PART 3

CHAPTER 7—SINGLE-ENGINE FLYING AND RELIGHTING

Contents

General

1. Handling procedures in the event of an engine failure during take-off are described in Chapter 2 of this Part.

Shutting Down an Engine in Flight

2. The engine is only to be shut down in flight on the following occasions:

a. During specific emergency procedures.

b. When required by an air test schedule.

c. When there is an operational necessity to conserve fuel.

3. If the situation permits the pilot to choose which engine to shut down, No 2 engine should be chosen because, if No 1 were shut down and it failed to relight, the emergency undercarriage lowering facility is lost and the brake parachute would be slow to deploy or not stream at all.

4. The **Engine Shut Down drill** is contained in the FRC. If an engine is shut down to comply with an air test schedule or to conserve fuel, the appropriate FUEL COCK switch is to be left ON to provide fuel lubrication for the engine HP fuel pump.

5. If No 2 engine has been shut down, take care to ensure that the No 1 engine remains above 58% RPM.

Single-Engine Flying

6. There are no asymmetric handling problems associated with single-engine flying. However, flight through icing conditions should be avoided owing to the lack of anti-icing protection on the shut-down engine.

7. Correct any fuel asymmetry by using the fuel transfer switch; both DC pumps switches must be on (see Part 4, Chapter 2 for engine/fuel management during low level diversion). When gauged fuel on the side with the shut-down engine falls to 400 lb, thereby uncovering the DC pumps, transfer continues at approximately 33 lb/minute if the windmilling engine is kept above 30% RPM.

Single-Engine Landing and Overshoot

8. Use the normal descent and approach procedures, listed in the FRC, when flying on one engine, but maintain the live engine at fast idle during the descent and increase attitude to 7° nose up for at least 15 seconds half-way down the descent.

9. A single-engine landing presents no difficulty; use the normal approach and landing speeds. On the approach, the live engine RPM settings required are eight to 10% higher than on a 2-engine approach.

10. At normal landing weights an overshoot with undercarriage and flaps down can be achieved in maximum cold power. Details of climb performance on one engine are given in the ODM. Raise the undercarriage when safely climbing away, and the flaps at not less than 190 knots.

Single-Engine Landing at High AUW (F Mk 6)

11. When at or close to the maximum permissible emergency landing weight in the F Mk 6 (40,500 lb), the maximum cold power available on one engine may be insufficient to enable the aircraft to maintain a normal glidepath. Without overwing tanks at weights over 38,000 lb, the VCH is 250 feet and the EOA 150 feet. With overwing tanks fitted at weights over 34,000 lb, the VCH is 700 feet and the EOA 600 feet. Overwing tanks are to be emptied before landing.

12. If an approach at a high AUW cannot be avoided, make a flapless approach at 195 knots with the airbrakes in. When certain of reaching the runway, lower flap and extend the airbrakes with caution to achieve threshold speed.

13. Make the decision to land or overshoot before the flap is lowered and the speed reduced, since the height loss during overshoot from 185 knots at this weight can be as great as 200 feet.

Simulated Single-Engine Flying

14. Single-engine flight may be simulated by throttling back either engine to idle, taking care to maintain at least 58% RPM on the other engine to ensure AC power supplies.

Relighting an Engine in Flight

15. There are two methods of relighting an engine in flight: 'hot' relight and 'cold' relight.

16. The minimum recommended windmilling RPM for relighting an engine is 15%; however, in an emergency, relighting may be attempted at any RPM.

17. *Hot Relight.* If a flame-out occurs, an immediate (hot) relight may be attempted at any height and speed. Leave the throttle at its set position (or, if in reheat, move it into the cold power range) and press the relight button for 2 seconds. A successful relight is indicated by the RPM stabilising and then starting to rise. Ensure that the maximum JPT is not exceeded by throttling back if necessary. If no relight occurs within 20 seconds, set the appropriate throttle at HP COCKS OFF and wait 1½ minutes to drain excess fuel before attempting a cold relight.

18. *Cold Relight*

WARNING: Each time an unsuccessful attempt to relight is made, a quantity of fuel is discharged into the engine and jet pipe. Repeated attempts result in a fire risk, which is greater when relighting No 2 engine. Therefore, only one cold relight is to be attempted unless:

a. *No 1 Engine.* There are overriding flight safety reasons for *not* making a single-engine recovery.

b. *No 2 Engine.* Ejection is the only alternative.

Relighting becomes progressively more certain at lower altitudes. The stated height and speed limits for a cold relight are 0·9M and 40,000 feet. However, if practicable, it is recommended that the relight attempt be made between 250 and 300 knots below 25,000 feet. Set the live engine at less than 96% RPM and try to achieve 15 to 20% RPM on the windmilling engine. Ensure that the ENGINE MASTER and fuel switches are on. When the throttle has been at HP COCKS OFF for at least 1½ minutes, press the appropriate relight button for 2 seconds and immediately set the throttle to IDLING. If a relight is not achieved within 20 seconds, select HP COCK OFF and decide upon subsequent actions in accordance with the above WARNING. It is unlikely that an engine which fails to relight during the first cold relight attempt will achieve a successful relight during a subsequent attempt.

Relighting in Icing Conditions

19. If an engine flames out when flying in icing conditions, a hot relight may be attempted. If this is unsuccessful, descend out of icing conditions, if possible, before attempting a cold relight. However, the cold relight attempt is to be made within three minutes of the flame-out; an attempt after this interval may damage the engine.


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