SECTION III
EMERGENCY PROCEDURES

table of contents

INTRODUCTION

This section contains what experience has shown to be the best procedures in meeting various emergencies that may be encountered. Each emergency presents a different problem, but a thorough knowledge of the procedures contained in this section will enable an air crew to better cope with any emergencies they may encounter. The pilot, as soon as practical after encountering an emergency, and after completing initial corrective action, shall establish communications with the ground station which he is monitoring at the time. There has been a tendency in the past, on the part of the air crew, to minimize certain disorders that could become serious. This practice is not consistent with safety as there may be insufficient time later to alert the agencies that can help. Once an emergency call has been channeled to Air Rescue Service and other agencies, a very diligent and constant check on the subsequent progress of the flight is maintained. Include a complete description of the trouble in the original message. This enables rescue agencies to make early preparations and computations in connection with their responsibilities. Keep the ground station notified at all times of any changes or developments in the emergency, as well as informing them of action taken.

If a reciprocating engine or propeller failure is anticipated, the jet engine on that side should be started if time and circumstances permit. Although many inflight emergencies require immediate corrective action, frequently difficulties are compounded by the tempo of the pilot's commands and hurried execution by the crew. It is essential that the pilot carefully analyze the difficulty prior to taking corrective action. The urgency of certain emergencies requires immediate action by the applicable air crew member. These checklist items are in bold print and will be memorized by the crew member. Following completion of the bold print items, the remaining portion of the checklist will be completed in its entirety, time permitting.

NOTE

During in-flight emergencies the crew will be informed and a landing made at the nearest suitable airfield.

ENGINE FAILURE.

In the event there is a loss of reciprocating engine power, conditions permitting, attempt to return the affected engine to normal or partial operation by reducing power, placing the mixtures to RICH, fuel boost pump to HI, and applying carb heat as required. If normal or partial power cannot be maintained shutdown the affected engine usir the applicable shutdown procedures in this sectic

CAUTION

Do not compromise directional control or allow airspeed to decrease below recommended engine-out climb speed while attempting to return the engine to normal operation.

ENGINE-OUT FLIGHT CHARACTERISTICS.

The most significant flight characteristic of the aircraft during engine-out operation is the immediate tendency to yaw toward the inoperative reciprocating engine. This can, of course, be offset by timely application of rudder and aileron control if necessary. But such corrective control is dependent upon an adequate flow of air across the flight control surfaces and should be applied immediately upon experiencing the engine failure. Of related importance is the immediate loss of thrust which seriously impairs the climb and speed performance of the aircraft. With the cargo doo and ramp open, or with the aft troop doors open, the additional drag is particularly noticeable when operating on one engine. However, as long as the recommended airspeed is maintained and the aircraft is properly trimmed for engine-out flight, all the normal flight maneuvers may be performed.

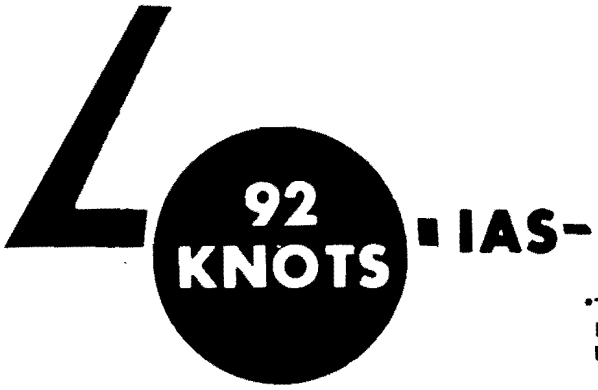
Pedal forces and rudder deflection required to fly at airspeeds for recommended engine-out rate-of-climb, while not excessive, are nevertheless somewhat tiring. Experience shows that pilots tend to choose higher airspeeds because the control forces involved are lower. However this practice should be avoided to prevent a degradation in climb performance.

WARNING

A difference in airspeed indications between the pilot's and copilot's airspeed indicators occur during yaw conditions such as encountered under asymmetric power. Actual IAS should be considered to be the average of the two airspeed indicators.

RECIPROCATING ENGINE OUT MINIMUM CONTROL SPEED (OUT OF GROUND EFFECT)

5° BANK INTO GOOD ENGINE
PROPELLER WINDMILLING
MAXIMUM WET POWER
SYMMETRICAL JET THRUST
MAXIMUM RUDDER DEFLECTION

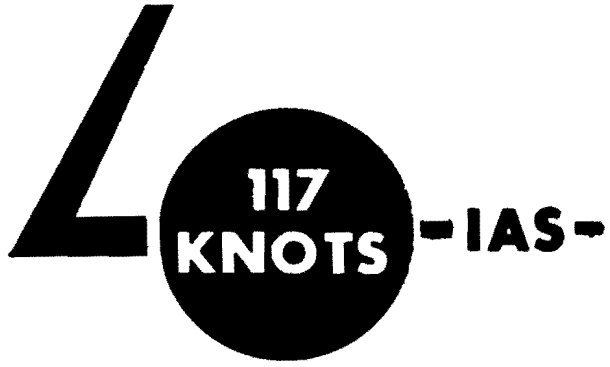


		MINIMUM CONTROL SPEEDS–KNOTS IAS	
POWER RATING	ANGLE OF BANK	PROPELLER FEATHERED	PROPELLER WINDMILLING
MAXIMUM WET	0° 5°	107 84	116 92
MAXIMUM DRY	0° 5°	105 82	113 89
METO	0° 5°	97 77	106 * 84 *

*THE AIRCRAFT WITH A WINDMILLING PROPELLER IS UNABLE TO MAINTAIN ALTITUDE ON METO POWER WITH BOTH JETS INOPERATIVE.

TWO ENGINES OUT SAME SIDE MINIMUM CONTROL SPEED (OUT OF GROUND EFFECT)

5° BANK INTO GOOD ENGINE
PROPELLER WINDMILLING
MAXIMUM WET POWER
ASYMMETRICAL JET THRUST
MAXIMUM RUDDER DEFLECTION



		MINIMUM CONTROL SPEEDS–KNOTS IAS	
POWER RATING	ANGLE OF BANK	PROPELLER FEATHERED	PROPELLER WINDMILLING
MAXIMUM WET	0° 5°	137 106	148 117
MAXIMUM DRY	0° 5°	135 * 104 *	145 * 114 *
METO	0° 5°	130 * 100 *	140 * 110 *

*ESTIMATED DATA

Figure 3-1

Factors Affecting Engine-out Performance.

Aside from gross weight, which has a very noticeable effect on performance under all conditions, numerous factors influence an aircraft's performance under engine-out conditions. These include poor technique in reducing drag (such as failing to retract the landing gear or flaps, feather the propeller, or close the cowl flaps on the inoperative engine) as well as permitting the airspeed to decrease too far by delaying the application of power on the good engine. Also of major importance are such mechanical items as proper fit of landing gear doors, flaps, and all external inspection doors, as well as the general cleanliness of the aircraft's exterior surfaces. More important, however, is the requirement for reducing the drag of the windmilling propeller by feathering, a move which improves both performance and controllability. A correction in the power setting on the good engine should not be delayed since minimum control speed must be attained in order to continue flight in a straight path. It can be seen by reference to Figure 3-1 that by executing a slight bank (5^{o}) toward the good engine, directional control can be realized at lower airspeeds. Should the airspeed fall below the minimum control speed, it will then become necessary to reduce power sufficiently to maintain a straight path over the ground. Depending on the gross weight of the aircraft, this may necessitate losing altitude to regain the minimum control speed.

The use of auxiliary jet thrust has no adverse effects on the engine out minimum control speed when both jet engines are run at the same power. However, the additional thrust horsepower is a substantial asset when directional control is marginal since acceleration to recommended climb speed is improved. Minimum control speed may also be reduced by operation of the jet engine (on the same side as the inoperative engine) at 100% rpm and reduction of power on the other side. This will result in a substantially lower minimum control speed than shown by Figure 3-1.

Minimum Control Speed. (Reciprocating Engine Inoperative).

Minimum control speed is that speed required to provide sufficient rudder control to enable the aircraft to fly a straight path over the ground when an engine has failed. This speed is based on standard day, sea level condition. Refer to figures 3-1 and 3-1A. Note that the primary values of minimum control speed are those for 5^{o} of bank into the good engine. Also note that the values given in figure 3-1 are for out-of-ground effect while those in figure 3-1A are for in-ground effect. If a takeoff is to be made at minimum control speed, the takeoff speed would be that given in figure 3-1A.

WARNING

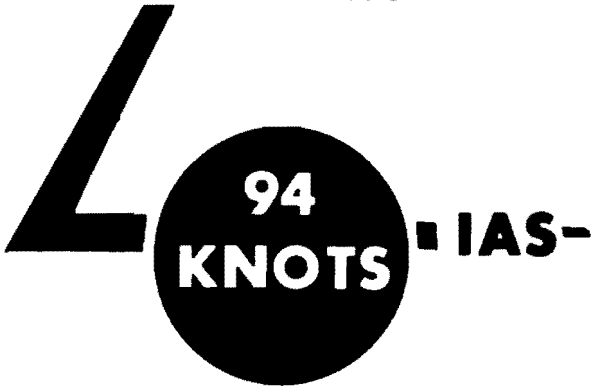
During take-off or in flight, if a reciprocating engine fails near minimum control speed, it is imperative that a 5^{o} bank into the good engine be established immediately. Failure to do so would appreciably increase the minimum control speed.

Recommended Engine-Out Climb Speed.

Recommended engine-out climb speed is that speed which will permit the aircraft to attain a maximum rate-of-climb at sea level after clean configuration is established and the inoperative engine propeller feathered. This speed is based on the power setting of the operating reciprocating engine and jet engines, and may be obtained from the engine-out rate-of-climb curves in Appendix I, Part 4.

RECIPROCATING ENGINE OUT MINIMUM CONTROL SPEED IN GROUND EFFECT, TAKEOFF

5° BANK INTO GOOD ENGINE
PROPELLER WINDMILLING
MAXIMUM WET POWER
SYMMETRICAL JET THRUST
MAXIMUM RUDDER DEFLECTION

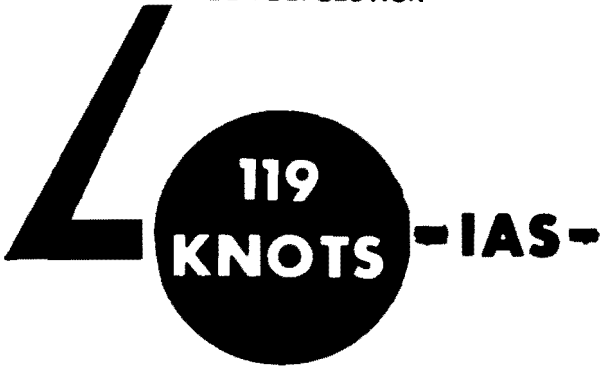


POWER RATING	ANGLE OF BANK	MINIMUM CONTROL SPEEDS–KNOTS IAS	
		PROPELLER FEATHERED	PROPELLER WINDMILLING
MAXIMUM WET	0° 5°	109 85	118 94
MAXIMUM DRY	0° 5°	107 83	115 90
METO	0° 5°	99 78	108 85

*THE AIRCRAFT WITH A WINDMILLING PROPELLER IS UNABLE TO MAINTAIN ALTITUDE ON METO POWER WITH BOTH JETS INOPERATIVE.

TWO ENGINES OUT SAME SIDE MINIMUM CONTROL SPEED IN GROUND EFFECT, TAKEOFF

5° BANK INTO GOOD ENGINE
PROPELLER WINDMILLING
MAXIMUM WET POWER
ASYMMETRICAL JET THRUST
MAXIMUM RUDDER DEFLECTION



POWER RATING	ANGLE OF BANK	MINIMUM CONTROL SPEEDS–KNOTS IAS	
		PROPELLER FEATHERED	PROPELLER WINDMILLING
MAXIMUM WET	0° 5°	138 108	149 119
MAXIMUM DRY	0° 5°	136 106	146 116
METO	0° 5°	132 102	141 112

