

## PART IV

# EMERGENCIES

### 74. Feathering

- (i) Close the throttle immediately.
- (ii) Push the r.p.m. control lever down through the feathering gate.
- (iii) Press the feathering button long enough to ensure that it stays in by itself, then release it so that it can spring out when feathering is complete. If it does not do so, it must be pulled out.

NOTE.—Pressing the button accelerates the feathering. The propeller will feather slowly at a decreasing rate, and not quite fully, on the control lever alone.

- (iv) Turn off the engine master cock immediately the engine stops.
- (v) Switch OFF the ignition and generator and set the radiator shutter control to CLOSE.
- (vi) If No. 3 engine has been feathered, set the vacuum change-over cock to EMERGENCY.

### 75. Unfeathering

- (i) Switch ON the ignition, set the throttle closed and the r.p.m. control lever just forward of the feathering gate.
- (ii) Switch ON the fuel master cock and then, without delay, if the booster pumps are on, press the feathering push-button, and release it, or pull it out, when the r.p.m. rise to 1,000.
- (iii) Warm up the engine at 0 lb./sq. in. boost and 1,400 r.p.m. until the minimum coolant and oil temperatures are attained. Then set the radiator shutter control to AUTO and open up to the power required.
- (iv) It is advisable not to unfeather at speeds higher than normal cruising in order to avoid the risk of over-speeding.

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- (v) The propeller will not unfeather unless the pushbutton is pressed.

### 76. Starting an engine on the ground after a "practice feathered" landing

After carrying out the normal checks after landing, set the controls of the engine to be started as follows:—

Throttle	... ..	One third open
R.p.m. control lever	... ..	Max. r.p.m. position
Ignition switches	... ..	ON
Engine master cock	... ..	ON
Fuel booster pump	... ..	ON for not more than fifteen seconds, then OFF.

Open up the other engines to 1,500 r.p.m. and switch ON the generators. Start the engine in the normal way, except that no priming should be required. When the engine is running, press the feathering pushbutton until the r.p.m. reach 1,000 and then release it. If the button does not spring out it must be pulled out. After warming up the engine, open to 0 lb./sq. in. and check that the r.p.m. are normal. Check the operation of the constant-speed unit and then switch OFF the generators.

### 77. Engine failure during take-off

- (i) The safety speed is 105 knots. At this speed the aircraft can be climbed away easily.
- (ii) When the propeller of the failed engine is feathered, and the undercarriage raised, speed should be increased to 120 knots, the flaps raised at a safe height and power reduced to the intermediate setting.
- (iii) If No. 3 or No. 4 engine fails, the undercarriage and flaps will take longer than normal to retract.

### 78. Handling on three engines

The aircraft can easily be trimmed to fly straight and level, and normal cruising speeds can be maintained with the engines operating within the weak mixture range.

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### 79. Landing on three engines

With the aircraft trimmed to maintain straight and level flight on three engines, the circuit and approach should be made in the same way and at the same speeds as on four engines. If either No. 3 or No. 4 engine is stopped, the undercarriage and flaps will take longer than normal to lower.

### 80. Going round again on three engines

- (i) The decision to go round again should be made before full flap is lowered. Increase power to +18 lb./sq. in. boost and 2,600 r.p.m. and re-trim. Then in quick succession select undercarriage and flaps up and climb at the normal climbing speed.
- (ii) If in emergency it is necessary to go round again after the flaps have been fully lowered, power may be increased to +18 lb./sq. in. boost provided that the airspeed is not allowed to fall below 105 knots. Power should be increased and the aircraft retrimmed, then the undercarriage selected UP and the flaps set to TAKE-OFF. At 120 knots when climbing away, the flaps should be selected UP and the power reduced to +14 lb./sq. in. boost and 2,600 r.p.m.

### 81. Flying on asymmetric power on two engines

- (i) Below 7,000 feet in low gear the aircraft should maintain height at an airspeed of 130-135 knots at 72,000 lb. at +9 lb./sq. in. boost, 2,400 r.p.m. The aircraft can be trimmed to fly straight and level at this power and speed. The aircraft can be controlled at any speed down to 115 knots, but at low speeds a large force on the aileron controls is necessary in conjunction with the rudders, to keep the aircraft straight and level. No hydraulic power is available when Nos. 3 and 4 engines are stopped.

