SECTION 3.1

EMERGENCY PROCEDURES

1 INTRODUCTION

The procedures outlined in this section deal with the common types of emergencies ; however, the actions taken in each actual emergency must relate to the complete situation.
Throughout this section, "Land immediately","Land as soon as possible" and "Land as soon as practicable" are used to reflect the degree of urgency and are to be interpreted as follows :
- Land (or ditch) immediately
- Land as soon as possible : land at the nearest site at which a safe landing can be made
- Land as soon as practicable : extended flight is not recommended. The landing site and duration of the flight are at the discretion of the pilot.

2 AUTOROTATION LANDING

2.1 Autorotation Landing Procedure following Engine Failure

- Set low collective pitch.
- Monitor and control rotor r.p.m.
- Establish approximately 65 knots (120 km/hr) airspeed.
- Move the fuel flow control to the shutdown position.
- According to the cause of loss of the engine:
  .Re-light the engine (see paragraph 3.2 of this Section).
  .Otherwise : close the fuel shut-off valve
  switch off : the booster pump
  generator
  alternator (if installed)
  electrical power master "ALL-OFF" switch
  (if smell of burning).
  .Maneuver to head the helicopter into the wind in final approach.
  .At a height of approximately 65 ft (20 m) above the ground, flare to a nose-up attitude.
- At height 20-25 ft (6-8 m) and at constant attitude, gradually apply collective pitch to reduce the sink-rate.
- Resume level attitude before touch-down, and cancel any side-slip tendency.
- Gently reduce collective pitch after touch-down.

NOTE : IT IS POSSIBLE THAT THE TAIL SKID MAY TOUCH THE GROUND FIRST.

2.2 Landing after Engine Failure in Hover I.G.E.

- Do not reduce collective pitch.
- Control yaw.
- Cushion touch-down by increasing collective pitch.
- Reduce collective pitch as soon as the aircraft is on the ground.

2.3 Landing after Engine Failure in Hover O.G.E.

- Reduce collective pitch.
- Apply forward cyclic pitch to gain air speed according to available height.
- Terminate in accordance with paragraph 2.1 procedure.

2.4 Autorotation Landing Training Procedure

- Reduce collective pitch to establish autorotation configuration.
- Monitor and control rotor r.p.m.
- During final approach, shut down the engine, or reduce power, maintaining the Ng above 67 %.
- After touch-down, still at low collective pitch, apply the normal starting procedure.

3 ENGINE FAILURE

3.1 Flame-out in Flight

The symptoms of an engine failure are as follows :

. Jerk in the yaw axis (only in high-power flight).
. Drop in rotor speed (aural warning sounds below 360 rpm).
. Torque at zero.
. Ng falling off to zero :
. Generator warning light illuminates.
. Engine oil pressure drop warning light illuminates.
In the event of an engine failure in flight, carry out autorotation transition procedure (see paragraph 2).

3.2 Relighting the Engine in Flight

The normal relighting ceiling is 13000 feet, but, relighting may be attempted throughout the altitude envelope.

Proceed as outlined below :

- Booster pumps - on
- Generator - on
- Wait until Ng falls below 30 % then carry out normal starting procedure.

In order to avoid any jerk on re-synchronization, accelerate the engine progressively, when free turbine speed approaches rotor speed.

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2.4 AUTOROTATIONAL LANDING TRAINING PROCEDURE

For the helicopters subjected to the restrictions specified in paragraph A of Airworthiness Directive No. 90-105B (and further revisions), or in AEROPASTIALE Service Telex No. 0125B (and further revisions), the autorotational landing training procedure is as follows :

- Reduce collective pitch to establish autorotational configuration.
- Monitor and control rotor r.p.m. then, without delay,
- shut down the engine (fuel flow lever in the "shut-down" gate).
- After landing, with the collective lever in low position, wait until the engine stops.
- Apply the rotor brake.
- After rotor stopping, apply the normal starting procedure.

4 GOVERNOR FAILURE

4.1 Large Drop in Fuel Flow Rate

Same symptoms as for complete engine failure but after a few seconds, Ng stabilizes at a low r.p.m. value (less than 70 %).

. Establish autorotation I.A.S. 65 kt (120 km/hr), then advance the fuel flow control into the emergency sector. Ng and t4 should rise.
. Control engine speed to 70 % Ng.
. If necessary, increase collective pitch to bring rotor speed to 350r.p.m.
. Increase fuel flow until rotor speed is approximately 380 r.p.m.
. Trim collective pitch and fuel flow control to hold level flight at this rotor speed.