*ESTIMATED DATA

Figure 3-1A

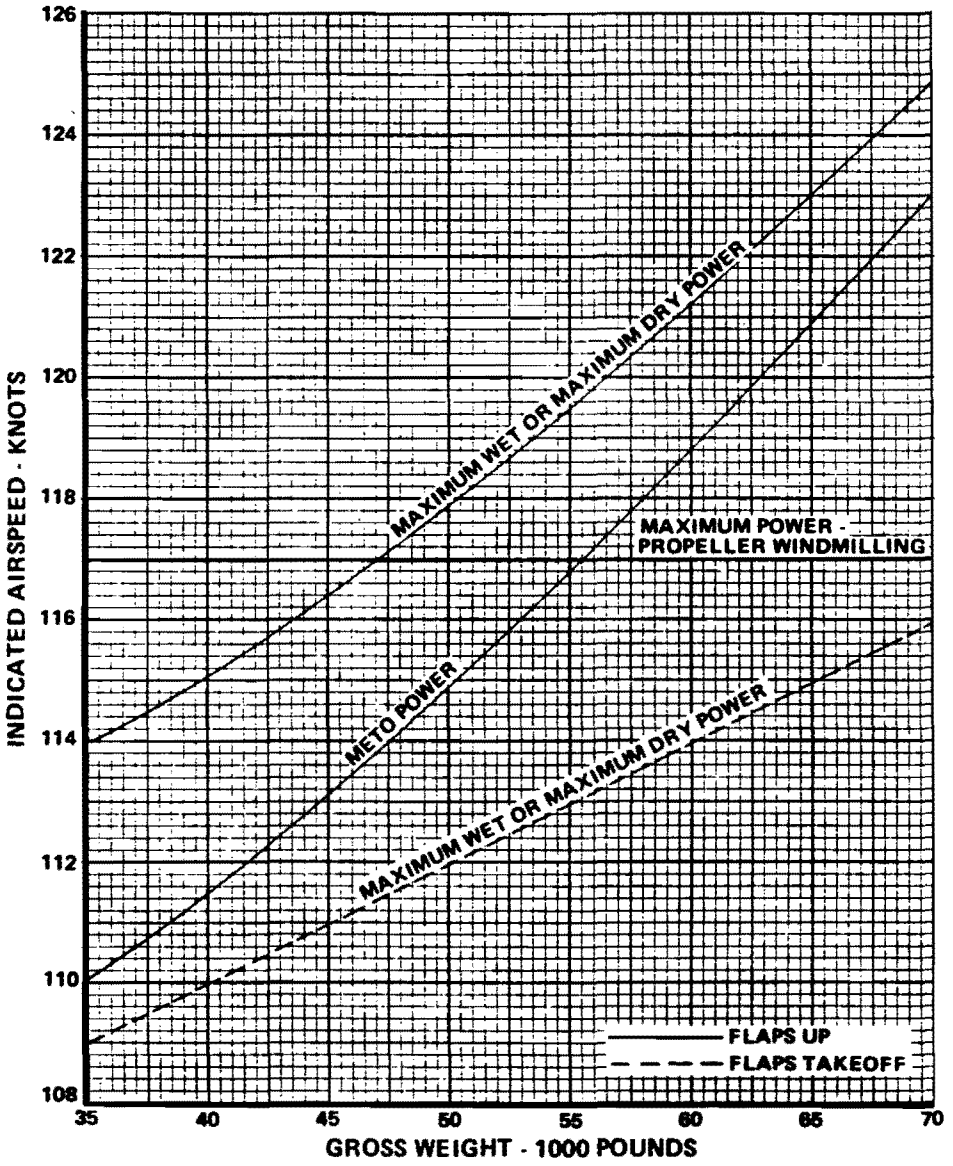
MODEL: C-123K

RECOMMENDED ENGINE-OUT CLIMB SPEEDS

JETS OPERATING AT FULL THROTTLE
GEAR UP

DATA AS OF: SEPTEMBER 15, 1973
DATA BASIS: FLIGHT TEST

FUEL GRADE: 100/130
FUEL DENSITY: 6 LB/GAL



NOTE:
PROPELLER ON INOPERATIVE ENGINE IS FEATHERED EXCEPT AS NOTED

Figure 3-2

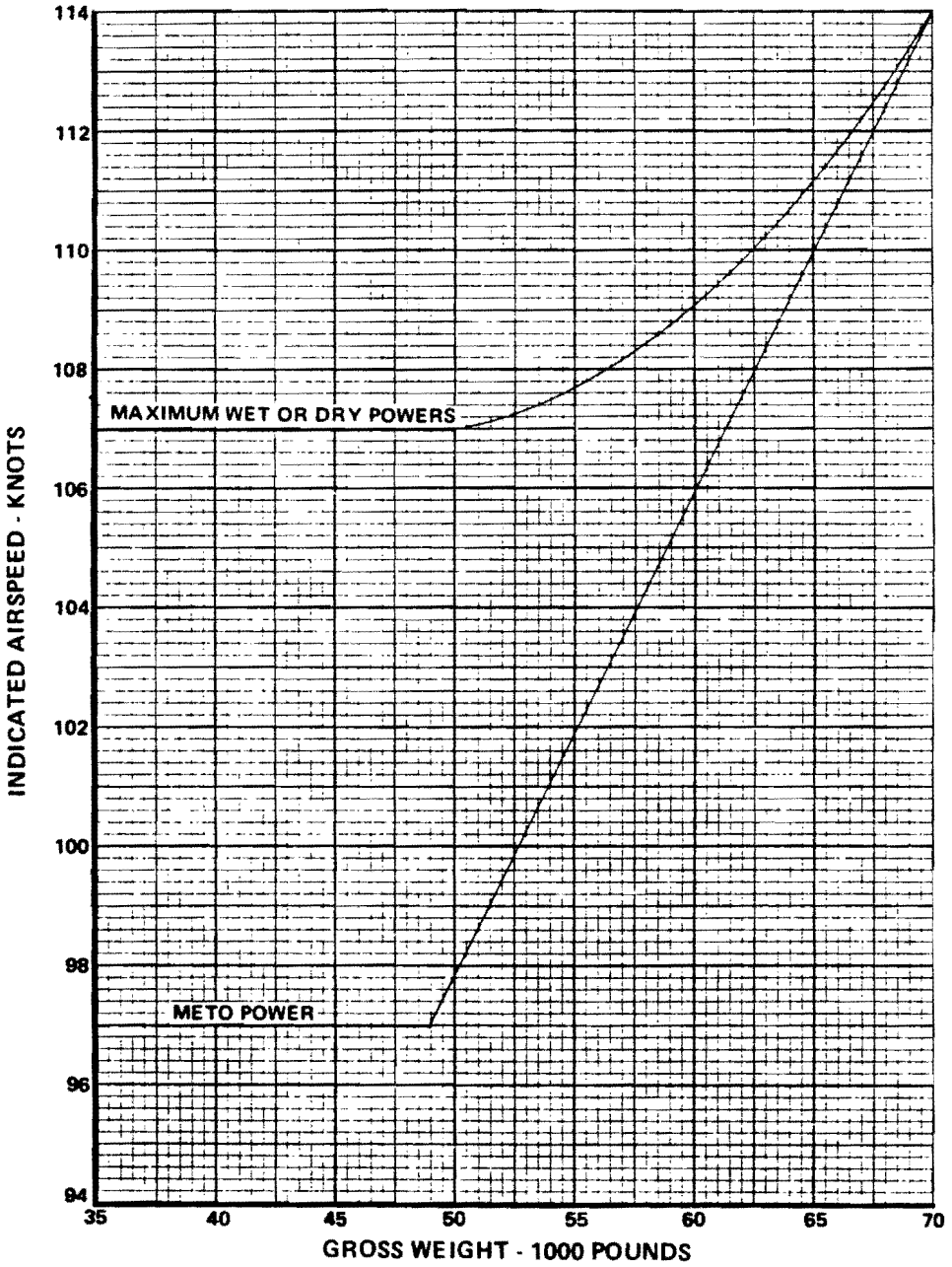
MODEL: C-123K

RECOMMENDED ENGINE-OUT CLIMB SPEEDS

JETS - INOPERATIVE
GEAR AND FLAPS UP

DATA AS OF: SEPTEMBER 15, 1973
DATA BASIS: FLIGHT TEST

FUEL GRADE: 100/130
FUEL DENSITY: 6 LB/GAL



NOTE:
PROPELLER ON INOPERATIVE ENGINE IS FEATHERED

Figure 3-2A

MODEL: UC-123K

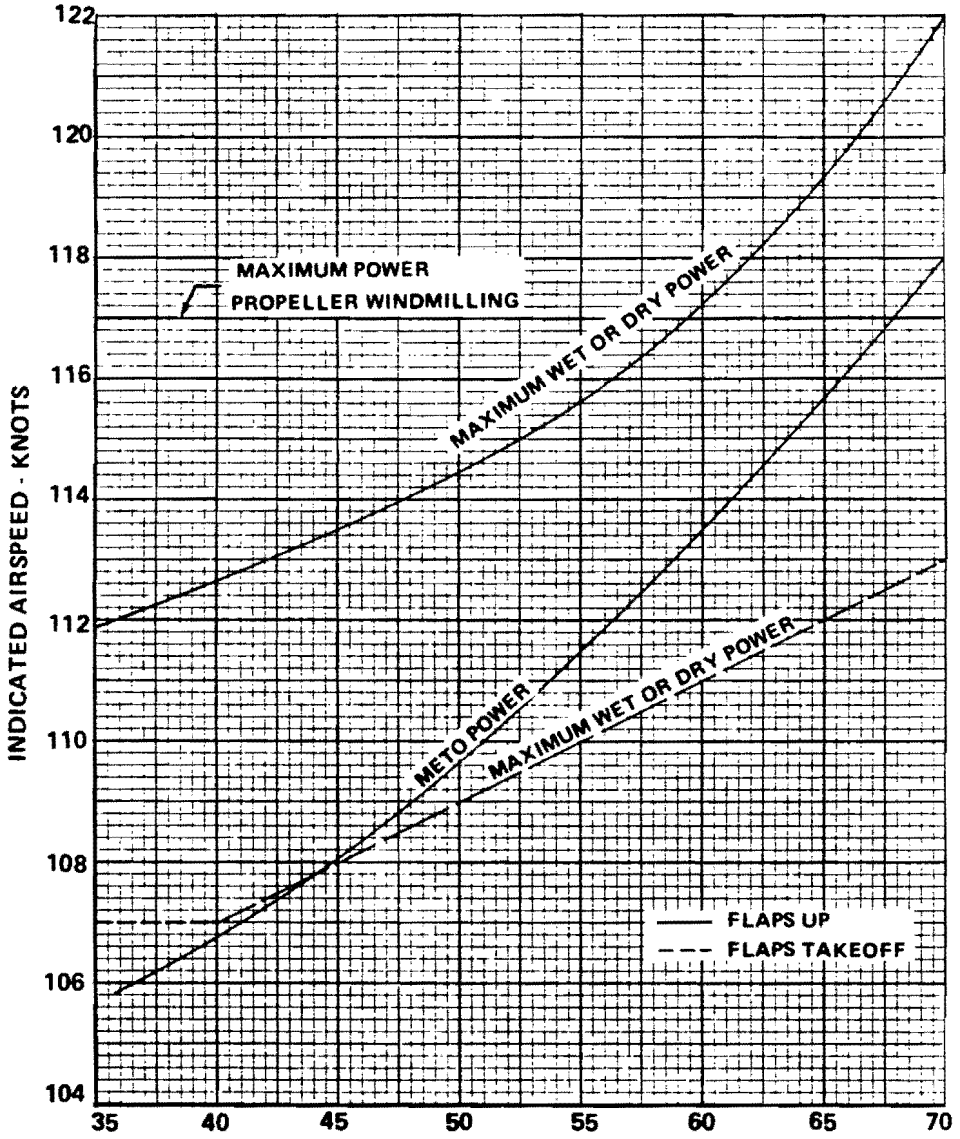
RECOMMENDED ENGINE-OUT CLIMB SPEEDS

JETS OPERATING AT FULL THROTTLE

GEAR UP

DATA AS OF: SEPTEMBER 15, 1973
DATA BASIS: FLIGHT TEST

FUEL GRADE: 100/130
FUEL DENSITY: 6 LB/GAL



NOTE:
PROPELLER ON INOPERATIVE ENGINE IS FEATHERED EXCEPT AS NOTED

Figure 3-2B

MODEL: UC-123K

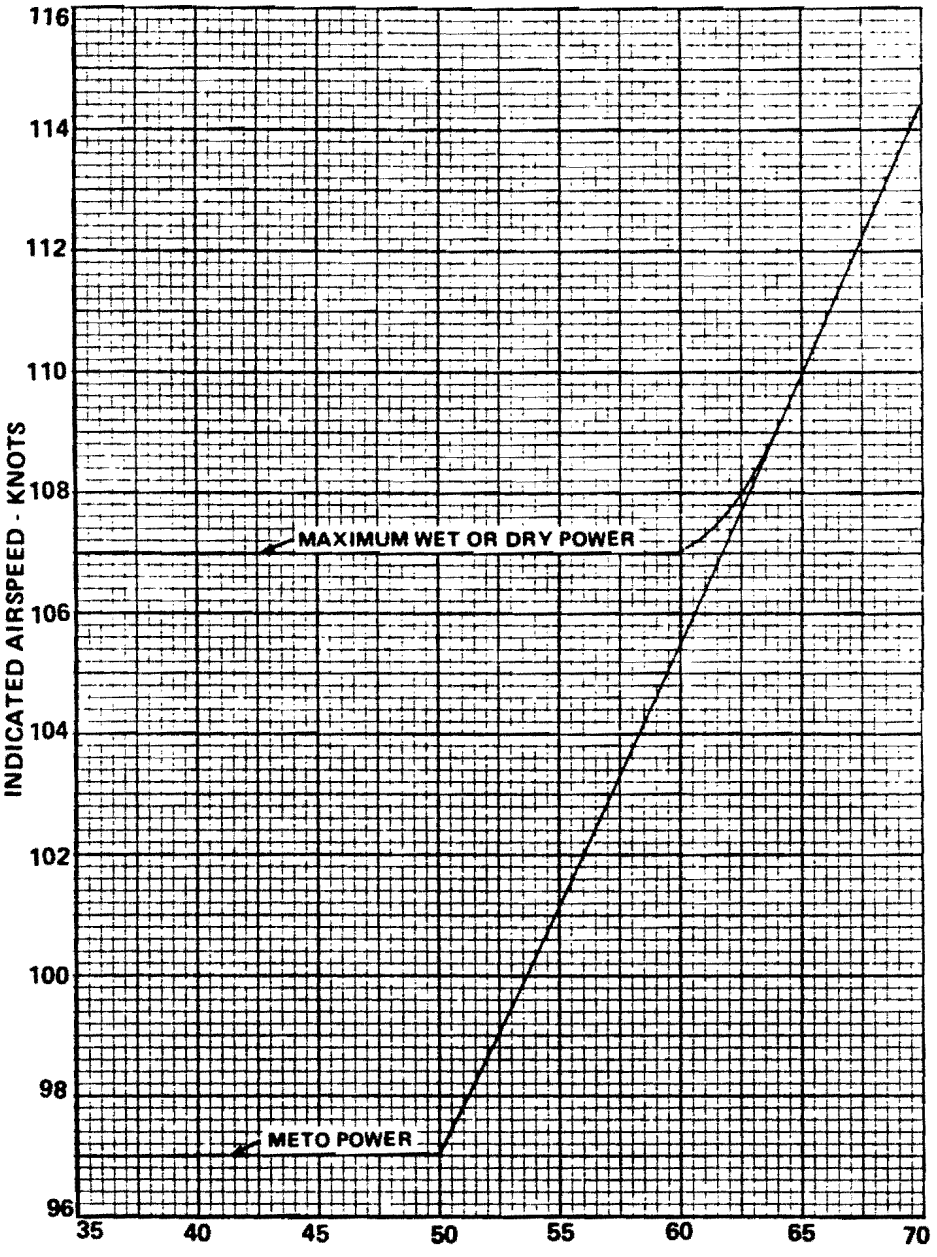
RECOMMENDED ENGINE-OUT CLIMB SPEEDS

JETS INOPERATIVE

GEAR AND FLAPS UP

DATA AS OF: SEPTEMBER 15, 1973
DATA BASIS: FLIGHT TEST

FUEL GRADE: 100/130
FUEL DENSITY: 6 LB/GAL



NOTE:

PROPELLER ON INOPERATIVE ENGINE IS FEATHERED

Figure 3-2C

occur. Factors to be considered are: altitude, airspeed, gross weight, and runway remaining. By sacrificing altitude, engine-out best climb speed may be attained and flight continued by following the procedures in After Engine-Out Best Climb Speed, this section.

After Attaining Engine-out Best Climb Speed.

If engine failure occurs during take-off after engine-out best climb speed is attained, accomplish the following procedure. Refer to Engine-out Rate-of-Climb Curves in Appendix I, Part 4.

WARNING

It may be necessary to maintain straight flight in order to gain altitude before attempting to circle back for a landing. At least several hundred feet of altitude should be gained before any turning is attempted. Engine-out best climb speed should be held throughout the turn, even if it is necessary to sacrifice altitude.

Adjust Airspeed for Directional Control.

1. **Gear and Wing flaps – UP.** CP
2. **Throttle – Closed.** P
3. **Prop – FEATHERED.** CP

Note

Pull fire handle if fire exists and employ ENGINE FIRE DURING FLIGHT procedures

4. **Mixture – OFF.** CP
5. **Fuel Shutoff – Closed.** CP

DETECTION OF INOPERATIVE ENGINE.

If engine failure should occur, the inoperative engine can best be determined by:

a. Noting the change in directional trim. When an engine fails, the effect is such that it causes the aircraft to yaw in the direction of the failed engine.

b. Having determined which side of the aircraft is affected, determine which engine has failed by noting the engine instrument readings. For reciprocating engine failure, the torque meter reading, which is a ready index of the power an engine is producing, will drop off rapidly at the time of engine failure. A drop in cylinder head temperature is also an accurate indication of engine failure; however, it is not as immediately discernible as the drop in torque pressure. For a jet engine failure, the primary indication will be a drop in rpm. The secondary indication will be a change in EGT. Increases in EGT generally denote compressor stall while decreases in EGT normally denote flameout.

After establishing which engine has failed, refer to RECIPROCATING ENGINE FAILURE and/or JET ENGINE EMERGENCIES, this section.

RECIPROCATING ENGINE FAILURE DURING TAKE-OFF.

During Take-off Roll.

Prior to the start of the take-off roll pilots must determine and establish the most probable course of action should engine failure occur during take-off. This involves consideration of refusal speed, critical field length, and the terrain off the end of the runway.

If refusal speed is higher than take-off speed or critical field length is equal to or less than effective runway length, the best procedure to follow should an engine fail prior to becoming airborne, will normally be to abort the take-off. (See Section III for aborted take-off). Under many circumstances it may be better to abort the take-off even though it is obviously impossible to stop on the runway remaining. There is a high probability of survival in a crash at moderate speeds and in general the speed will be far lower during an attempted abort than it will during an unsuccessful attempted take-off.

The critical situation develops when failure occurs between refusal speed and take-off speed, and the critical field length exceeds the available effective runway length. A partial power loss can normally be tolerated, depending on the speed at which power loss occurs and how much power is lost. Complete engine failure may be tolerated in some cases provided proper procedures are employed. These procedures involve:

Maintain directional control:

a. Keep the nose gear on the runway until take-off speed is attained.

b. Feather the propeller on the failed engine.

c. Power reduction on the side opposite the failed engine.

d. Bank into the good engine side as soon as control is available.

These four steps will necessarily require rapid crew response to a critical situation. There is little or no time for delay. Nose wheel steering will be required until adequate airspeed can be attained to control the aircraft; i,e., Air minimum control speed. Minimum control speed can be lowered by: feathering the propeller, establishing a 5° bank into the good engine, and if necessary, reducing power on the reciprocating or the jet engine on the good engine side. Reduction of power should be a "last resort" and should be based on pre-takeoff performance computations. Because of accessibility and more positive response, power should be reduced first on the reciprocating engine, as low as 50 in. Hg MAP. If further reduction is required, the jet engine on the good side should be retarded to idle and power reapplied on the reciprocating engine, up to maximum, if possible.

Accelerate to takeoff speed: critical field length chart is based on a takeoff speed of 109 kts, flaps at takeoff. Although directional control may be marginal, substantially lower takeoff speeds can be used. Allow the aircraft to accelerate until approaching the end of the runway. (At light gross weights, consider raising the flaps.) Approaching the end of the runway rotate the aircraft in a banked attitude (into the good engine) to assist in directional control. Consider jettisoning of pylon tanks, if they contain fuel (and coordination can be effected to jettison both tanks at the same time). To reduce drag, raise the flaps as quickly as airspeed will permit and raise the landing gear. Accelerate with minimum rate of climb to recommended engine-out climb speed. Complete the RECIPROCATING ENGINE FAILURE and AFTER TAKEOFF CLIMB Checklist.

Before Attaining Minimum Control Speed.

If engine failure occurs after take-off and before minimum control speed has been attained, attempt to maintain directional control by banking the aircraft and feathering the propeller of the failed engine. Reduce power only as much as necessary to maintain directional control. With jet engines operating adequate power should be available to continue flight. Raise the wing flaps and landing gear, and accelerate to recommended engine-out climb speed. Consider jettisoning of pylon tanks if they contain fuel.

If the pilot elects not to continue flight, reduce power as necessary to maintain control and proceed as follows:

a. Alarm bell - ON.

b. Fuel tanks - Jettison. (above 50 feet)

NOTE

When definitely committed to a crash landing and the aircraft is above 50 feet, the nacelle tanks should be jettisoned to avoid danger of fire on impact.

c. Shoulder harness - Locked.

d. Land straight ahead with gear and flaps down. (If altitude permits, flaps should be extended to LAND to lower touchdown speed.)

e. Jet engine(s) shutdown.

f. Mixture and electrical power sources - OFF.
(Battery, APU, Ignition switches)

g. Abandon the aircraft.

After Attaining Minimum Control Speed and Prior to Attaining Recommended Engine-Out Climb Speed.

Depending upon the aircraft gross weight, the minimum control speed may be considerably less than recommended engine-out climb speed. The pilot will have to determine the course of action to be taken during the transition period from minimum control speed to recommended engine-out climb speed should engine failure occur. Factors to be considered are: altitude, airspeed, gross weight, and runway remaining. By sacrificing altitude, recommended engine-out climb speed may be attained and flight continued by following the procedures in After Recommended Engine-out Climb Speed, this section.

After Attaining Recommended Engine-Out Climb Speed.

If engine failure occurs after recommended engine-out climb speed is attained, accomplish the following procedure. Refer to Engine-out Rate-of-Climb Curves in Appendix I.

WARNING

It may be necessary to maintain straight flight in order to gain altitude before attempting to circle back for a landing. At least several hundred feet of altitude should be gained before any turning is attempted. Recommended engine-out climb speed should be held throughout the turn, even if it is necessary to sacrifice altitude.

Maintain Directional Control.

1. LANDING GEAR - UP. CP
2. WING FLAPS - UP. CP

While the landing gear and wing flaps are retracting, determine which engine has failed and accomplish checklist item.

3. THROTTLE - CLOSED. P
4. PROPELLER - FEATHERED. CP

NOTE

Pull fire handle if fire exists and employ ENGINE FIRE DURING FLIGHT procedures.

Clean-up Inoperative Engine.

