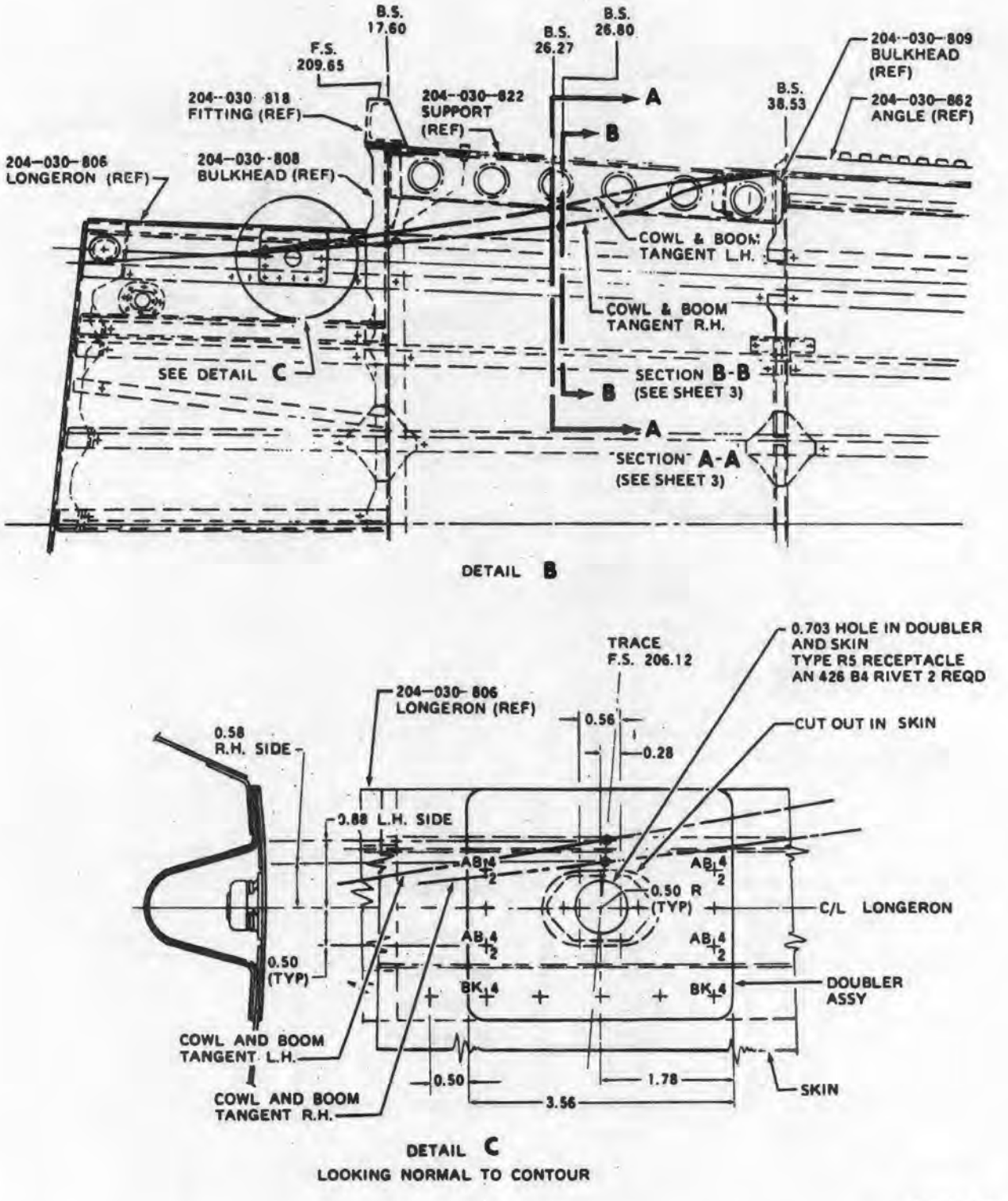


Figure 2-75. Repair of worn skins on tailboom caused by tail pipe fairing (Sheet 3 of 4)

APPLICATION A:

When wear does not exceed 25 percent of skin thickness.

REQUIRED:

(C19) fairing compound.

PROCEDURE A:

Clean, polish and refinish. Fill and fair with (C19) fairing compound.

APPLICATION B:

When wear exceeds 25 percent of skin thickness.

REQUIRED:

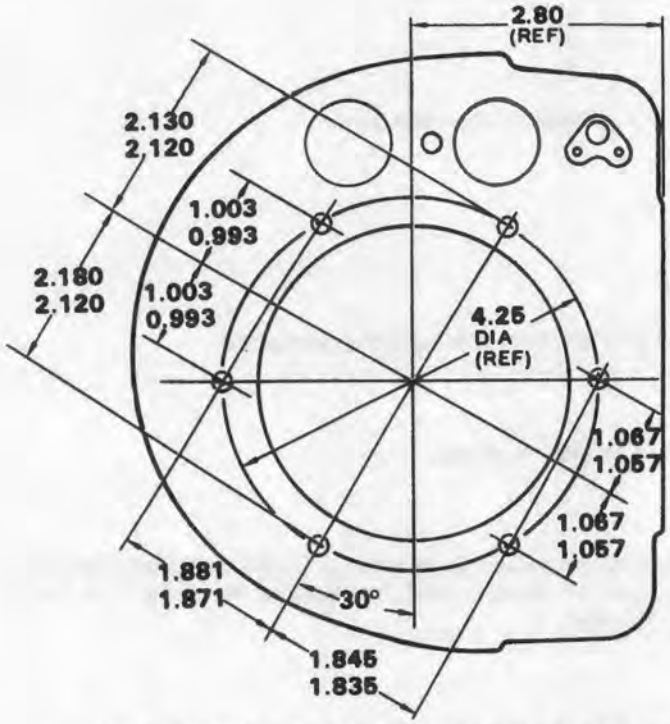
Right side and/or left side doubler (as shown on sheet 1) of 0.020 inch thick, type 301, 1/2 hard, stainless steel (shape of doublers will be dictated by pattern of wear), MS20426AD3 rivets (C14) adhesive.

PROCEDURE B:

Install doubler as shown on sheet 2 using (C14). If hole exists, rout out minimum amount for cleanup. Radius all sharp edges and corners.

204030-46-4B

Figure 2-75. Repair of worn skins on tailboom caused by tailpipe fairing (Sheet 4 of 4)



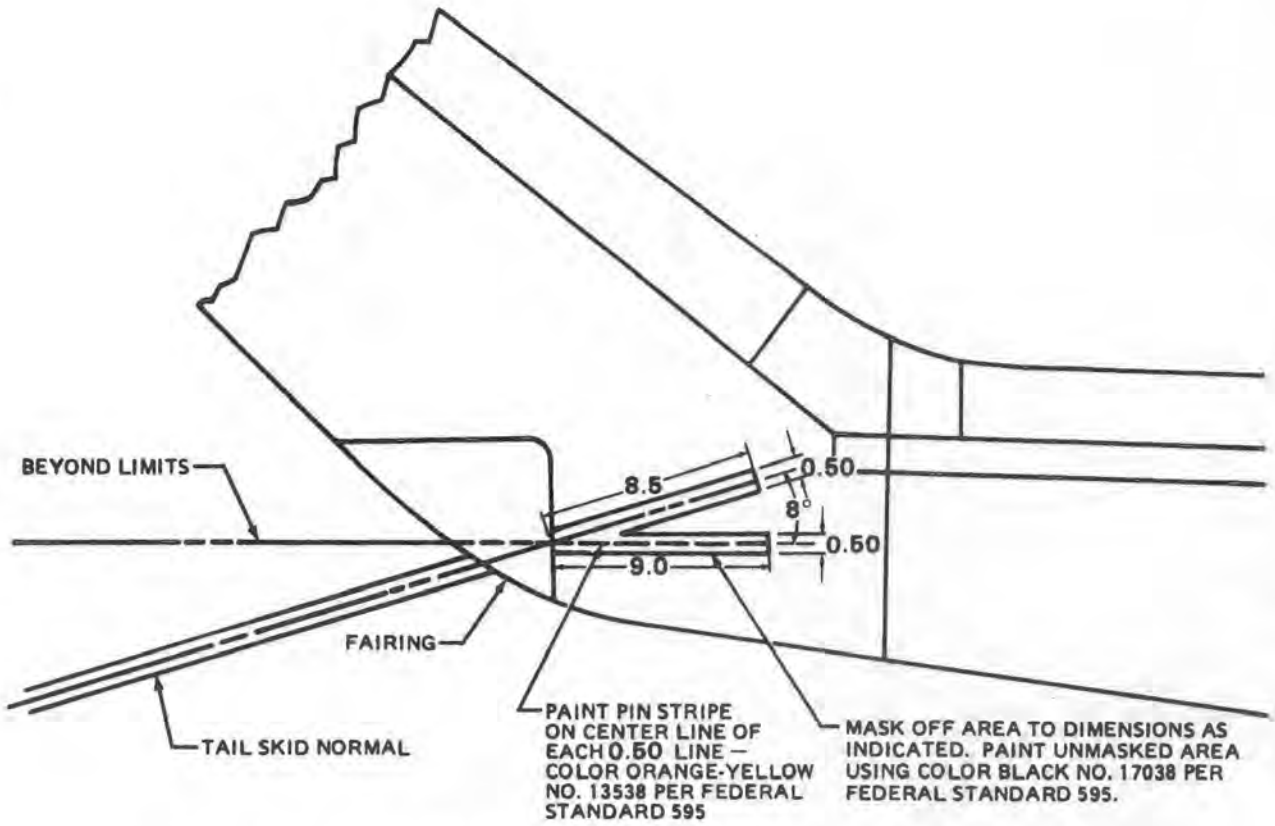
VIEW LOOKING AT GEARBOX MOUNTING FACE OF FITTING

NOTES

1. NO CRACKS ALLOWED.
2. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

205030-142B

Figure 2-76. Tail rotor gearbox support fitting hole relationship



NOTE: ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

205030-1039A

Figure 2-77. Tail skid

b. Inspect for minor nicks, scratches, and dents; cracks or permanent buckles. Maximum allowable deflection of tail skid is approximately 4.0 vertical.

2-294. Repair or Repalcement — Tail Skid. a. Repair minor nicks, scratches or dents by polishing out.

b. Replace cracked or permanently buckled tail skid.

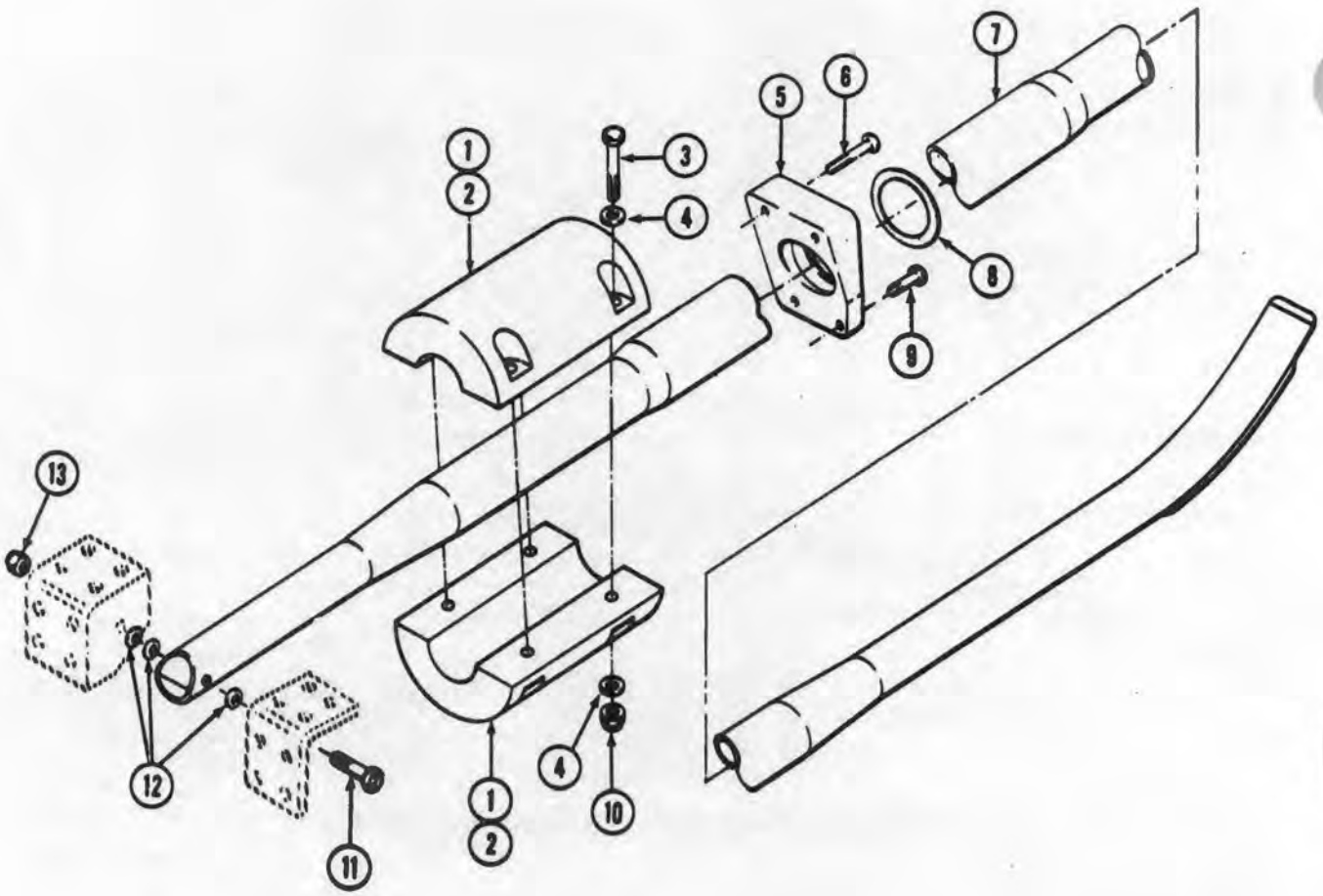
2-295. Installation — Tail Skid. a. Insert tail skid tube (7, figure 2-78) through support block (5). Align holes in forward end of tail skid with holes in tailboom structural member, shim as required between skid and inner surfaces of support with AN960C10L washers to eliminate excessive clearance. Install attaching screw (11), washer, (12) and nut (13).

b. Position side covers on lower tailboom fin, at aft end of tailboom. Install attaching screws.

2-296. Ballast Installation — Tail Skid. If ballast is required to keep the helicopter within CG limits, install ballast.

WARNING

Install ballast on tail skid as shown in figure 2-78. Max. of 50 pounds permitted on P/N 204-030-947.



1. 1560UH-1-347-3 weight, ballast 35.0 pounds
2. 1560UH-1-347-5 weight, ballast 60.0 pounds
3. Bolt
4. Washer
5. Support block
6. Screw
7. Skid tube
8. Packing
9. Screw
10. Nut
11. Screw
12. Washers
13. Nut

205070-1016A

Figure 2-78. Ballast installation — tail skid

SECTION III —

CONVERSION OF UH-1C TO UH-1M

2-297. Conversion — UH-1C to UH-1M Aircraft. Convert UH-1C to UH-1M aircraft as follows: (Table 2-7)

NOTE

Initial conversion shall be accomplished by using the necessary repair parts available at AVIM maintenance. If required parts are not available, they shall be requisitioned in accordance with TM 55-1520-210-23P.

Table 2-7. Conversion of UH-1C to UH-1M

From UH-1C REMOVE:

Asterisk symbols used in Table 2-7.

***Return to stock.**
****Retain for future use.**

1. Remove T53-L-9*, -11* series engines as a quick-change assembly with adapting parts attached. Preservation shall be accomplished as applicable before removing engine. (Refer to TM 55-2840-229-23.)
2. Remove 200-amp starter generator, Part Nos. STU6A*, VG700*, 23031-04*, or 2CM63E1*, shrouds, Part Nos. 204-061-413-1*, and 204-061-414-1*
3. Remove 300-amp starter generator, Part No. 204-060-200-1**, shrouds, Part Nos. 204-060-200-7**, and 204-060-200-11**.
4. Remove torquemeter indicator, Part No. PD125578* (50 psi).
5. Remove adapter, curvic coupling, Part No. 204-040-630-5*.

NOTE

From T53-L-11B engines, remove adapter curvic coupling, Part No. 204-040-812-3**.

6. Remove pressure transmitter, Part No. 218-50A* (50 psi).
7. Remove droop compensator cam box assembly, Part No. 204-060-787-3*.
8. Remove 205-070-113-3 placard.
9. Remove starter-generator, Part No. 30E20-61A.
10. Remove 204-060-499-1 bracket * and 204-060-589-1 decal.
11. Remove 204-060-133-1* bolt from S/N 64-14101 through S/N 64-14191 UH-1C Model A/C.
12. Remove 204-060-472-1** end plate.

Table 2-7. Conversion of UH-1C to UH-1M (Cont)

Into UH-1M install:

1. Install T53-L-13 series engines, apply procedure to build up the basic engine as a quick-change assembly ready for installation in aircraft. (Refer to Chapter 4 and TB 55-1500-200-42/2.)

NOTE

Only 300-amp starter generator is used with T53-L-13 engine.

2. Install 300-amp starter generator, Part No. 204-060-200-1, shrouds, Part No. 204-060-200-7, and -11, end-plate cover, Part No. 204-060-472-1.