4.2 Exessive Fuel Flow Rate

Ng, t4, NR and torque increase

. Do not reduce collective pitch.
. Reduce fuel flow until rotor speed corresponds to a position of the indicator pointer in the center of the green area.
. Continue flight with the governor out of action. Any reduction of collective pitch will cause an increase in rotor speed which must be counteracted by adjusting the fuel flow control position.

In both cases mentioned above, the landing approach should be made along a low gradient path, at 65 knots (120 km/hr) I.A.S., holding the rotor speed at the upper limit of the green area (394 r.p.m.) using the fuel flow control. In final approach, reduce forward speed without touching the fuel flow control. The rotor speed will drop when the collective pitch is increased on touchdown. After touchdown, reduce the fuel flow control setting before decreasing the collective pitch.

4.3 Surging

Surging is evidenced by hunting of the r.p.m., torque and t4 indications and jerks in the yaw axis.

. Change the collective pitch setting.
If surging persists while fuel pressure and engine oil pressure are correct, reduce fuel flow slightly to leave the governed range.
If surging still persists, land as soon as possible and shut down the engine if there is a tendency to divergence (see paragraph 2.1).

5 ENGINE FIRE

5.1 Fire during Engine Start

- Close the fuel shut-off cock and apply the rotor brake if necessary.
- Switch off the booster pumps.
- Crank the engine for 10 seconds then switch off the battery.
- Use the nearby extinguishers to fight the fire.

5.2 Fire in Flight ("FIRE" light on)

- Enter autorotation (see paragraph 2.1).
- Close the fuel shut-off cock to shut down the engine.
- Switch off the booster pumps, generator and alternator (if installed).
- Switch off the electrical master "ALL OFF" switch if there is a smell of burning.

6 SMOKE IN THE CABIN

6.1 If Source of Smoke is identified

- Shut off the corresponding system.
- If necessary, use the fire extinguisher*.
- Air the cabin by opening :
  . The front ventilator
  . The ventilation ports
  . The bad weather windows.

6.2 If source of Smoke is not identified

- Shut off the heating * demisting system.
  If the smoke does not clear :
  - Switch off the electrical master switch ("ALL OFF").
  - When the smell of smoke has cleared, set all switches to "OFF", including the generator and alternator (if installed), close the cabin ventilators.
  - Reset the "ALL OFF" electrical master switch to normal position.
  - Switch on the generator, check voltage and current.
  - If everything is normal, switch on the circuits one by one until the malfunction is identified.

NOTE : If the electrical power supply system is faulty, carry out the appropriate procedure, as detailed in Section 3.3.

7 TAIL ROTOR FAILURE

7.1 Tail Rotor Drive Failure

Loss of the tail rotor in power-on flight results in a yaw movement to the left ; the extent of such rotation will depend on the power and speed configuration at the time the failure occurs.

7.1.1 Failure of the Tail Rotor in Hover or at Low Speed

- I.G.E. : bring the aircraft to the ground by reducing collective pitch before the yaw rate is too high.
- O.G.E. : reduce collective pitch moderately, to reduce yaw torque, and simultaneously start to pick up speed.

* If installed

7.1.2 Failure in Forward Flight

- In forward flight reduce the power as much as possible and maintain forward speed (weathercock effect), select a suitable landing area for a steep approach at a power enabling a reasonably coordinated flight.
- On final approach, shut down the engine and make an autorotative landing at the lowest possible speed.

7.2 Tail Rotor Control Failure

- Set I.A.S. 70 knots (130 km/hr), in level flight.
- Press the hyd. accumulator test push-button (this cuts off hydraulic power to the yaw servocontrol and depressurizes the load-compensating servo accumulator). After 5 seconds, reset the test button to the normal position.

- Make a shallow approach to a clear landing area with a slight side slip to the left. Perform a run-on landing ; the side slip will be reduced progressively as power is applied.

SECTION 3.2

SYSTEM FAILURES

1 FUEL SYSTEM FAILURES

1.1 No fuel pressure

Failure is confirmed by illumination of the FUEL P. warning light. See Sections 3.3 and 2.2.

If failure is not confirmed, the faulty item is the fuel pressure gauge. Flight may be continued.

1.2 Low fuel pressure

Failure is confirmed by illumination of the F.FILT. warning light. See Sections 3.3 and 2.2.

