Part III

Chapter 4—Asymmetric Flying and Flight with PFCU's Failed

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1 Handling in flight

Flight with one engine stopped presents little difficulty and from handling considerations may be indistinguishable from four-engine flying. Any slight rudder loads may be easily trimmed out. With two engines on one side stopped the amount of trim required for normal cruising is small. The loss of one or two engines will have an obvious effect on performance. The closing down or loss of two engines will also cause the associated RAT scoop to extend. The management of the electrical system under such conditions is described at Part I, Chapter 1.

2 Approach and landing

(*a*) The minimum approach speed, with or without drop tanks fitted, is 145 knots. If Blue Steel is fitted the minimum approach speed is 155 knots.

(*b*) As long as the necessary total power can be obtained from the operative engines, the technique for approach and landing using three engines should be as normal. ▶◀

(*c*) When on two engines if the calculated approach speed is *less* than minimum approach speed, the latter should be maintained until the decision height of 350 feet has been reached.

3 Overshooting

(*a*) With one engine stopped, it is possible to climb away with full flap and undercarriage down, airbrakes in, at all weights. The slow and varying acceleration times of the engine may increase the asymmetric effect considerably if the throttles are opened rapidly and, until experience of a particular engine installation is gained, the decision to overshoot should be made early enough for the throttles to be opened slowly.

(*b*) With two engines stopped the aircraft will climb away with take-off flaps and undercarriage down, airbrakes in, at the normal landing weight. Climb straight ahead to a minimum height of 1,000 ft. AGL maintaining at least minimum approach speed. The power required will vary with AUW. If the throttles are moved rapidly to the fully open position the sudden increase of power as the engines accelerate causes a sharp roll and yaw towards the dead

engines. Full rudder and half aileron will be needed to control the aircraft and it is recommended that power is increased initially to 92% RPM and the remaining power fed on more slowly. The overshoot, must be commenced at or above the decision height and the approach speed. (See para. 2).

4 Flight with PFCU's failed

(*a*) *Failure of any one* PFC *sub-unit*

The failure of a PFC sub-unit has a negligible effect upon aircraft handling within the flight limitations stated in Part II.

(*b*) *Failure of a complete elevator* PFCU

The degree of control available following the failure of a complete elevator PFCU is sufficient for all permitted manoeuvres, but landing in this condition requires considerable concentration, as control forces are higher and response is less. The most critical period occurs during the round-out and to ensure that sufficient control is retained to accomplish this manoeuvre, it is recommended that the landing is made using take-off flap only and the threshold speed increased by 20 kts.

(*c*) *Failure of a complete aileron* PFCU

The failure of an aileron PFCU produces considerable disharmony of the controls and results in a much reduced maximum rate of roll. Despite these effects the degree of control remaining is sufficient for all permitted manoeuvres and, in calm weather conditions, a landing may be made using normal technique and threshold speed. The increased control force and reduced aircraft response, however, demand that special care is taken to avoid having to make large rolling corrections at a late stage on the approach. In gusty or cross-wind conditions the threshold speed should be increased by 20 kts.

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