1. Mixture - OFF. CP
2. Fuel shutoff - CLOSED. CP
3. Oil temperature - HOT. CP
4. Cowl flaps - CLOSED. CP

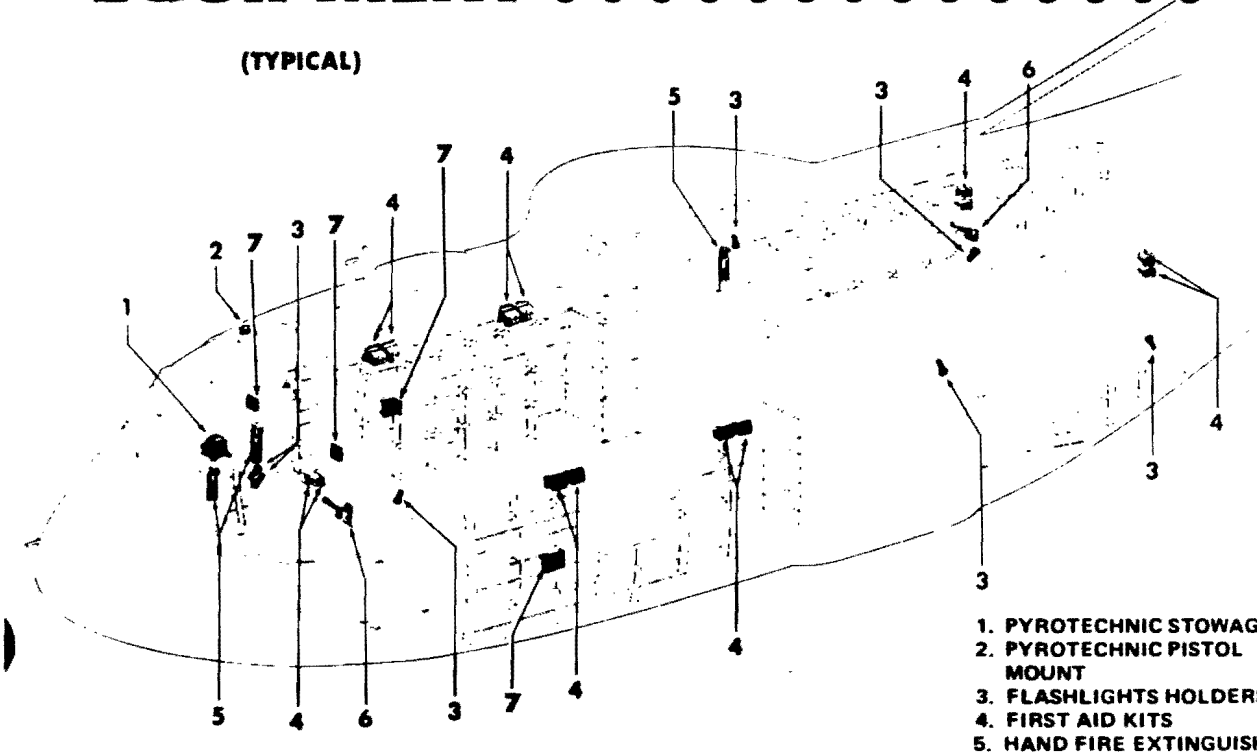
NOTE

If the fire handle was pulled it must be reset before the oil cooler exit door and cowl flaps will close.

5. Boost pump - OFF. CP
6. Ignition - OFF. CP
7. Generators - OFF. CP

miscellaneous EMERGENCY EQUIPMENT

(TYPICAL)



1. PYROTECHNIC STOWAGE
2. PYROTECHNIC PISTOL MOUNT
3. FLASHLIGHTS HOLDERS
4. FIRST AID KITS
5. HAND FIRE EXTINGUISHERS
6. EMERGENCY HAND AXE
7. PORTABLE OXYGEN BOTTLE AND FIRE FIGHTERS MASK

Figure 3-3

8. All unnecessary electrical equipment - OFF. CP

9. APU - As required. CP

   The output of the APU should be kept available in the event all engine-driven generator power should fail, but should not be connected to the bus as long as one engine-driven generator is functioning properly. The APU generator will not assume any of the electrical load while an engine-driven generator is energizing the primary and flight emergency bus, and could be suddenly overloaded if engine-driven generator power failed unexpectedly.

10. Engines - Checked. FM

    The flight mechanic will visually check the engines and report to the pilot.

(11) Jettison - As required. ALL

If necessary, jettison cargo, equipment, fuel tanks, and chemical to reduce weight. Refer to EMERGENCY JETTISONING AND EMERGENCY DUMPING.

WARNING

Chemical dumping should not be accomplished unless absolutely necessary. All crew members should be on 100% oxygen prior to dumping. Heavy concentrations of fumes will be drawn in around the cargo door and ramp; contaminate the atmosphere, and may cause crew incapacitation. Crew members exposed to heavy concentrations of chemical should obtain medical care as soon as possible.

NOTE

If difficulty is encountered in maintaining directional control, safe altitude, and airspeed, alert passenger and crew for bailout by three short rings on the alarm bell or crash landing by six short rings on the alarm bell. (For crash landing or bailout, refer to Forced Landing/Bailout procedures in this section). When necessary, sound the bailout/crash landing signal by continuous ringing of the alarm bell.

12. RECIPROCATING ENGINE FAILURE DURING TAKE-OFF Checklist - Completed. CP

RECIPROCATING ENGINE FAILURE DURING FLIGHT.

Should an engine failure occur during flight employ the following procedure. While the procedure is being accomplished do not sacrifice airspeed or directional control. Maintain at least minimum control speed until the propeller is feathered, then maintain recommended engine-out climb speed if any lost altitude is to be regained. Upon completion of the procedure refer to appropriate sections of the Appendix for recommended engine-out performance.

NOTE

During spray operations the jets should be operating to provide immediate power in the event of a malfunction at low altitude. Use jet power as required to maintain altitude and airspeed while accomplishing the procedure.

Maintain Directional Control and Airspeed.

1. **THROTTLE-CLOSED. P**

   The throttle should be closed to provide final identification of the failed engine. Reversal of yaw or radical changes in sound level indicates that the wrong engine may have been selected.

(2) **PROPELLER-FEATHERED. CP**

The pilot will direct which propeller is to be feathered. The copilot will confirm the selection by checking engine power output on the torque-meter and feather the propeller.

NOTE

If fire exists pull fire handle and employ fire procedures.

(3) Mixture - OFF. CP

(4) Fuel shut-off - CLOSED. CP

5. Power - As required. P, CP

   If jet engines are operating, advance power as required. If increased reciprocating power is necessary, adjust power by placing mixtures to rich, increasing RPM and MAP as necessary. Place the boost pump to Hl if operation at or above METO Power is anticipated. Refer to Appendix I for recommended engine-out climb, ceiling, and cruise performance data.

6. APU - START - RUN, generator - ON. CP, FM

CAUTION

Normally the APU should be running and generator on for jet start; however emergency starts with two generators can be made if necessary.

7. Propeller deice - OFF. CP, FM
8. Jet engines - Start, power - As required. CP, FM
9. Propeller deice - As required. CP, FM
10. Fuel management - As required. CP, FM

    Use fuel boost pumps and crossfeed as required.

Clean-up Inoperative Engine.

1. Oil temperature - HOT. CP, FM
2. Cowl flaps - CLOSED. CP, FM

NOTE

If the fire handle was pulled, it must be reset before the oil cooler exit door and cowl flaps will close.

3. Boost pump - OFF. CP, FM
4. Ignition - OFF. CP

   The copilot will advise the pilot before shutting off the ignition. The pilot will monitor closely.

5. Generator(s) - OFF. CP
6. All unnecessary electrical equipment - OFF. CP
7. Secondary bus - MONITOR (if required). CP
8. Engines - Checked. FM /LM

   The flight mechanic or loadmaster will visually check all engines and report any unusual conditions to the pilot.

9. Jettison - As required. ALL

   If necessary, jettison cargo, equipment, fuel tanks, and chemical to reduce weight. The pilot will specifically approve the opening of the cargo door and/or ramp. Jettisoning should be accomplished; if possible through the troop door on the inoperative engine side to minimize drag and reduce the risk of objects being thrown into the tail section by propeller wash.

WARNING

Chemical dumping should not be accomplished unless absolutely necessary. All crew members should be on 100% oxygen prior to dumping. Heavy concentrations of fumes will be drawn in around the cargo door and ramp; contaminate the atmosphere, and may cause crew incapacitation. Crew members exposed to heavy concentrations of chemical should obtain medical care as soon as possible.

NOTE

If difficulty is encountered in maintaining directional control, safe altitude, and airspeed, alert passengers and crew for bailout by three short rings on the alarm bell, or crash landing by six short rings on the alarm bell. (For crash landing or bailout refer to Forced Landing/Bailout procedures in this section). When necessary sound the bailout/crash landing signal by continuous ringing of the alarm bell.

10. RECIPROCATING ENGINE FAILURE DURING FLIGHT Checklist - Completed. CP

RESTARTING RECIPROCATING ENGINES IN FLIGHT.

To restart the engine in flight, the following procedure should be employed:

CAUTION

If engine has been shut down because of fire, do not attempt to restart engine. If

the cause of engine failure has been other than fire, the engine may be restarted in flight provided it is deemed reasonably safe to do so.

1. Propeller - DECREASE. CP
2. Throttle - CLOSED. CP
3. Fuel shutoff - OPEN. CP
4. Starter - Eight blades. CP

   Flight mechanic will check for liquid lock and count eight blades.

5. Boost pump - LO. CP
6. Propeller - Unfeathered. CP

   Pull out feathering button until tachometer indicates approximately 500 rpm, then release. The flight mechanic will visually check the engine during starting.

7. Ignition - BOTH. P

CAUTION

If oil pressure does not register almost immediately, refeather the engine.

8. Mixture - RICH. CP
9. Generator(s) - ON. CP
10. Cowl flaps - As required. CP
11. Oil temperature - AUTO. CP, FM

NOTE

Allow engine to warm up at low power settings until oil temperature reaches 40°C. Establish 1500 rpm and 20 inches Hg MAP. After indication of rise in cylinder head and oil temperatures, the manifold pressure may be increased to 25 inches Hg for faster warm-up.

12. RESTARTING RECIPROCATING ENGINES IN FLIGHT Checklist - Completed. CP

FUEL PRESSURE DROP—ENGINE OPERATING NORMALLY.

DURING GROUND OPERATION.

If the fuel pressure drops below the operating limits during ground operation, but the engine continues to operate normally, stop the aircraft and shut down immediately by placing the mixture lever to OFF. Do not take off. Investigate the cause and correct.

DURING FLIGHT.

If the fuel pressure drops below the operating limits during flight but the engine continues to operate normally, the cause may be one or more of the following: primer leakage, oil dilution solenoid leakage, engine-driven fuel pump bypass valve leakage, clogged pressure line, instrument failure, or line leakage. The following courses of action should be taken depending upon the cause of the pressure drop.

WARNING

Whenever fuel pressure drops and the engine continues operating normally, the first concern of the crew must be to guard against the outbreak of an engine fire. The greatest danger lies in the fact that the crew develops a false sense of security because no fire exists at the time that the fuel pressure drop is noticed nor after several hours of flight. However, when the throttle is retarded (as in preparation for a landing), an engine fire develops and the results are usually disastrous. What has happened is that a fuel leak existed, but the cooling and dispersing effect of the airflow through the engine nacelle at cruising speed has prevented the start of a fire. When the throttle was retarded, the airspeed dropped and the airflow was reduced sufficiently to permit ignition of the leaking fuel. Any change in the airflow pattern, such as feathering the propeller or entering a climb, can start a fire if a fuel leak exists. Increasing the power is less likely to start a fire since

airspeed will be increased, but even then, there is a possibility of fire since the exhaust heat and flame pattern may change sufficiently to outweigh the increase in cooling airflow. Accordingly, it must be the objective of the crew to eliminate the fuel before any change is made to the airflow or exhaust pattern. The most effective means of accomplishing this is by moving the mixture lever to OFF before any throttle reduction, propeller feathering, or any other engine shutdown procedure is initiated. An additional advantage of moving the mixture lever to OFF is that it provides the most rapid means of eliminating exhaust stack flames and reducing exhaust heat.

a. Cut the engine immediately by first moving mixture control to OFF, turning boost pump OFF, then pulling fire emergency shutdown handle. Do this if power is not necessary to sustain flight or to reach a safe destination.

NOTE

It will be necessary to reset the fire handle in order to close the oil cooler door or cowl flaps if the extinguishing agent discharge switch has not been used.

CAUTION

Prior to resetting the fire handle, close the fuel shutoff switch to reduce the possibility of fire.

b. Keep the affected engine in operation at or above cruising speed while maintaining watch for fire. This can be done if it cannot be determined whether or not an actual leak exists, and the engine is required to either sustain flight or maintain the required altitude for arrival at a safe destination. However, prior to power reduction for entrance to the landing pattern, cut the affected engine completely (by first moving mixture lever to OFF - not by retarding throttle, then pulling fire handle) and accomplish a partial power landing. If the added power of the affected engine is absolutely essential to make a safe landing, keep the engine in operation until the landing is assured, then cut the power using the mixture lever, and continue the approach on the good engine.

c. Continue operating the engine normally. This may be done if it can be reasonably ascertained that the indicated fuel pressure drop has not resulted from a fuel leak.

NOTE

All other factors being equal, course "a" is generally the best. However, action to be taken depends entirely upon the circumstances existing at the time. Such factors as the known condition of the aircraft and the remaining engine, stage and requirements of the mission, and power requirements of the aircraft should all be considered.

JET ENGINE EMERGENCIES.

HOT START.

During a hot start, the exhaust gas temperature increases very rapidly and will exceed the limits if the start sequence is not discontinued. If the exhaust gas temperature exceeds 900°C, rotate the jet engine start switch clockwise to SHUTDOWN and allow engine to cool.

CAUTION

If EGT exceeds limits shown in Section V, do not attempt to restart jet engine.

OVERTEMPERATURE.

Whenever the exhaust gas temperature exceeds the established limits at any time during operation of the jet engine, perform the following:

a. Retard engine rpm with the throttle switch until the exhaust gas temperature is within operating limits.

b. If unable to reduce temperature to operating limits, rotate the affected jet engine start switch clockwise to SHUTDOWN.

c. If on the ground, cool the engine by placing the motoring switch to the MOTOR position for a maximum of 20 seconds. Wait 15 minutes before attempting an engine start or additional motoring.

CAUTION

If EGT exceeds limits shown in Section V, do not attempt to restart jet engine.

OVERSPEED.

If the established maximum engine speed is exceeded, position the appropriate jet engine throttle switch to RETARD to reduce the engine power. If the engine continues to overspeed, shut it down by positioning the jet engine start switch to SHUTDOWN, and inspect engine prior to further operation.

FLAMEOUT.

Shut the jet engine down immediately when a flameout occurs by rotating the jet engine start switch clockwise to SHUTDOWN.

COMPRESSOR STALL.

Compressor stall is recognized by exhaust gas over-temperature, rpm stopping and a rapid audible change in the characteristic sound of normal engine operation. The stall usually occurs during rapid throttle advancements and may result from improper adjustment or malfunctioning components in the variable geometry system. Bird ingestion is normally recognized by an audible compressor stall and/or high EGT accompanied by a rapid loss of power. As soon as a stall is recognized, perform the following:

a. Retard engine rpm with the throttle switch to idle.

b. Allow engine to stabilize at idle for one minute for cooling.

c. Rotate jet engine start switch clockwise to SHUTDOWN.

d. Make appropriate entry in Form 781.

JET ENGINE FIRE.

See FIRE paragraph, this section.

MAXIMUM GLIDE.

The glide performance of the aircraft is illustrated graphically in Figures 3-4 and 3-5. Maximum Glide. These charts show the best glide speed, rate-of-sink, and glide range (no wind) for both tanks on and off and with both propellers either feathered or windmilling.

BEST GLIDE SPEED.

The best glide speed is that which results in the minimum glide angle. With both propellers feathered, the minimum glide angle is 4.7°, but when both propellers are windmilling, the best angle of glide that can be maintained is 7.4°. Descent at these glide angles will result in the maximum glide range with no engine power available. This is accomplished, regardless of gross weight by maintaining the glide speed recommended in the "Best Glide Speed" portion of the Maximum Glide Charts.

RATE-OF-SINK.

Inasmuch as the airspeeds required to hold the minimum glide angle increase as the gross weights increase, the rates-of-sink (vertical velocities of descent) likewise increase. The rate-of-sink also vary with atmospheric conditions and altitude because of the variations in air density. By entering the center portion of the Maximum Glide Charts, the rate-of-sink at any known density altitude may be found.

GLIDE RANGE.

With the minimum glide angle established and a no-wind condition prevailing, the glide range is wholly dependent upon the absolute altitude (actual height above terrain) of the aircraft. The glide range from a given absolute altitude remains the same for any gross weight provided the glide speed for that gross weight is maintained.

CAUTION

With either or both nacelle tanks off, landing gear down, or with wing flaps extended, the glide range will be appreciably reduced. Because of the increase in drag from the above items, the minimum glide angle that can be maintained is increased.

ENGINE-OUT LANDING.

Should it be necessary to execute an engine-out landing, the auxiliary jet engines shall be used to augment the power available from the good engine. By operating one jet engine at cruise or take-off power on the same side as the dead engine, a considerable reduction in minimum control speed will be attained. The other jet engine shall be operating at 60% as a standby source of power. Although engine-out landings can be accomplished without using auxiliary jet thrust, the additional power available from the jets increases the safety factor, especially when the landing gross weight is high.

WARNING

For engine-out landing, do not lower wing flaps below take-off setting until landing is assured, as it may not be possible to maintain altitude on the remaining engines with landing gear and wing flaps extended.

WARNING

When the aircraft is flown in a sideslip, or with wing-low drift correction during a crosswind landing, or near minimum control speed with one engine inoperative, the pilot's and copilot's airspeed indicators should be closely monitored and the actual IAS should be considered to be the average of the two airspeed indicators. If the stall warning angle of attack system is operable, the angle of attack indicator should be monitored to insure adequate airspeed is being maintained.

The engine out landing pattern, figure 3-6, should be as much like a normal pattern as possible to reduce the possibility of misjudging the landing. The DESCENT and BEFORE LANDING checks for normal procedures are used except that the propellers will be set at 2600 rpm and an airspeed of at least 115 knots will be maintained until landing is assured.

NOTE

Be prepared to extend the landing gear manually. Refer to Landing Gear Emergency Operation, this section.

