

In-Flight:

A tripped cb shall not be reset in flight unless doing so is consistent with explicit procedures specified in the approved Flight/Maintenance Manual, its supplements and checklists used by the crew members or unless, in the judgment of the pilot-in-command, resetting the cb is necessary for the safe completion of the flight. Crew members should limit resetting of cb's to one in-flight reset where this action is required.

No attempt should be made to reset a cb if it trips a second time.

Logbook entry:

A detailed logbook write-up is a proven safety practice.

3.1.6 Definition of terms

The term

“OEI flight condition– Establish”

is used as a leading step in some engine emergency procedures to express the following:

1. In case that power of affected engine tends to zero:

- Maintain the normal engine within OEI limits.
- Attempt to obtain a safe single engine flight condition. If a climb is necessary to reach a safe flight altitude, attempt to obtain Vy (best rate of climb) or 45 kts (best climb gradient speed).
- Continue with the remaining steps of the relevant procedure.

2. In case that affected engine still delivers power:

- If deemed necessary, try to escape from immediate danger with both engines operating.

- Establish steady level flight and determine if the situation will allow for OEI flight. As a rule of thumb, this can be done by checking that the sum of the individual engine torques is lower than the OEI torque limit. If this is fulfilled, re-check OEI power available by setting the affected engine to IDLE while maintaining the normal engine within appropriate OEI limit.
- If engine power is sufficient for OEI flight and if a safe OEI landing can be assumed, continue with the remaining steps of the relevant procedure.
- If engine power is not sufficient for OEI flight or if a safe OEI landing is not assured, **LAND AS SOON AS POSSIBLE**. If necessary, re-establish power of affected engine before landing. After landing perform single engine emergency shutdown of affected engine.

3.2 WARNINGS AND CAUTIONS

A **red warning light** on the WARNING PANEL coming on together with a gong signal or dedicated audio signal indicates an emergency condition requiring immediate corrective action.

A **caution indication** on the CAD and two **yellow master caution lights** on the instrument panel indicate malfunction or failure conditions which do not require immediate crew action but the possible need for future corrective action.

The cautions, indicated at the CAD, are divided into three sections, SYSTEM 1, MISC and SYSTEM 2. SYSTEM 1 indicates the operating conditions of the left power plant or the system 1 of a redundant system. SYSTEM 2 provides the same features for the right power plant or the system 2 of a redundant system. MISC indicates the operating conditions of the non-redundant systems.

The yellow master caution lights in the pilot's field of view leads the pilot's attention to the indication(s) on the CAD whenever a caution has been activated there.

Each caution (CAD-indication and master caution light) must be acknowledged by the pilot (copilot) by pushing the RESET button on the cyclic stick grip or the SELECT key on the CAD. Acknowledged cautions are indicated in sequence of importance. In case of lack of space on the screen, further confirmed cautions will be stored on additional pages, which will be indicated by the "1 of 2" message on top of the middle column. They can be called up via the SCROLL key. Any new unconfirmed caution overlies the previous caution and is bordered by two flashing lines to draw the pilot's attention to the new caution.

It is always possible that a warning light or caution indication will come on unnecessarily. Whenever possible, check the light or indication against its associated instrument to verify that an emergency condition has actually occurred.

Following is an alphabetical listing of the warning lights (WARNING PANEL) and caution indications (CAD) with the relevant conditions, any further indications and the emergency procedures.

ENGINE EMERGENCY CONDITIONS

3.4.4 Single engine failure - flight

Conditions/Indications

- Slight jerk in the yaw axis, nose left
- Possible change in noise level

Affected engine:

- **ENG FAIL** warning light and warning gong on
- **ENG SPLIT** caution indication
- **ENG OIL P** caution indication
- **FUEL PRESS** caution indication
- **GEN DISCON** caution indication
- **OVSP FAIL** caution indication
- **VAR NR** caution indication
- NORM/MAN pb (main switch panel) MAN legend comes on (yellow)
- Instruments indicate power loss

NOTE The VAR NR system will revert to the manual mode automatically.