If failure is not confirmed, the faulty item is the fuel pressure gauge. Flight may be continued.

2 ENGINE SYSTEM FAILURES

2.1 Low Engine Oil pressure "Gauge pointer in red arc for Ng above 85 %"

- Test Warning-Caution-Advisory Panel and check ENG. P. light illuminates.

  . Light does not illuminate when tested :

  If torquemeter reading is much too low, shut down engine and make an autorotation landing.

  If torquemeter reading is correct, land as soon as possible.

  . Light illuminates when tested :

  If torquemeter reading is much too low, land as soon as possible.

  If torquemeter reading is correct, land as soon as practicable. Monitor ENG. P. light.

2.2 Engine Oil Temperature higher than Maximum specified

2.2.1 At Low Speed or in Hover

. Land if possible.
- Stop the engine.
- Check that the cooler fan operates.

. If landing impossible :.
- Increase speed and reduce power
- Fly at approximately 80 knots (148 km/hr)
  The temperature should fall rapidly.
  If this result is not obtained, land as soon as possible.

2.2.2 In Cruising Flight

Reduce power ; then proceed as prescribed above.

3 Ng DIFF., TORQUE, t4 & NR INDICATOR FAILURES

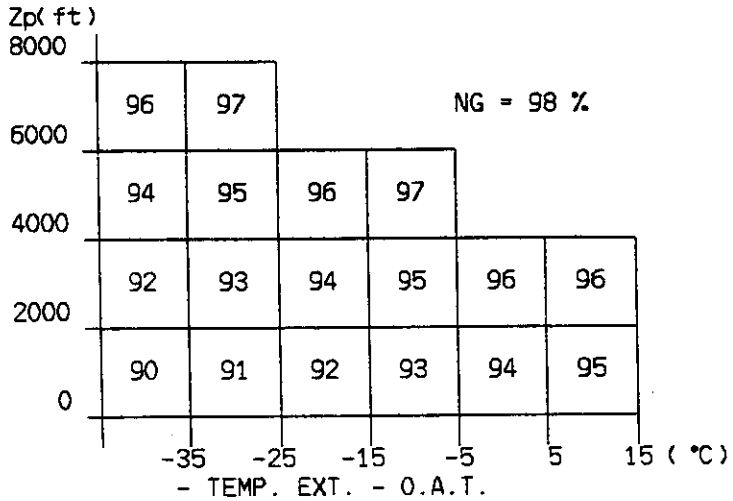
3.1 Ng difference Indicator Failure

In the event of an indicator failure, do not exceed the maximum authorized torque value, and keep the t4 temperature below the following limits :

O.A.T.	t4 limit
Below 15 °C Above 15 °C	730 °C 750 °C

3.2 Torquemeter Failure

In the event of a torquemeter failure, do not allow the engine speed to rise above following Ng limits :



3.3 t4 Indicator Failure

- Comply with the Ng limitations (refer to "LIMITATIONS" section).
- Do not attempt to start the engine.

3.4 Abnormal NR/Nf Readings

3.4.1 NR/Nf readings below green arc

- Nf and NR values agree
  . Excessive power demand : reduce collective pitch.
  Indicator reading should rise to governed value.
  . Governor failure (refer to Section 3.1 paragraph 4).

3.4.2 Different NR/Nf readings

- NR reading exceeds Nf
  . NR reading is incorrect, except in autorotation (near zero torque).
- Nf reading exceeds NR
  . On the ground during the starting sequence : reduce the engine fuel flow control setting to check for possible freewheel slippage.
  . In flight : NR reading is probably incorrect (refer to § 3.5).

3.5 Rotor RPM Indicator Failure

In the event of complete loss of NR indication :
- Maintain engine torque above 10 % : NR reading is then given by the Nf pointer.
- Land as soon as possible.

3.6 Free Turbine RPM Indicator Failure

Check that NR reading remains within governed range when collective pitch is slowly modified with engine torque above 0 %.
Continue flight.

4 HYDRAULIC SYSTEM FAILURES

4.1 Yaw Servo-control Slide-valve Seizure

- In hover : If no movement about the yaw axis, land normally ; if rotation about the yaw axis, cut off hydraulic pressure by actuating the switch situated on the collective pitch control lever.
- In cruising flight : Reduce speed, entering into a side-slip if necessary, then cut off hydraulic pressure by actuating the switch situated on the collective pitch control lever.