3. Install torquemeter indicator, Part No. PD 115438 (100 psi).

4. Install pressure transmitter, Part No. TRU66A.

5. Install droop compensator cam box assembly, Part No. 204-060-787-9.

6. Install adapter, curvic coupling, Part No. 204-040-812-2.

7. Install standby generator field relay, Part No. MS24149D1, on aircraft prior to UH-1C 63-8636 through 66-491.

   a. At FS 173:00 in aft left side electrical compartment, locate WL 31.5 and BL 27.25 for installation of standby generator field relay. Align relay. Drill two holes, 0.170 to 0.176. Install relay using two screws, Part No. AN515-8R7, washers, Part No. AN960PDD8L, and nuts, Part No. NAS679A08.

   b. Remove wire, P35A16, from terminal A of standby generator voltage regulator and convert to terminal B2 of standby field relay, Part No. MS24149D1.

   c. Using 16 gage wire, connect terminal A of standby voltage regulator to terminal B3 of relay, Part No. MS24149D1. Mark wire P80A16.

   d. Using 16 gage wire, connect terminal B3 to terminal A3 of relay, Part No. MS24149D1. Mark wire P80B16.

   f. Using 20 gage wire, connect terminal X2 of relay, Part No. MS24149D1, to terminal X2 of starter relay. Mark wire K3E20.

   g. Using 20 gage wire, connect terminal X1 of relay, Part No. MS24149D1, to existing gorund. Mark wire K18A20N.

8. Remark instrument operating range and limits for T53-L-13 series engine. (Refer to TM 55-1520-220-10.)

9. Change aircraft model designation (Refer to TB 746-93-2.)

10. Remark data plate after conversion to UH-1M. (Refer to TB 746-93-2.)

11. Weight and balance change is negligible.

12. Recording and reporting of conversion shall be required, in accordance with TM 38-750.

13. Install 205-070-113-1 placard and 205-070-258-1 decal.

CHAPTER 3

ALIGHTING GEAR

SECTION I — LANDING GEAR

3-1. LANDING GEAR ASSEMBLY.

3-2. Description — Landing Gear Assembly. The landing gear assembly consists of two skid tubes attached on ends of two arched crosstubes that are secured to fuselage structure by four padded caps. Each skid tube is fitted with a forward end step, a tow-ring fitting, two saddles with sockets for crosstubes, a two-piece replaceable shoe along bottom, a rear end cap, and two eyebolt fittings for mounting of ground handling wheel assemblies. Crosstubes are fitted with bearing straps at fuselage mounting points (figure 3-1).

3-3. Removal — Landing Gear Assembly.

NOTE

The complete landing gear can be removed as an assembly, or skids and crosstubes can be removed separately.

a. Position helicopter on smooth surface.

b. Place a support stand under tail skid.

CAUTION

Assure that support stand is under tail skid securely prior to removal of retention cap assemblies.

c. Remove bolts and washers at each of four retention cap assemblies which secure crosstube assemblies to structure. Identify retention cap assemblies for correct location.

d. Position a person at tail skid. Raise helicopter off landing gear using suitable hoist or jacks (paragraph 1-37 or 1-48). Remove landing gear.

3-4. Installation — Landing Gear Assembly. If separated, assemble skid and crosstubes by inserting the ends of crosstubes into socket of skid saddles. Install bolts and washers.

a. For landing gear using 204-050-152-9 bearing straps use the following procedure:

CAUTION

Assure that fuselage landing gear points are centered between rivets of crosstube bearing strap when lowering helicopter. Ensure bearing straps are centered and fully seated in crosstube saddles. On forward and aft crosstubes, viewing from outside, no more than two bearing plate rivet studs should be seen at each position. If more than two rivet studs are seen, position a person at tail skid, lift helicopter and reposition gear.

(1) Position landing gear assembly under helicopter. While steadying tail skid, carefully lower helicopter to seat on four mounting points of structural beams on bearing straps (centered between rivet studs) of crosstubes.

NOTE

Through bolts are not to be used for repair of loose nutplates. Ensure that the four short bolts are used in the first two holes at each end of retention cap assembly. The two long bolts must be used in the two middle holes.

(2) Install four retention cap assemblies, and secure each retention cap assembly to nutplates in fuselage. Use six bolts and washers on each retention cap assembly. Tighten bolts to a snug fit while the helicopter is still supported by hoist or jacks.

(3) Lower the helicopter fully and remove hoist or jacks. Make sure helicopter settles on crosstubes correctly before tightening bolts through cap assemblies to proper torque.

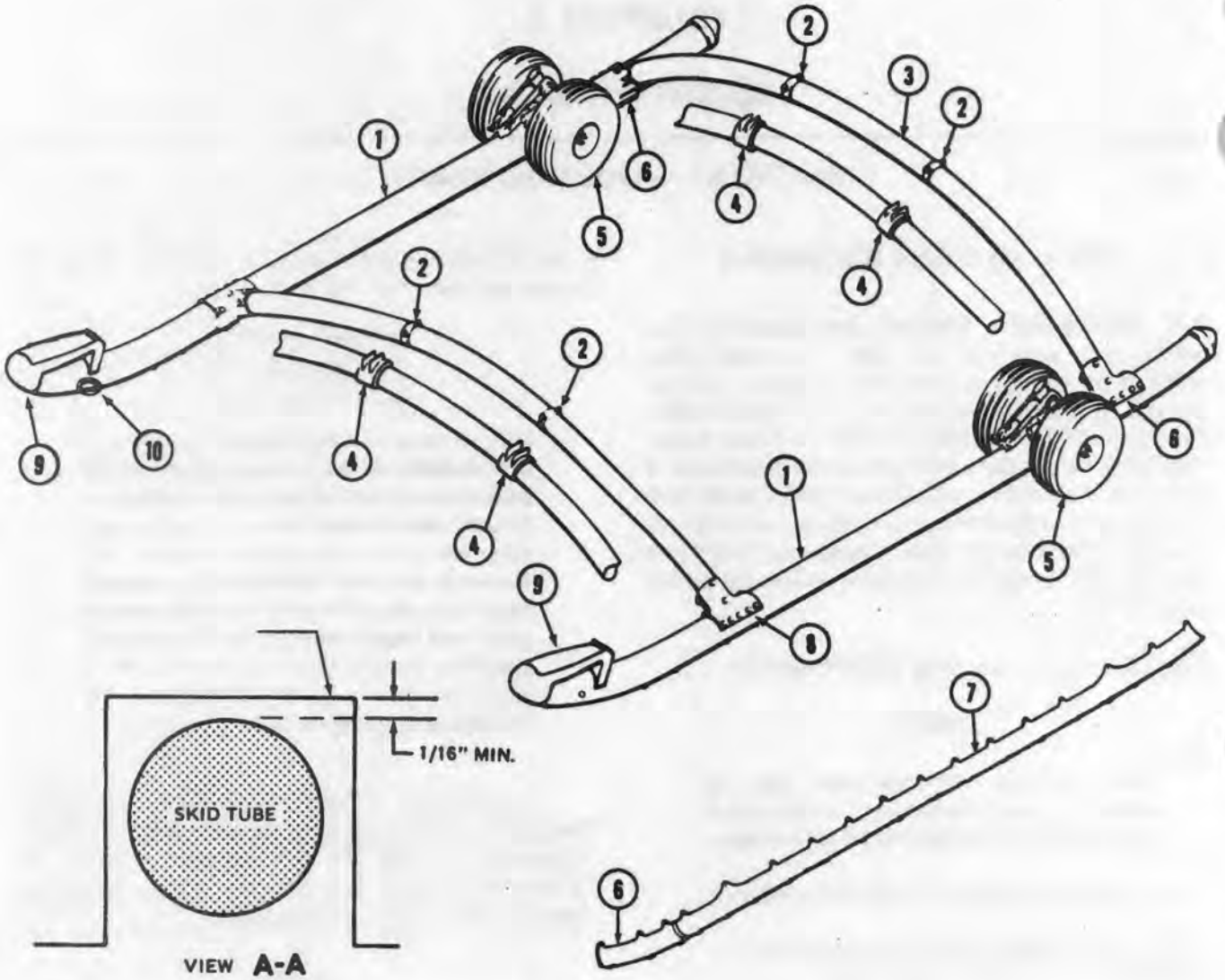


Figure 3-1. Landing gear assembly and installation

b. For landing gear using 204-050-011-13 horseshoe fittings use the following procedures:

(1) Position landing gear under helicopter.

(2) Install the four landing gear retaining straps.

NOTE

The bevel edge of the rubber pad on the strap must be positioned outboard.

(3) Newly installed landing gear assemblies shall meet the following requirements:

NOTE

Previously installed landing gear assemblies may remain in service provided they do not contact skid channel top skin.

(a) There shall be no vertical movement of the skid cross-tube between the horseshoe fitting and retaining straps.

(b) The clearance between the skid channel top skin and skid at center of aircraft shall be **0.06** inch minimum (See view A-A of figure 3-1).

(c) The clearance between skid channel top skin and the top of the inboard saddle lip shall be **0.06** inch minimum (See view B-B of figure 3-1).

3-5. CROSSTUBES.

3-6. Description — Crosstubes. The landing gear crosstubes are formed of heavy aluminum alloy tubing. Each crosstube is attached to the underside of the helicopter fuselage in two places by means of retention cap assemblies. The outer ends of the crosstubes are attached to the landing gear skid tubes (figure 3-1).

3-7. Removal — Crosstubes. a. Remove landing gear assembly (paragraph 3-3).

b. Raise helicopter clear of ground using suitable hoist, if available, or with hydraulic jacks (item 18, table 1-3) (paragraph 1-37 or 1-48).

CAUTION

Observe the following precautions while helicopter is on jacks:

If helicopter is being placed on jacks preparatory to removing landing gear, take up slack with hoist (paragraph 1-48).

All personnel in the immediate area shall exercise extreme caution not to bump or otherwise disturb the helicopter while it is being raised or supported by jacks.

Personnel shall not crawl into or onto the helicopter while it is being raised or supported by jacks.

Rope off the area around the helicopter and prominently display warning signs to the effect that THIS HELICOPTER IS ON JACKS.

c. Position a person at the tail skid and remove nuts, washers, bolts, and retention cap assemblies at four points where landing gear is attached to fuselage structure. Hoist helicopter and lower landing gear to the ground (paragraph 1-48).

d. Remove bolts and washers attaching defective crosstube to upper part of skid tube saddles, and remove crosstube.

NOTE

Helicopters equipped with heavy duty, locally manufactured crosstubes will be inspected every 50 hours in accordance with paragraph 1-62.

3-8. Inspection — Crosstubes. a. Inspect crosstubes for light scratches, scuffs, nicks, cracks, dents, or damage.

b. Perform fluorescent penetrant inspection per TM 43-0103 on crosstubes (2, figure 3-1).

c. Inspect crosstube bearing plates for looseness.

d. Inspect rubber bumper pad on landing gear retention cap assemblies for looseness.

e. Inspect crosstubes for corrosion damage. (Refer to TM 43-0105.)

f. With landing gear installed on helicopter, inspect crosstubes for proper deflection.

(1) Position the helicopter on a smooth surface.

(2) Raise helicopter off the surface with hydraulic jacks, removing all weight from the landing gear (paragraph 1-38).

(3) Level helicopter (paragraph 1-37).

(4) Halve the distance between crosstube bearing plates to determine helicopter centerline.

(5) Drop a plumb line from helicopter centerline to ground or floor surface (figure 3-2). Measure from plumb line to centerline of each skid tube at crosstube locations.

NOTE

Distance shall be 48 to 50 inches from centerline of skid tube to plumb line. If distance exceeds 50 inches from either crosstube, replace crosstubes.

(6) Lower helicopter to surface and remove hydraulic jacks.

3-9. Repair or Replacement — Crosstubes.

a. Minor scratches, scuffs, and nicks may be polished out to depth of damage not to exceed 10 percent of crosstube wall thickness as shown in figure 3-3. No repairs by patching or insertion are allowed to crosstubes.

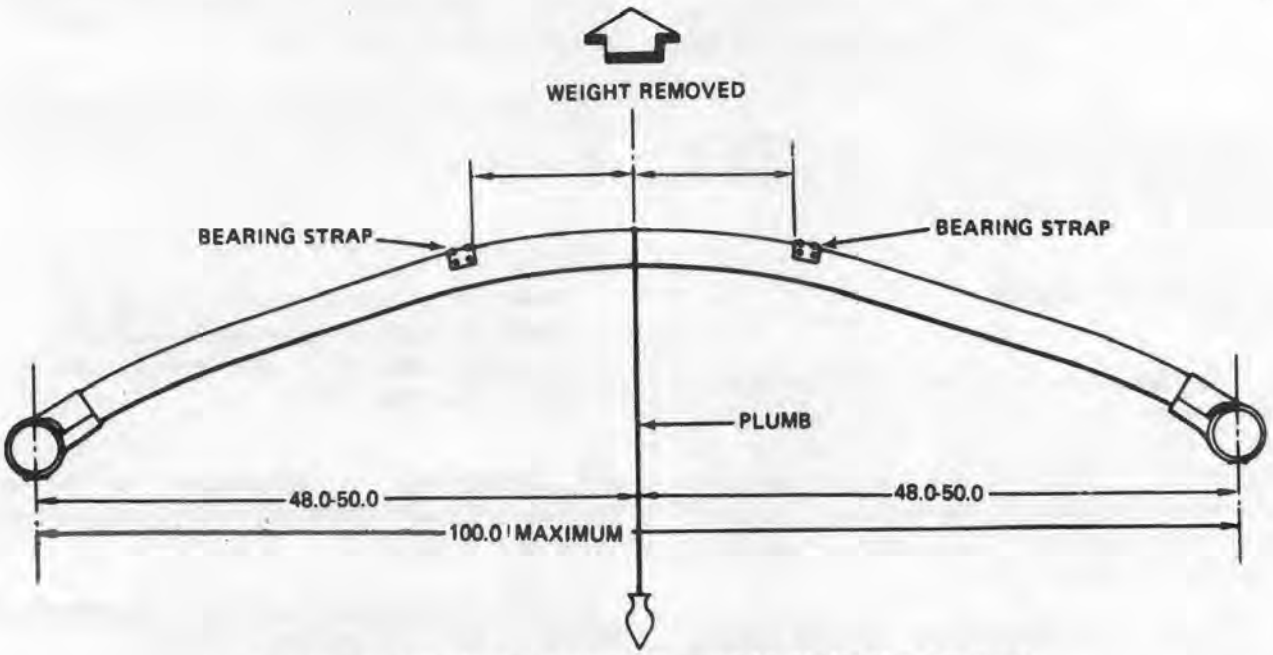
b. Replace crosstube if deflection dimension exceeds inspection requirement:

c. If crosstube has dents or holes severe enough to affect its function, replace crosstubes.

NOTE

Bearing and support, Part No. 204-050-011, may be modified by rounding off forward and aft edges of inboard ear only. Round off edges 0.88-inch maximum radius.

d. Repair and treat corrosion damage to crosstubes in accordance with TM 43-0105.



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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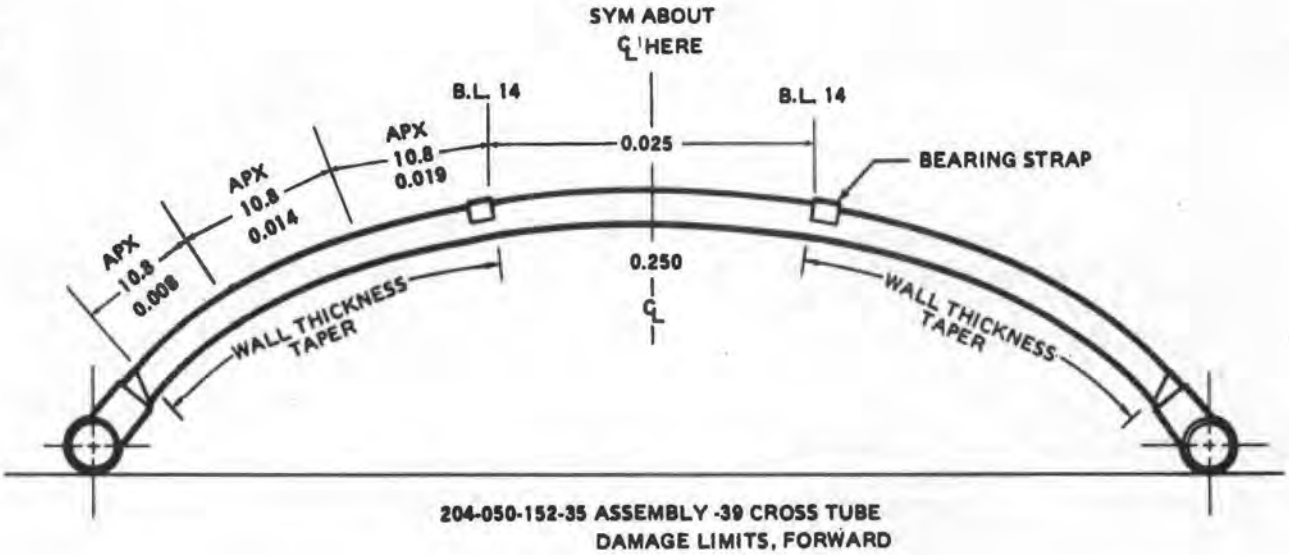
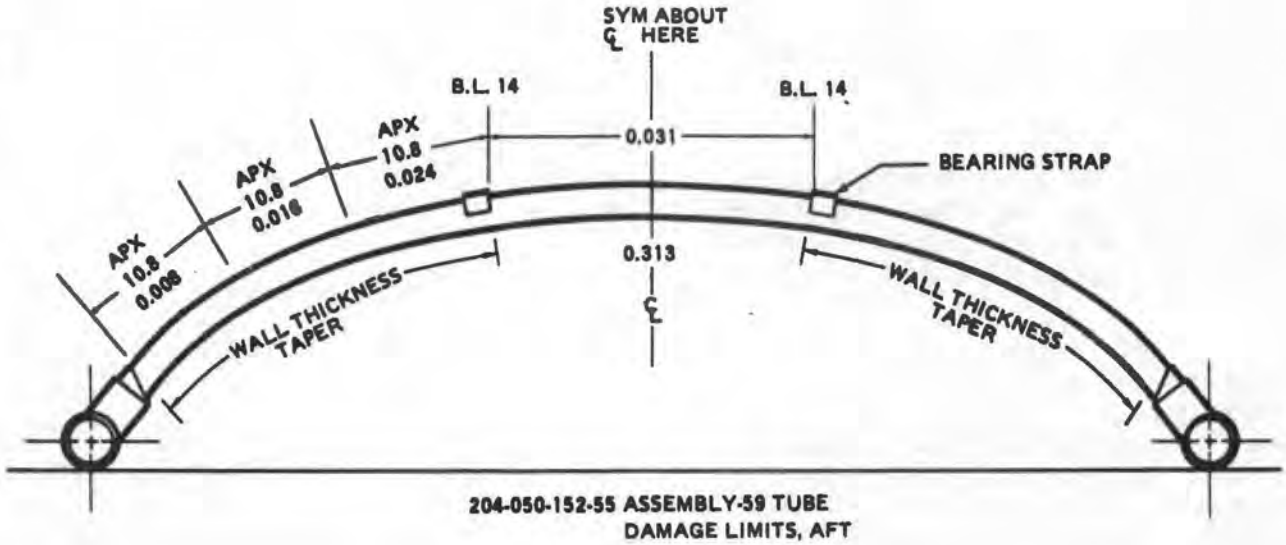
Figure 3-2. Landing gear crosstube deflection check



204-050-152-35 ASSEMBLY -39 CROSS TUBE
DAMAGE LIMITS, FORWARD

NO CRACKS ALLOWED



204-050-152-55 ASSEMBLY-59 TUBE
DAMAGE LIMITS, AFT

204050-1007B

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

Figure 3-3. Crosstube damage limits

3-10. Installation — Crosstubes. a. Position aft crosstube assembly mounting opening in upper part of aft saddle on left skid tube.

b. Use 0.31 inch drift punch to align holes in aft skid tube saddle with holes in crosstube, and install five washers and bolts.