Procedure

1. OEI flight condition	– Establish
2. Rotor speed	– Trim to maximum
3. Affected engine	– Identify
4. Single engine emergency shutdown	– Perform
5. LAND AS SOON AS PRACTICABLE	

ENGINE EMERGENCY CONDITIONS

3.4.6 Single engine landing

Conditions/Indications

One engine inoperative (OEI)

Procedure

LANDING APPROACH:

- | | |
|-------------------------------------|-----------------------------|
| 1. Rotor speed | – Check maximum |
| 2. Bleed air heating (if installed) | – Check OFF |
| 3. Airspeed | – 65 KIAS (V _Y) |
| 4. Shallow approach | – Establish |

ON FINAL, AT 50 FT AGL:

- | | |
|--------------------|-------------------|
| 5. Airspeed | – 40 KIAS |
| 6. Rate of descent | – Max. 500 ft/min |

TOUCHDOWN:

- | | |
|---------------------|--|
| 7. Airspeed | – Reduce to minimum depending on power available |
| 8. Landing attitude | – Establish |
| 9. Collective lever | – Raise as necessary to stop descent and cushion landing |

CAUTION AN OSCILLATION, WHICH COULD BE UNINTENTIONALLY INDUCED/ASSISTED BY THE PILOT (**PIO/PAO**) MAY BE EXPERIENCED DURING RUNNING LANDING OR HARDER VERTICAL LANDINGS. IN CASE OF PIO/PAO, RAPIDLY INCREASE OR DECREASE COLLECTIVE LEVER, WHICHEVER THE SITUATION ALLOWS, UNTIL OSCILLATION HAS STOPPED.

AFTER LANDING:

- | | |
|----------------------|-----------------------------|
| 10. Collective lever | – Lower slowly |
| 11. Cyclic stick | – Maintain neutral position |

5.1.9 Height-velocity envelope

The height-velocity envelope shown in the height-velocity diagram (figure 5-11) is the combination of indicated airspeed and height above ground as a function of gross mass, pressure altitude and outside air temperature.

The diagram shows the area which is critical for helicopter operation in the event of a single engine failure during takeoff, landing or other operations near the ground.

The curves are applicable for landing sites with smooth firm surfaces and define the conditions in which a safe landing can be made after an engine suddenly becomes inoperative.

- NOTE**
- The helicopter configuration shall comply with the mass-altitude-temperature limits shown in section 5.
 - The data presented in the height-velocity diagram (fig. 5-11) for density altitudes above 15000 ft have been established by theoretical analysis only.

EXAMPLE: (see figure 5-11)

The critical height-velocity area which should be avoided, can be defined by first determining point **P**, a point on the requested boundary curve.

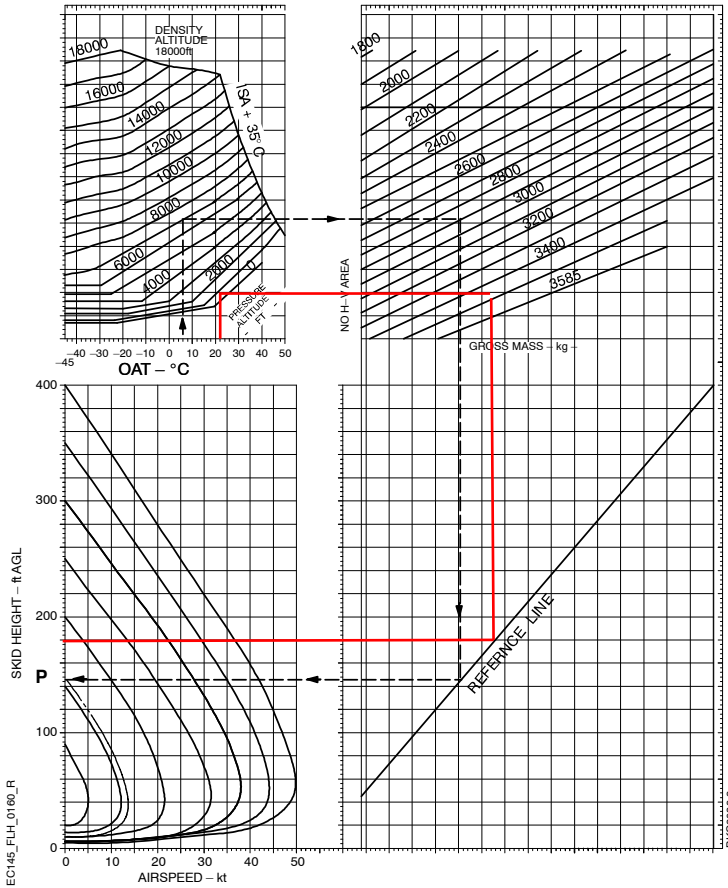
Determine: Critical height-velocity curve

Known:	OAT	6 °C
	Pressure altitude	7000 ft
	Gross mass	2900 kg

Solution:

1. Enter chart at known OAT (6 °C)
2. Move vertically upwards to known pressure altitude (7000 ft)
3. Move horizontally right to known gross mass (2900kg)
4. Move vertically downwards to intersect the reference line
5. From intersection with reference line move horizontally left and read height above ground for point **P = 146 ft**
6. Draw the boundary curve through point P by interpolating between the existing curves on the chart

HEIGHT-VELOCITY DIAGRAM



22 deg c
1000 ft
3443 kg

Fig. 5-11 Height-velocity diagram

CAUTION INDICATIONS

ENG CHIP

or

ENG CHIP

(SYSTEM 1)

(SYSTEM 2)

Conditions/Indications

Metal particles detected in engine oil.

