Part V

Chapter 3—Abandoning and Emergency Landing Procedures

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1 Abandoning the aircraft

(*a*) *Preparatory actions*

(i) Whenever possible, altitude should be reduced to below 40,000 ft. Before abandoning aircraft, speed should be reduced as much as possible (at least below 250 knots, the recommended speed is approximately 200 knots) and the aircraft should be as clean as conditions permit. Bomb-doors should be closed and main flaps and undercarriage raised, although trials show that dummies pass well inboard, of the main undercarriage in straight and level flight.

(ii) The manual override must not be used above 20,000 feet. However, it must be used below 1,000 feet (below 250 knots) although this does not preclude the use of the static line.

(*b*) *Abandoning drill*

(i) Warn crew, reduce speed if appropriate.

(ii) Select oxygen mask toggles down.

(iii) Transmit distress calls. Clamp key and set IFF to EMERGENCY.

(iv) Navigator at prone position returns to his seat. Other crew members assist in putting on his parachute.

(v) "Clean" aircraft—close bomb-doors, retract flaps, undercarriage and airbrakes if possible. Co-pilot selects NO PRESSURE.

(vi) Check personal safety equipment. Parachutes on, dinghy attached, protective helmets on. Rear crew seat harness release.

(vii) Operate ABANDON AIRCRAFT switch and order "*Jump, Jump*". Cabin depressurisation should take about 6 seconds after operating abandon aircraft switch. (Post-Mod. 3817 when the cabin differential pressure gauge indicates $1\frac{1}{2}$ PSI).

(viii) Nav. Plotter opens the door not less than seven seconds after illumination of ABANDON AIRCRAFT light if cabin has been pressurised.

(ix) Rear crew members should abandon aircraft in the following order:

Navigator Plotter (centre crew member)
Sixth seat member
AEO (port crew member)
Navigator Radar (starboard crew member)

On leaving their seats, each rear crew member should disconnect his main oxygen supply and operate his emergency oxygen supply.

(x) In turn, leave seat and on reaching the door, connect to static line, if above 1000 ft.

(It is essential that the line be passed over the shoulder and not under the left arm after it has been attached to the snap hook). Sit on the top step, right foot braced against the front of the step, and left foot braced against the centre step. The body should be hunched up as much as possible, head tucked in and hands grasping the trouser legs below the knees, in order to ensure a clean exit. The exit is made by rolling forward in a "balled up" position, assisting the roll forward by a push from the right foot. The compact position should be held as tightly as possible on meeting the airstream. Static lines should be pulled in by each following man if time permits.

(xi) Last crew member taps 2nd pilot before leaving aircraft.

(xii) 2nd pilot operates control snatch unit* and ejects.

(xiii) 1st pilot operates control snatch unit* and ejects.

* Unless Mod. 2789 is embodied

(*c*) *Swivel seats*

WARNING: Post-Mod. 3886 the sixth crew member must ensure that before leaving his seat his oxygen hose and static line are routed between the back of his legs and his seat.

(i) When swivel seats are fitted (Mod. 3295), the assister cushion should be operated to assist the crew member to his feet, after swivelling the seat.

(ii) When using the Mk. 40 parachute, the static line should be connected to the swivelling lever handle before abandoning the aircraft if time permits.

(iii) Post-Mod. 3955 (aircraft oxygen hose assembly) a Mk. 46 parachute is used. The static line is connected at all times when the parachute is worn and operates the crew gone light in front of the 1st Pilot. Thus there is no requirement for the last crew member to tap the co-pilot before leaving the aircraft."

(*d*) *Abandoning aircraft at low altitude*

NOTE: Whenever possible speed should be converted to height.

Should it be necessary to abandon the aircraft at low altitude (below 1,000 feet and 250 knots) reduction of the time interval between the moment at which the order is given to abandon the aircraft and the moment at which the parachute is deployed can be of overriding importance, and the following points should be borne in mind.

(i) Whilst it is highly desirable to connect a static line, time should not be wasted if this proves troublesome.

(ii) The static line arms the parachute barostat, which then withdraws the pack pins after a delay of 2 seconds. Therefore, irrespective of whether the static line is connected or not, the manual override should always be pulled as soon as possible after abandoning the aircraft below 1,000 ft.

2 Landing with the hydraulic system in the emergency condition

If an EMERGENCY HYDRAULIC SELECTOR warning light has illuminated it must be anticipated that, during the landing run, wheelbrake pressure will be limited to accumulator pressure and nosewheel steering will not be available. The use of flaps will be available but airbrakes will not be available. A normal approach and landing should be made at the correct speeds. In normal wind conditions the brake-parachute should be streamed, but if cross-wind conditions exist, consideration must be given to the lack of directional control aids which exist. It is suggested that the parachute should be streamed to gain the initial deceleration, but jettisoned before excessive brake pressure is required to maintain directional control. Sufficient brake pressure should be available for a normal full-stop landing. Apply the brakes steadily and continuously, increasing pressure as the speed reduces, but avoiding excessive pressure which may cause the maxaret units to operate and cause intermittent brake application. When the brake pressure gauge readings fall to 2,000 PSI, further brake application will cause the readings to fall to zero. When the aircraft is stopped make no attempt to taxy further but close down the engines and have the aircraft towed away.

3 Undercarriage malfunction drills (hydraulic system normal)

(*a*) *Up selection, 3 green lights remain on*

(i) Check undercarriage control and pressure head control fuses (change each one once only).

(ii) If no effect, select undercarriage DOWN and leave down.

(iii) Modify sortie.

(*b*) *Undercarriage not fully retracted*

(i) Check control fuse.

(ii) If no effect select NORMAL DOWN leave down and modify sortie (if necessary replace control fuse again).

(iii) If control fuse is serviceable suspect protection unit operation.