WARNING

Water injection should not be reset at power settings above that at which the water injection system is activated. Momentary loss of power or serious engine damage may result.

SINGLE-ENGINE REVERSING.

NOTE

Single-engine reversing is not recommended except in extreme emergencies.

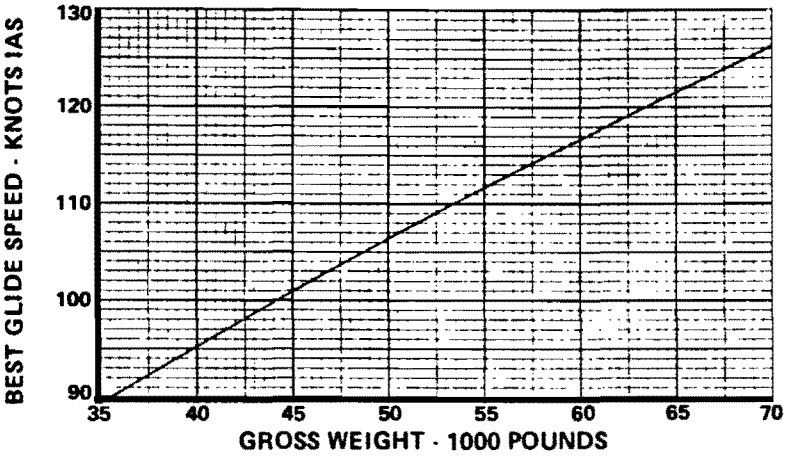
The use of single-engine reverse thrust is a positive aid in landing an aircraft with one engine inoperative, provided the necessary techniques are employed and their limitations thoroughly understood. Under any of the conditions listed below, it should be noted that reverse thrust is most effective during the initial phase of the landing roll. Likewise, it should be understood that a short-field landing approach on the longest available runway, with consideration of wind velocity and direction, gross weight, width and surface of runway, is recommended. In addition, when the use of single-engine reversing is

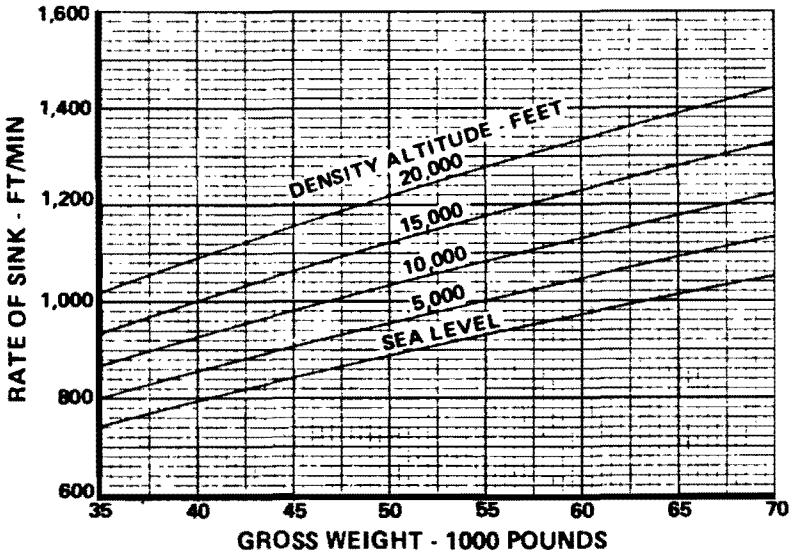
MODEL: C-123K

MAXIMUM GLIDE

PROPELLERS FEATHERED -
GEAR AND FLAPS - UP

DATA AS OF: SEPTEMBER 15, 1973 DATA BASIS: FLIGHT TEST





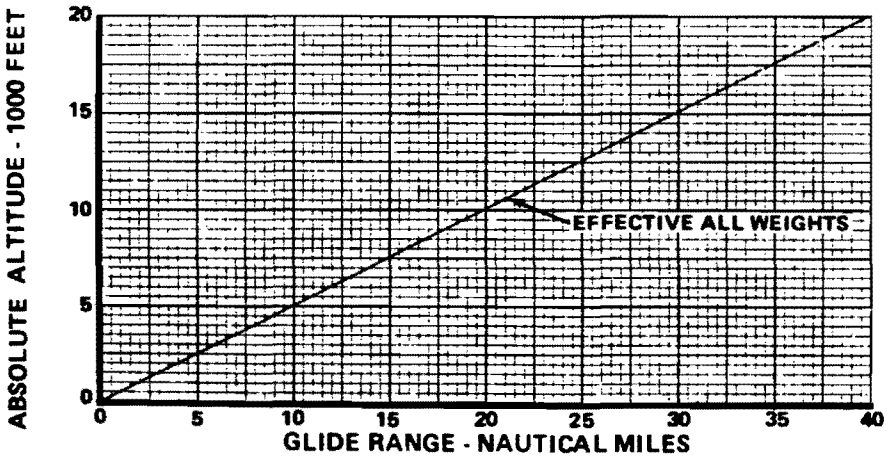


Figure 3-4

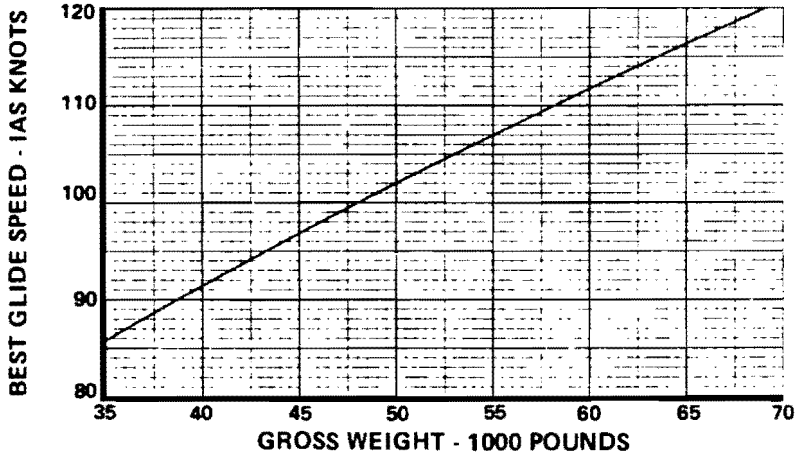
MODEL: C-123K

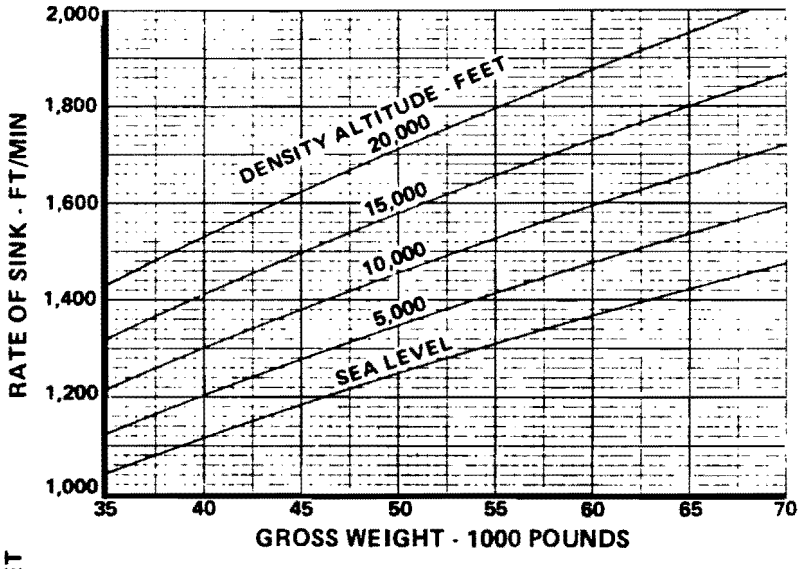
MAXIMUM GLIDE

PROPELLERS WINDMILLING
GEAR AND FLAPS - UP

DATA AS OF: SEPTEMBER 15, 1973

DATA BASIS: FLIGHT TEST





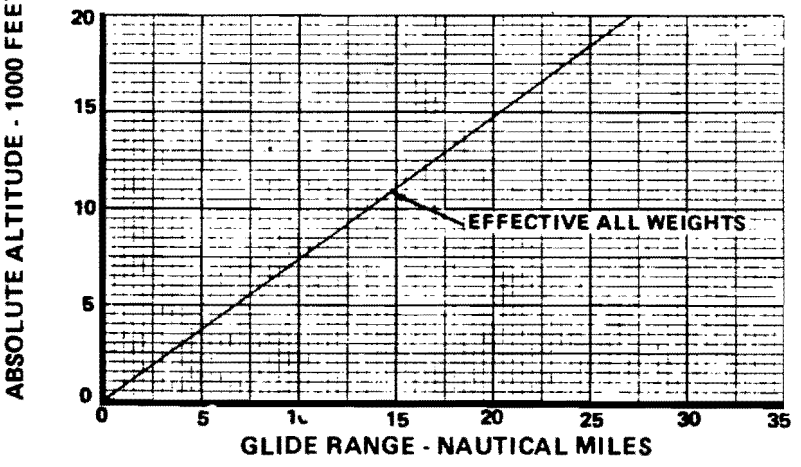


Figure 3-5

MODEL: UC-123K

MAXIMUM GLIDE

PROPELLERS FEATHERED
GEAR AND FLAPS UP

DATA AS OF: SEPTEMBER 15, 1973

DATA BASIS: FLIGHT TEST

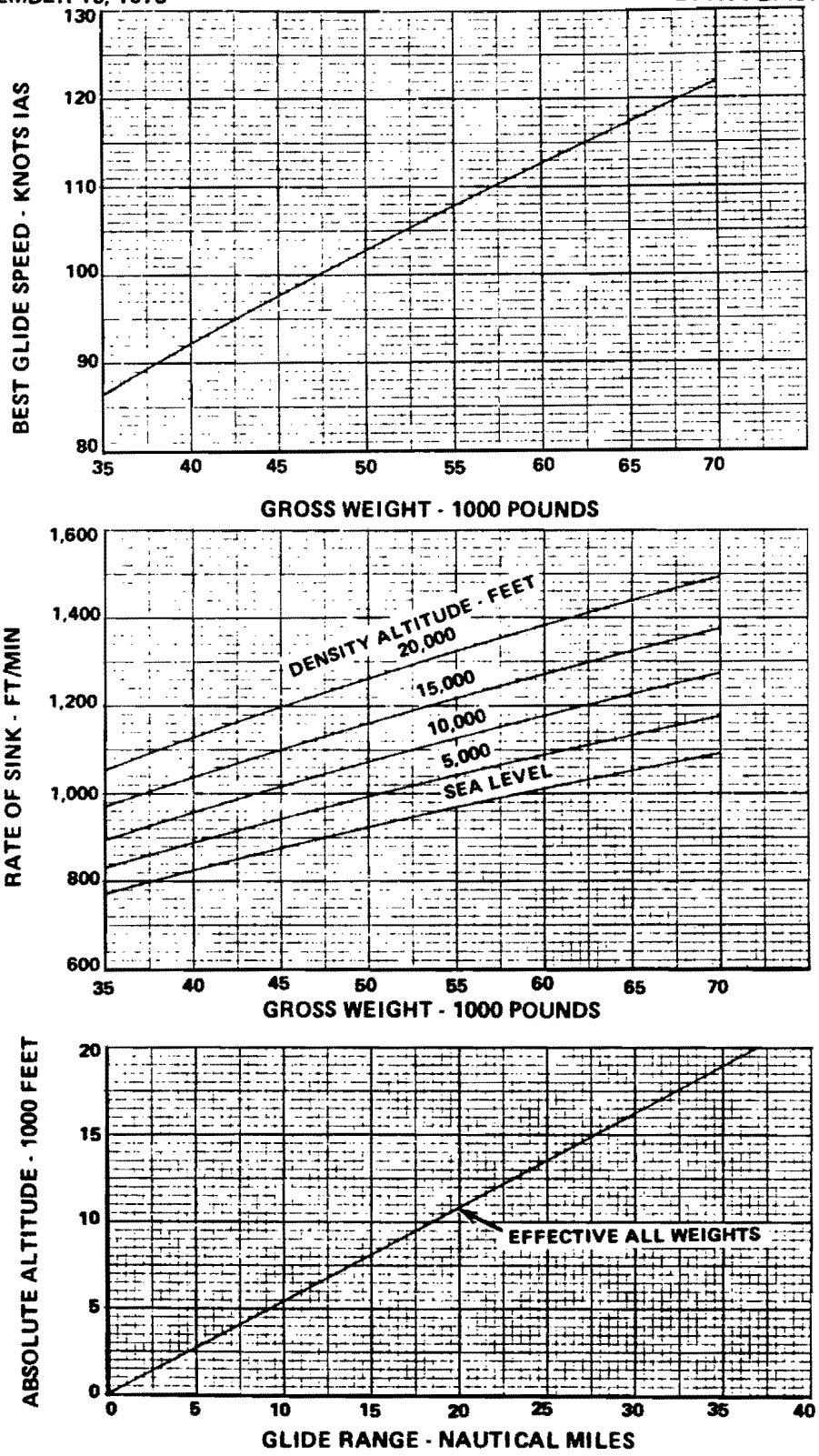


Figure 3-5A

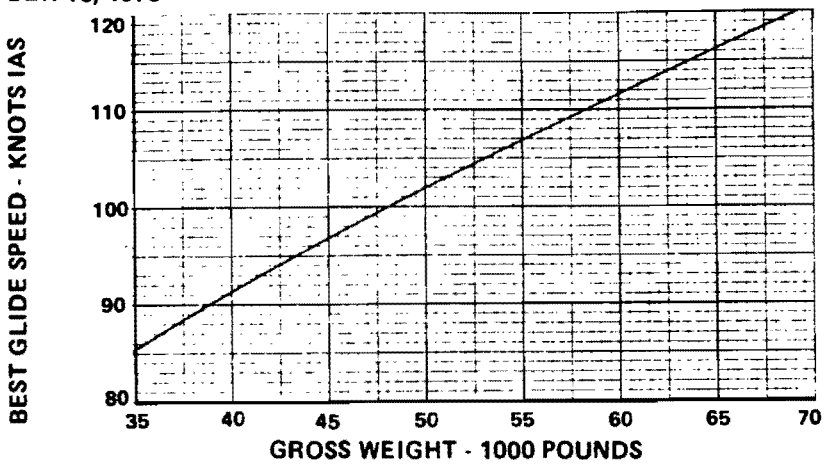
MODEL: UC-123K

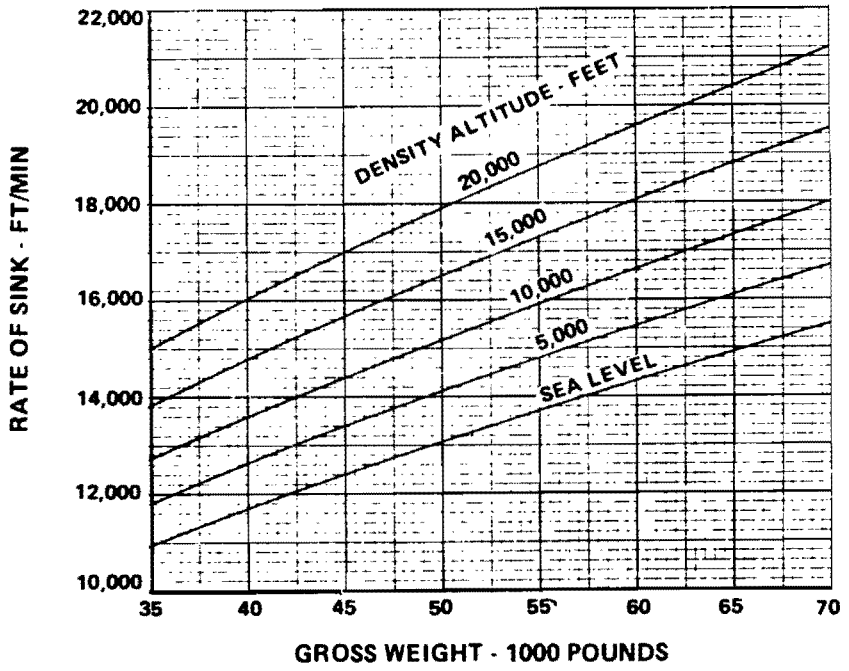
MAXIMUM GLIDE

PROPELLERS WINDMILLING
GEAR AND FLAPS UP

DATA AS OF: SEPTEMBER 15, 1973

DATA BASIS: FLIGHT TEST





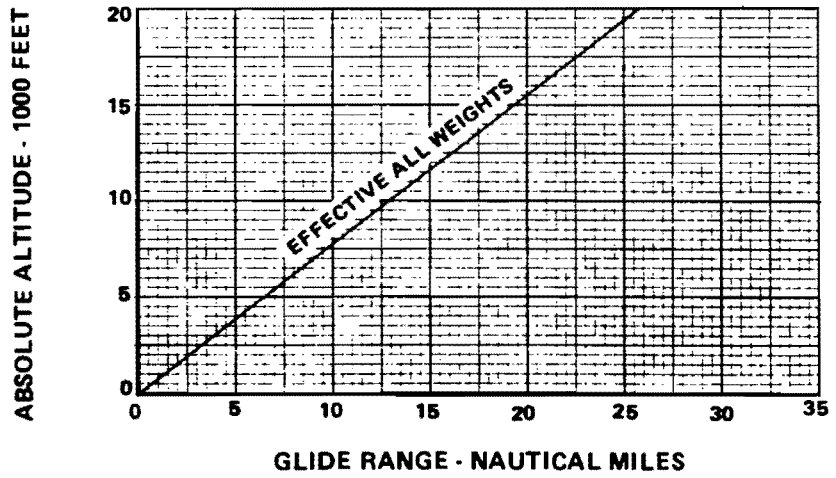


Figure 3-5B

anticipated, land well to the inoperative engine side of the runway as the reverse thrust of one propeller will tend to cause the aircraft to turn into the direction of the propeller reversed.

NOTE

In the event the right engine is inoperative, the right throttle must also be placed in the reverse thrust position to obtain gust lock operation. This may result in the right propeller moving out of the feathered position.