NOTE

Do not install lower inside washer and bolt at this time. These items will be installed later as attaching parts securing skid shoe to skid tube.

c. Repeat above steps a. and b. to attach right end of aft crosstube to aft saddle on right skid tube.

d. Repeat steps a, b, and c. above to attach forward crosstube to forward skid tube saddles.

e. Install landing gear skid shoes (paragraph 3-24).

f. Raise landing gear in accordance with paragraph 1-37 or 1-48, and position crosstube bearing straps in four support fittings on underside of the fuselage.

g. Position a retention cap assembly across each of four support fittings. Rubber pad of retention cap assembly must be facing upward against underside of crosstube, with indentured radius of pad outboard.

h. Install four washers and bolts into permanently installed nut plates. Prior to torque application the gap between the top of the cap assembly and the bottom of the fuselage at the cross tube mounting area should be in accordance with figure 3-3.1. The gap shall be measured with appropriate feeler gage.

i. If gap is larger than recommended, fabricated shims per figure 3-3.2 may be added between fuselage and cap assembly. If gap is smaller than recommended, rubber pad is worn and cap should be replaced.

j. Install two bolts, washers, and nuts, one set on each side next to crosstube.

CAUTION

Assure bearing plates are centered and fully seated in crosstube saddles. On forward and aft crosstubes, viewing from outside, no more than two bearing plate rivet studs shall be visible at each position. If more than two studs are visible, helicopter is unsafe to fly.

k. Tighten bolts through retention cap assemblies to a snug fit while helicopter is in a hoisted position. Lower helicopter to ground, tow forward to settle gear, then tighten bolts to proper torque.

3-11. Painting — Crosstubes. (Refer to TB746-93-2.)

3-12. SKID TUBES.

3-13. Description — Skid Tubes. The skid tube is a one piece formed aluminum alloy tube with a forward end step, rear end cap, two eyebolts for mounting a ground handling wheel assembly, two saddles with sockets for crosstubes, a tow-ring fitting, and a two-piece shoe on the bottom of skid.

3-14. Removal — Skid Tubes. a. Raise helicopter until skid shoes are clear of the ground (paragraph 1-37 or 1-48).

b. Remove bolts and washers securing skid tube saddles to crosstubes.

c. Remove skid tubes.

3-15. Inspection — Skid Tubes. a. Surface scratches and smooth contour dents in skid tubes not in excess of 0.62 inch in depth shall be classified as negligible damage.

b. Smooth dents in skid tubes between crosstube saddles up to 0.25 inch deep and 1.0 TO 1.2 inches in diameter are negligible, and may be disregarded.

c. Scratches in skid tube between crosstube saddles running in any direction except directly across top of tube are negligible.

d. Scratches running directly across top of tube between crosstube saddles up to 0.03 inch deep and 1.0 TO 1.2 inches long are negligible.

e. Scratches, dents, holes, or other damage on skid tube in front of forward crosstube saddle and to the rear of aft crosstube saddle are negligible. Repair of such damage is left to the discretion of local maintenance officer.

f. Inspect skid tubes for corrosion damage. (Refer to TM 43-0105.)

g. Perform dye penetrant inspection per TM 43-0103 on skid tubes (1, figure 3-1).

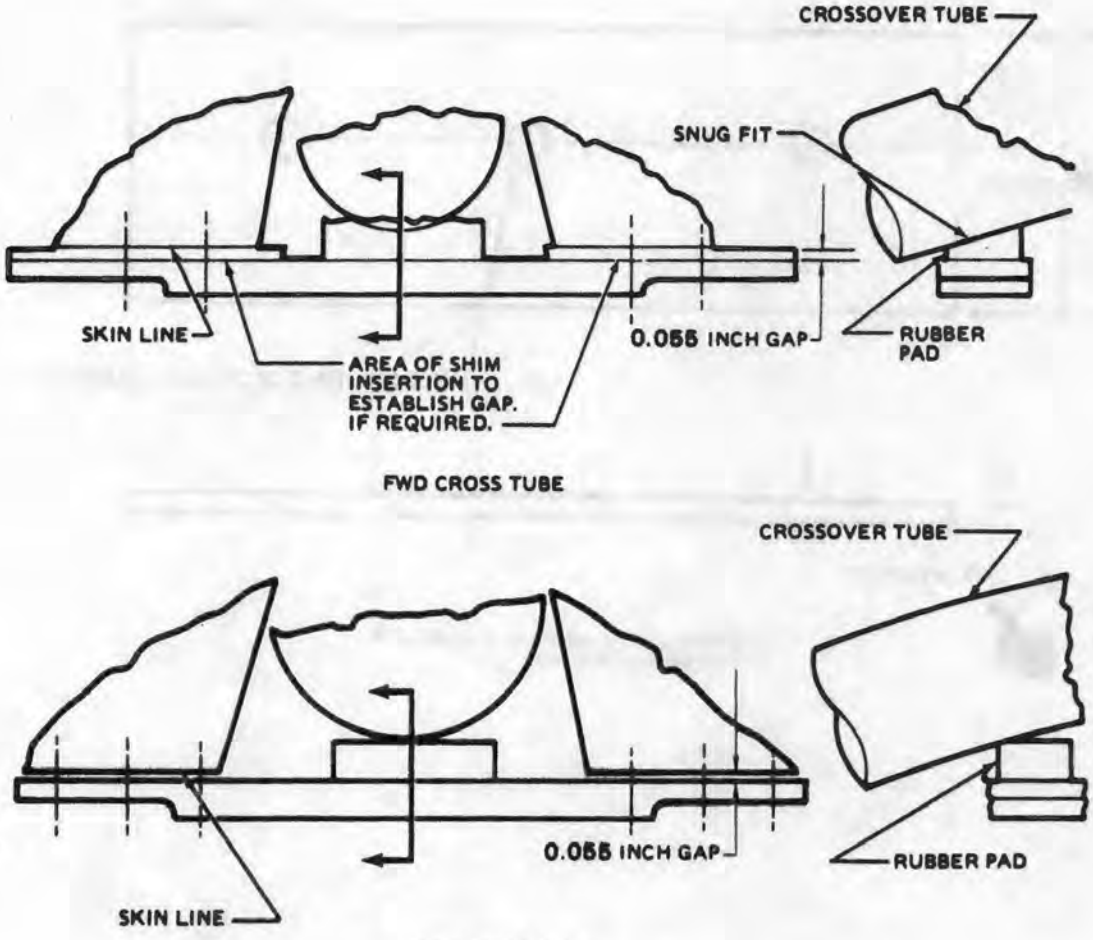


Figure 3-3.1. Crosstube Gap Measurement

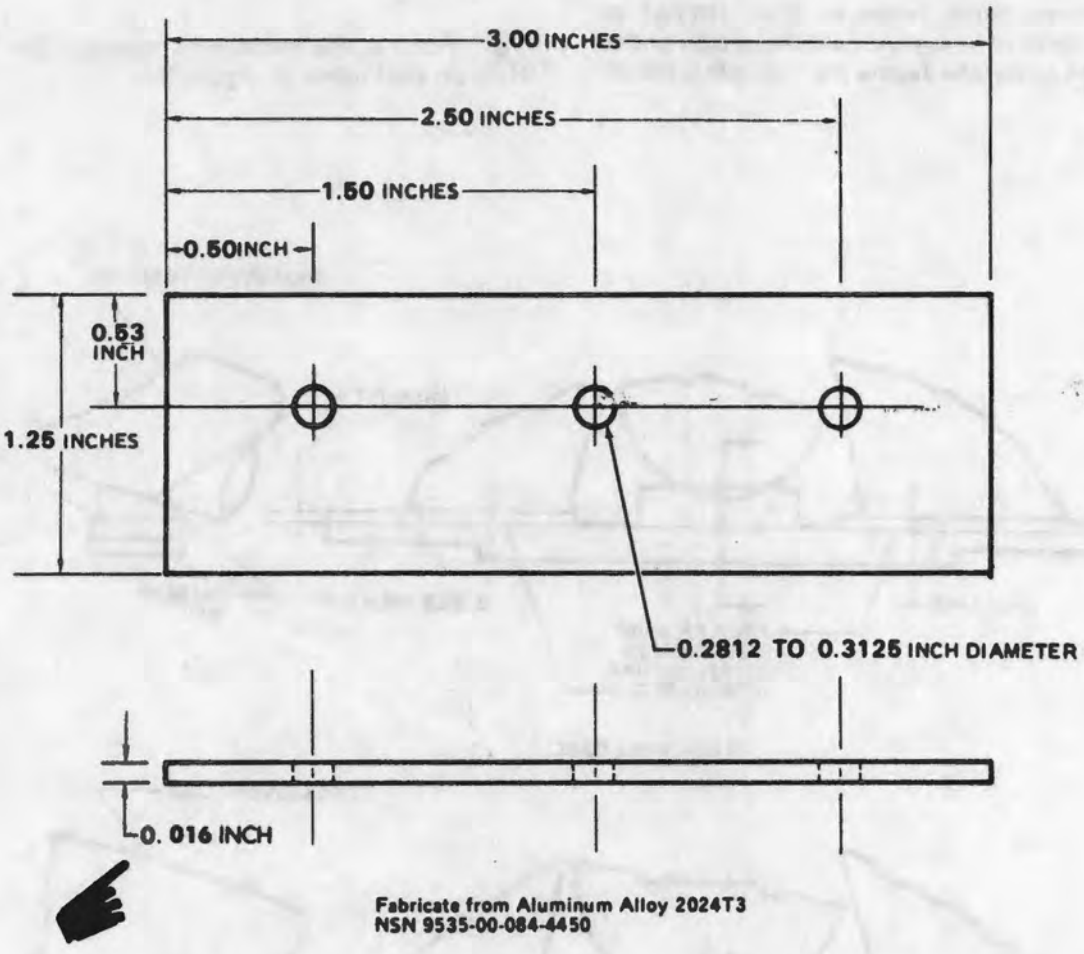


Figure 3-3.2. Crosstube Shim Fabrication

Premaintenance requirements for repair of skid tubes

Conditions	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C1.3), (C6.4), (C167), (C171)
Repair Materials	Items 23, 48.1, 48.2, (table 2-1)
Special Environmental Conditions	None

3-16. Repair — Skid Tubes. a. Damage Reparable by Polishing. Scratches as described in above paragraph 3-15 may be polished out, using 600 grit abrasive cloth (C1.3).

b. Damage Reparable by Patching. Damage reparable by patching is as follows:

(1) Scratches running directly across top of tube more than **0.03** inch deep and **1.2 TO 4.0** inches long, dents more than **0.25** inch deep and **1.2 TO 4.0** inches across, and any holes up to **4.0** inches in diameter (through one surface of tube only) may be repaired.

(2) Patch repairs are limited to top side of skid tube and to areas shown in figure 3-4.

c. Repair skid tubes as follows:

(1) Lift helicopter (paragraph 1-48). Remove skid tube (paragraph 3-14).

(2) Polish out scratches using 600 grit abrasive cloth (C1.3) and trim and smooth rough edges of holes.

(3) Fabricate a patch from **0.100**-inch thick aluminum alloy (item 23, table 2-1) of required size as shown in figure 3-4 or fabricate patch from material salvaged from scrap skid tube.

(4) Lay out rivet hole pattern and form patch to fit contour of skid tube as shown in figure 3-4.

(5) Securely clamp patch in place on skid tube and drill rivet holes using a No. 10 drill.

(6) Rivet patch in place using blind rivets (item 53.1, table 2-1).

(7) Apply primer (C171) and lacquer (C6.4).

(8) Install skid tube and lower helicopter (paragraph 3-17).

c. Damage Reparable by Insertion. a. Damage reparable by insertion is as follows:

CAUTION

Dents and holes on either top or bottom side of skid tube which are greater than 4 inches across in any direction shall be repaired by inserting a splice of new tubing. Such repairs are restricted to areas shown in figure 3-4.

(1) Lift and support helicopter and remove skid tube (paragraph 1-37 or 1-48).

(2) Cut out damaged portion of skid tube with hand or powered metal saw.

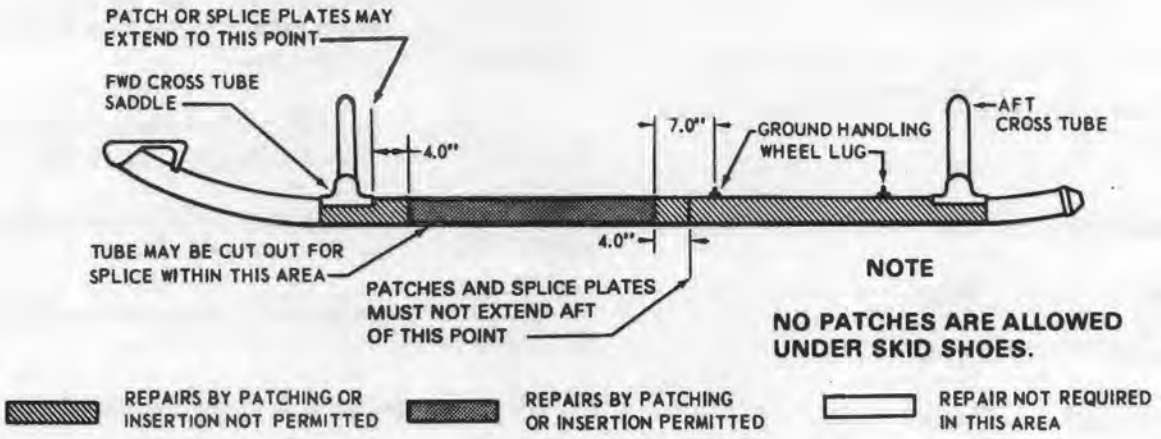
(3) Fabricate an insert of required length from tubing, **0.083**-inch wall thickness (item 24.1, table 2-1) or from scrap skid tube (figure 3-4).

(4) Fabricate splice plates as follows:

(a) Cut four plates to required dimensions from sheet stock **0.100** inch thick (item 23, table 2-1) or use material salvaged from scrap skid tube (figure 3-4).