4.2 Main Servo-control Slide-valve Seizure

- Actuate the switch, situated on the collective pitch control lever, to cut off hydraulic pressure.
  Load feedback will be felt immediately ; load feedback may be heavy if the helicopter is flying at high speed :
  . collective pitch : 20 kg pitch increase load
  . cyclic : 7 to 4 kg left-hand cyclic load
  . cyclic : 2 to 4 kg forward cyclic load
  . yaw pedals : practically no load in cruising flight.
- Reduce speed to 60 knots (110 km/hr) and proceed as in the case of illumination of the "HYD" light.

5 BLEED VALVE FLAG ON Ng DIFFERENCE INDICATOR

The flag disappears when the bleed valve closes.
The bleed valve is normally open when the engine is shut down, during starting and at low power.
The Ng values at which the bleed valve opens and closes depend on the temperature and altitude, and are specified in the NORMAL PROCEDURES Section.
If the flag does not disappear above the specified Ng value, the maximum available engine power is reduced, especially in cold weather.
If the flag does not appear below the specified Ng value, engine surging may result. Avoid sudden power variations.

SECTION 3.3

WARNING-CAUTION-ADVISORY PANEL AND AURAL WARNING

1 AURAL WARNING

The horn sounds to warn of :

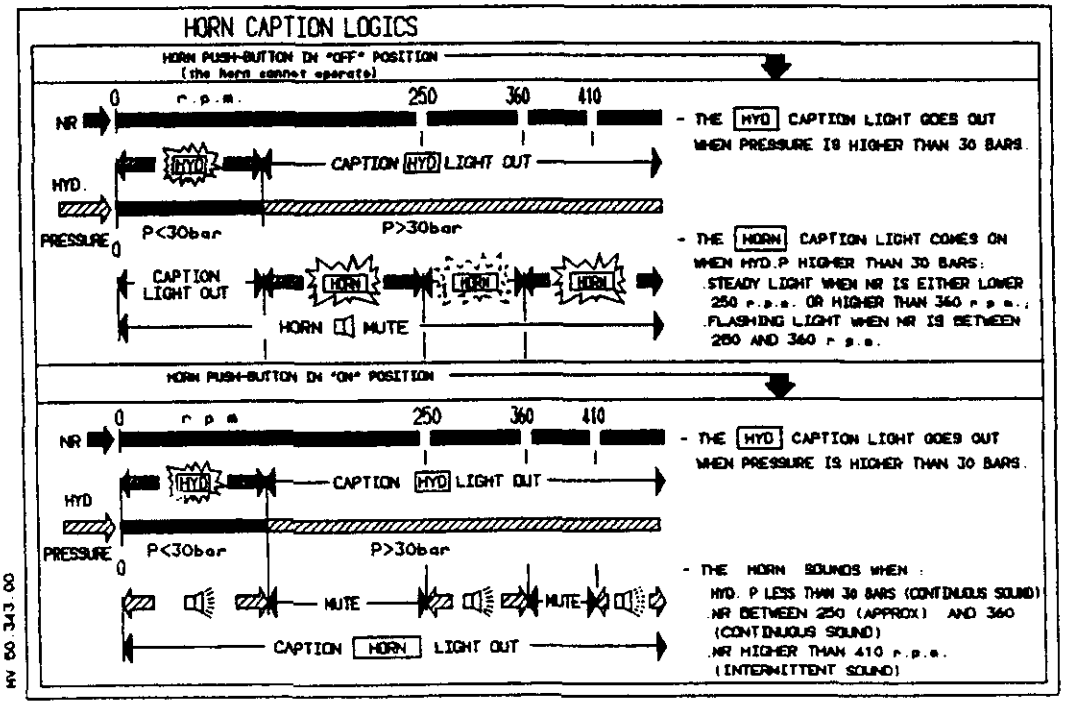
- Rotor speed (NR) between approx. 250 and 360 r.p.m. (continuous soun
- Rotor speed above 410 r.p.m. (intermittent sound).
- Hydraulic pressure drop (below 30 bars).

It is operative only if the "HORN" push-button is pushed in.
When this push-button is out, at nominal rotor speed, the HORN light o
the warning-caution-advisory panel is ON.

Alarm procedure (if HORN sounds) :

- If the HYD warning light is on :
  The malfunction is in the hydraulic system; see paragraph 2.