### (ii) Landing

A circuit in either direction can be made irrespective of which engines have failed. The flaps may be lowered to

TAKE-OFF on the down-wind leg, and the undercarriage should be locked down by the end of the downwind leg. If the two starboard engines are stopped, the undercarriage and flaps must be lowered by means of the compressed air emergency system. A speed of 120 knots should be maintained until the final approach. The r.p.m. should be set at 2,600 on entering the circuit, and the boost adjusted as necessary to maintain height and air-speed. Full flap must not be lowered until it is certain that the airfield is within easy reach. On the final part of the approach, power and speed should be reduced gradually, and the airfield boundary crossed at the normal engine-assisted approach speed.

- (iii) Going round again must not be attempted if the two starboard engines are stopped, as the undercarriage cannot be retracted. If the two starboard engines are running, it is possible to go round again at weights up to 72,000 lb., provided that the speed is not allowed to fall below 115 knots, and full flap has not been lowered. Open up to +18 lb./sq. in. boost and retract the undercarriage and flaps. Reduce power to +14 lb./sq. in. boost and 2,600 r.p.m. and climb at 125 knots until a height of 1,000 feet is reached; then increase speed to 140 knots.

NOTE.—To prevent undue drag from the radiator shutters when flying at high powers on two engines, the shutters on the two live engines should be manually operated to the trail position (in line with the cowlage ahead of the shutter).

#### 82. Flapless landings

When landing with the flaps up, the initial approach should be made at 120 knots, reducing to 115 knots over the airfield boundary. Little power is required and the approach is flat, a small change of attitude only being necessary to carry out the round-out and landing. The aircraft can be brought to rest easily within 2,000 yards.

#### 83. Undercarriage and flaps emergency operations

- (i) A compressed air system is provided for emergency operation of the undercarriage, and for operation of the flaps through the flaps control valve. The system is controlled by two levers (162) and (163) at the bottom of the flight-engineer's main panel on the starboard side. Both levers have safety pins which must be withdrawn before the levers can be operated, and each lever must be held down whilst the relevant service is being used as the levers are spring-loaded to OFF.
- (ii) When the lever (163) for the emergency control of the undercarriage is operated the main wheel units are lowered irrespective of the position of the normal hydraulic control buttons, nevertheless the DOWN buttons should be pressed to prevent any loss of air pressure which may cause the undercarriage locks to be released and the undercarriage to collapse. It is not possible to retract the main wheels again once the emergency system has been used.
- (iii) Emergency operation of the flaps is possible by two methods:—
- (a) In the event of electrical failure only, two push-buttons give mechanical operation of the valves. The buttons are reached through a hole in the front of the starboard end of the flap operating rod and jack cover, on the fuselage floor below the mid-upper turret; an instruction plate is fixed to the cover and labelled TOP-FLAPS DOWN, BOTTOM-FLAPS UP. The buttons are spring-loaded to "off" and therefore the selected one must be kept depressed until the desired operation of the flaps is complete. When the flaps are raised by this method, they come

up much quicker than when the normal method is used.

- (b) In the event of either electric or hydraulic failure, the flaps may be lowered (and raised, if Mod. 98 has been incorporated) by means of the compressed air system. The normal flaps control lever must be set to DOWN before operating the emergency lever (162) which is then held down until the desired flap position has been obtained. Aircraft not incorporating Mod. 98 have a label on the pilot's panel which reads **FLAPS UP MUST NOT BE SELECTED WHEN EMERGENCY AIR HAS BEEN USED.**

#### 84. Bomb door emergency operation

A separate compressed air system is fitted for emergency opening and closing of the bomb doors and is controlled by two levers at the bottom of the flight engineer's main panel on the port side. The left-hand lever (168) is labelled OPEN and the right-hand one (167) CLOSED and a slide pin with a lug forms a manually-operated catch which holds the two levers OFF. Movement of the catch to one side frees the lever on the other side only, thus preventing the inadvertent operation of both levers simultaneously. The appropriate lever must be held down until the bomb doors are fully opened or closed as required. A check may be made through the inspection door in the forward bomb compartment bulkhead.