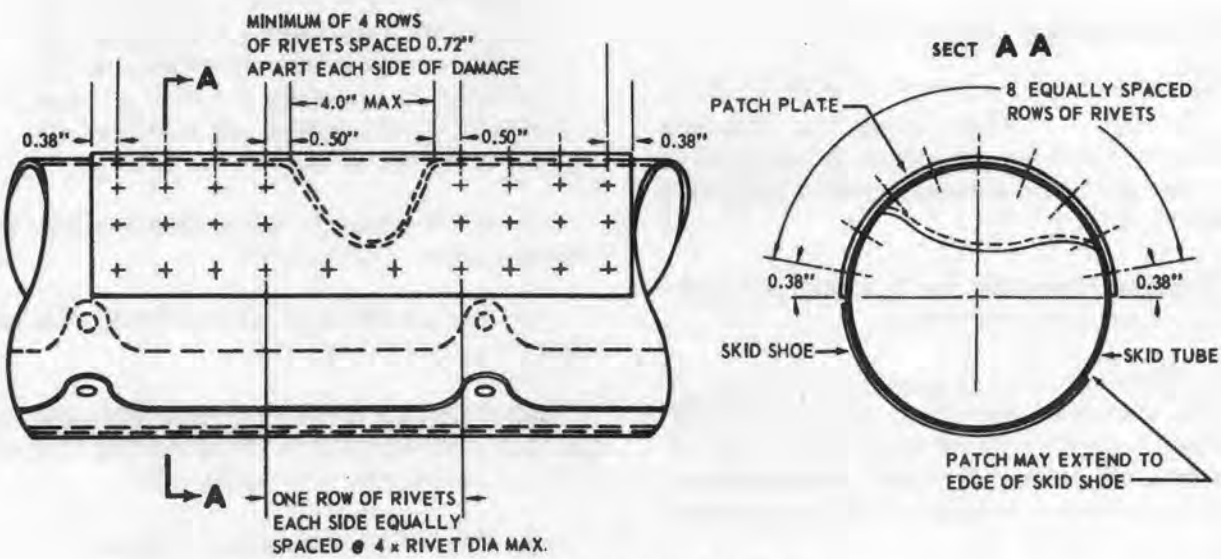
(b) Form two plates to fit outside diameter of skid tube and two plates to fit the inside diameter of skid tube as shown.

(5) Apply a coat of primer (C167) coating to plates and tubes.



SKID TUBE REPAIR LIMITS

NO CRACKS ALLOWED



TYPICAL PATCH REPAIR

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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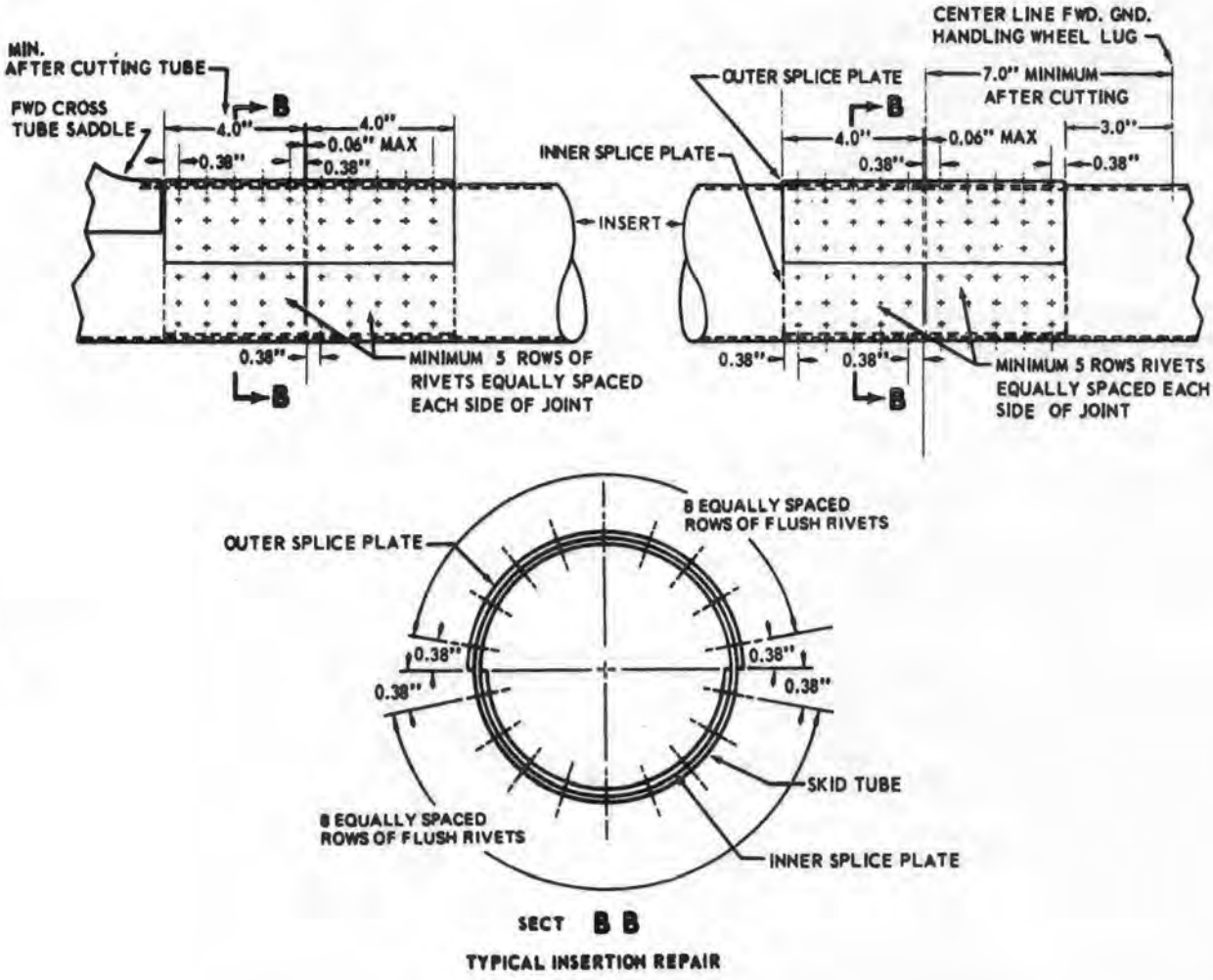
Figure 3-4. Skid tube repair (Sheet 1 of 2)



TYPICAL INSERTION REPAIR

NO CRACKS ALLOWED

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

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Figure 3-4. Skid tube repair (Sheet 2 of 2)

(6) Lay out rivet hole pattern on upper splice plates and lower side of tubes as shown.

(7) Maintaining proper alignment, assemble and securely clamp splice plates and tubes together.

(8) Drill rivet holes in plates and tubes with No. 10 drill. Countersink lower holes with 100 degree countersink. Install blind rivets (item 44.1, table 2-1) in upper half of splice and flush rivets (item 44.2 table 2-1) in lower half of splice as shown.

(9) If repair involves removal of skid shoe bolt sleeves, mark sleeve locations using skid shoe as a template and install new sleeves.

(10) Apply touchup coat of primer (C167). Apply final finish in accordance with TB746-93-2 and TM55-1500-204-25/1.

(11) Damage to skid tubes beyond the limits for repairs by patching or insertion, as shown in figure 3-4, requires replacement of skid tube.

(12) Repair and treat corrosion damage to skid tube in accordance with TM 43-0105.

3-17. Installation — Skid Tubes. a. Position skid tube saddles onto corresponding crosstubes.

b. Align bolt holes in crosstube and saddles and install attaching bolts and washers.

c. Lower helicopter to ground and remove lifting equipment.

3-18. Painting — Skid Tubes. Refer to TB746-93-2 and TM 55-1500-204-25/1.

3-19. SKID SHOES.

3-20. Description — Skid Shoes. The skid shoe is a two-piece replaceable steel shoe secured along the lower surface of skid tube with bolts and steel washers. The purpose of the shoes is to prevent abrasion and damage to landing gear skid tubes when the helicopter contacts the ground.

3-21. Removal — Skid Shoes. a. Raise the helicopter clear of ground by use of jacks or hoist (paragraph 1-37 or 1-48).

b. Remove the front and rear sections of skid shoes from skid tube by removing bolts and steel washers.

3-22. Inspection — Skid Shoes. a. Inspect skid shoes for damage and for loose or damaged bolt inserts, expander nut sleeve combination, and suitability for continued service.

b. Inspect thickness of skid shoes for excessive wear.

c. Inspect skid shoes for corrosion damage. (Refer to TM 43-0105.)

d. Perform magnetic particle inspection per TM 43-0103 on skid shoes (4 and 5, figure 3-1). Inspect for cracks.

3-23. Repair or Replacement — Skid Shoes. a. Replace excessively worn skid shoes, or shoes that do not meet inspection requirements (paragraph 3-22).

b. Remove and replace any skid shoes or bolt inserts that do not meet inspection requirements.

c. For repairs and treatment of corrosion damage to skid shoes, refer to TM 43-0105.

d. Remove loose or damaged inserts in skid tube as follows:

Premaintenance requirements for replacement of expander nut and sleeve

Conditions	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	(T4)
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Three
Consumable Materials	(C167), (C189)

Condition	Requirements
Special Environmental Conditions	None

(1) Remove bolts and washers attaching skid shoes to skid tube and remove skid shoes from skid tube (paragraph 3-21).

(2) Using a **0.250** inch drill, carefully drill the damaged or loose expander nut (2, figure 3-5) and sleeve (1) blind nut from skid tube (3).

(3) Carefully drill off the countersunk portion of sleeve (1) head from skid tube (3). Do not damage the original drilled hole in the skid tube.

(4) Remove the remaining portion of expander nut (2) and sleeve (1) using a **5/16** inch or smaller punch.

(5) Remove damaged expander nuts (2) and sleeves (1) from skid tube (3).

e. Apply a light coat of thinned primer (C167) to hole in skid tube. Using installation tool (T4), install new expander nut (2) and new sleeve blind nut (1) in skid tube (3). Refer to TM55-1500-204-25/1.

CAUTION

Overtorquing the nut installation tool (T4) may result in cracking sleeve blind nut (1).

f. Torque nut using installation tool (T4) **215 TO 240** inch-pounds.

g. Remove nut installation tool (T4) from completed installation.

3-24. Installation — Skid Shoes. a. Position aft skid shoe (4) to the mounting holes on skid tube (3). Install necessary bolts (6) and (thin steel) washers (5). Align forward skid shoe (7) overlapping the end of aft skid shoe (4) and install bolts (6) and (thin steel) washers (5).

b. Lower the helicopter to ground (paragraph 1-37 or 1-48).

3-25. Paint — Skid Shoes. Refer to TB746-93-2 and TM 55-1500-204-25/1.

3-26. SKID SADDLES.

3-27. Description — Skid Saddles. The skid saddles are installed on each skid tube, forward and aft, to hold the ends of the crosstube. The saddles are manufactured of formed aluminum alloy material and contoured to the shape of skid tube. The saddle assembly consists of two parts, inboard and outboard, which are riveted together. The landing gear assembly requires four saddle assemblies, two on each skid tube. The saddle assemblies are secure to skid tube with blind rivets.

3-28. Removal — Skid Saddles. a. Remove landing gear (paragraph 3-3).

b. Remove skid tube (1, figure 3-1) (paragraph 3-14).

c. Drill out existing rivets attaching saddle to skid tube.

d. Stand tube vertically to clear chips and rivet collars from inside tube.

e. Remove bolts securing saddles to skid tube.

3-29. Inspection — Skid Saddles. a. Check skid saddles for damage and distortion.

b. Inspect skid saddles for corrosion damage. (Refer to TM 43-0105.)

c. Perform fluorescent penetrant inspection of skid saddles per TM 43-0103.

3-30. Repair or Replacement — Skid Saddles. a. Replace saddles if damaged or distorted.

b. Repair and treat corrosion damage to skid saddles in accordance with TM 43-0105.

NOTE

As a preventive maintenance measure, apply sealing compound, (C189), to fasteners securing saddle to side tube and saddle to crosstube prior to reinstallation of saddle fitting. This action will provide a tighter rivet to material installation and reduce the non-interference fit between the hole and fastener.

NOTE

Apply a light coat of primer (C167) to hole prior to installing nut and sleeve.

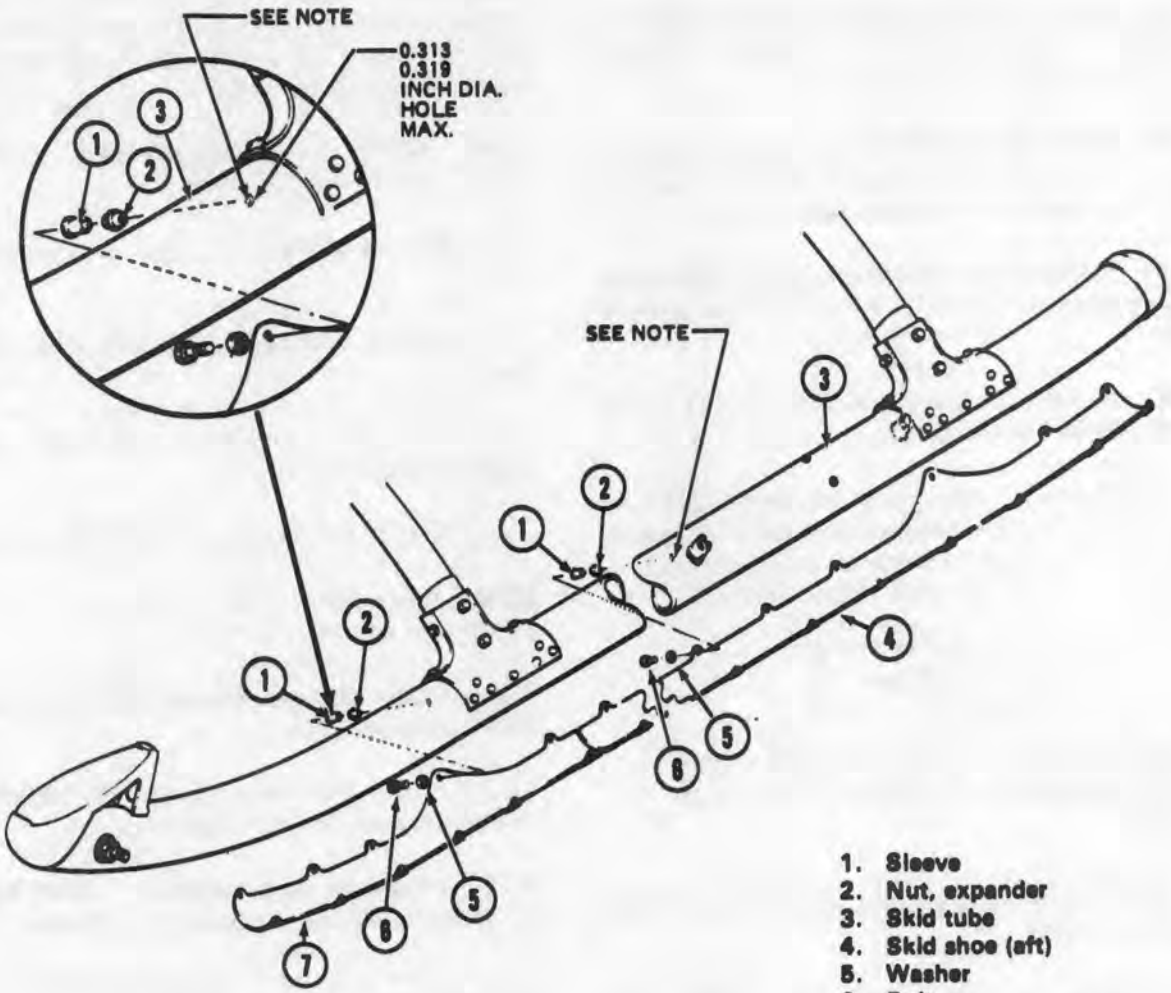

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Figure 3-5. Skid shoe bolt insert replacement

3-31. Installation — Skid Saddles. a. Position saddles on skid tube.

b. Install bolts attaching saddles to crosstube.

c. Install rivets and bolts securing saddles to skid tube.

d. Install landing gear on helicopter (paragraph 3-4).

3-32. Painting — Skid Saddles. (Refer to TB 746-93-2 and TM 55-1500-204-25/1.)

3-33. TRUCK, GROUND HANDLING GEAR. (SINGLE WHEEL)

3-34. Description — Ground Handling Gear. Two manually retractable wheel assemblies (figures 3-6 and 3-7) are provided to facilitate ground handling of the helicopter.

CAUTION

To prevent possible damage to handling wheels, the forward portion of the skids should be raised by pulling the tail skid down while extending the wheels. To further prevent damage to ground handling gear equipment, release pressure slowly allowing the helicopter to be lowered slowly.

3-35. Removal — Ground Handling Gear. a. If support rods (9, figure 3-6) are engaged, open valve (located on side of pump assembly (1)), slowly, and retract ground handling gear.

b. Detach support rod (9) from skids and stow in clips.

c. Press release pin on front of pump cradle assembly (3) from eyebolt of skid and lift ground handling gear from landing gear.

3-36. Disassembly — Ground Handling Gear.

Premaintenance requirements for disassembly ground handling gear

Conditions	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	(T6)
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C32), (C49), (C106), (C112), (C205)
Special Environmental Conditions	None

NOTE

Disassembly procedures are the same for opposite side of ground handling gear.

a. Ground Handling Gear.

(1) Pull ball-lock pin (10, figure 3-6) from rod assembly (9) and remove support rod assembly from axle assembly (8).

(2) Remove cotter pin (16), nut (15), and retainer (14) from axle assembly (8) and remove wheel assembly (17).

(3) Disconnect flexible hose from tee on pump assembly (1) and from cylinder assembly (12).