- If the HYD warning light is out :
  Check NR :
  . If NR below 360 r.p.m. (continuous sound)
  Reduce collective pitch.
  This can only occur in the event of an engine failure. Check the engine parameters by pulling slowly on the collective pitch lever.
  . If NR above 410 r.p.m. (intermittent sound)
  Slightly increase collective pitch in oder not to exceed 430 r.p.m



2 WARNING-CAUTION-ADVISORY PANEL

The Warning-Caution-Advisory Panel located on the instrument panel includes lights of different colours :

- Red to indicate a failure requiring immediate action.
- Amber to indicate a failure which does not require immediate action.

2.1 Red Lights

Light	Failure	Pilot action
HYD	Servo-control system failure. The pressure stored in the accumulators allows sufficient time to reach the fall-back speed with hydraulic servo-assistance. Warning of the pressure drop is also confirmed by sounding of the horn in the cabin. NOTE : The yaw servo-control is equipped with a load compensator and a hydraulic accumulator which remains pressurized indefinitely after a hydraulic pump failure or after hydraulic power cut-off via the collective lever hydraulic power release control. The accumulator may be depressurized by pressing the HYD. TEST pushbutton. Do not press the HYD. TEST push button : this would cause immediate depressurization of the accumulator and the resulting control loads could be heavy.	- In flight : . Calmy reduce collective pitch and ajust the air-speed to between 40 and 60 knots (74 to 111 km/hr) in level flight. . Cut off the hydraulic pressure, using collective lever pushbutton. Control loads are felt : - on collective pitch increase - on forward and LH cyclic. The horn stops (but the rotor r.p.m. function remains operative). . If necessary, increase I.A.S., but the control load feedback will also increase. . Make a flat approach over a clear landing area and land with slight forward speed. . Shut down the engine, holding the collective pitch lever on the low pitch stop. - In hover . Land normally. . Shut down the engine. holding the collective pitch lever on the low pitch stop.
FEU/FIRE	Refer to Section 3.1 paragraph 5	

Red lights (Cont'd)

Light	Failure	Pilot action
PH BTP MGB.P	Main gearbox oil minimum pressure	- Reduce power, and land as soon as possible. NOTE : The MGB has successfully passed a bench test consisting in running the gearbox for 45 min. with zero oil pressure at the power corresponding to minimum power in level flight (at 55 ft)
TH.BTP MGB.T	Main gearbox oil max. temperature	- Test the warning caution advisory panel to check the MGB.P light. . If the light does not illuminate, proceed as for MGB oil pressure at zero. . If the light illuminates, land and check the M.G.B. oil level. If the oil level is normal, fly to the nearest base.
T.BATT BAT T.	Battery maximum temperature	- Isolate the battery (push-button "OFF") and land as soon as possible.
PH M ENG P	Engine oil pressure alarm	- Reduce power. - Check engine oil pressure indicator : . If pressure is low or zero read torquemeter : . If reading very low shut down engine . If reading correct land immediately . If both pressure and torquemeter readings are correct, land as soon as possible.

2.2 Amber lights

Light	Failure	Pilot action
GENE GEN	- D.C. power supply failure (See NOTE 1) - Overvoltage detected	- Test the D.C. voltage. - Check the position of the push-button. - Attempt to reset - If unsuccessful : Shed the least essential consumer circuits ; continue flight, according to circumstances, keeping a close check on voltage (22 volts minimum). - Maximum flight time on battery : Day : 50 mn. / Night : 20 mn. (see NOTE 2) - Land as soon as practicable. See altitude limits after booster pumps have been switched off.
BATT BAT	Battery isolated from the d.c. network ; no longer charging (see NOTE 2)	- Check the push-button (ON). - Keep a watch on voltage. - Continue flight, according to circumstances.
KLAXON HORN	Horn not set	- Set the horn by actuating the push-button situated on the control pedestal panel (see paragraph 6 of this Section).
COMB FUEL	Fuel quantity less than 60 litres (15.8 US.Gal)	- Avoid large attitude changes. NOTE : Remaining usable fuel allows approximately 18 minutes level flight at maximum continuous power.
PITOT (if fitted)	Pitot heating system not energized	- Check the push-button (ON). - Monitor airspeed indicator.
PORTES DOORS	One or both baggage hold side doors unlocked NOTE : If sliding doors fitted see relevant supplement.	- Reduce airspeed (120 kt - 222 km/hr - 138 MPH maximum). - Check visually that doors are closed. - If one or both doors are open, or if checking is impossible : Land if possible, or continue flight at reduced speed (120 kt - 222 km/hr - 138 MPH maximum).

R