Reversing of either propeller will shut down both jet engines.

CAUTION

It the aircraft starts to yaw excessively during the application of reverse thrust, corrective action will be applied immediately as follows:

a. Return throttles to forward thrust range.

b. Apply brakes as necessary.

c. Steer with nose wheel.

Single-engine Reversing With Brakes And Steering Available.

With both brakes and nose gear steering available, the use of reverse thrust on one propeller is controllable and can be used to shorten the landing roll if the runway length is critical. Reverse upon initial contact of all three gear, maintaining directional control by use of the brakes and nose gear steering.

Single-engine Reversing With Steering But Without Brakes.

If nose gear steering is available but brakes are not, there is a reduction in controllability, so that the amount of reverse thrust applied should be governed by the ability to control the aircraft directionally. Reverse immediately upon contact of all three gear, maintaining directional control by use of nose gear steering. If a full stop cannot be safely accomplished within the remaining runway length, the aircraft may be partially ground-looped.

Single-engine Reversing With Neither Brakes Nor Steering Available.

If neither brakes nor nose gear steering is available, extreme caution should be exercised in landing with only one engine operative. The following procedure is recommended.

CAUTION

A consideration of the many factors involved under these conditions may make a crash landing procedure advisable. At the pilot's discretion, either the procedure outlined below or that set forth under FORCED LANDING, this section, should be employed.

a. Land as short on the runway as possible using minimum safe landing speed. Wing flaps as required when landing is assured.

b. Hold the nose gear off as long as possible.

c. Maintain directional control with the rudder until it becomes ineffective (approximately 50 knots).

d. If a full stop cannot be made safely within the remaining runway length, reverse thrust may be used to ground loop the aircraft.

CAUTION

If it is anticipated that a ground loop may be necessary, select that section of the runway which affords the widest paved area and maximum clearance of obstacles. Particular attention should be given to the suitability of the field immediately off the sides of the runway as the ground loop may cause the aircraft to veer off the paved area.

RECIPROCATING ENGINE-OUT GO-AROUND.

Altitude required for successful accomplishment of a reciprocating engine out go-around is dependent on aircraft gross weight, flap setting and crew

proficiency in applying power expeditiously. Flaps should not be lowered beyond TAKE-OFF unless landing is assured.

WARNING

If go-around is attempted from altitudes below 500 feet above terrain with flaps extended below the TAKE-OFF position, the aircraft may continue to descend and ground contact may be unavoidable.

(1.) **POWER - AS REQUIRED. P, CP**

The pilot will state, "Go-around, propeller full increase, jets maximum." The copilot will advance the propeller lever on the operating engine to full increase, and toggle both jet engines to maximum thrust. The pilot will advance the throttle on the operative reciprocating engine to maximum power or as required.

WARNING

If the jet engines were not previously pre-staged to 60% rpm, they may not accelerate evenly, and serious control problems could result. In this event, the jet engine on the inoperative reciprocating engine side must be advanced first. After power is assured on this engine, advance power on the other jet engine as required.

(2.) **WING FLAPS (IF EXTENDED) - TAKE-OFF. CP**

The pilot will call "Flaps takeoff", and if flaps are extended beyond takeoff, the copilot will raise the flaps to TAKE-OFF.

(3.) **LANDING GEAR - UP. CP**

After it is definitely determined that landing will not be accomplished, the pilot will give visual and aural signal to raise the landing gear. The copilot will raise the landing gear, and when the landing gear indicates UP, respond "Gear up."

(4.) **WING FLAPS - UP. CP**

After safe altitude and airspeed have been attained, the pilot will call "Flaps up, METO power, water off, after take-off/climb checklist." The copilot will retract the flaps, set propellers 2600 rpm, turn off water injection, and adjust reciprocating throttle to METO.

5. Carb air - As required. CP

6. AFTER TAKE-OFF/CLIMB Checklist - Completed. FM

   The flight mechanic will silently recheck items 1 through 5 of the ENGINE-OUT GO-AROUND Checklist and accomplish the AFTER TAKE-OFF AND CLIMB Checklist.

ENGINE-OUT PRACTICE MANEUVERS.

To familiarize yourself completely with the engine-out characteristics of the aircraft, practice the engine-out procedures at safe altitude.

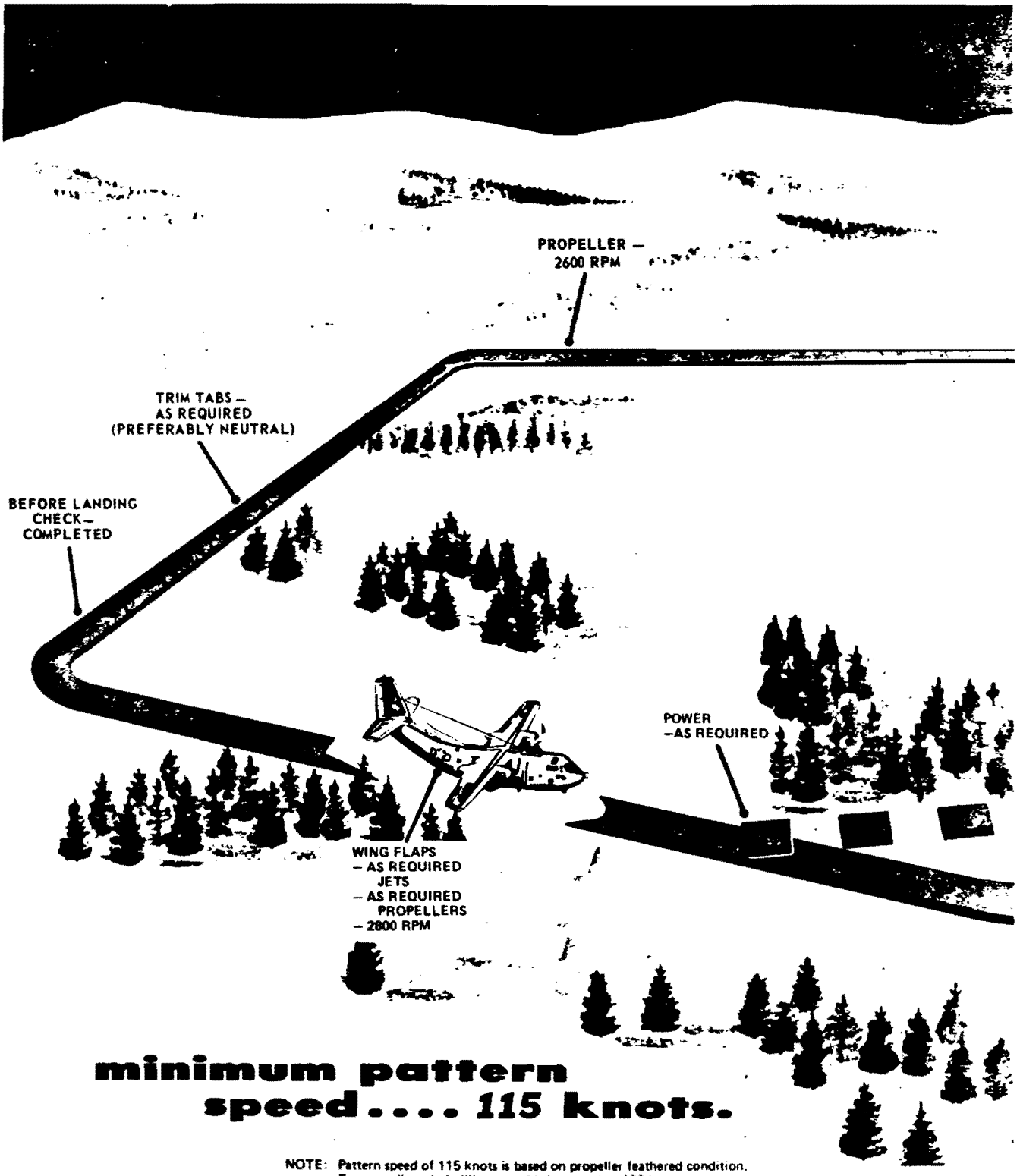
CAUTION

If the propeller is actually feathered, in order to prevent possible damage to the propeller oil control unit and/or the auxiliary oil pump motor, check that propeller feathering switch returns to neutral after each feathering operation. If the switch does not return to neutral within 25 seconds, manually place switch to neutral and record the malfunction in Form 781.

SIMULATED ENGINE-OUT POWER.

When simulating engine failure with a low power setting, it is important to cushion the high inertia loads on the master rod bearings which occur at conditions of high rpm and low manifold pressure. As a rule of thumb, it is well to remember that each hundred rpm requires at least one inch Hg manifold pressure. An engine-out condition may be simulated with both engines operative by setting the controls of an engine at 1500 rpm and 17 inches Hq respectively, with mixture in RICH. This

ENGINE-OUT LANDING



minimum pattern speed.... *115* knots.

NOTE: Pattern speed of 115 knots is based on propeller feathered condition. For propeller windmilling, speed is increased to 122 knots.

Figure 3-6. (Sheet 1 of 2)

WARNING

Holding the feathering button all the way out may cause inadvertant propeller reversal if the blade switch is defective or inoperative.

If a runaway propeller condition arises at some less critical period of flight, the throttle should be retarded immediately and airspeed reduced. Attempt propeller control by use of the propeller lever. If, after several attempts, control is impossible, proceed as follows:

NOTE

The procedures for a RUNAWAY PROPELLER and FAILURE TO FEATHER are progressive steps. If control of the propeller is regained and maintained, subsequent steps are not required to be performed.

1. THROTTLE - CLOSE - P

Close throttle of affected engine and establish approximate recommended engine-out climb speed.

(2.) PROPELLER-FEATHER. CP

NOTE

Hold in the feather button to assure complete feathering. One 18-second operation of the auxiliary pump may not be sufficient to feather the propeller if the overspeed condition is excessive.

(3.) Mixture - OFF. CP

(4.) Fuel shut off - CLOSED. CP

5. RECIPROCATING ENGINE FAILURE DURING FLIGHT Checklist - Completed. CP

FAILURE TO FEATHER.

If the propeller cannot be feathered, reduce airspeed, power, and altitude as necessary to control rpm. If engine failure has not occured and power is required to offset the drag of a windmilling propeller, advance the throttle of the overspeeding engine to obtain 2850 rpm and maintain engine-out best climb speed.

Employ the following steps if the engine is inoperative:

(1.) Fire handle - PULL. CP

NOTE

This employs separate electrical circuitry to some extent and may possibly bypass the source of trouble. If it is impossible to feather the propeller by either means when a complete engine failure or fire occurs, proceed as follows:

Check feather power circuit breaker and for oil loss. If the load meter shows an increase when attempting to feather, turn the propeller replenish switch on and continue attempting to feather.

Adjust power on good engine to maintain approximate recommended engine-out climb provided the windmilling propeller does not present a directional control problem.

WARNING

The drag of the windmilling propeller will increase the minimum control airspeed and it may not be possible to maintain altitude at any gross weight. The fire handle should be pushed in if a fire does not exist to close the cowl flaps and oil cooler doors to reduce drag. Discharge extinguisher if fire exists. If the propeller does feather through use of the fire handle, pull out feather power circuit breaker.

(2.) Propeller lever - DECREASE RPM. CP

The propeller in decrease should windmill at an rpm lower than that shown in Figure 3-7 which is based on the propeller at increase.

(3.) Throttle - Open. CP

The engine rpm will decrease as the cylinders are forced to pump additional air.

4. ENGINE FAILURE DURING FLIGHT Checklist - Completed. CP

PROPELLER OIL LEAKAGE.

Provisions have been incorporated into the aircraft to supply oil from the engine oil system to the propeller control system should a loss of propeller oil occur. If propeller rpm fluctuates excessively at any time, it should be feathered if possible.

NOTE

If the propeller oil emergency replenishing system is used, the propeller reservoir should be drained, loss of oil investigated, and reservoir filled with proper oil before the next flight. It is the pilot's responsibility to make certain that entry is made in Form 781.

If either or both propeller oil level indicator lights come on, turn the corresponding propeller oil level emergency replenishing switch to the ON position until the light goes out. If the light glows continually for more than two minutes with the switch in the ON position leave the replenishing switch ON and feather the propeller since a rate of oil loss as great as or greater than rate of replenishing is indicated.

CAUTION

In some maneuvers the propeller control oil level may shift enough to cause the indicator light to glow momentarily. This does not require replenishing of the unit. However, persistent light indication denotes oil loss and the replenishing system should be turned ON.

SELF-FEATHERING OF PROPELLER.

If the propeller should unaccountably feather and the engine is not required for further flight, the engine should be shut down following the procedures under RECIPROCATING ENGINE FAILURE DURING FLIGHT, this section. If use of the engine is required, refer to unfeather and restart procedure, this section. While performing the restart procedure, after an increase in rpm is noted during unfeather, pull out the feather power circuit breaker, then release the feather button.

NOTE

With the feather power circuit breaker pulled, the feathering button is rendered inoperative; however, operation of the fire handle is unaffected.

FAILURE TO UNFEATHER.

Should a propeller fail to unfeather when the feathering button is pulled out, repeat the procedure several times. If unfeathering is then impossible, complete shutdown of engine as outlined in ENGINE FAILURE DURING FLIGHT.

FAILURE TO REVERSE.

If one or both propellers fail to reverse during landing, advance both throttles to forward thrust range and use brakes to stop forward landing roll. If only one propeller fails to reverse, the available thrust from one engine may still be used advantageously if applied with caution. The throttle controlling the malfunctioning propeller should be immediately returned to idle.

FAILURE TO UNREVERSE.

If either or both propellers should fail to unreverse after being used to brake the landing roll and it is necessary to obtain forward thrust for continued operation, place the throttles in the forward thrust range and depress the feathering button for a sufficient length of time to bring the propellers into the forward thrust range. If continued operation of the engine is not required, shut down with the propellers in reverse; this will aid the ground crew in determining the cause of the malfunction.

FAILURE OF PROPELLER DEICING.

In the event deicing failure on one propeller should occur, attempt to locate an altitude where icing conditions are less prevalent. If icing conditions cannot be avoided and if propeller roughness has not become excessive, increase engine rpm as necessary for a period of 10 to 20 seconds tc dislodge ice from the blades. If excessive roughness does develop, feather and shut down the engine. Should the propeller deicing system on both propellers fail or should a complete failure of the electrical system occur, avoid icing conditions.

FIRE.

Procedures are outlined below for fighting a fire in the engines (on the ground or during flight), heating system, fuselage, wings, electrical system, and APU.

RECIPROCATING ENGINE FIRE DURING GROUND OPERATION.

If an engine fire occurs during any phase of ground operation (start, taxi, take-off, or landing roll) employ the following procedure. If the aircraft is moving, and conditions permit, the movement should continue until after both engines have been shut down. The fire may be a result of a fuel leak and you may stop over an area of flaming fuel. If you continue movement temporarily you may put out the fire on the aircraft and taxi away from the fire on the ground. Other aircraft in the area should not be placed in jeopardy by your continued movement and in a congested area you should stop immediately or continue to taxi clear of the area based on your judgment of the situation. During spray operations the jets should be operating to provide immediate power in the event of a malfunction at low altitude. Use jet power as required to maintain altitude and airspeed while accomplishing the procedure.

1. FIRE HANDLE - PULL. CP
2. MIXTURE - OFF. CP
3. FIRE EXTINGUISHER - AS REQUIRED. CP
4. Ignition - OFF. CP
5. Call tower for assistance. P, CP

If Fire Persists:

6. Mixture (good engine) - OFF. P, CP
7. Ignition - OFF. P, CP
8. Jet start switches - Shut down. P, CP
9. Electrical power source (APU, Battery) - OFF. P, CP
10. Alarm bell - ON. P
11. Abandon aircraft - All.
12. Hand fire extinguisher - As required. FM

RECIPROCATING ENGINE FIRE DURING FLIGHT.

Should an engine fire occur during flight, proceed as follows:

Fight The Fire.

1. FIRE HANDLE - PULL. CP
2. MIXTURE - OFF. CP
3. FIRE EXTINGUISHER - AS REQUIRED. CP
4. Power - As required. P, CP

   If jet engines are operating, advance power as required. If increased reciprocating power is necessary, adjust power by placing the mixture to rich, increasing rpm and MAP as necessary. Place the boost pump to HI if operation at or above METO power is anticipated. Refer to Appendix I for recommended engine-out climb, ceiling and cruise performance data.

5. APU - START, RUN, generator - ON. CP, FM

CAUTION

Normally the APU should be running and generator on for jet start; however, emergency starts with two generators can be made if necessary.

6. Propeller deice - OFF. CP, FM
7. Jet engines - Start, power as required. CP, FM
8. Propeller deice - As required. CP, FM
9. Fuel management - As required. CP, FM

   Use boost pumps and crossfeed as required.

Clean-Up Inoperative Engine.

1. Oil temperature - HOT. CP, FM

2. Cowl flaps - CLOSED. CP, FM

(3) Fuel Shut-off - CLOSED. CP

4. Fire Handle - RESET. CP

NOTE

If the fire extinguisher was not used the oil cooler exit door and cowl flaps will not close until the fire handle is reset.

(5.) Ignition - OFF. CP

The copilot will advise the pilot before shutting off the ignition. The pilot will monitor closely.

6. Generator(s) - OFF. CP

7. Engines - Checked. FM

The flight mechanic will visually check all engines and report any unusual conditions to the pilot.

(8.) Jettison - As required. ALL

If necessary, jettison cargo, equipment fuel tanks, and chemical to reduce weight. The pilot will specifically approve the opening of the cargo door and/or ramp. Jettisoning should be accomplished; if possible through the troop door on the inoperative engine side to minimize drag and reduce the risk of objects being thrown into the tail section by propeller wash.

WARNING

Chemical dumping should not be accomplished unless absolutely necessary. All crew members should be on 100% oxygen prior to dumping. Heavy concentrations of fumes will be drawn in around the cargo door and ramp; contaminate the atmosphere, and may cause crew incapacitation. Crew members exposed to heavy concentrations of chemical should obtain medical care as soon as possible.