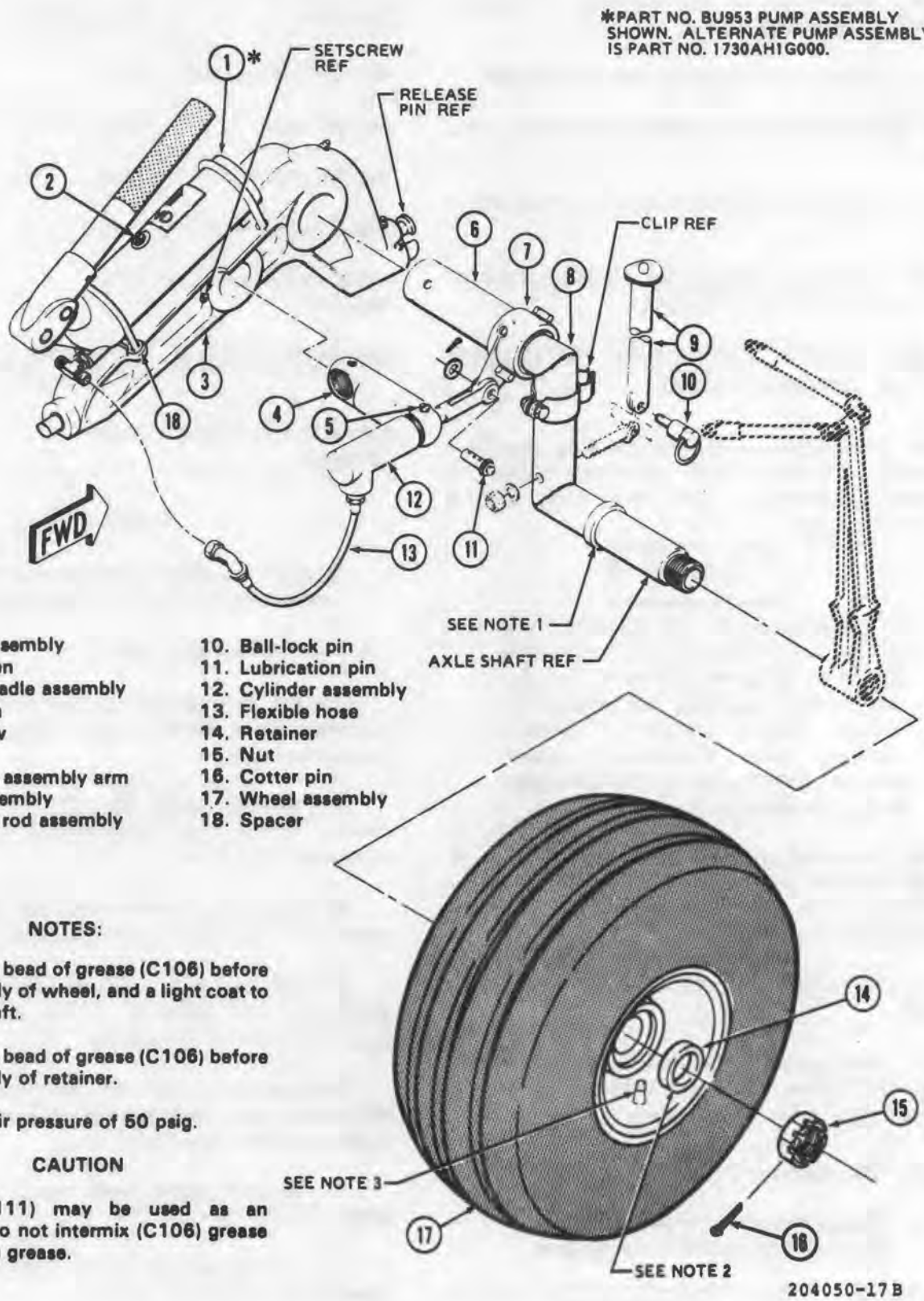
(4) Remove nuts, washers, and U-clamps attaching pump assembly (1) to pump cradle assembly (3) and remove pump.

(5) Remove cotter pin and washer from lubrication pin (11) and remove lubrication pin from clevis of cylinder assembly (12).

(6) Remove clevis from shaft of cylinder assembly (12).

(7) Loosen setscrew (5) and remove cylinder assembly (12) from trunnion (4).

(8) Remove cylinder assembly arm (7) and sleeve (6) from axle assembly (8).



*1. Pump assembly
2. Fill screen
3. Pump cradle assembly
4. Trunnion
5. Setscrew
6. Sleeve
7. Cylinder assembly arm
8. Axle assembly
9. Support rod assembly
10. Ball-lock pin
11. Lubrication pin
12. Cylinder assembly
13. Flexible hose
14. Retainer
15. Nut
16. Cotter pin
17. Wheel assembly
18. Spacer

NOTES:

1. Apply a bead of grease (C106) before assembly of wheel, and a light coat to axle shaft.
2. Apply a bead of grease (C106) before assembly of retainer.
3. Apply air pressure of 50 psig.

CAUTION

Grease (C111) may be used as an alternate. Do not intermix (C106) grease with (C111) grease.

Figure 3-6. Ground handling gear — disassembly

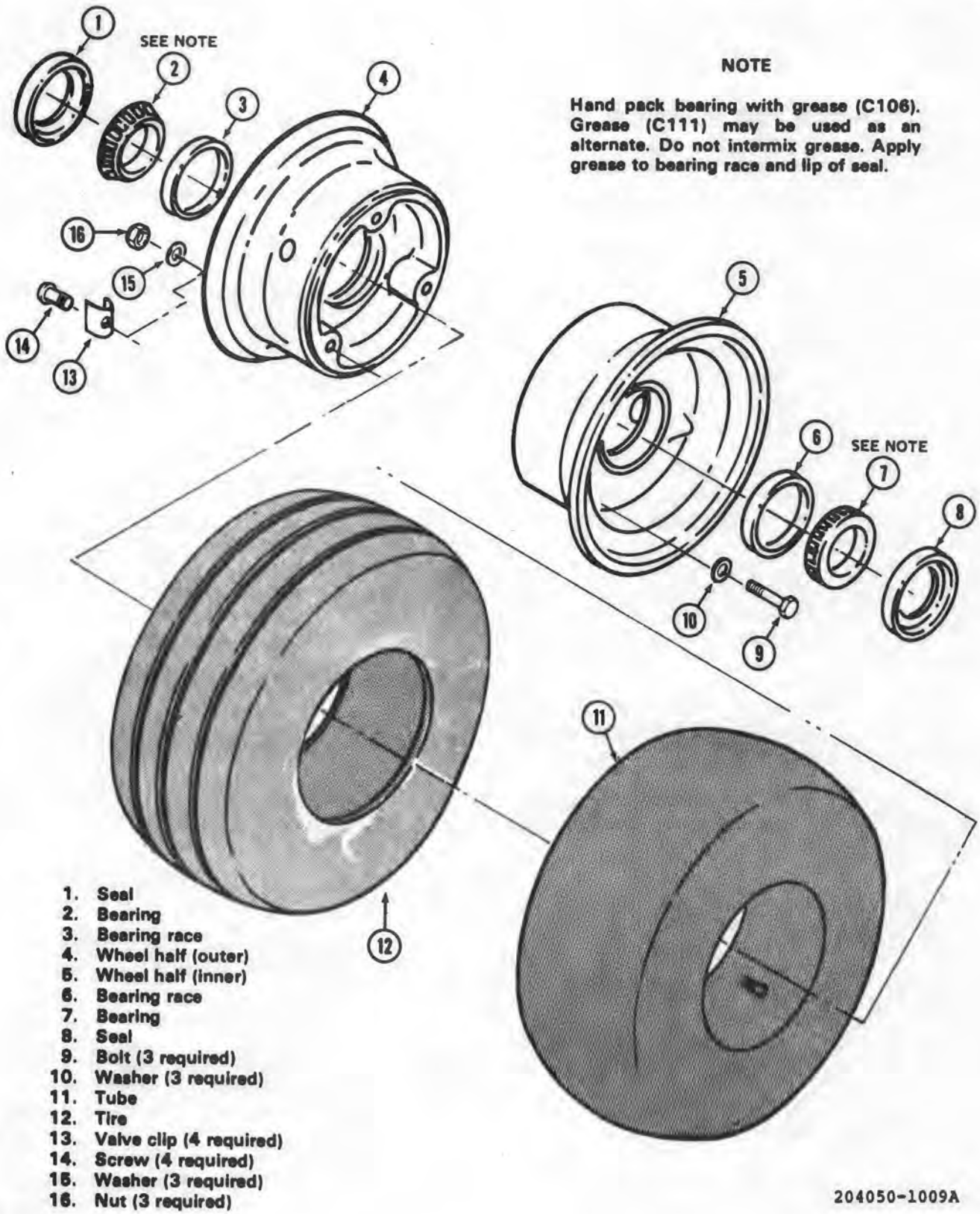


Figure 3-7. Wheel assembly, ground handling gear — disassembly

(9) After disassembly procedures have been accomplished to opposite side of ground handling gear, remove trunnion (4) from pump cradle assembly (3).

b. **Pump Assembly (Part No. BU953). (AVIM).**

(1) Remove retaining rings (1, figure 3-8) from two pins (2) and slide pins from handle assembly (3) and pump body (12). Remove handle assembly.

(2) Remove screw (21) with preformed packing (22) from tank (23), and drain oil from tank. Discard packing.

(3) Pull up on clip (5) until it bottoms, then using an adjustable spanner wrench, loosen and unscrew gland nut (7) from pump body (12). Pull clip/plunger assembly from pump body.

(4) Remove spreader (11), three leather packings (9), rubber packing (10), support (8), and gland nut (7) from piston (6). Discard leather and rubber packings.

(5) Pry out screen (27) from port of pump body (12). Remove screw (28), spring (29), ball (0.31-inch diameter) (30), spring (31), and ball (3/16-inch diameter) (32).

(6) Remove screw (36). Grasp knob (35) and detach from valve stem (37). Unhook loop of spring (33) from pin on pump body (12).

(7) Slip knob (35) onto valve stem (37). Remove spring (38), (steel) washer (39), packing (40), and ball (0.31-inch diameter) (41).

(8) Remove hexnut (24) and preformed packing (25). Twist tank (23) off pump body (12). Remove preformed packing (13). Discard packings.

(9) Remove screw (19) and screen (20).

(10) Remove valve body (18) from tie rod (26). Remove spring (16) and plunger (17) from valve body (18).

c. **Wheel Assembly.**

(1) Remove valve cap from valve stem and release all air pressure from wheel assembly.

(2) Remove four screws (14, figure 3-7) and four valve clips (13) from outer wheel half (4).

(3) Remove three nuts (16), and three washers (15) from bolts (9). Remove three bolts (9) and three washers (10) from inner and outer wheel half (5 and 4).

(4) Remove inner wheel half (5) and outer wheel half (4) from tire (12).

(5) Using a drift punch and hammer, tap seal (1) from outer wheel half (4) and remove bearing (2). Discard seal.

(6) Using suitable bench press, press bearing race (3) from outer wheel half (4).

(7) Remove seal (8), bearing (7), and bearing race (6) from inner wheel half (5) using same procedure as outlined in above sub-steps (5) and (6). Discard seal.

(8) Remove tube (11) from tire (12).

3-37. Cleaning — Ground Handling Gear. a. Clean all foreign particles from magnet assembly (14, figure 3-8) using clean cloth.

WARNING

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

b. Thoroughly clean recessed hole into which screen (20) fits, using solvent (C205).

c. Thoroughly clean inside of valve body (18) using solvent (C205).

d. Clean tie rod (26) using solvent (C205) to ensure clean passage through hole in end of tie rod.

e. Clean all grease fittings with solvent (C205).

f. Wash all parts with a soft bristle brush (C32) in solvent (C205) and allow to air dry. Blow dry passage hole in tie rod (26) with clean, filtered, compressed air.

3-38. Inspection — Ground Handling Gear. a. Inspect ball-lock pins (10, figure 3-6) for damage, wear and distortion.

b. Inspect wheels (17) for cracks and damage.

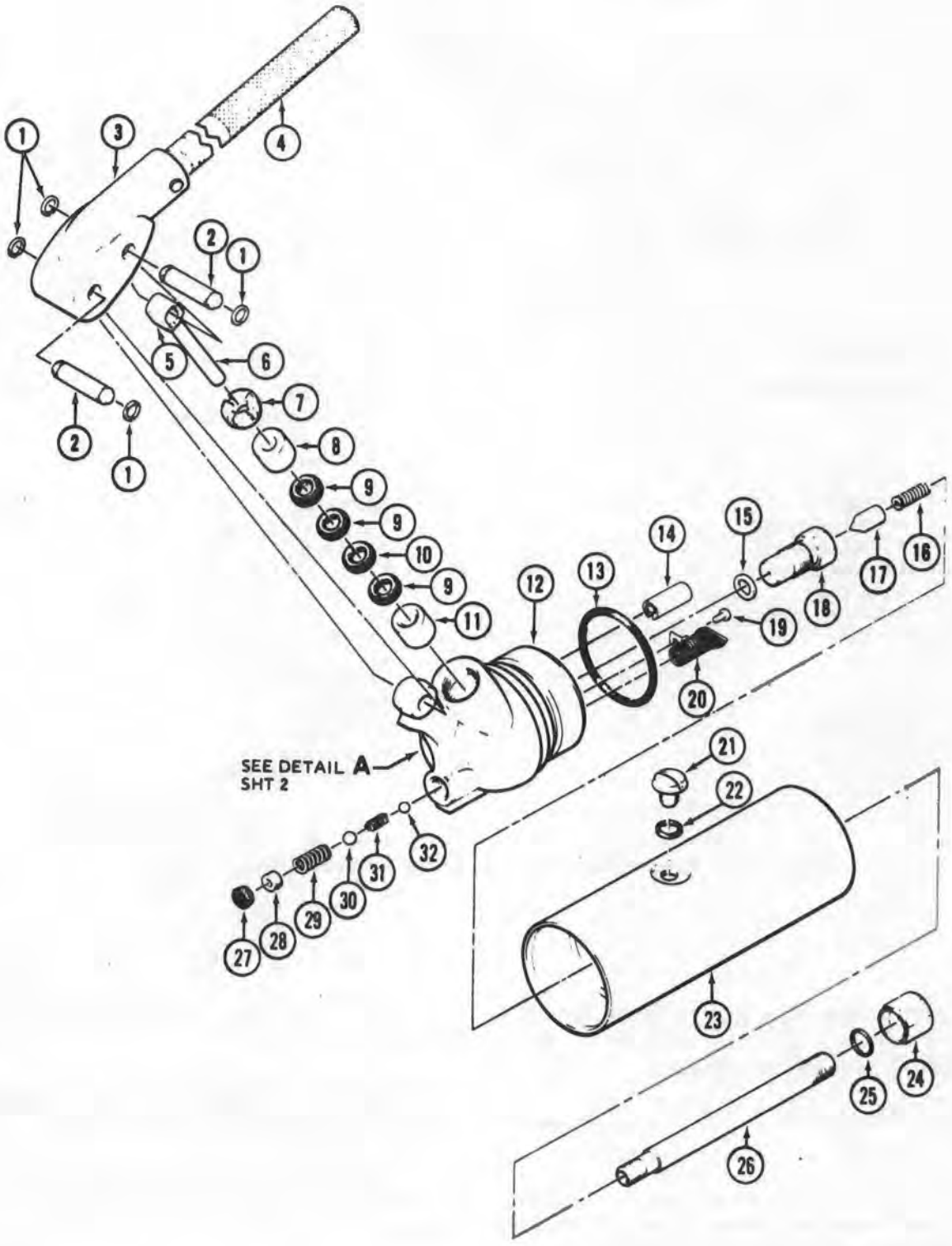
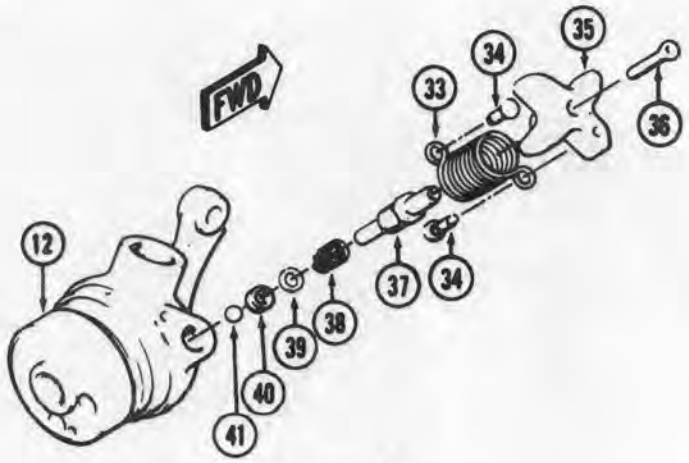


Figure 3-8. Ground handling gear pump assembly (Sheet 1 of 2)



DETAIL A

1. Retaining ring
2. Pin
3. Handle assembly
4. Handle
5. Clip
6. Piston
7. Gland nut
8. Support
9. Leather packings
10. Rubber packing
11. Spreader
12. Pump body
13. Preformed packing
14. Magnet
15. Gasket
16. Spring
17. Plunger
18. Valve body
19. Screw
20. Screen
21. Screw
22. Packing
23. Tank
24. Hexnut
25. Preformed packing
26. Tie rod
27. Screen
28. Screw
29. Spring
30. Ball (0.31" dia.)
31. Spring
32. Ball (0.19" dia.)
33. Spring
34. Pin
35. Knob
36. Screw
37. Valve stem
38. Spring
39. Washer
40. Packing
41. Ball (0.31" dia.)

