PART IV
EMERGENCY HANDLING

66. Engine failure and relighting in flight

(i) *Mechanical*

If the engine fails due to obvious mechanical causes, immediately turn off the L.P. and H.P. cocks, switch off the booster pump and all non-essential electrical services.

(ii) *Flame-out*

(a) Close the H.P. cock immediately.

(b) Wait if possible for one minute, to allow excess fuel to drain from the tail pipe before proceeding with the drill.

(c) Relighting may be accomplished at altitudes up to 40,000 ft., but is more certain at 30,000 ft. and below.

(d) Set the throttle closed. ~~If difficulty is experienced in relighting, the throttle may be moved to the one-quarter open position.~~ A.L.1

(e) Maintain forward speed between 180 and 250 knots.

(f) Press the relight button on the H.P. cock while proceeding as in (g) below.

(g) Return the H.P. cock to the fully open position keeping the relight button pressed for 20-25 seconds.

~~IMPORTANT.—If a normal light up does not occur within 5-6 seconds of opening the H.P. cock, *close the throttle*, if it is open, to encourage flame propagation, and to avoid flooding of unlit cans with subsequent fire risk.~~ A.L.1

(h) If the engine has not relit within 20-25 seconds of having opened the H.P. cock, close the cock again and wait about one minute before repeating the cycle of operations.

NOTE.—If practicable, all electrical services, except those which are immediately essential, should be switched off in order to obtain the maximum output from the batteries. Do not switch off the booster-pump.

67. Action in the event of engine fire

(i) Should the fire warning light(s) come on, close the throttle immediately. If the light goes out within 5 seconds of closing the throttle, a fractured air casing, as distinct from fire, is indicated. It is safe to use the engine in this condition but a landing should be made as soon as practicable. Reduced power should be used but, unless the power required is small, the light(s) will probably come on again. It is advisable, therefore, to throttle back every 5 minutes, to check that the light goes out and so ensure that a fire has not started.

(ii) If the light does not go out after closing the throttle, proceed as follows:—

(a) Close the L.P. and H.P. cocks.

(b) Switch off the booster-pump.

(c) Reduce the airspeed as far as practicable and turn OFF the cockpit pressure before operating the extinguisher. If the fire is extinguished, the warning light should go out.

(d) Any attempt to relight the engine may result in a further outbreak of fire, which will be uncontrollable, since the extinguisher cannot be used again.

WARNING.—Fire in the engine bay may render the flying controls and pressure instruments useless, necessitating abandoning the aircraft immediately.

PART IV—EMERGENCY HANDLING

68. Flying in manual control

NOTE.—1. Intentional manual reversion must be carried out at speeds below 0.82M.

2. If automatic reversion occurs above 0.82M aileron buffet will be encountered, the severity of which will depend on the amount of G being applied. Use of the trim switch should be avoided as response above 0.82M is slow and when it does take effect with decrease in speed the amount of trim may be in excess of that required for the lower speed, causing the aircraft to roll rapidly.

3. Although flying in manual control presents no difficulties, it must be remembered that it is a "get you home" device and its use must not be abused.

(i) If hydraulic pressure fails, the aileron control will revert to manual automatically. For practice purposes, manual control can be selected by means of the selector valve on the floor by the right of the pilot's seat. It must be pushed down and turned clockwise to lock in the MANUAL position.

(ii) When manual reversion takes place a slight longitudinal trim change occurs caused by the ailerons upfloating.

(iii) The aileron forces in manual are very heavy, requiring at times both hands on the control column to bank the aircraft. There will be slight backlash at the control column due to dead travel of the servodyne selector valve.

(iv) The aircraft can be trimmed by the trimmer (4). Care should be taken in its use, as the tab actuator speed is high and overcorrection may result, particularly at high I.A.S. At high Mach numbers the tab effectiveness is decreased (see NOTE 2). The use of the trimmer for manœuvring the aircraft is not recommended, as it will be found that its action is so much in advance of aircraft response that it is impossible to check the aircraft laterally when required. In case of malfunctioning of the trim tab actuator, it can be switched off by means of the cut-out switch. In the event of a tab runaway to full travel, it is unlikely that the aircraft could be held laterally level at speeds in excess of 250 knots.