NOTE

If difficulty is encountered in maintaining directional control, safe altitude, and airspeed, alert passengers and crew for bailout by three short rings on the alarm bell or crash landing by six short rings on the alarm bell. (For crash landing or bailout refer to Forced Landing/Bailout procedures in this section). When necessary, sound the bailout/crash landing signal by continuous ringing of the alarm bell.

9. RECIPROCATING ENGINE FIRE DURING FLIGHT Checklist - Completed. CP

RECIPROCATING ENGINE SMOKE AND FLAME IDENTIFICATION.

For the identification of various types of engine fires and the remedial action to be undertaken, refer to Figure 3-8.

JET ENGINE FIRE.

1. JET START SWITCH - SHUTDOWN. CP, FM
2. JET BOOST PUMP - OFF. CP, FM
3. JET EXTINGUISHER - AS REQUIRED. CP, FM

If fire warning light remains on, discharge extinguisher agent.

Fire in the accessory section is indicated by a jet fire warning light on the overhead engine emergency panel. The jet fire extinguisher will control fires in this section only.

4. MOTORING SWITCH - AS REQUIRED. CP, FM

The jet engine motoring switch should be activated when a fire occurs in the engine on the ground.

A fire is indicated when EGT continues to exceeding limits.

When airborne, there is sufficient airflow through the intake ducts to extinguish an engine fire.

NOTE

When placed in the MOTOR position, the jet engine motoring switch automatically overrides the jet engine start switch and de-energizes the ignition and the throttle actuator circuits.

5. Jet start switch - OFF. CP, FM
6. Jet generator - OFF. CP
7. Call tower for assistance. P, CP
8. All engines - Shutdown (ground operation). P, CP

If fire persists, all engines should be shutdown to expedite fighting the fire.

9. JET ENGINE FIRE Checklist - Completed. CP

WARNING

Do not restart the engine until the cause of the fire has been determined and corrected.

HEATING SYSTEM FIRE.

Refer to "FIRE IN FUSELAGE" procedures.

FIRE IN FUSELAGE.

If fire occurs in the fuselage, follow the procedure outlined below.

NOTE

The most important consideration is the application of extinguishing agent at the earliest possible moment.

1. Crew - Alerted. P
2. All exits and vents - Closed. ALL
3. Oxygen or smoke masks - ON. ALL

Don masks and set the diluter lever to 100%, if possible.

NOTE

Not required in a combat zone if oxygen system is deactivated.

4. Heater primary selector - OFF. CP
5. APU ignition - OFF. CP
6. Fight fire. FM (LM, N)

ENGINE SMOKE and FLAME . . . .

Various engine malfunctions are often indicated by characteristic smoke and flame patterns. This chart is provided so that the flight crew may more accurately identify different engine smoke and flame conditions and know at once the cause and the remedial action to be undertaken.

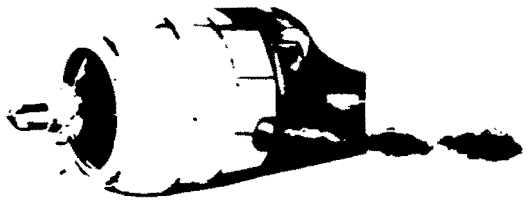
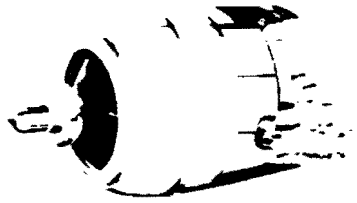
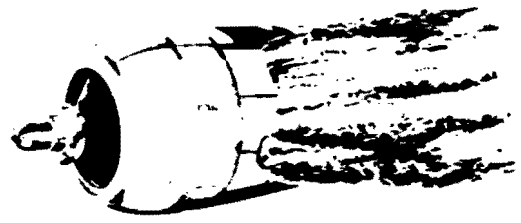
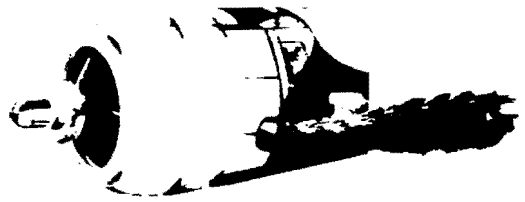
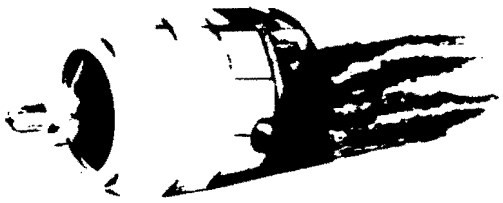
	cause	action
 ROUGH ENGINE AND PUFFS OF BLACK SMOKE FROM EXHAUST	Detonation, afterfire or backfire from lean mixture or carburetor failure which may be indicated by high CHT and CAT, fluctuating MP, RPM. If this condition is allowed to continue, loss of power and engine failure are imminent.	Enrich mixture, reduce power, and temperature, monitor engine instruments.
 THIN WISPS OF BLUISH-GRAY SMOKE FROM COWL FLAPS AND EXHAUST AREA	Slight oil leak. Possibility of fire exists but no action necessary unless fire develops.	Watch closely and feather if volume of smoke indicates the necessity.
 ROUGH ENGINE AND VARIABLE QUANTITY OF GRAY SMOKE AND POSSIBLE LIGHT FLAME FROM COWL FLAPS AND EXHAUST AREA	Cylinder head or exhaust stack failure indicated by high CHT, fluctuating MP and RPM, low oil pressure. If this condition is allowed to continue, engine failure and fire may result.	Fire and feather procedure and alert crew.

Figure 3-8 (Sheet 1 of 2)

	cause	action
 HEAVY BLACK SMOKE FROM EXHAUST	Initial induction fire from burning fuel possibly indicated by high CHT and a sudden drop in MP and RPM. An uncontrolled fire may develop.	Fire and feather procedure and alert crew.
 DENSE WHITE SMOKE FROM ACCESSORY SECTION	Induction casting burning and/or burned through possibly indicated by very high CHT and CAT and fluctuating engine instruments. An uncontrolled fire may develop.	Fire and feather procedure and alert crew.
 BLACK SMOKE FROM ACCESSORY SECTION	Oil leak and oil fire possibly indicated by variable oil pressure, high CHT and illumination of fire detector lights. An uncontrolled fire may develop.	Fire and feather procedure and alert crew.
 BLACK SMOKE AND ORANGE FLAME FROM ACCESSORY SECTION	Gasoline leak and fire possibly indicated by variable fuel pressure, high CHT, and illumination of fire detector lights. An uncontrolled fire may develop.	Fire and feather procedure and alert crew.

26110

Figure 3-8 (Sheet 2 of 2)

WARNING

Prolonged exposure (five minutes or more) to high concentrations (pronounced irritation of eye and nose) of Bromochloromethane (CB) of its decomposition products should be avoided. CB is an anesthetic agent of moderate intensity. It is safer to use than previous fire extinguishing agents (carbon tetrachloride, methylbromide). However, especially in confined spaces, adequate respiratory and eye protection from excessive exposure, including the use of oxygen when available, should be sought as soon as the primary fire emergency will permit.

7. FIRE IN FUSELAGE Checklist - Completed. FM

SPRAY SYSTEM ENGINE FIRE. (A) (B)

Refer to "FIRE IN FUSELAGE" procedures.

WING FIRE.

If fire should occur in the wing, side-slip the aircraft away from the fire and follow the procedure outlined below:

1. Crew and passengers - Alerted. P
2. Jet start switch - OFF. CP
3. Jet boost pump - OFF. CP
4. Jet generator - OFF. CP
5. Wing lights - OFF. CP
6. Drop tank air pumps - OFF. CP
7. Pitot heat - OFF, if fire in right wing. CP
8. Pilot's three-phase inverter - OFF, if fire in left wing. P
9. Single-phase inverter - OFF, if fire in left wing. CP
10. Reciprocating engine fuel crossfeed - OFF. CP

WARNING

Should it become necessary to jettison a nacelle tank with the crossfeed switch OFF, a resultant reciprocating engine loss will occur due to fuel starvation.

11. Jet engine fuel crossfeed - OFF. CP

WARNING

Should it become necessary to jettison a nacelle tank with the crossfeed switch OFF, a resultant jet engine loss will occur due to fuel starvation.

12. Aileron deicing distributor valve - OFF. CP
13. Fuel tanks - Jettison as necessary. CP

    If fire is in the vicinity of either the nacelle or external drop tanks, they should be jettisoned. Refer to EMERGENCY JETTISONING. Follow the progress of the fire closely and land quickly as possible, crashland, or bail out, whichever the situation demands. Be prepared to bail out at a moment's notice even though the decision to land the aircraft is made.

14. WING FIRE Checklist - Completed. CP

AUXILIARY POWER UNIT FIRE.

Refer to FIRE IN FUSELAGE procedures, this section.

ELECTRICAL FIRE (SOURCE UNDETERMINED).

When fire or smoke in the aircraft is suspected to be of electrical origin, but the source is not determined, proceed as follows:

1. Crew - Alerted. P
2. All generators - OFF. CP
3. Battery - OFF. CP

d. Tighten parachute straps.

e. Trim aircraft to approximately level flight.

f. Open bail-out chute, aft troop doors, cargo door and ramp as these are the only safe inflight exits.

WARNING

When using the bail-out chute, the bail-out should be accomplished in a head-first manner, thus placing the head in the slipstream prior to the remainder of the body and reducing the likelihood of head injury.

g. Give bail-out order over interphone accompanied by one long ring of the alarm bell.

BAIL-OUT OVER WATER.

Consideration of various unfavorable factors involved in an over-water bail-out of the crew limits the decision recommending over-water bail-out to several specific instances; namely, when visual contact is made with land or adequate surface help; when wind and sea conditions are such as to preclude ditching; and when fire or loss of control makes ditching impossible. Should a bail-out over water be required, employ the following procedure:

a. Give spoken warning over interphone and three short rings of the alarm bell.

b. Turn IFF to EMERGENCY. The copilot should send distress signals and position reports as directed by the pilot.

c. If time permits (approximately one extra minute is required) put on exposure suits over flying clothing, if they are available.

d. Don life jackets and parachutes, making certain the individual life-raft pack is secured to the parachute harness. Crew members should check the equipment of each other for completeness and proper adjustment.

WARNING

Do not attempt to inflate the life jacket prior to bailing out as it may be damaged in egress from the aircraft as well as hinder the wearer in his exit.

e. Reduce airspeed as much as possible without losing control.

WARNING

The wing flaps should not be extended to reduce airspeed if bail-out is to be made from the aft troop doors due to possibility of the personnel contacting the flaps.

f. Trim aircraft to approximately level flight.

g. Open bail-out chute, aft troop doors, and cargo door, as these are the only safe inflight exits.

WARNING

When using the bail-out chute, the bail-out should be accomplished in a head-first manner, thus placing the head in the slipstream prior to the remainder of the body and reducing the likelihood of head injury.

h. If a ship is in the vicinity, make a run so that personnel, on bailing out, will drift onto the course and just ahead of the ship.

i. Give bail-out order over the interphone and one long ring of the alarm bell.

EMERGENCY JETTISONING.

Prior to jettisoning any substantial quantity of cargo, equipment, or fuel tanks, the pilot should be prepared for sudden change in c.g. location. Jettisoning should be conducted in accordance with the following instructions.

JETTISONING OF CARGO AND EQUIPMENT.

In the event that it is necessary to jettison the cargo and equipment of the aircraft in order to maintain altitude during emergency engine-out operation, the aft troop door on the side of the dead engine should be used.

WARNING

Always jettison cargo from the aft troop door on the side of the inoperative engine to prevent the cargo being caught in the propwash and carried into the tail assembly of the aircraft.

Should the cargo be too large for jettisoning through the troop door, the cargo loading ramp and door may be opened and cargo ejected.

WARNING

- If fuselage fuel tanks or other bulky cargo are jettisoned, damage to the aircraft could result.
- When the cargo door and ramp system are used in flight, the limitations outlined under CARGO DOOR AND RAMP LIMITATIONS, Section V, apply.
- Whenever a troop or cargo door is opened during flight, no crew member or passenger will go aft of fuselage station 365, without wearing a parachute or restraining harness. Permission must be obtained from the aircraft commander prior to opening any door during flight.
- When removing the troop doors during flight, the doors must be fully open before the hinge pins are released in order to prevent loss of the door or injury to the crewmember.

JETTISONING OF FUEL TANKS.

Any one or combination of fuel tanks may be jettisoned as necessary depending upon the circumstances of the emergency. However, since the external drop tanks transfer into the nacelle tanks, it is unlikely that both nacelle tanks will be jettisoned except in the event of an uncontrollable fire aft of the firewall in each nacelle, or when a crash landing is imminent. The external drop tanks may also be jettisoned in the event of a forced landing, but when making a belly landing, or when

landing with partial extension of the landing gear on a hard-surface runway, the drop tanks should be retained if empty.

Jettisoning—Loss of Power.

If the emergency demands an immediate reduction in gross weight, it is better to jettison the external drop tank first, note the effect of the weight reduction, and then decide upon the advisability of dropping one nacelle tank. Should this latter action become necessary, the lateral trim of the aircraft may be unbalanced sufficiently to make an immediate landing hazardous unless the remaining nacelle tank is also jettisoned or fuel partially consumed. Normally at cruising speeds or above, the effect of an asymmetrical fuel load may be adequately offset with aileron trim; but when the speed is reduced for approach and landing, the load must be more evenly distributed. The safe fuel load limit for landing with one nacelle tank only will vary somewhat, depending upon the degree of crosswind encountered, but should never exceed a no-wind limit of approximately 3200 pounds.

Jettisoning—Fuel Transfer Failure.

In addition to situations involving weight reduction, it may be necessary to jettison the external drop tanks in order to improve the trim of the aircraft in the event of an inflight failure of the fuel transfer system. In this case, the effect of asymmetrical fuel loading is more noticeable because of the weight concentrated farther outboard on the wing. The defective drop tank should be released prior to landing if the difference in fuel load amounts to more than 1350 pounds (approximately half a tank), or if the inbalance cannot be brought into acceptable limits by crossfeeding.

Jettisoning—Fire.

Fire is most likely to occur forward of the firewall and will not in all cases necessitate jettisoning the nacelle fuel tank. If the fire cannot be brought under control with the engine fire extinguisher system, the nacelle tank should then be jettisoned at the discretion of the pilot. Refer to RECIPROCATING ENGINE FIRE DURING FLIGHT, this section.

Jettisoning—Forced Landing.

When definitely committed to a crash landing, all four fuel tanks should be jettisoned. Refer to FORCED LANDING, this section.

WARNING

In considering the advisibility of jettisoning any tank, the concentration of population in the immediate area should be taken into consideration.

To Jettison Fuel Tanks.

a. To jettison fuel tanks reduce airspeed to the maximum speed for jettisoning applicable tanks as stated in AIRSPEED LIMITATIONS, Section V.

b. Place the appropriate jettison switches in the DROP position.

CAUTION

Minimum drop altitude should be not less than 50 feet due to the forward tumbling action and fuel spray from the tanks.

EMERGENCY DUMPING. (A) (B)

DUMPING OF SPRAY AGENT.

The spray agent may be dumped as necessary depending upon the extent of the emergency. Should dumping be decided upon, the pilot should be prepared for a sudden change in center-of-gravity when the spray agent is released.

When dumping is decided upon, if the emergency is not immediately urgent, consideration should be given to the area over which the chemicals are to be released. If at all possible, a remote area should be selected in order to minimize the resultant damage.

(B) With the aircraft in the three tank configuration, emergency dumping shall be accomplished from three tanks simultaneously or from the aft tank(s) first, then the forward tank.

CAUTION

Dumping solely from the forward tank with liquid in the aft tanks and a full fuel load the aft Center-of-gravity limit will be exceeded.

The manual shut-off valves of each tank(s) must be in the open position for dumping.

To Dump Spray Agent.

a. Position dump switch on pilot's instrument panel to DUMP.

NOTE

(A) The dumping action is not reversible. Once the dumping controls are activated, the entire chemical load will be released.

(B) Dumping of spray agent can be stopped by electrically closing the dump valve or closing the Manual shut-off valve on each tank. Closing the dump valve electrically must be accomplished by placing the dump switch (that was used to open the valve) to the CLOSED position.

(B) If the contents fail to dump the pilot will direct the flight mechanic to manually operate the manual dump valve.

(A) b. Pull the emergency dump handle.

(A) c. If contents fail to release, the flight mechanic, at the pilot's direction, will release the tank contents by movement of the manual release handle on the tank assembly.

NOTE

(A) Approximate dumping time is 29 seconds. Refer to Figure 3-8A.

(B) Approximate dumping time with full tanks is 90 seconds.

DUMPING OF FUEL FROM SPRAY TANK.

WARNING

In the event an emergency should warrant the use of the dump system when using the 1000 gallon spray tank as an auxiliary fuel tank, all electrical power should be turned off and the manual dump system used since fuel may be drawn back inside the aircraft which creates a fire hazard. Electrical power should not be restored to the aircraft until all fuel fumes have dissipated.

DEFOLIANT DUMP RATE

MODEL: UC-123K
DATA AS OF: OCTOBER 15, 1967
DATA BASIS: ESTIMATED

EXAMPLE PROBLEM:

With 8000 pounds of defoliant on board, how long will it take to empty the the tank?

a. Enter chart at 8000 pounds; proceed horizontally to the line, read down to five seconds.

b. Enter chart at 0 pounds; proceed horizontally to the line, read down to 34 seconds.

SOLUTION: 34-5=29 seconds.