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Figure 3-8. Ground handling gear pump assembly (Sheet 2 of 2)

c. Inspect flexible hose (13) for leaks, fraying, breaks, abrasions, general condition, and serviceability. Check internal threads.

d. Check lubrication pin (11) for damage, distortion, and wear.

e. Check internal threads of trunnion (4) for damage. Inspect setscrew (5) and its internal threads in trunnion for damage. Inspect threads for corrosion damage. (Refer to TM 43-0105.)

f. Inspect lubrication pin (11) for serviceability.

g. Inspect release pin, support pin, and spring for damage or distortion.

h. Inspect all lubrication fittings, for damage, wear, and suitability for continued service.

i. Check axle assembly (8), pump cradle assembly (3), sleeve (6), and cylinder assembly arm (7) for wear, damage, and cracks.

j. Check hydraulic cylinder assembly (12) for leaks and damage. Inspect cylinder wall of cylinder assembly (12) for corrosion. (Refer to TM 43-0105.)

k. Check hydraulic pump assembly (1) for leaks and damage.

l. Inspect packings, seals, and gaskets of hydraulic pump for distortion, wear, or damage (figure 3-8).

m. Inspect washers, screws, retaining rings, clips and springs of hydraulic pump for damage and serviceability (figure 3-8).

n. Inspect screens (20 and 27, figure 3-8) of hydraulic pump for damage and serviceability.

o. Inspect balls (30, 32 and 41) of hydraulic pump for pitting, corrosion, and damage.

p. Inspect hole in tie rod (26) for clear passage.

q. Inspect bearings (2 and 7, figure 3-7) for galling, nicks, and cracks and freedom of rotation.

r. Inspect bearing races (3 and 6) for nicks, scratches, roller grooves and cracks.

s. Inspect inner and outer wheel halfs (4 and 5) for nicks, scratches, gouges and warpage.

t. Inspect bearing race area of inner and outer wheel halfs (4 and 5) for damage.

u. Inspect tires (12) and tubes (11) for cracks, deterioration and serviceability.

v. Inspect all hardware of wheel assembly (figure 3-7) for serviceability.

w. Inspect all components of ground handling gear assembly (figures 3-6, 3-7 and 3-8) for corrosion damage. (Refer to TM 43-0105.)

x. Magnetic particle inspect bolts (9, figure 3-7) for cracks per TM 43-0103.

3-39. Repair or Replacement — Ground Handling Gear. a. Replace ball-lock pin (10, figure 3-6) if unserviceable.

b. Replace cracked or damaged wheel halfs (4, or 5 figure 3-7), tires (12) or tubes (11).

c. Replace bearings (2 or 7), seals (1), or bearing races (3) when cracked, damaged, or corroded.

d. Replace trunnion (4, figure 3-6) if internal threads are damaged or corroded.

e. Replace lubrication pin (11) if damaged.

f. Replace flexible hose (13) if leaking or damaged.

g. Replace sleeve (6) or pump cradle assembly (3) if cracked or damaged.

h. Repair pump assembly (1) if leaking, using service kit, Part No. JS953 (T6) as follows:

(1) Replace clip (5, figure 3-8), three leather packings (9) and rubber packing (10).

(2) Replace filter screen (27) in hose port, spring (29), 0.31-inch ball (30), spring (31), and 0.19-inch ball (32).

(3) Replace spring (38), washer (39), packing (40), and 5/16-inch ball (41).

(4) Replace preformed packings (13) and (25).

(5) Replace screw (19) and screen (20).

(6) Repair or replace any part that has corrosion. (Refer to TM 43-0105.)

i. Repair cylinder assembly (12, figure 3-6), Part No. BUO954B as follows: (AVIM)

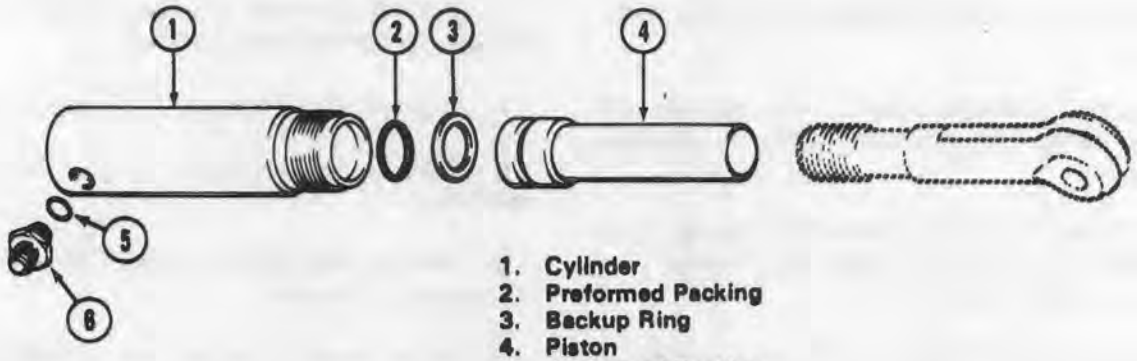
NOTE

If hydraulic cylinder does not have piston, Part No. 330617, which is machined for preformed packing and backup ring, requisition new piston, Part No. 330617.

(1) Replace hydraulic cylinder if inside of cylinder (1, figure 3-9) has nicks, scratches, or pits deeper than 0.005 inch in cylinder wall.

(2) Burnish scratches inside cylinder (1) that are less than 0.005 inch deep, using abrasive cloth (C49).

(3) Carefully slip new backup ring (3), over inboard end (end opposite clevis) of piston (4). Part No. 330617, and into packing groove.



1. Cylinder
2. Preformed Packing
3. Backup Ring
4. Piston
5. Preformed Packing
6. Fitting (Union)

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Figure 3-9. Cylinder assembly, BU0954B ground handling gear — disassembly

CAUTION

Ensure packing is not spiralled in groove.

(4) Carefully slip new preformed packing (2) over inboard end of piston (4) and into packing groove.

(5) Saturate cylinder wall of cylinder (1) and preformed packing (2), backup ring (3) and piston (4) with hydraulic fluid (C112) or (C112.1) and insert piston into cylinder.

(6) Remove fitting (6) and preformed packing (5) from cylinder (1). Discard packing.

3-40. Assembly — Ground Handling Gear.

NOTE

An application of hydraulic fluid (C112 or C112.1) will be applied to all packings (leather or rubber), piston, clip, and threads prior to assembly.

a. Ground Handling Gear.

(1) Insert trunnion (4, figure 3-6) in pump cradle assembly (3) with threaded openings facing aft.

(2) Assemble pump assembly (1), refer to following step b.

NOTE

To prepare a new pump assembly (1) and cylinder assembly (12) for installation, remove pipe plug on each and drain original fluid.

(3) Position spacer (18) between pump assembly (1) and pump cradle assembly (3) and install two U-clamps, four washers, and four nuts.

(4) Install cylinder assembly (12) on each end of trunnion (4) to bottom out in hole. Loosen until hydraulic outlet is directed down. Secure cylinder assemblies (12) with setscrews.

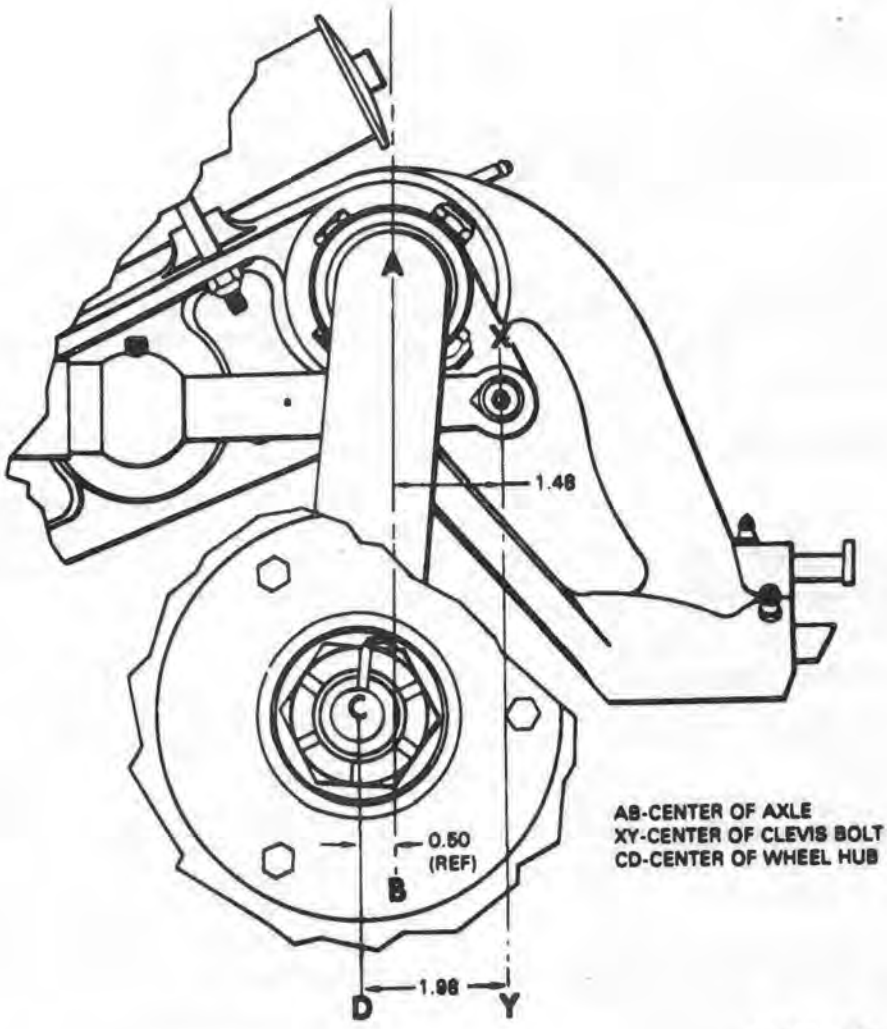
(5) Position cylinder assembly arm (7) on sleeve (6). Insert axle assembly (8) and secure with bolts. Insert sleeve and axle combination through pump cradle assembly (3) and install cylinder assembly arm (7) on opposite end.

NOTE

Hydraulic cylinder assembly arm (7) must be forward of wheel hub centerline 1.98 inches (figure 3-10).

(6) Install cylinder assembly (12, figure 3-6) to clevis. With cylinder fully extended, adjust clevis to hold 1.48-inch dimension (figure 3-10).

(7) Position support rod assembly (9, figure 3-6) on clevis pin and install ball-lock pin (10).



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

Figure 3-10. Positioning wheel cylinder and clevis

(8) Install preformed packing (5, figure 3-9) and fitting (6) into open port of cylinder assembly cylinder (1).

(9) Connect two flexible hoses (13, figure 3-6) to fittings on cylinder assemblies (12) and to tee on pump assembly (1).

(10) Remove screw (21, figure 3-8) from tank (23). Fill pump assembly with clean hydraulic fluid (C112) or (C112.1), install screw (21).

(11) Actuate pump handle several strokes.

(12) Crack hydraulic hose at tee of pump.

(13) Pump until no air can be expelled. Tighten hydraulic hose connection.

(14) If air is still present in hydraulic cylinder assembly (12, figure 3-6), refill pump and repeat procedures.

(15) Tighten or replace any hardware as necessary.

(16) Build up hydraulic pressure with pump and check for leaks. Extend and retract ground handling wheels to ensure proper operation.

(17) Testing — ground handling gear hydraulic cylinder (12, figure 3-6).

(a) Pump until overload in hydraulic pump goes off with cylinder against trunnion stop.

(b) Check for leaks.

(c) Release pressure and pump cylinder piston out half-way. Allow to stand a few minutes.

(d) Check for leaks.

b. **Pump Assembly, Part No. BU953.** (Figure 3-8). (AVIM).

CAUTION

All parts must be thoroughly cleaned and assembled in a clean dust free area.

(1) Insert spreader (11, figure 3-8) in pump body (12), flat side down.

(2) Slide support (8) onto piston (6).

NOTE

The "V" must face away from groove on piston.

(3) Dip two leather packings (9), one rubber packing (10), and third leather packing in hydraulic fluid (C112) and (C112.1) and assemble in the order as shown.

NOTE

The "V" on packing must rest on brass spreader.

(4) Insert piston (6) with packings installed into pump body (12).

(5) Install and tighten gland nut (7) using an adjustable spanner wrench.

(6) Replace clip (5).

(7) Insert 0.19-inch ball (32), spring (31), 0.31-inch ball (30), and spring (29). Install screw (28).

(8) Install new filter screen (27) in hose hole.

(9) Insert 0.31-inch ball (41), packing (40), washer (39) and spring (38) into pump body (12).

CAUTION

Do not overtighten knob (35).

(10) Install valve stem (37) in pump body (12) down against ball (41) by slipping knob (35) onto stem and tightening.

(11) Remove knob (35) from stem (37).

(12) Position spring (33) over knob (35) and hook one eye of spring onto pin (34). Place knob and spring over valve stem (37) and hook eye of spring onto pin (34) in pump body (12).

NOTE

Do not place knob onto hex of valve stem.

(13) Hold pump body (12) and valve stem (37) firmly and twist knob (35) to the left two faces of the hex. Push knob onto hex of valve stem at this position. Insert flat head socket screw (36) 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.

NOTE

Knob and valve stem should work free and valve should close firmly when opened and released.

CAUTION

An improperly operating valve means improper assembly and an inoperative pump.

(14) Install new screen (20) in pump body (12) and secure with screw (19).

(15) Install plunger (17) and spring (16) in valve body (18). Screw tie rod (26) into valve body (18), and position in tank (23).

(16) Install gasket (15) and preformed packing (13) and assemble tank (23) to pump body (12).

(17) Install preformed packing (25) and hexnut (24) and tighten hexnut lightly. Rotate tank so that filler hole is on top and in line with pump handle. Tighten hexnut (24).

(18) Replace tank filler hole screw (21) and packing (22).

(19) Position handle assembly (3) to pump body (12) and secure with two pins (2) and four retaining rings (1).

(20) Testing — ground handling pump (figure 3-8).

(a) Fill the oil tank to proper level with hydraulic fluid (C112) or (C112.1).

(b) Connect a **10,000** psi pressure gage to outlet hole.

(c) Operate pump until pressure builds up and overload valve unloads. Proper setting is **8300 TO 8800** psi. If pressure goes to high, turn tie rod (26) counterclockwise using a screwdriver. If pressure is too low, turn rod clockwise. Test and readjust as required until proper setting is obtained.

(d) When proper setting is obtained, tighten hexnut (24).

NOTE

Hold tie rod in position using screwdriver in slot to prevent rod turning with nut.

c. **Wheel Assembly.**

(1) Using a bench press, press bearing race (3, figure 3-7) into wheel half (4).

(2) Using a bench press, press bearing race (6) into wheel half (5).

(3) Hand pack bearings (2 and 7) with grease (C106).

(4) Apply a coat of grease (C106) to surface of bearing races (3 and 6) and inner area of lip of seals (1 and 8).

(5) Install bearing (2) into bearing race (3). Position seal (1) to wheel half (4) and press seal into cavity until it bottoms against bearing.

(6) Install bearing (7) into bearing race (6). Position seal (8) to wheel half (5) and press seal into cavity until it bottoms against bearing.

(7) Install tube (11) into tire (12).

(8) Install valve stem of tube (11) through hole in wheel half (4) and press wheel half into tire.

(9) Install wheel half (5) into opposite side of tire and align bolt holes.

(10) Install three bolts (9) with three washers (10) through both wheel halfs (4 and 5).

(11) Install three washers (15) and three nuts (16) to bolts (9).

(12) Install four valve clips (13) and four screws (14).

WARNING

Face of wheel half will be facing to your left and right side when inflating tire to maximum air pressure.

(13) Inflate tire to **50** psig air pressure.

(14) Install wheel assembly to axle of ground handling gear (paragraph 3-47).

3-41. Painting — Ground Handling Gear. Clean components in accordance with TM 55-1500-204-25/1. Paint or touch up components in accordance with TB 746-93-2 and TM 55-1500-204-25/1.

3-42. WHEELS, TIRES AND TUBES — GROUND HANDLING GEAR. (SINGLE WHEEL)

3-43. Description — Ground Handling Tires. Each ground gear assembly has two 7.00-6, 6-ply rating, type III aircraft tires.

NOTE

Tires and tubes shall be stored under normal temperature conditions if possible. If it becomes necessary to store tubes at subnormal temperatures, partially inflate them in order to remove creases and folds. Tires and tubes shall be warmed before mounting so normal handling will not flex them to the point of cracking. When not in use, ground handling wheels shall be removed from helicopter and placed in warm storage. If tires become frozen to the ground, they can be released by heat application or by over-inflation. Under no circumstances shall the applied heat exceed 160 degrees F (71.1 degrees C). If tires are to be released by over-inflation, they may be inflated to one and one-half times normal pressure (50 psig) or to a maximum of 75 psig.

3-44. Removal — Ground Handling Tires. Remove ground handling gear from skid. Remove either wheel assembly from axle assembly (8, figure 3-6) by removing cotter pin (16), nut (15), and retainer (14). Remove wheel assembly (17).

3-45. Inspection — Ground Handling Tires. Inspect tires for cuts, excessive wear and 50 psig air pressure.

3-46. Repair or Replacement — Ground Handling Tires. a. Replace tire if badly cut or excessively worn.

b. Inflate tire to 50 psig air pressure.

c. Repair or replace tires as required. (Refer to TM 55-2620-200-24).

3-47. Installation — Ground Handling Tries. a. Apply a bead of grease (C106) around inboard end of axle shaft.

b. Place wheel assembly (17, figure 3-6) on axle assembly (8).

c. Apply a bead of grease (C106) adjacent to seal lip and axleshaft, around entire circumference of axle and install retainer (14), nut (15). Tighten nut (15) and secure with cotter pin (16).

3-48. TRUCK, GROUND HANDLING GEAR (DUAL WHEEL).

3-49. Description — Ground Handling Gear. Two ground handling gear assemblies (figure 3-11) are provided to allow moving helicopter on the ground. Each assembly consists of two wheels (16) on an offset axle (19), a supporting cradle assembly (5), and a hand-operated hydraulic pump (1) with two hydraulic cylinders (7) which actuate axle (19) to extend or retract wheels. The cradle assembly (5) is mounted to eyebolts on landing gear skid by means of a fixed rear pin and a spring-loaded front pin.