Procedure

● **ON GROUND**

1. Affected engine	– Identify
2. Single engine emergency shutdown	– Perform

● **IN FLIGHT**

1. OEI flight condition	– Establish
2. Affected engine	– Identify

1. Alternative:

3. Single engine emergency shutdown	– Perform
-------------------------------------	-----------

2. Alternative:

3. Twist grip (affected engine)	– Rotate slowly to IDLE, check indications
---------------------------------	--

CAUTION THE SECOND ALTERNATIVE ENABLES THE CREW TO USE THE AFFECTED ENGINE FOR LANDING IF NECESSARY. BE PREPARED FOR ENGINE FAILURE. MONITOR N1, TOT, TORQUE, OIL PRESSURE AND TEMPERATURE OF AFFECTED ENGINE CLOSELY. IF THE PARAMETERS FLUCTUATE OR THEIR LIMITS ARE EXCEEDED PERFORM SINGLE ENGINE EMERGENCY SHUTDOWN IMMEDIATELY.

4. LAND AS SOON AS PRACTICABLE

CAUTION INDICATIONS

ENG O FILT

or

ENG O FILT

(SYSTEM 1)

(SYSTEM 2)

Conditions/Indications

Engine oil filter contaminated.

NOTE During engine start the ENG O FILT caution indication may come on for up to two minutes.

Procedure

1. Engine oil pressure and engine oil temperature – Monitor
2. LAND AS SOON AS PRACTICABLE

3. EMERGENCY AND MALFUNCTION PROCEDURES

CAUTION INDICATION

ENG CHIP

(SYSTEM 1)

or

ENG CHIP

(SYSTEM 2)

Conditions/Indications

Metal particles detected in engine oil.

Procedure

NOTE If the caution extinguishes but a chip detector caution (ENG 1/2, MGB, TR) illuminates subsequently at a later time in flight, a second activation of the system is permitted.

● ON GROUND

- | | |
|---------------------------------|-------------------------------|
| 1. FUZZ BURN sw (spring loaded) | – On (approximately 1 second) |
| 2. Chip pulse event | – Record |
| 3. Engine parameter | – Monitor |

If ENG CHIP caution indication goes off:

NOTE After 1 min, if no unusual behaviour of engine is noticed, follow normal takeoff procedure.

- | | |
|------------|-----------|
| 4. Takeoff | – Perform |
|------------|-----------|

If ENG CHIP caution indication remains on:

- | |
|--|
| 4. Proceed in accordance with the basic Flight Manual. |
|--|

● IN FLIGHT

- | | |
|---------------------------------|-------------------------------|
| 1. FUZZ BURN sw (spring loaded) | – On (approximately 1 second) |
| 2. Chip pulse event | – Record |
| 3. Engine parameter | – Monitor |

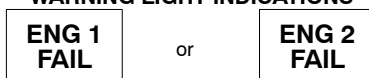
If ENG CHIP caution indication remains on:

- | |
|--|
| 4. Proceed in accordance with the basic Flight Manual. |
|--|

If ENG CHIP caution indication goes off:

- | |
|-------------------------------|
| 4. No further action required |
|-------------------------------|

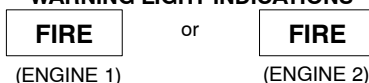
WARNING DO NOT RESTART ENGINE WITH "ENG CHIP" CAUTION INDICATION ON.

WARNING LIGHT INDICATIONS**Conditions/Indications**

- Respective N_1 -RPM below threshold value.

Procedure

- | | |
|--|--------------------|
| 1. OEI flight condition | – Establish |
| 2. Affected engine | – Identify |
| 3. Single engine emergency shutdown | – Perform |
4. LAND AS SOON AS PRACTICABLE