(v) Landing in manual control is straightforward but because of the considerable force required and the slow response of the ailerons a slightly larger circuit will have to be made.

69. Hydraulic pump failure

(i) If the hydraulic pump fails, pressure is available in three accumulators for emergency use.

(h) If the engine has not relit within 20-25 seconds of having opened the H.P. cock, close the cock again and wait about one minute before repeating the cycle of operations.

NOTE.—If practicable, all electrical services, except those which are immediately essential, should be switched off in order to obtain the maximum output from the batteries. Do not switch off the booster-pump.

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3. Although flying in manual control presents no difficulties, it must be remembered that it is a "get you home" device and its use must not be abused.

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(v) Landing in manual control is straightforward but because of the considerable force required and the slow response of the ailerons a slightly larger circuit will have to be made.

69. Hydraulic pump failure

(i) If the hydraulic pump fails, pressure is available in three accumulators for emergency use.

Open the hood in the normal way, taking care to keep the hand unclenched to avoid snatch of the wrist when the hood suddenly lifts.

NOTE.—Attempts to jettison manually, by first opening the hood in the normal way and then pulling the ring handle, must never be made.

73. Generator failure

If one generator fails, the output of the other, even at flight idling r.p.m., will be sufficient to keep the battery charged, using the normal services including Gee.

74. Loss of cabin pressure

In the event of cabin pressurization failure occuring at heights above 42,000 ft. the following emergency drill should be used:—

Warn crew and order "Emergency oxygen" (on regulator).

Descend to below 42,000 ft. and then turn off emergency oxygen.

Check that 100% is selected.

The aircraft should not be flown between 40 and 42,000 ft. for longer than 15 minutes and between 38 and 40,000 ft. for longer than 30 minutes.

75. Landing with one full tip tank

Landing with a full tip tank on one side and an empty one on the other presents no difficulty. The runway threshold speed should be increased by 5 knots above the normal.

76. Drop tank jettisoning

(i) *Wing tip tanks*

The tanks can safely be jettisoned in straight and level flight at any speed in the following range:—

Tanks full ...	...	...	130 to 260 knots
Tanks empty	...	...	180 to 260 knots

The electrically-operated jettison switch is on the port shelf behind the throttle box. If it fails to operate, the mechanical jettison lever on the port side behind the shelf should be used.

(ii) *Pylon drop tanks*

To be issued later.

77. Forced landing

(i) In all cases of engine failure, and when a relight is not possible, the following immediate actions should be carried out:—

L.P. and H.P. cocks	Off
Booster pump	Off
All non-essential electrics	Off
Glide at 165 knots	

(ii) Even if the engine is windmilling it is unlikely that sufficient hydraulic pressure will be generated to keep the accumulators charged and the ailerons in power, so the following procedure is recommended:—

(a) Select manual control. (See para. 68.)

(b) If circumstances permit, jettison the wing-tip tanks.

(c) Jettison the hood.

(d) When manoeuvring to land, maintain 140 knots until the selected area is within reach.

(e) Lower the flaps aiming to cross the threshold of the landing area at 120 knots.

NOTE.—Do not use the airbrakes (see para. 69 (ii) (a).)

78. Flapless landing

The turn onto the final approach should be done at 145 knots. A long, flat approach requiring little power should be made and the runway threshold crossed at 130

knots. This speed can be reduced to 125 knots if the weather conditions are calm.

79. **Ditching**

(i) It is believed that the ditching qualities of this aircraft are poor.

(ii) If ditching is inevitable:—

(a) Jettison the hood.

(b) Jettison all drop tanks.

(c) Lower the flaps 30°. If power is available it should be used to make the touchdown speed as low as possible.

(d) When contact with the water is made, the tail booms will probably break off, the aircraft may bounce and then bury its nose.

NOTE.—If the water is calm there may be a greater chance of a successful ditching if the flaps are only lowered 10° and the approach is made at normal landing speed, aiming to prevent the booms touching the water first.

80. **Abandoning**

Speed should be reduced if possible, and the aircraft inverted after trimming nose-heavy, to enable the crew to fall out.