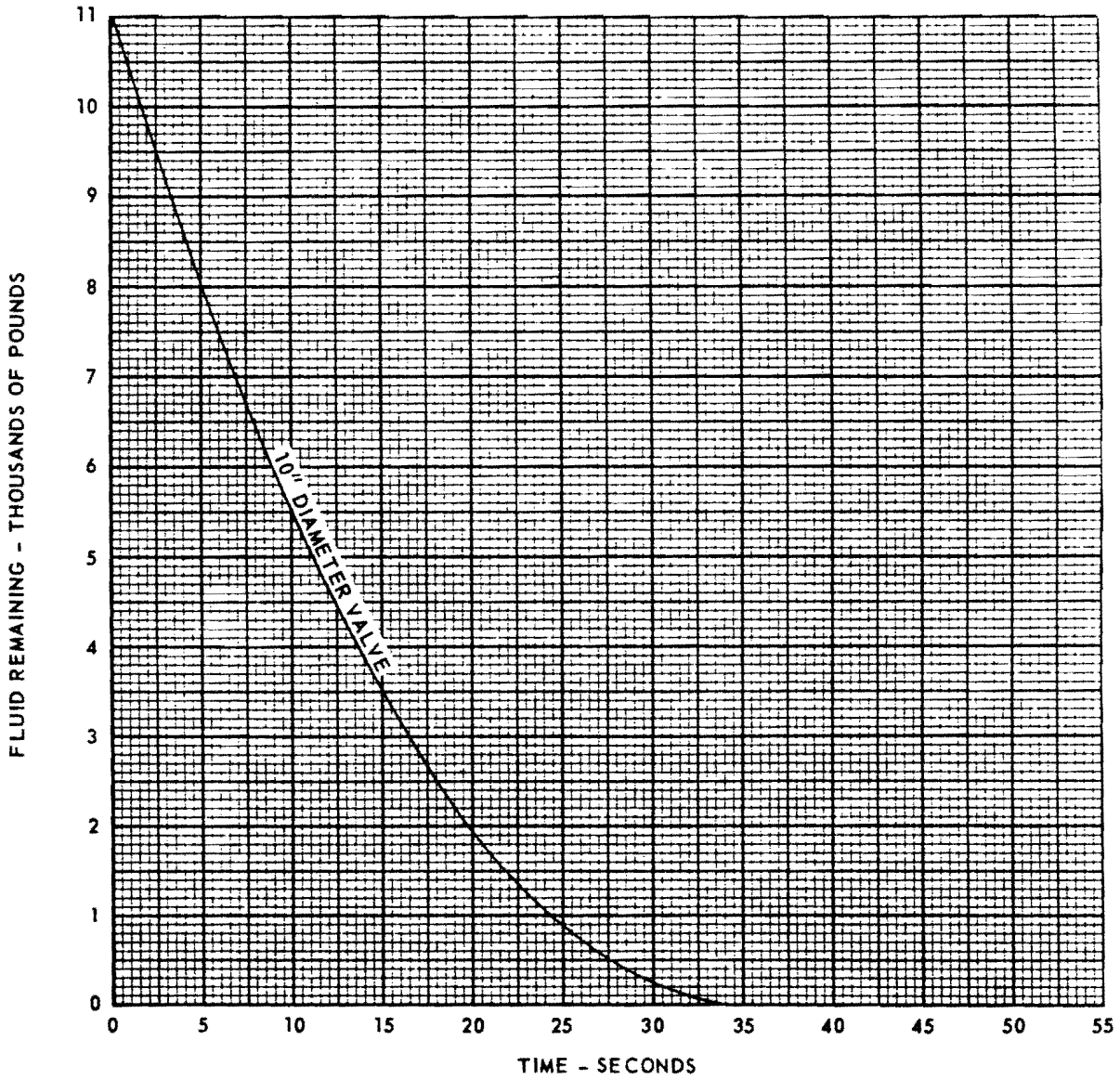


Figure 3-8A

TAKE-OFF AND LANDING EMERGENCIES.

Take-off and landing emergencies develop basically from equipment failure or flight conditions which were not foreseen and taken into account at the onset of the mission. By accurately checking the aircraft before take-off and by anticipating emergency conditions which may develop, the hazards involved, which suddenly become very real as the take-off progresses or the landing pattern is approached, may be effectively reduced. Following is the recommended procedure to be employed should a take-off abort be necessary. In addition, techniques and procedures which are of primary importance in successfully accomplishing an emergency landing are given for forced landing, landing without nose gear extended, landing without main gear extended, landing with a flat tire and landing without brakes. Refer to ENGINE-OUT LANDING and SINGLE-ENGINE REVERSING, this section, for the recommended landing procedures should engine failure occur during flight. Prior to attempting a landing with known control difficulties, simulate a landing at safe altitude to determine what aircraft characteristics will be encountered.

ABORT.

During a take-off roll, should the decision be made to abort, the procedure used to stop the aircraft is basically the same regardless of the type of failure or emergency encountered. The following procedure is recommended.

a. Hold aircraft straight with nose wheel steering and brakes.

NOTE

- Nose wheel steering, together with brakes, should be used to maintain directional control. This is especially important if the abort decision was made due to engine failure since the aircraft will tend to turn toward the good engine when reverse thrust is applied.

- After the decision is made to abort and power is reduced, the copilot should assume aileron control upon direction of the pilot.

b. Move throttles into reverse range to shut down jet engines. Return throttles to forward thrust range immediately unless reverse thrust is required.

c. Apply reverse thrust, if required.

d. Apply brakes as necessary to bring the aircraft to a stop within available runway.

NOTE

If reverse thrust and brakes are insufficient to prevent crashing into obstacles, landing gear retraction may be accomplished by unlocking landing gear lever and placing it in the UP position.

Wing Flap Failure.

If the wing flaps fail to extend to the position selected, position the wing flap lever to correspond with the flap position indicator. Determine the cause of failure or make a landing using appropriate speed or next higher speed if in an intermediate position.

WARNING

If flaps fail to operate and the cause of failure cannot be determined, no further attempt to operate the flaps should be made until landing is completed.

Split Flaps.

Split flaps or asymmetrical wing flap deflection may occur as a result of failure or malfunction in the flap system. The first indication of this condition is a rolling motion around the longitudinal axis. The rate of roll is proportionate to the differential angle between the flap segments, and may reach such a magnitude that roll control cannot be restored with aileron and/or rudder. Increasing airspeed and/or differential power may aid in this case.

When a split flap condition has been identified, the wing flap lever should be immediately placed in the up position. Once directional control is regained, an inspection should be made to determine the condition of the flaps and ailerons. Do not reset the flaps. Land as soon as possible.

FORCED LANDING PROCEDURE.

The recommended procedures to be employed in a forced landing are outlined below. Personnel occupying the cargo compartment should bail out if time and altitude permit; otherwise, they should assume positions indicated in DITCHING AND CRASH LANDING STATIONS, Figure 3-10.

1. Crew and passengers - Alerted. P

   Alert passengers and crew with six short rings of alarm bell.

2. Aircraft position - Transmitted. CP

   Transmit course, speed, altitude, and position.

3. IFF EMERGENCY. CP

4. Navigator's seat - Stowed. FM

5. Jettison as required. P, FM, LM

   Jettison drop tanks and all cargo and loose gear.

   NOTE

   Nacelle tanks should also be jettisoned when actually committed to a crash landing. However this action should be taken before reaching an altitude of 50 feet.

6. APU - OFF. CP

7. Heaters - OFF. CP

8. All non-essential electrical switches - Off. CP

9. Jet engines - SHUTDOWN. CP

10. Jet boost pumps - OFF. CP

11. Landing gear - As desired. CP

    Position of the landing gear, which is dependent upon terrain, is left to the pilot's discretion.

12. Seats, safety belts, and shoulder harnesses - secured and locked. ALL

    NOTE

    The pilots are prevented from bending forward when the inertia reel lock control is in the locked position; therefore, all switches not readily accessible should be "cut" before moving the control to the locked position.

A normal approach should be made, landing with as slow forward speed as possible with wing flaps LAND. Immediately prior to impact, give one

long sustained ring of the alarm bell and close throttle, cut mixture, and turn off ignition and nacelle fuel shutoff valve switches. Abandon the aircraft as soon as it comes to a stop. Refer to Figure 3-13, EMERGENCY EXITS.

LANDING-NOSE/MAIN GEAR FAILS TO EXTEND.

The following procedure is recommended should either or both main landing gear fail to extend or should the nose landing gear fail to extend. If possible, the landing should be made on a foamed hard surface runway with fire and crash equipment standing by. A strip of foam 2500 x 24 feet wide is recommended. With all landing gear up on a foamed runway, the rudder is effective to approximately 40 kts.

a. Crew and passengers - Alerted.

Alert crew and passengers with six short rings of the alarm bell.

b. All loose equipment - Stowed/Tied down.

c. Navigator's seat - Stowed.

d. Drop tanks - Jettisoned, unless empty.

WARNING

External drop tanks should be retained, if empty, in order to minimize the possibility of personal injury, aircraft damage, and fire.

e. APU-OFF.

f. Heaters - OFF.

g. Jet engines - SHUTDOWN.

h. Jet boost pumps - OFF.

i. All nonessential electrical switches - OFF.

j. Seats, safety belts, and shoulder harnesses - Secured and locked.

NOTE

The pilots are prevented from bending forward when the inertia reel lock control is in locked position; therefore, all switches not readily accessible should be "cut" before moving the control to the locked position.

k. Landing gear - As required.

NOTE

- Should the nose gear fail to extend, the landing should be made with the main gear extended.
- Should either or both main gear fail to extend, retract extended gear.

l. Flaps - LAND.

m. Immediately prior to contact - One long ring on alarm bell.

n. Upon contact with the ground - Both fire handles pulled.

When nose gear fails to extend, hold the nose off the ground as long as possible to reduce fuselage damage. Use brakes, if necessary, only after nose makes contact with the ground.

o. Mixtures - OFF.

p. Ignition - OFF.

q. Battery - ON.

The battery switch should remain on until it is certain that power is not required for operation of the fire emergency system, then turned OFF.

LANDING WITH A FLAT TIRE.

When landing with one or more tires flat, insert gear pins, make a normal approach planned so that touchdown occurs as short on the runway as possible. Upon touchdown, hold the gear with the flat tire off the runway as long as feasible. In the case of a flat nose gear tire, land on the center of the runway, holding the nose gear off until the last possible moment. When landing with a flat main gear tire, touch down on the side of the runway away from the flat tire with the serviceable tire as near to the runway edge as practical. An aircraft veering towards the flat main gear tire will then utilize as much runway distance as possible before run-off to unprepared landing area results. Landing with both main gear tires blown may be made in the center of the runway. In all cases, lock shoulder harness and tighten safety belt prior to touchdown. Maintain directional control, as

circumstances permit, by proper use of reverse thrust, nose wheel steering, rudder, and brakes when touchdown is complete. Using differential power can aid in directional control if runway permits.

LANDING WITH ANTI-SKID SYSTEM INOPERATIVE.

If the brake anti-skid system becomes inoperative, the brakes will automatically revert to direct manual control. A normal landing sequence may be performed with care being taken not to use excessive braking which could cause skidding and possible blowout of a tire. Turn anti-skid switch OFF.

LANDING WITHOUT BRAKES.

Should the hydraulic and emergency air brake systems be unavailable for braking during landing, land with as slow a speed as consistent with gross weight, utilizing full flaps with reverse thrust. Plan approach so as to touch down on the runway near the approach end.

Loss of Hydraulic Brakes.

If braking action is lost, immediately turn the anti-skid switch OFF; if braking action is not regained use the emergency air brakes.

FLIGHT IF LANDING LIGHT COVER IS LOST.

Loss of a landing light cover in flight will cause severe control problems. The aircraft will yaw toward the side where the cover is missing and buffeting will be encountered. The severity of the buffeting will increase as airspeed is reduced below cruise. Therefore, it is recommended that a no-flaps, straight-in approach emergency landing be made as soon as possible. Airspeeds during approach should be maintained as high as required to maintain directional control.

EMERGENCY ENTRANCE.

In the event a crash landing damages all doors so that entry into the aircraft is impossible, the emergency entrance areas as outlined in yellow on the aircraft should be cut through. (Refer to Figure 3-9.) These areas are located on all the hatches on the top of the fuselage and around the side windows of the cargo compartment. If it is impossible to open the doors or hatches by means of the external release handles, cutting through the fuselage skin at the areas outlined in yellow can be accomplished with the least resistance.

DITCHING.

The success of aircraft ditchings is primarily dependent upon three factors:

a. Wind and sea conditions.

b. Type of aircraft.

c. Skill and technique of pilot.

Under ideal conditions of wind and sea, and by skillful execution of the recommended techniques, the ditching of transport-type aircraft can usually be accomplished with a high degree of success. However, due to the high-wing configuration of this aircraft, the fuselage may be expected to settle rapidly after touchdown with consequent flooding of the cargo compartment. For this reason, it is recommended that the navigator, flight mechanic, loadmaster, and all passengers bail out rather than ditch whenever possible. On the other hand, if no personnel are aboard in the cargo compartment, it is considered better to ditch if circumstances permit since this makes available the additional life rafts and survival equipment carried in the cargo compartment. In any event, the decision to ditch or bail-out must be made by the pilot in view of the existing circumstances. This decision should never be delayed until the fuel supply is exhausted since the most effective ditching approach is made with power on at a speed slightly above the stall speed.

PREPARATION FOR DITCHING.

The fundamental procedures and techniques essential to successful ditching operations should be emphasized in periodic drills and training exercises. In this way the flight crew can become proficient in the performance of ditching duties to the extent that a successful ditching can be made when little time is available to prepare.

Communications.

The pilot has the responsibility of deciding when an emergency exists, or when a forced landing or bailout is necessary. He should, therefore, start the

appropriate emergency communications procedures as soon as any doubt exists concerning the safety of the aircraft. It is far better to start the distress procedure, and then not to need assistance, than to delay until it is too late. Turn IFF to EMERGENCY and immediately transmit SOS (CW) or MAYDAY (voice) three times on the normal air/ground frequency, followed by the aircraft identification repeated three times. If this channel fails, use 121.5 mc (VHF), 243 mc (UHF), or 8364 kc (LIAISON) depending upon distance and time of day. Following the initial distress signal a more complete distress message should be sent including as much of the following information as time permits:

a. Navigational position.

b. Course, speed, and altitude.

c. Nature of distress.

d. Intentions; bail-out or ditch.

e. Kind of assistance required (escort, information concerning sea conditions, ditching heading, etc.)

At the end of the message, transmit two 10-second dashes followed by the aircraft identification. This will aid receiving stations in taking D/F bearings. In the event it is impossible to establish two-way communications, continue transmitting distress messages "in the blind."

Final Preparation.

Once the decision to ditch has been made, the pilot should warn the passengers and crew by sounding six short rings on the alarm bell. The aircraft should be lightened to increase floatation and reduce the possibility of structural failure on impact. All cargo that can be jettisoned should be disposed of as well as any equipment that is likely to break loose and cause injury to personnel. Fuel should be burned down to the minimum required for several approaches, and all heaters should be turned off. In the meantime, personnel should dispose of any sharp objects such as keys, glasses, pens, pencils, etc., and attempt to arrange padding from whatever material is at hand; extra clothing, blankets, parachutes, etc., in order to minimize the danger of injury. At the same time, consideration should be given to the need for extra clothing as protection from exposure. Last minute preparations should be made at the discretion of the pilot. Among these are transmission of ditching navigational position, and assumption of ditching stations by all personnel. Interior lights, flashlights, and life jacket lights should be turned on at this time if the ditching is conducted at night. Upon the pilot's order "stations for ditching," all personnel in the cargo compartment should draw seat belts tight around the hips (not the stomach) and lean forward as far as possible, covering the head with the arms. Refer to Figure 3-10. The navigator should assume a similar position in one of the troop seats. The pilot and copilot should at this time tighten shoulder harness and safety belt and lock the inertia reel lock control. Approximately 10 seconds before striking the water, the pilot should warn all personnel to brace by sounding one long sustained ring on the alarm bell. Occupants should not relax until the aircraft has definitely stopped, since more than one shock may be felt. When the aircraft comes to rest, all personnel should leave by the nearest exit and enter the water downwind of the aircraft.

NOTE

In case of fire, it may be advisable to enter the water upwind in order to avoid being engulfed by smoke and burning fuel.

WARNING

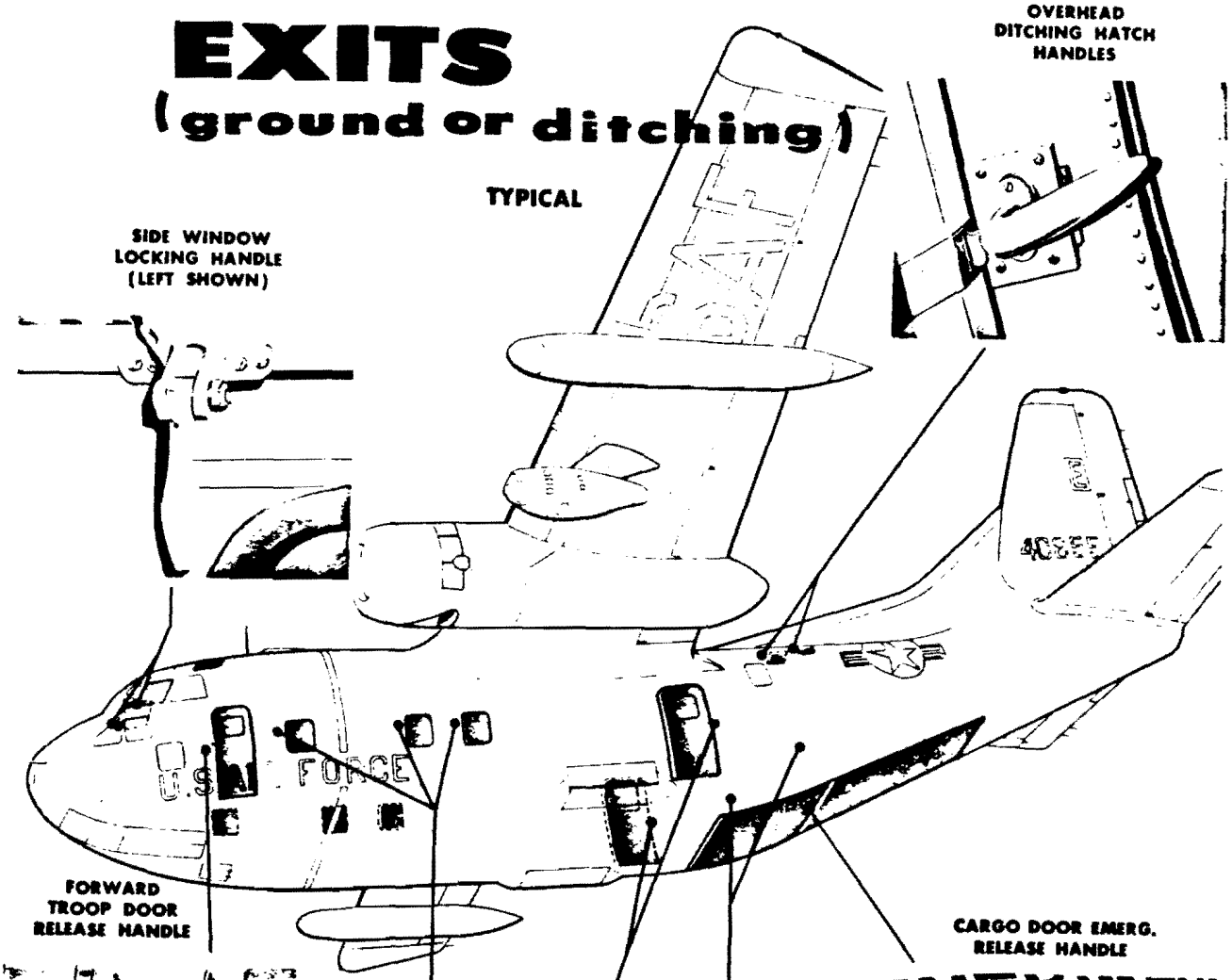
Life jackets should be inflated outside the aircraft prior to entering the water. This simplifies passage through the emergency exits and minimizes the danger of puncturing the life jacket.