(iv) Inform ATC and request a visual check.

(v) See para. (*d*)(v).

(*c*) *Down selection—Failure to lower—No travel lights*

(i) Check undercarriage indicator and day/night screen.

(ii) If hydraulic system normal switch both pumps to AUTO.

(iii) AEO reports on pump ammeters:

1 No load indication—check undercarriage control fuse
2 Normal load indication—check the indicator fuse

(iv) If no effect select EMERGENCY DOWN, when 3 greens select NORMAL DOWN (see para. (*d*)(vii)).

(*d*) *Failure to lower fully, any combination of lights*

(i) Check undercarriage indicator changeover.

(ii) If hydraulic system normal, select both pumps AUTO.

(iii) Inform ATC and request a visual check.

(iv) Allow as much time as possible to overcome the effect of cold soak in micro switches.

(v) Depending on fuel state, orbit, or divert as necessary.

(vi) Reduce to landing weight—select EMERGENCY DOWN, if 3 greens available—select NORMAL DOWN.

(vii) If unsuccessful:

1 Check undercarriage emergency control fuse.
2 Check main selector changeover relay fuse.
3 Check fuses to main emergency selector.

(viii) Operate nitrogen lowering system (post-Mod. 3079).

(ix) In instances of 2 green lights and 1 red, but undercarriage leg appearing down on visual check, consideration should be given to a light roller landing at *approach* speed with a view to making the micro switch for the third green. In all cases this action must be preceded by operating the emergency hydraulic and nitrogen lowering systems.

(x) If three greens are not obtained, a landing should be made using a foam strip whenever possible.

(xi) *Do not attempt to taxy.*

4 Landing with one main leg retracted

Should it become necessary to land with one main undercarriage unit not locked down the following drill is recommended:

(*a*) Reduce weight as much as is practicable.

(*b*) Render ejection seats safe.

(*c*) Disconnect parachutes, dinghies, leg-restraining straps and emergency oxygen tubes.

(*d*) Operate the pressurisation dump valve, jettison the pilots' canopies and open the entrance door.

(*e*) Ensure that the crew are strapped in, with their seats at the crash position.

(*f*) Land using normal landing flap, with sufficient speed to ensure a touchdown at 125 knots.

(*g*) Lower the nosewheel and simultaneously apply aileron to hold the wings level.

(*h*) As speed falls to 110 knots, lower the wing-tip gently on to the ground, and simultaneously apply rudder and wheelbrakes to hold the aircraft straight.

(*j*) Stream the braking parachute as soon as the wing-tip touches the ground. Continue to apply aileron to reduce the ground reaction at the wing-tip and so delay the start of the ground loop.

NOTE 1: Aileron effectiveness will be lost at approximately 105 knots. To reduce the possibility of major damage to the wing it is important that the wing-tip is lowered to the ground at a controlled rate whilst aileron control is still available.

NOTE 2: A ground loop imposes a heavy strain upon the undercarriage, and should be delayed until speed is as low as possible. A foam strip laid along the side of the runway where the wing-tip is expected to strike will reduce friction and enable the aircraft to be held straight, down to a lower speed.

5 Crash landing

The following drill is recommended if a crash landing becomes necessary:

(*a*) Reduce weight as much as is practicable.

(*b*) Jettison bombs at captain's discretion. Ensure bomb-doors are closed.

(*c*) At 10,000 feet have the nav.plotter place the safety pins in the ejection gun sears on the pilots' seats.

(*d*) Between 5,000 and 2,000 ft. when committed to a landing disconnect parachutes, dinghies, leg-restraining straps and emergency oxygen tubes.

(*e*) If, in the opinion of the captain, there will be a danger of the navigators and AEO being trapped in the aircraft after landing, they should be ordered to abandon the aircraft.

(*f*) Have the pressurisation dump valve operated and, below 5,000 ft., the entrance door opened.

(*g*) Make a normal approach with the undercarriage up or down as required. The advantages of reducing impact load with the undercarriage down, however, should be carefully considered.

(*h*) Ensure that the crew are strapped in and that their seats are at the crash position.

(*j*) At 500 ft. jettison the pilots' hatches and close the HP cocks just before touchdown.

(*k*) After touchdown the crew should escape through the nearest exit.

6 Ditching

Model tests indicate that the ditching characteristics should be satisfactory there being no tendency to dive under the surface provided the vertical rate of descent is low at the moment of ditching.

The following drill is recommended:

(*a*) Warn the crew. Crew acknowledges.

(*b*) Jettison bombs. Ensure bomb-doors are closed.

(*c*) At 10,000 ft. or below, depressurise and have the nav./plotter place the safety pins in the ejection gun sears on the pilots' seats.

(*d*) Between 10,000 ft. and 5,000 ft., when committed, disconnect parachutes, dinghies, leg-restraining straps and emergency oxygen tubes.

(*e*) Ensure that the crew are strapped in and that their seats are at the crash position.

(*f*) At 500 ft. jettison the co-pilot's hatch. Lower flap as required.

(*g*) During the final stages of the approach, the airspeed should be the minimum consistent with satisfactory control. The round out should be made as accurately as possible to obtain the minimum rate of descent at touchdown. The touchdown should be made parallel to the swell. If the swell is not steep and the wind across it is above 25 knots, it may be preferable to land into wind.

(*h*) At the touchdown, if the bomb-doors hold and the procedure in (*g*) is carried out correctly, the ditching should be gentle. If the impact is severe enough to collapse the bomb-doors, the deceleration will be increased but the ditching will still be satisfactory.

(*j*) Just before touchdown, close the HP cocks. After touchdown, jettison the 1st pilot's hatch. A rear crew member should operate the dinghy release handle and the crew leave the aircraft through the pilots' escape hatches carrying personal dinghies.