#### 85. Bomb, photoflash and flare jettisoning

The complete bomb load may be jettisoned (after the bomb doors have been opened) by means of the pull handle on the right of the pilots' panel but for this to be effective the bomb release change-over switch must be set to the AIR BOMBER position. Above this handle are pushbuttons for jettisoning the photoflashes and flares carried in the bomb bay.

#### 86. Auxiliary tank jettisoning

The auxiliary fuel tank (if fitted) may be jettisoned by operation of the bomb jettison handle.

#### 87. Engine fire-extinguishers

Each engine is provided with a fire-extinguisher system, and warning lights are mounted on the respective feathering pushbuttons; if a fire warning light comes on, pressing the feathering button also operates the fire-extinguisher system. The pilot should, however, press the appropriate one of the four pushbuttons (36) on the pilots' panel as well, when the propeller has stopped turning. If the warning light is not on, pressing the feathering pushbutton will not operate the extinguisher. The fire-extinguishers are also operated automatically by a crash switch in the nose of the aircraft.

#### 88. Fuel tanks and water/methanol tanks fire-extinguisher system

Twelve fire-extinguishers for the fuel tanks in the main planes and two for the water/methanol tanks in the outboard engine nacelles are automatically operated in the event of fire. If the automatic system fails to function the extinguishers can be electrically operated from two pushbuttons (37) on the pilots' panel, the left-hand button for the port tanks, and the right-hand button for the starboard tanks. The system is also operated by the crash switch in the nose of the aircraft.

#### 89. Crew warning horns

A pushbutton (55) on the pilots' panel operates a horn on the front spar bulkhead and another on the bulkhead between the mid-upper turret and the main entrance door.

#### 90. Emergency equipment

Stowage for an axe, fire-extinguisher and asbestos gloves is provided in a detachable panel in the main door. This panel is accessible from both inside and outside the aircraft. A second axe is stowed on the starboard side of the fuselage opposite the navigator's station. Hand fire-extinguishers and portable oxygen bottles are stowed near each crew station. Two first-aid kits are provided, one on the port side of the rear fuselage and the other on the starboard side of the navigator's station.

#### 91. Parachute exits

The parachute exit in the nose of the aircraft is the most suitable and should be used by as many members of the

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crew as possible. The main entrance door in the starboard side of the fuselage should be used by the remainder of the crew and it can be jettisoned inwards by pulling the yellow and black striped handle at the forward edge.

### 92. Escape hatches

There are five escape hatches, two in the canopy above the pilots' position; one in each side of the fuselage between the spars, one in the roof just forward of the entrance door and one in the floor of the nose. Each hatch is released by operating a turn handle situated near the hatch; before the handle can be operated an adjacent pushbutton must be pressed in.

### 93. Crash stations

Four members of the crew—both pilots, the wireless operator and the radar operator—remain in their seats; the navigator seated just forward of the front spar turns in his seat so that his back is against the spar and the other members of the crew take up the following stations:—

One on the step below the astrodome;

Two sitting on the floor with their backs to the step behind the front spar;

Two sitting on the floor with their backs to the forward face of the rear spar.

All stations have a Z-type harness and all the stations except the last have crash handles provided to allow the occupant to cradle his head on his arm. The step below the astrodome should be dropped to its lowest position before being used. This is done by releasing the spring-loaded locking pins at each side of the step.

### 94. Dinghies

- (i) Two type J dinghies are stowed, one in the centre-section trailing edge of each wing and a manual release cord runs from each dinghy stowage compartment to two pull-off positions one on the starboard wall near the mid-upper turret and the other further aft at the "look out" station. When a cord is pulled the corresponding dinghy is released and inflated. A hand lever is provided to enable

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the dinghy release mechanism to be operated from outside the aircraft. When this lever is used the cord to the inflation bottle must also be pulled.

- (ii) Twelve stowages are provided for K type single seat dinghies.

### 95. Ditching

(To be issued later by amendment.)

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