NOTE

To prevent possible damage to handling wheels, the forward portion of the skids should be raised by pulling the tail skid down while extending the wheels. To further prevent damage to ground handling gear equipment, release pressure slowly allowing the helicopter to be lowered slowly.

3-50. Removal — Ground Handling Gear. If support rods (18) are engaged, release hydraulic pressure and raise wheels (16) to detach rods from skids and stow in clips. Press release pin (30) on rear of cradle assembly (5) to withdraw support pin (29) from eyebolt. Lift off handling gear assembly.

Premaintenance requirements for ground handling gear assembly

Conditions	Requirements
Model	All
Part No. or Serial No.	All
Special Tools	(T6)
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	One

Condition	Requirements
Consumable Materials	(C32), (C49), (C106), (C111), (C112), (C112.1), (C205), (C211)
Special Environmental Conditions	None

3-51. Disassembly — Ground Handling Gear.

NOTE

Disassembly procedures are the same for opposite side of ground handling gear.

a. Ground Handling Gear.

(1) Remove ball-lock pin (17, figure 3-11) and remove support rod (18) from axle (19).

(2) Remove wheel (16) with tire and tube assembled (paragraph 3-59).

(3) Disconnect and remove flexible hose (8) from tee on hydraulic pump (1) and hydraulic cylinder (7).

(4) Remove nuts (22) and washers (21) and lift U-bolts (4) attaching hydraulic pump (1) to cradle assembly (5). Remove hydraulic pump (1).

(5) Remove cotter pin (27), washer (24), and lubricator pin (23), attaching ram arm (2) to clevis (25) of hydraulic cylinder (7).

(6) Back out set screw (3) and remove hydraulic cylinder (7) from trunnion (9). Using clevis (25) as handle, hold ram housing or cylinder. Separate ram piston from cylinder.

(7) Remove lubrication fitting (32), unscrew and remove connecting pin (31) and release pin (30). When connecting pin (31) is removed, support pin (29) can be released and spring (28) will slide from cradle.

(8) Remove trunnion (9) from cradle (5).

3-52. Cleaning — Ground Handling Gear.

WARNING

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

a. Wash all parts with a soft bristle brush (C32) in solvent (C205) and allow to air dry.

3-53. Inspection — Ground Handling Gear.

a. Inspect ball-lock pin (17, figure 3-11) for damage, wear and distortion.

b. Inspect lubrication pin (23) for damage, wear, and distortion.

c. Inspect internal threads of trunnion (9) for damage and set screw (3) and its internal threads in trunnion for damage.

d. Inspect connecting pin (31), support pin (29) and spring (28) for damage or distortion.

e. Inspect flexible hoses (8) for leaks and damage.

f. Inspect axle (19), cradle assembly (5), and sleeve for wear and cracks.

g. Inspect hydraulic cylinder assembly (7) for leaks or damage.

h. Inspect hydraulic pump (1) for leaks and damage.

i. Inspect all parts of hydraulic pump for wear or damage.

j. Inspect screens of hydraulic pump (1) for damage.

k. Inspect balls in hydraulic pump (1) for pitting, damage, and corrosion.

l. Inspect hole in tie rod (26, figure 3-8) for clearance and no obstructions.

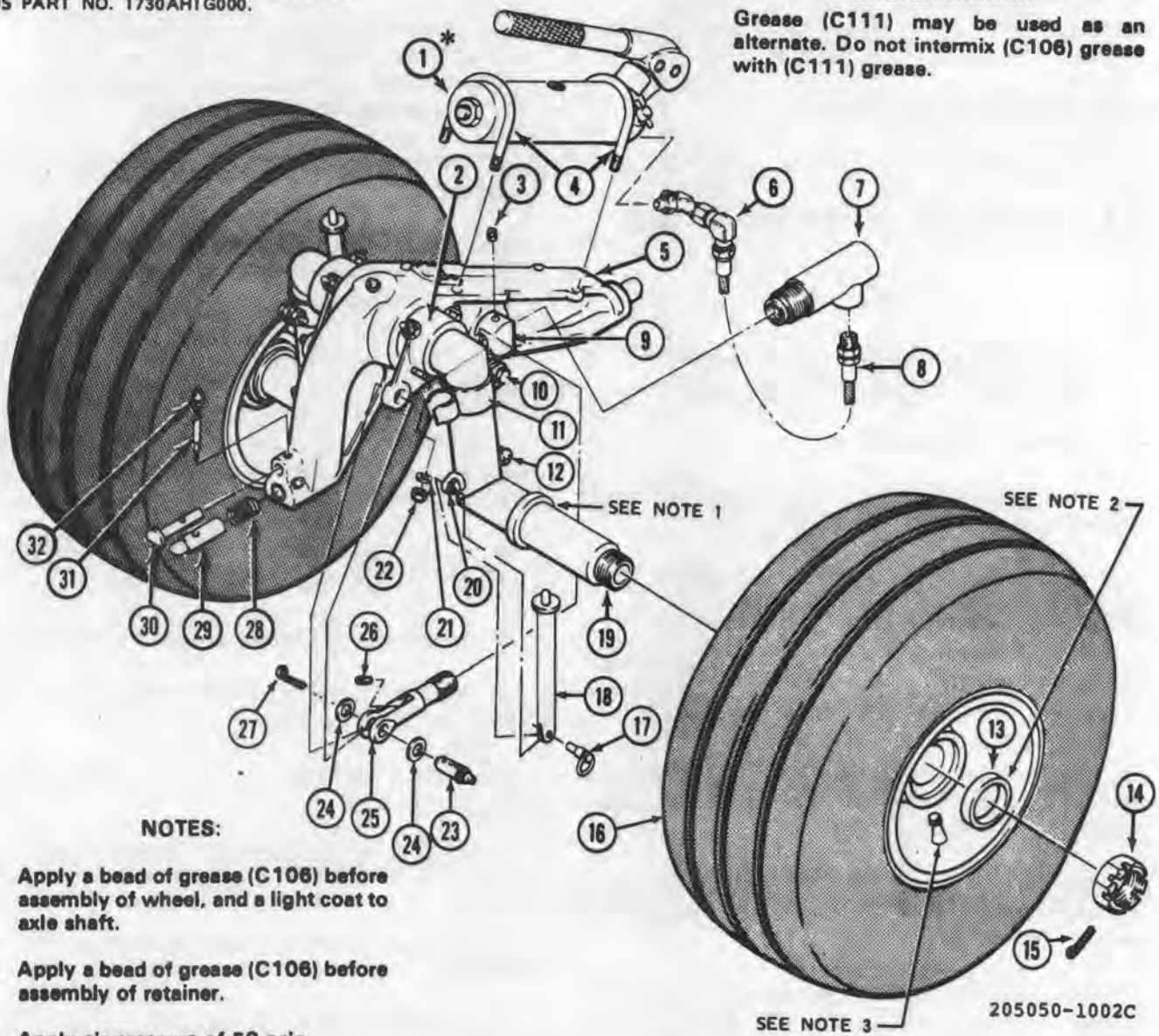
m. Visually inspect wheels (16, figure 3-11) for cracks.

3-54. Repair or Replacement — Ground Handling Gear. a. Replace ball-lock pin (17, figure 3-11) if unserviceable.

*PART NO. BU953 PUMP ASSEMBLY SHOWN. ALTERNATE PUMP ASSEMBLY IS PART NO. 1730AH1G000.

CAUTION

Grease (C111) may be used as an alternate. Do not intermix (C106) grease with (C111) grease.



NOTES:

1. Apply a bead of grease (C106) before assembly of wheel, and a light coat to axle shaft.
2. Apply a bead of grease (C106) before assembly of retainer.
3. Apply air pressure of 50 psig.

*1. Hydraulic pump
2. Ram arm
3. Setscrew
4. U-bolts
5. Cradle assembly
6. Hose and fittings
6. Reducer and fittings
7. Hydraulic cylinder
9. Trunnion
10. Bolt
11. Clip
12. Nut
13. Retainer
14. Nut
15. Cotter pin
16. Wheel assembly
17. Ball lock pin
18. Support rod
19. Axle
20. Eyebolt
21. Washer
22. Nut
23. Lubricator pin
24. Washer
25. Clevis
26. Setscrew
27. Cotter pin
28. Spring
29. Support pin
30. Release pin
31. Connecting pin
32. Lubricator fitting

Figure 3-11. Ground handling gear — disassembly

b. Replace lubrication pin (23) if worn or distorted.

c. Replace trunnion (9) if the internal threads are damaged.

d. Replace lubrication fitting (32) if damaged.

e. Replace connecting pin (31) and support pin (29) and spring (28) if damaged.

f. Replace flexible hose (8) if leaking or damaged.

g. Replace axle (19) or cradle assembly (5) if cracked or damaged.

h. Repair hydraulic pump if leaking. Use service parts kit (Part No. JS953) (T6), (figure 3-8).

(1) Replace the following parts in hydraulic pump:

(a) Replace clip (5, figure 3-8) rubber and leather packings (9 and 10).

(b) Replace filter screen (27), discharge valve spring (29), 0.31 inch ball (30), suction valve spring (31), and 0.19 inch ball (32).

(c) Replace release valve spring (38), washer (39), packing (40), and 0.31 inch ball (41).

(d) Replace preformed packings (13 and 25), screw (19), and screen (20).

(2) Remove hydraulic pump from ground handling gear.

(a) Release hydraulic pressure by turning T-handle valve on pump (1, figure 3-11) to open position.

(b) Place suitable vessel to catch fluid. Disconnect hydraulic hose from tee fitting on pump. Cap the hoses. Remove fitting (6) from pump (1) and install plug.

(c) Remove four nuts (22) and washers (21) from U-bolts (4) to detach hydraulic pump (1) from cradle assembly (5). Keep the U-bolts with pump.

(3) Disassemble hydraulic pump as follows: (AVIM)

(a) Remove retaining rings (1, figure 3-8) fulcrum pins (2) and separate handle assembly (3) from pump body (12).

(b) Remove filler screw (21) with preformed packing (22) from tank (23), and drain oil from tank. Discard packing.

(c) Pull out piston (6) and remove clip (5) by spreading clip slightly. Unscrew gland nut (7) using adjustable spanner wrench and remove support (8), leather packings (9), rubber packing (10) and spreader (11).

(d) Remove filter screen (27, figure 3-8). Remove screw (28), spring (29), ball (30), spring (31), and ball (32).

(e) Remove screw (36). Grasp knob (35) and detach from valve stem (37). Unhook loop of spring from pin on pump body. Slip knob (35) onto valve stem (37). Remove spring (38), steel washer (39), packing (40), and 0.31 inch diameter ball (41).

(f) Remove nut (24) and packing (25). Twist tank (23) off pump body (12). Remove seal (13).

(g) Remove screw (19) and screen (20). Discard screen.

(h) Remove overload valve body (18) from tie rod (26). Remove spring (16) and plunger (17) from body (18).

(4) Cleaning.

(a) Clean all foreign particles from magnet assembly (14, figure 3-8) using clean cloth.

WARNING

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

(b) Thoroughly clean recessed hole into which screen (20) fits, using solvent (C205).

(c) Thoroughly clean inside of valve body (18) using solvent (C205).

(d) Clean rod (26) using solvent (C205) to assure clear passage through hole in end of rod.

(5) Reassemble hydraulic pump.

(a) Insert trunnion (9, figure 3-11) in cradle assembly (5) with threaded openings aft. (AVIM)

(b) Insert spreader (11, figure 3-8) in pump body (12), flat side down.

(c) Slide support (8) onto piston (6).

NOTE

The "V" must face away from groove on piston.

(d) Dip two leather packings (9), one rubber packing (10), and third leather packing (9) in hydraulic fluid (C112) or (C112.1) and assemble in the order shown in figure 3-8.

NOTE

The "V" on packing must rest on brass spreader.

(e) Drive piston (6) with packing down solid, using medium weight hammer on seating tool.

(f) Remove packing guide.

(g) Install and tighten gland nut (7) using an adjustable spanner wrench.

(h) Replace clip (5).

(i) Insert ball (32), spring (31), ball (30), and spring (29). Install screw (28).

(j) Install filter screen (27) in hose hole.

(k) Insert ball (41), packing (40), washer (39) and spring (38) into pump body (12).

CAUTION

Do not overtighten knob (35).

(l) Install valve stem (37) in pump body (12) down against ball (41) by slipping knob (35) onto stem and tightening.

(m) Remove knob (35) from valve stem (37).

(n) Position spring (33) over knob (35) and hook one eye of spring onto pin (34). Place knob and spring over valve stem (37) and hook eye of spring onto pin (34) in pump body (12).

(o) Hold pump body (12) and valve stem (37) firmly and twist knob (35) to the left two faces of the hex. Push knob onto hex of valve stem at this position. Insert flat head socket screw (36) 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.

CAUTION

An improperly operating valve means improper assembly and an inoperative pump.

NOTE

Knob and valve stem should work free and valve should close firmly when opened and released.

(p) Install screen (20) in pump body (12) and secure with screw (19).

(q) Install plunger (17) and spring (16) in valve body (18). Screw tie rod (26) into valve body (18), and position in tank (23).

(r) Install gasket (15) and preformed packing (13) and assemble tank (23) to pump body (12).

(s) Install preformed packing (25) and nut (24) and tighten nut lightly. Rotate tank so that filler hole is on top and in line with pump handle. Tighten nut (24).

(t) Replace tank filler hole screw (21).

(u) Position handle assembly (3) to pump body (12) and secure with pins (2) and retaining rings (1).

(6) Testing — ground handling pump.

(a) Fill the oil tank to proper level with hydraulic fluid (C112) or (C112.1) (paragraph 3-55).

(b) Connect a 10,000 psi pressure gage to outlet hole.

(c) Operate pump until pressure builds up and overload valve unloads. Proper setting is **8300 TO 8800** psi. If pressure goes too high, turn tie rod (26) counterclockwise using a screwdriver. If pressure is too low, turn rod clockwise. Test and readjust as required until proper setting is obtained.

(d) When proper setting is obtained, tighten nut (24).

l. Repair hydraulic cylinder (figure 3-12). (AVIM)

(1) Remove hydraulic cylinder as follows:

(a) Remove cotter pin (27, figure 3-11), washer (24), and pin (23) attaching ram arm (2) to clevis (25) of hydraulic cylinder (7).

(b) Back out setscrew (3) and remove hydraulic cylinder (7) from trunnion (9). Using clevis (25) as handle, hold ram housing or cylinder. Separate cylinder piston from cylinder.

(c) Remove lubrication fitting (32), unscrew and remove connecting pin (31) and release pin (30). When connecting pin (31) is removed, support pin (29) can be released and spring (28) will slide from cradle.

(d) Remove trunnion (9) from cradle assembly (5).

j. Repair hydraulic cylinder (7, figure 3-11) Part No. BUO954B as follows: (AVIM)

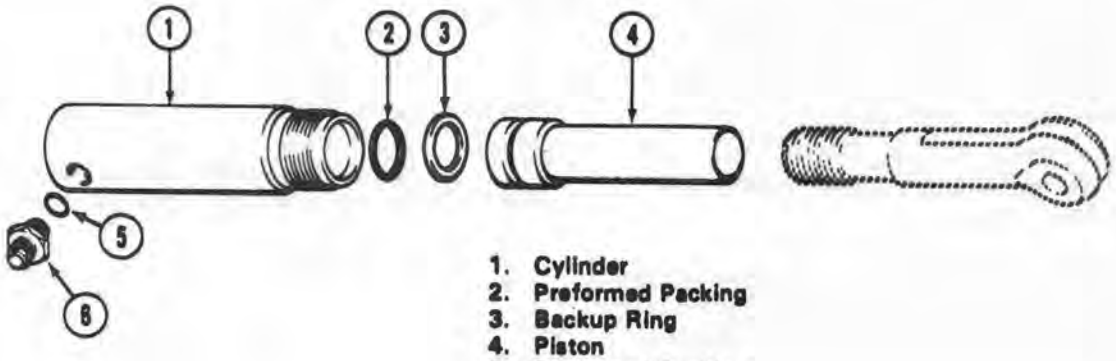
NOTE

If hydraulic cylinder does not have piston, Part No. 330617, which is machined for preformed packing and backup ring, requisition new piston, Part No. 330617.

(1) Replace hydraulic cylinder if inside of cylinder (1, figure 3-12) has nicks, scratches, or pits deeper than **0.005** inch in cylinder wall.

(2) Burnish scratches inside cylinder (1) that are less than **0.005** inch deep, using abrasive crocus cloth (C49).

(3) Carefully slip new backup ring (3), over inboard end (end opposite clevis) of piston (4). Part No. 330617, and into packing groove.



1. Cylinder
2. Preformed Packing
3. Backup Ring
4. Piston
5. Preformed Packing
6. Fitting (Union)

204050-16D

Figure 3-12. Cylinder assembly, ground handling gear — disassembly

CAUTION

Ensure packing is not spiralled in groove.

(4) Carefully slip new preformed packing (2) over inboard end of piston (4) and into packing groove.

(5) Saturate cylinder wall of cylinder (1) and preformed packing (2), backup ring (3) and piston (4) with hydraulic fluid (C112) or (C112.1) and insert piston into cylinder.

(6) Remove fitting (6) and preformed packing (5) from cylinder (1). Discard packing.

3-55. Installation — Ground Handling Gear — Hand Pump and Hydraulic Cylinder. a. Prepare a new hydraulic pump (1, figure 3-11) and hydraulic cylinder assembly (7) for installation by removing pipe plug on each end and drain original fluid.

b. Install hydraulic cylinder (12) on ground handling gear as follows (figure 3-6):

(1) Insert trunnion (4) through cradle assembly (3) with set screws (5) removed and holes facing up.

