

## Part IV

## Chapter 1—Engine Emergency Procedures

## List of Contents

	<i>Para.</i>
Engine mechanical failure . . . . .	1
Engine failure during take-off . . . . .	2
Two-engine failure in flight . . . . .	3
Four-engine flame-out . . . . .	4

NOTE: The following emergency drills are contained in the Flight Reference Cards.

- Engine fire drill
- Engine overheat warning
- Four engine flame-out

### 1 Engine mechanical failure

If an engine fails under conditions which indicate a mechanical failure, immediately stop the engine by closing the HP cock. ▶◀ Select the appropriate RAT intake OPEN. Keep close observation for warning of engine bay fire. Switch OFF the alternator.

### 2 Engine failure during take-off

(a) If a single engine fails during take-off while below the "stop" speed, the take-off must be abandoned. Throttle back all engines, stream the brake-parachute and use wheelbrakes as required.

(b) If an engine fails above the "stop" and "go" speeds, continue with the take-off. The safety speed will always be below the unstick speed. As soon as possible, depending on the circumstances of the failure, attempt to relight the failed engine, or stop it by closing the HP cock. ▶◀ The RAT intakes will normally be extended during take-off and the AAPP will be running.

(c) Should a double engine failure occur at a speed lower than safety speed but above the "stop" speed the live engines should be throttled back momentarily to stop the yaw, and then power re-applied as required.

### 3 Two-engine failure in flight

(a) If two adjacent engines fail in flight, the appropriate RAT intake will automatically open as the RPM decrease, but in order to ensure that the RAT alternator is capable of accepting its electrical loads, the intake should be manually selected OPEN as soon as possible. Depending on the circumstances of engine failure attempts may be made to relight the engines as soon as possible or stop them by closing the HP cocks. ▶◀ If an attempt is made to relight, relight the inboard engine first.

(b) If the engines are stopped, or if immediate attempts to relight the engines are unsuccessful, the PFCU's will automatically be transferred to the RAT alternator busbar when the engine-driven alternators come off line. If the two port engines have failed, the No. 1 T/R unit and the No. 2 transformer will automatically be

transferred to the RAT alternator busbar. Switch off the motor-operated loads (e.g. frequency changer, hydraulic pump motors, booster pumps) and, when the POWER FAILURE warning lights illuminate, switch OFF the alternators. If the two starboard engines have failed the output of the starboard LV battery should be checked and the LV busbars paralleled. Switch the frequency changer load transfer switch to the No. 1 position to maintain the Stand-by Horizon supply, then switch OFF No. 2 frequency changer.

(c) If one or both engines are subsequently relit switch ON the appropriate alternators when the outputs are normal. Reload the alternator as required and deparallel the LV busbar. Close the RAT intakes as required. If neither engine is successfully relit, descend and light the AAPP as soon as possible. Connect the AAPP alternator to the busbars as required.

#### 4 Four-engine flame-out

(a) If four engines flame out, the RAT intakes automatically open when the engine speeds fall below 52% RPM. The engine-driven alternators may be kept on line for a limited period by descending at the highest practicable IAS/MN. The RAT intakes should be selected open manually. Carry out the appropriate drills in the check list.

(b) *If alternators come off line*

(i) As the POWER FAILURE warning lights illuminate check that the RAT TURBINE ON LOAD lights illuminate and that the RAT alternator frequency and voltage outputs remain normal. Switch OFF the alternators.

(ii) Check that No. 2 T/R unit, ECM, hydraulic pump motors, frequency changers, NBS, Green Satin, fuel booster pumps, auto-pilot and all other non-essential loads are switched off. Switch the main yaw damper to STANDBY and standby yaw damper ON if required.

(c) *If main engine(s) are relit*

If the main engine(s) are successfully relit, switch ON the alternator(s) when the engine(s) reach flight idling RPM. Check that the RAT TURBINE ON LOAD lights go out. Switch on MV and LV loads as required. Standby yaw damper STANDBY, main yaw damper ON.

(d) *If main engines are not relit*

Whilst attempting to relight the engines, descend as soon as possible to a height at which the AAPP can be started. Start the AAPP and check that its alternator frequency and voltage outputs are normal. Check that the starboard TURBINES ON LOAD light goes out when the AAPP magnetic indicator is horizontal. Parallel the MV synchronising busbars and check that the port TURBINES ON LOAD light goes out. Switch on No. 2 T/R unit, No. 2 hydraulic pump motor and fuel booster pumps as required.

(e) *If main engine(s) relit after AAPP*

When the engine(s) reach flight idling RPM, switch ON the alternator(s) and check voltage and frequency output. Select MV paralleling switch to NORMAL, ►◄ switch on MV and LV loads as required and resynchronise alternators.

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