Jettisoning Life Rafts.

In the normal ditching situation in which the navigator, loadmaster, flight mechanic, and all passengers bail out, the life rafts carried in the cargo compartment are pushed from the aircraft without any parachute attached, before the aircraft is ditched. This should be accomplished by the copilot at an altitude of 500 feet after the passengers have bailed out and are in the water. The drop must be planned so the life rafts will land upwind of the survivors; thus, the wind will carry

EXITS
(ground or ditching)

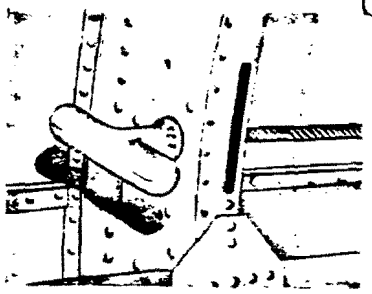
TYPICAL



OVERHEAD DITCHING HATCH HANDLES

SIDE WINDOW LOCKING HANDLE (LEFT SHOWN)

FORWARD TROOP DOOR RELEASE HANDLE

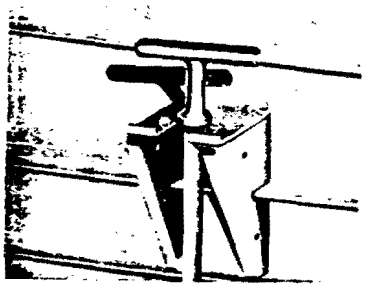


CARGO DOOR EMERG. RELEASE HANDLE

CARGO COMPT. WINDOW EMERG. RELEASE HANDLE

AFT TROOP DOOR JETTISON HANDLE (RIGHT SIDE SHOWN)

CARGO RAMP EMERG. RELEASE HANDLES



In general, it is considered hazardous to land, taxi, or take-off if the fuel quantity in one drop tank exceeds the other by more than 1350 pounds (approximately half a tank) when the nacelle tank loads are equal. For this reason it is essential that the transfer of fuel from the external drop tanks be checked periodically. If a failure of the transfer system on one side is detected before an appreciable amount of fuel is transferred, both external drop tank air pump switches should be turned OFF to prevent further unbalance unless the external fuel is needed to complete the mission. In this case, the pilot, depending upon the urgency of the mission, may decide to return to base, land enroute, or continue the flight, using as much external drop tank fuel as possible and jettisoning the defective tank. If it is determined that jettisoning is not absolutely necessary, the slow-speed flight characteristics of the aircraft should be checked with the landing gear and wing flaps extended to ensure that adequate aileron trim is available for a safe approach and landing. Refer to JETTISONING OF FUEL TANKS, this section.

ELECTRICAL SYSTEM EMERGENCY OPERATION.

Note

Refer to figures 1-29 and 1-30 for primary and flight emergency bus equipment power requirements.

The C-123K has four reciprocating engine generators which power the primary bus, and two jet engine starter/generators which provide auxiliary power to the aircraft electrical system through the flight emergency bus. Consequently, these aircraft are more versatile in encountering electrical power failure emergencies. However, due to the high fuel consumption of the jet engines, use of the jet engines to provide a source of auxiliary power will be dependent upon many factors; e.g., severity of the emergency, fuel supply, climatic conditions, etc. Use of the jet engines primarily to provide auxiliary power will, therefore, be at the discretion of the pilot.

APU EMERGENCY OPERATING PROCEDURES.

The following starting procedure should be employed whenever there is no electrical power available for starting the auxiliary power unit.

To Start The Auxiliary Power Unit Manually.

1. APU generator - OFF. FM
2. APU ignition - ON. FM
3. Governor - As required. FM

Note

Varying temperature conditions may require different governor lever settings.

4. APU field control relay - Manually reset. FM
5. Manual fuel bypass valve - Open. FM
6. Altitude compensator valve - Set. FM

   Place valve at setting nearest the altitude which the aircraft is being operated. Do not set pointer between altitude positions.

7. APU rewind starting handle - Pulled. FM
8. Governor - IDLE for warmup, when APU has started. FM
9. Starter - On. FM
10. Governor - RUN, after warmup. FM
11. Generator - ON, after engine has stabilized in RUN. FM
12. Battery - ON. FM
13. Manual fuel bypass valve - Closed. FM

PARTIAL POWER FAILURE.

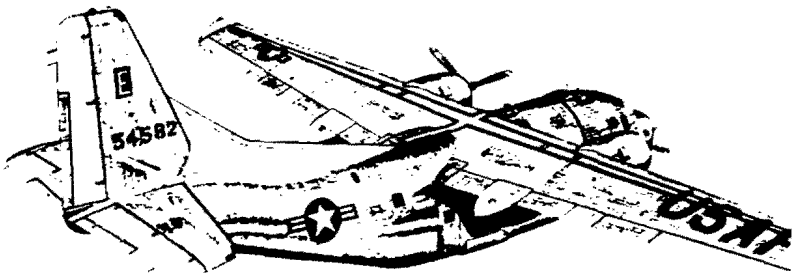
Partial electrical power failures are emergency conditions in that they restrict the aircraft in some specific phases of its operation. Such failures seldom jeopardize safety of flight and, in most cases, prompt corrective action in utilizing the equipment provided to cope with a partial power failure will offset the power loss. The dc voltmeter, as well as the loadmeters, will immediately confirm a suspected generator power failure. Likewise, the generator and inverter warning lights will indicate a malfunction in the electrical system. Loss of equipment powered by the secondary dc and ac busses similarly will provide evidence of a power failure. A malfunctioning flight emergency bus relay, however, can only be discovered prior to battery depletion by checking periodically. Discussed below are some specific partial electrical power failures and the remedial action to be undertaken should they occur.

FLIGHT EMERGENCY BUS RELAY FAILURE.

The 28-volt dc output of the reciprocating engine generators is directed to the primary bus. Normally, the flight emergency bus is connected to the primary bus by the flight emergency bus relay. In the event the flight emergency bus relay malfunctions and fails to connect the primary and flight emergency busses when the reciprocating engine generators are placed on the primary bus, the flight emergency bus equipment will be powered only by the battery. Unless de-

DITCHING and CRASH LANDING stations

Crew and passengers should be thoroughly briefed on the ditching and crash landing procedures prior to flight.

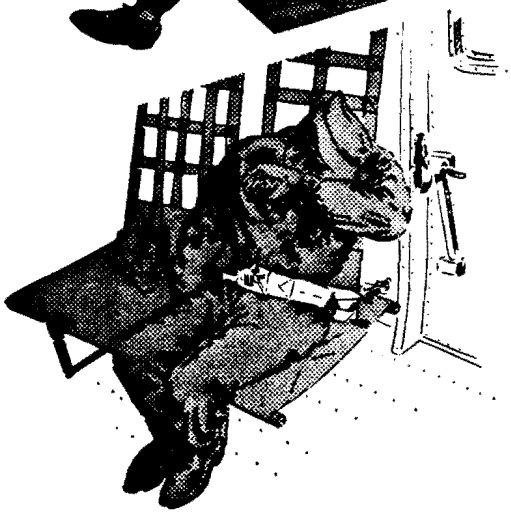


PILOT and COPILOT . . . . . .

Shoulder harness and safety belt tightened . . . inertia reel locked.

NAVIGATOR . . . . . .

Fold work table and lock navigator's seat in stowed position. Assume troop seat and tighten safety belt. Lean toward nose of airplane as far as possible.



FLIGHT MECHANIC, LOADMASTER, and PASSENGERS . . . . . .

Safety belt tightened. Lean toward nose of airplane as far as possible.

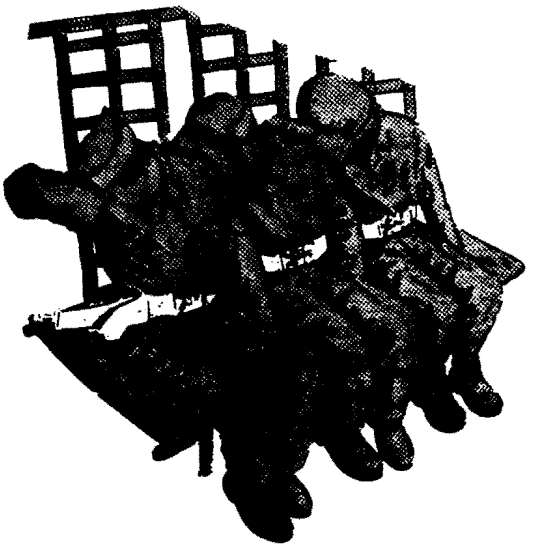


Figure 3-10

DITCHING chart

NOTE

PERSONNEL	DUTY	PROVIDE	POSITION	EXIT
PILOT	Sound three short rings on the alarm bell to warn crew and passengers to standby for bail-out. Order bail-out with one long ring. Alert crew for ditching with six short rings. If bail-out is not possible, turn all non-essential electrical equipment OFF. Order jettisoning of cargo if time permits. Evaluate wind and sea conditions to determine ditching heading. Check gear up, flaps 45° (LAND). Tighten safety belt and shoulder harness, examine life jacket, and lock inertia reel lock control. Locate all crew members after leaving aircraft.	Parachute, first aid kit.	Pilot's seat.	Forward overhead ditching hatch.
COPILOT	Conduct emergency communications as directed by pilot. Transmit position, course, speed, altitude, nature of distress and intention to ditch. Take over control of aircraft while pilot adjusts his equipment. Check life jacket, tighten safety belt and shoulder harness, and lock inertia reel lock control. Ring alarm bell as signal to brace for impact.	Parachute, pyrotechnic pistol, and flares.	Copilot's seat.	Forward overhead ditching hatch.
NAVIGATOR	Give position, course, and speed to copilot. Turn IFF to EMERGENCY. Stow and secure navigator's station and remove periscopic sextant. Bail out if possible, otherwise occupy troop seat, fasten safety belt and shoulder harness, and lean forward to brace for impact.	Parachute, emergency (dinghy) transmitter, survival equipment.	Troop seat.	Aft ditching hatch.
FLIGHT MECHANIC	Arrange emergency equipment to facilitate use (turn on flashlights, when directed) and lower aft ditching ladders. Bail out if possible, otherwise occupy troop seat, fasten safety belt and shoulder harness, and lean forward to brace for impact.	Parachute, survival equipment, and water supply	Troop seat.	Forward overhead ditching hatch.
LOADMASTER	Supervise jettisoning of cargo, review passenger briefing, assist flight engineer or navigator as necessary. Bail out if possible, otherwise occupy troop seat, fasten safety belt and shoulder harness, and lean forward to brace for impact.	Parachute, and survival equipment.	Troop seat.	Aft ditching hatch.
PASSENGERS	Bail out when directed. If circumstances prohibit bail-out, assist in jettisoning cargo and equipment, fasten safety belts and shoulder harnesses, lean forward to brace for impact.	Survival equipment.	Troop seats.	Forward or aft ditching hatches as directed in preflight briefing.

Figure 3-11

CAUTION

No jet engine starts should be made with only one reciprocating engine generator operating unless an absolute emergency condition exists. Cooling time (in the air or on the ground) for reciprocating engine generators after starting jet engines must be no less than 15 minutes and should be 20 minutes if conditions permit.

6. Drop tank air pumps (if installed) - ON.

   Fuel from the drop tanks should be transferred to the nacelle tanks to make certain this fuel is available should a loss of primary dc bus power occur.

7. Checklist - Completed.

8. Maintain fire watch.

FAILURE OF FOUR RECIPROCATING ENGINE GENERATORS.

Should four engine-driven generators fail in flight (and the APU is not operating) the primary dc bus is automatically disconnected from the flight emergency bus. Indication of the failure will be apparent immediately by the following conditions: generator warning lights will illuminate, all equipment except that on the flight emergency bus or connected directly to the battery will become inoperative, and the generator loadmeters will register a no-load condition. Since the battery will immediately assume the load, preservation of the battery requires that the APU be started as soon as possible. If used only to operate essential flight instruments, the battery may last several hours depending upon its condition at the time of generator failure. Operation of other equipment will materially shorten battery life. If absolutely necessary, interphone, VHF, and UHF equipment may be powered directly from the battery by depressing the emergency communications switch.

Battery Endurance.

The failure of four reciprocating engine generators in flight (APU or jet generators not operating) results in an electrical power emergency wherein only the battery remains to supply electrical power for the remainer of the flight. The need for battery power in such an emergency will depend primarily upon the weather conditions and the distance to the nearest suitable airfield. The availability of battery power will be contingent upon the condition of the battery at the time of generator failure, the temperature, and the conservation measures taken to preserve the battery as long as possible. Since both the need and the availability present highly variable factors, it is impossible to predict accurately how long the battery will last.

Procedure.

Should failure of four engine generators occur, the procedure to be employed is as follows:

Note

Make certain that the location of flashlights is known to all crew members. Should all generators fail during a night mission, several flashlights will be required to accomplish the emergency procedures.

1. Battery - ON.

2. All generators - OFF.

3. All unnecessary electrical equipment - Off.

Note

Attempt to stay clear of IFR conditions and land at the nearest suitable airfield.

4. Auxiliary power unit - Manually start and idle.

   Manual starting procedure of the APU is outlined in this section.

CAUTION

To conserve battery power do not attempt battery starting of the APU.

5. Field control relays - Reset manually.

   The manual reset buttons are located on the field control relays in the right electrical panel in the cargo compartment.

6. DC voltmeter (select one generator) - Check voltage.

7. If voltmeter reading is approximately 28 volts:

   a. Generator - ON.

      Closing the switch guard will not necessarily position the switch from OFF to ON. Check that the warning light remains off.

   b. Loadmeter - Check for output.

8. If voltmeter reading is more than 28 volts:

   a. Voltage regulator rheostat - Adjust for 28 volts.

      A rheostat knob on the corresponding voltage regulator in the left electrical panel in the cargo compartment permits adjustment of voltage. Voltage is decreased by turning the rheostat counterclockwise.

CAUTION

If inflight adjustment of the voltage regulator is absolutely necessary, extreme caution should be exercised to avoid inadvertently raising the voltage. This could result in an overvoltage condition with resulting failure or electrical fire.

   b. Accomplish step 7, if applicable.

9. If voltmeter reading is 0-5 volts:
   A voltmeter reading of 3-5 volts indicates that the field control relay has not reset. A voltmeter reading of zero probably indicates a mechanical failure of the generator; however, to preclude the possibility of field control malfunction, it is advisable to repeat field control relay resetting.

   a. Field control relay (of corresponding generator) - Reset manually.

   b. DC voltmeter step 7, if applicable.

   c. Accomplish step 7, if applicable.

10. If the output of the generator has been recovered:

   a. Auxiliary power unit - Start electrically, if manual starting has not been completed. Permit APU to warm up.

   b. APU starter - ON.

   c. APU governor - IDLE.

   d. APU generator - RESET, then OFF.

      The APU is permitted to idle in order to have its output available. It is connected to the bus only after all engine generator recovery attempts have failed since one malfunctioning generator may trip the field control relays of the other generators and result in loss of all generator power.

11. If the output of the generator cannot be recovered:

   a. Generator - OFF.

      The generator is turned OFF in order to avoid the danger of fire resulting from generator failure and to prevent excessive voltage of one generator from tripping the field control relays of other generators.

12. Attempt to recover the output of the other engine generators by repeating steps 6 through 11.

13. If output of any of the other engine generators cannot be recovered:

   a. Engine generators - OFF.

   b. APU governor - RUN (when warm-up is complete).

   c. APU generator - ON.

CAUTION

When operating solely on the APU, propeller deicing may be used in an extreme emergency provided all electrical systems are turned off except the pitot heat (if required), pilot's three-phase inverter and heaters (if required). Rated capacity of the APU will be exceeded under this condition.

Note

If it is not possible to start the APU and get its output on the flight emergency bus, the pilot's three-phase inverter switch may be placed in MANUAL OVERRIDE (on some aircraft). This will bypass the automatic changeover relay and its voltage failure circuits and will increase the length of time that three-phase inverter power is available for operation of the pilot's attitude and heading indicators. On aircraft without three-phase automatic changeover, this step is not necessary.

14. Jet engines - As required.

Note

Either or both jet engines may be shut down at the pilot's discretion, since no control of jet engine will be available if complete electrical failure occurs. APU should not be used to attempt to start jet engines.

15. Drop tank air pumps (if tanks installed) - ON.

    If not previously accomplished.