(2) Install cylinder assembly (12) on each end of trunnion (4). Visually insure that threads fill set screw (5) hole after cylinder assembly is aligned in the downward position. Install set screw (5).

(3) Assemble cylinder arm (7) and axle assembly (8) on sleeve (6) and secure with bolts. Insert assembly through cradle assembly (3) and assemble opposite end. Insure cylinder arm (7) is forward of wheel hub center line 1.98 inches (figure 3-10).

c. Install hydraulic pump on ground handling gear as follows:

(1) Position hydraulic pump (1, figure 3-11) on cradle assembly (5). Install U-bolts over pump and through flange of cradle assembly and secure with washers and nuts.

(2) Install reducer and fitting (6) in outlet, aligning open ends of tee across end of pump cylinder.

(3) Install cylinder clevis (25) with hydraulic cylinder full, extended and adjust clevis to hold **1.48** inches dimension.

(4) Insert support pin (29, figure 3-11) in aft end of cradle assembly (5), align holes and secure with spring pin.

(5) Insert release pin (30) in upper forward hole of cradle. Insert spring (28) and support pin (29) in forward hole of cradle, align holes in both pins and install connecting pin (31).

(6) Attach support rod (18) to clevis (25) and insert ball-lock pin (17).

(7) Connect hose (8) from cylinder (7) to outlet tee of pump.

(8) Fill pump with hydraulic fluid (C112) or (C112.1).

(9) Pump handle several strokes.

(10) Crack hydraulic hose at tee of pump.

(11) Pump until no air can be expelled. Tighten hydraulic hose connection.

(12) If air is still present in hydraulic cylinder (7), refill pump and repeat procedures.

(13) Tighten or replace any hardware as necessary.

(14) Build up hydraulic pressure with the pump to check for any possible leaks. Extend and retract the ground handling wheels to ensure that system functions properly.

d. Testing — ground handling gear hydraulic cylinder (7, figure 3-11).

(1) Pump until overload in hydraulic pump goes off with cylinder against trunnion stop.

(2) Check for leaks.

(3) Release pressure and pump cylinder out halfway. Allow to stand a few minutes.

(4) Check for leaks. The hydraulic cylinder is ready when no leaks are found.

3-55.1. Ground Handling Gear Hydraulic Pump (Power-Packer) P/N HP9902-41-10.

3-55.2. Disassembly - Hydraulic Pump.

a. Remove plunger cross pin (3, figure 3-12.1) and beam pin (28). Separate handle from base.

b. Remove tank filler plug (25) and copper gasket (23). Drain oil from reservoir.

c. Pull out plunger (4). Unscrew packing nuts (5) using packing nut tool (figure 3-12.1). Remove packing (6, figure 3-12.1), cup retainer (7), pump cups (8), and spreader (9).

d. Unscrew valve plug (33), outlet check spring (32) and balls (31 and 30).

e. Remove return spring (20). Remove screw (15) and lockwasher (14). Grasp handle (13) and detach from release spindle (12). Remove spindle (12), release packing nut (19) and release packings (18).

f. Twist reservoir assembly (24) off pump base (10). Remove reservoir shim washers (26). Remove relief valve (22) and copper gaskets (23). Remove screen (21).

3-55.3. Cleaning - Hydraulic Pump.

a. Clean screen (21) using solvent (C205).

b. Thoroughly clean relief valve (22) using solvent (C205).

3-55.4. Inspection - Hydraulic Pump.

a. Inspect packings, seals and gaskets for distortion, wear or damage.

b. Inspect washers, screws, retainers, pins, and springs for damage and serviceability.

c. Inspect balls (30 and 31) for pitting, corrosion or damage.

3-55.5. Repair or Replacement - Pump (Service Kit P/N KH9000).

a. Replace copper gaskets (23).

b. Replace packing (6), cup retainer (7), pump cups (8) and spreader (9).

c. Replace release packings (18).

d. Replace outlet check spring (32), balls (30 and 31).

3-55.6. Repair - Hydraulic Ram, P/N CB-1003-38-02 (Service Kit P/N KC1013) (Figure 3-12.3).

a. Carefully slip over the plunger and in the sequence indicated, the disc (4), V cup (5), cup separator (6), V cup (7), cup separator (6), V cup (5), spreader (8) and spring washer (9).

b. Assemble retaining nut (10) onto plunger and tighten.

c. Burnish scratches inside hydraulic ram cylinder that are less than 0.005 inch deep, using crocus cloth (C49).

d. Replace hydraulic ram if inside of cylinder has nicks, scratches or pits deeper than 0.005 inch.

3-55.7. Reassembly - Hydraulic Pump

a. Install relief valve (22, figure 3-12.1) and copper gaskets (23) into pump base (10).

b. Install screen (21).

c. Assemble reservoir (24) to pump base, using reservoir shim washers (26 and 27) as required to align filler plug on top of reservoir to top of pump $\pm$ 10°. The maximum number of shims to be used is four.

d. Assemble release spindle subassembly as follows: Dip release packings (18), release packing nut (19) and release spindle (12) in hydraulic fluid (C112). Screw release spindle (12) into release packing nut (19). Place two release packings (18) on spindle so that the non-skin sides are together.

e. Assemble release spindle subassembly into pump base. Tighten release packing nut (19) until release packings (18) bottom out in pump base. Loosen release packing nut (19) and retighten to a torque of 20 inch-pounds.

f. Install balls (30 and 31) and outlet check spring (32). Screw in valve plug.

g. Insert spreader (9), pump cups (8), cup retainer (7) and packing (6). Screw in packing nuts using packing nut tool. Insert plunger (4).

h. Install handle into pump base. Insert beam pin (28) and plunger cross pin (3).

i. Install tank filler plug (25) and gasket (23).

3-55.8. Testing - Hydraulic Pump P/N HP-9902-41-10.

a. Fill the oil tank to proper level with hydraulic fluid (C112).

b. Connect pump to test stand. Operate pump to check setting of relief valve (22). Relief valve should function at 8500 $\pm$ 300 psi. If pressure is not within range replace relief valve. Proper relief valve setting is to be specified when ordering valve.

c. Release pressure and pump up to 8000 psi. Observe for 15 seconds. Leakage in excess of 500 psi is cause for rejection.

3-56. Painting — Ground Handling Gear. Clean components in accordance with TM 55-1500-204-25/1. Paint or touchup components in accordance with TB 746-93-2. Do not paint tires.

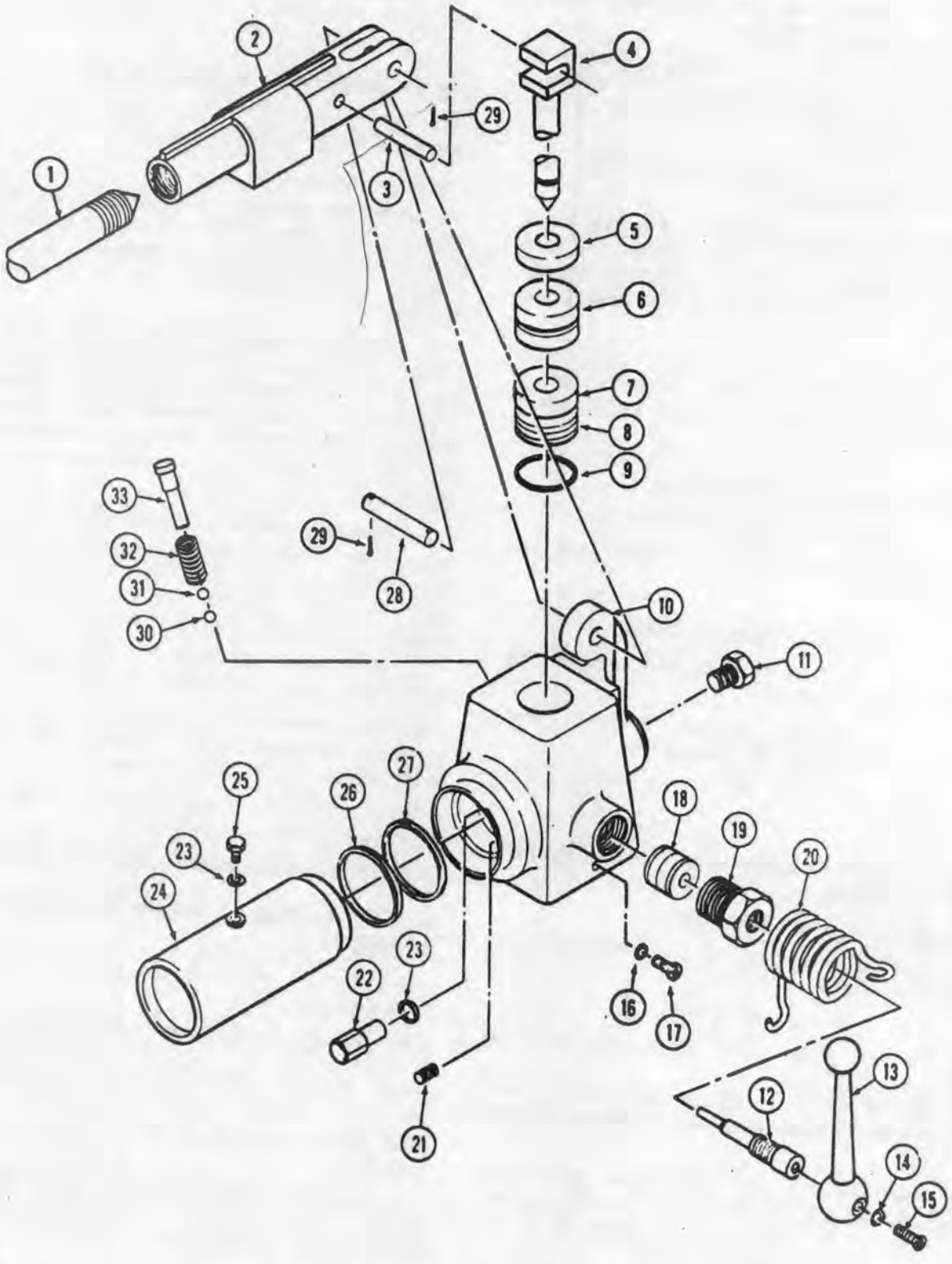


Figure 3-12.1. Ground Handling Gear Pump P/N HP-9902-41-10 (Sheet 1 of 2)

1. Handle
2. Beam
3. Plunger cross pin
4. Plunger
5. Packing nut
*6. Packing
*7. Cup retainer
*8. Pump cup
*9. Spreader
10. Base
11. Reducer bushing
12. Release spindle
13. Handle
14. Lockwasher
15. Capscrew
16. Washer

*Components of kit KH9000

17. Capscrew
*18. Release packing
19. Release packing nut
20. Return spring
21. Screen
22. Relief valve
*23. Gasket (copper)
24. Reservior
25. Filler plug
26. Reservior shim washer
27. Shim washer
28. Beam pin
29. Cotter pin
*30. Ball(0.2187inch diameter)
*31. Ball(0.3125 inch diameter)
*32. Outlet check spring
33. Valve plug

Figure 3-12.1. Ground Handling Gear Pump P/N HP-9902-41-10 (Sheet 2 of 2)

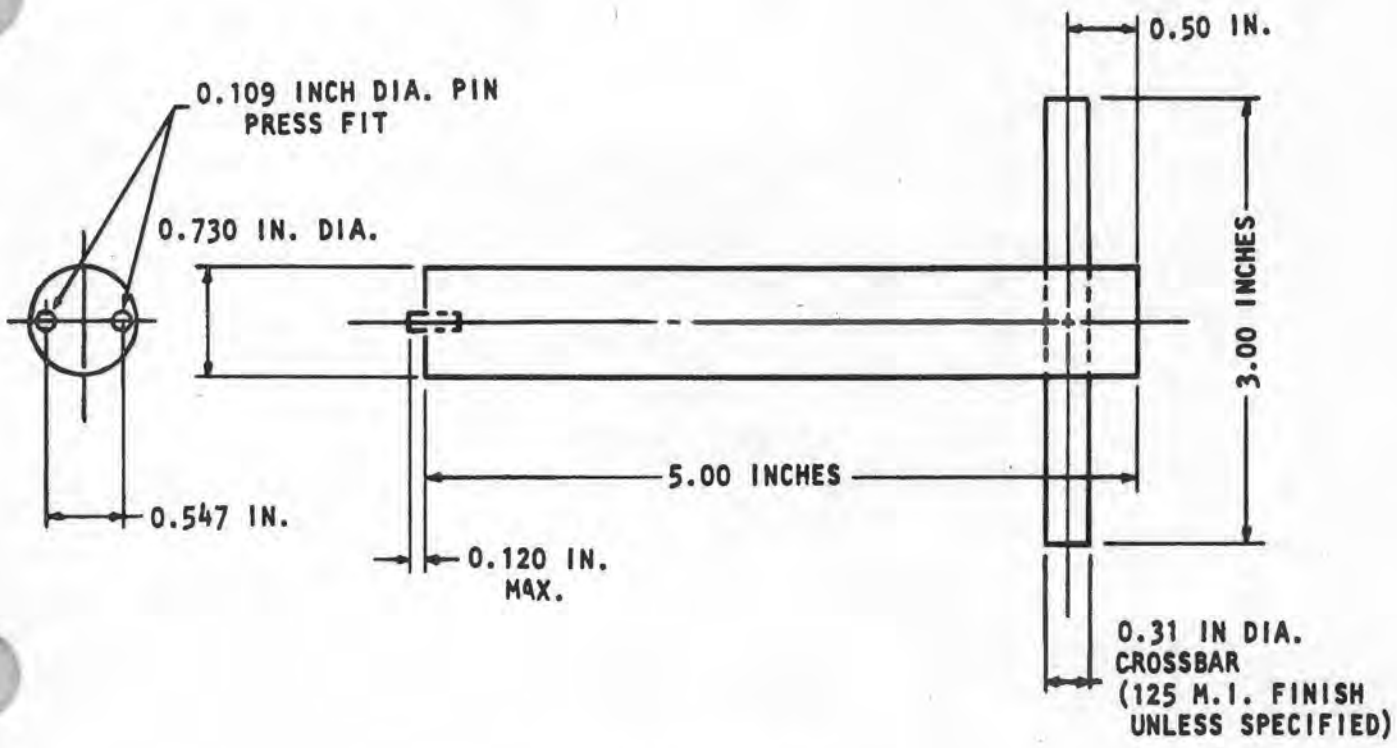
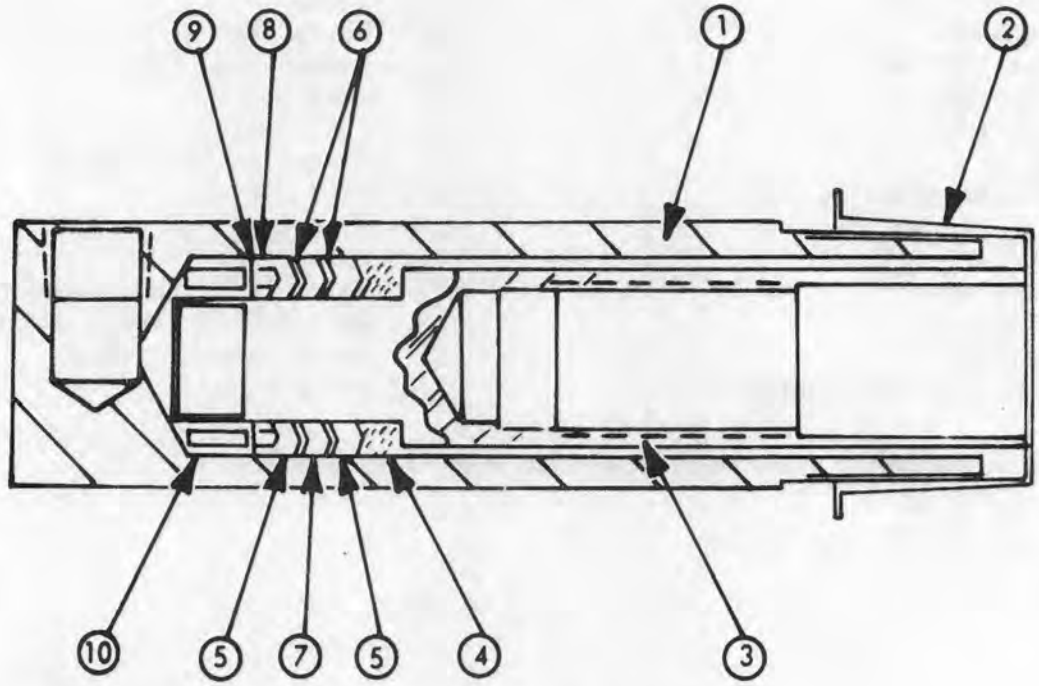


Figure 3-12.2. Packing Nut Tool



	1	CYLINDER BASE
	2	THREAD PROTECTOR
	3	PLUNGER
*	4	DISC
*	5	V CUP
*	6	CUP SEPERATOR
*	7	V CUP
*	8	SPREADER
*	9	SPRING WASHER
*	10	RRETAINING NUT

* COMPONENTS OF KIT
P/N KC1013

Figure 3-12.3. Hydraulic Ram

SECTION II — SKIDS/STRUTS

(Not Applicable)

SECTION III — FLOATS

(Not Applicable)

SECTION IV — SKIS

(Not Applicable)

SECTION V — BRAKES

(Not Applicable)