WARNING LIGHT INDICATIONS**Conditions/Indications**

Overtemperature in engine compartment

- Warning bell will be activated

Procedure**● ON GROUND**

- | | |
|-------------------------------------|-----------------------------|
| 1. FIRE sw (affected engine) | – Raise guard, press |
|-------------------------------------|-----------------------------|
- NOTE** Affected engine will shut down automatically, ACTIVE indication light, BOT 1 legend (both EMER OFF SW pnl), and F VALVE CL caution indication (CAD) come on. FIRE legend remains on as long as overheat condition exists.
- | | |
|---------------------------------|--------------------|
| 2. Both FUEL PRIME PUMPS | – Check OFF |
|---------------------------------|--------------------|
- | | |
|--------------------------|--|
| 3. BOT 1/BOT 2 pb | – Press; bottle 1 activated;
– EXT indicator light comes on (EMER OFF SW pnl) |
|--------------------------|--|
- NOTE** Extinguisher bottle will begin discharging when $N_1 < 50\%$. After discharge of bottle contents, BOT 1 legend and EXT indicator light go off; BOT 2pb legend comes on.
- | | |
|----------------------------|--|
| 4. Clock stop watch | – Start (after BOT 1 legend and EXT indicator light go off (EMER OFF SW pnl)) |
|----------------------------|--|
- | | |
|--|------------------|
| 5. Double engine emergency shutdown | – Perform |
|--|------------------|
6. Passengers – Alert/Evacuate

(continued):

If situation permits and FIRE warning is still on after 1 minute:

- | | |
|-------------------|--|
| 7. BOT 1/BOT 2 pb | – Press; bottle 2 activated;
– EXT indicator light comes on (EMER OFF SW pnl) |
| 8. BAT MSTR sw | – OFF |

● IN FLIGHT

- | | |
|------------------------------|--------------------------------------|
| 1. OEI flight condition | – Establish |
| 2. Airspeed | – Reduce if IAS is exceeding 100 kts |
| 3. FIRE sw (affected engine) | – Raise guard, press |

NOTE Affected engine will shut down automatically, ACTIVE indicator light, BOT 1 legend (both EMER OFF SW pnl), and F VALVE CL caution indication (CAD) come on. FIRE legend remains on as long as overheat condition exists.

- | | |
|-------------------|--|
| 4. BOT 1/BOT 2 pb | – Press; bottle 1 activated;
– EXT indicator light comes on (EMER OFF SW pnl) |
|-------------------|--|

NOTE Extinguisher bottle will begin discharging when $N_1 < 50\%$. After discharge of bottle contents, BOT 1 legend and EXT indicator light go off; BOT 2pb legend comes on.

- | | |
|-------------------------------------|---|
| 5. Clock stop watch | – Start (after BOT 1 legend and EXT indicator light go off (EMER OFF SW pnl)) |
| 6. Affected engine | – Identify |
| 7. Single engine emergency shutdown | – Perform |
| 8. Passengers | – Alert |

9. LAND AS SOON AS POSSIBLE

If FIRE warning is still on after 1 minute:

- | | |
|--------------------|--|
| 10. BOT 1/BOT 2 pb | – Press; bottle 2 activated;
– EXT indicator light comes on (EMER OFF SW pnl) |
|--------------------|--|

If FIRE warning remains on:

- | |
|----------------------|
| 11. LAND IMMEDIATELY |
|----------------------|

CAUTION INDICATIONS

ENG OIL P
(SYSTEM 1)

or

ENG OIL P
(SYSTEM 2)

Conditions/Indications

Affected engine oil pressure below minimum.

Procedure

- | | |
|--|--------------------|
| 1. Engine oil pressure | – Check |
| 2. OEI flight condition | – Establish |
| 3. Affected engine | – Identify |
| 4. Single engine emergency shutdown | – Perform |
| 5. LAND AS SOON AS PRACTICABLE | |

CAUTION INDICATIONS

ENG PA DIS
(SYSTEM 1)

and

ENG PA DIS
(SYSTEM 2)

Conditions/Indications

Respective parameter discrepancy between ENG 1 and ENG 2. Affected parameters indicated in yellow on FLI page.

Procedure

- CAUTION** • DO NOT TRY TO MATCH NEEDLES
- AVOID USING MAXIMUM POWER.

- | | |
|--------------------------------|--|
| 1. Engine digital values | – Compare to verify the lost parameter |
| 2. LAND AS SOON AS PRACTICABLE | |

CAUTION INDICATIONS**ENG SPLIT**

(SYSTEM 1)

and

ENG SPLIT

(SYSTEM 2)

Conditions/Indications

N₁ indicators show difference of 10% or more.

NOTE ENG SPLIT caution indication may come on during beep trim operation in VAR NR system MAN mode. Try to match N₁ until ENG SPLIT caution indication goes off.

Procedure

1. Collective lever — Adjust to OEI limits or below
2. Bleed air consumers — Off
3. Engines condition — Analyse
4. Continue in accordance with procedures for ENGINE UNDERSPEED - GOVERNOR FAILURE (para 3.4.11), or ENGINE OVERSPEED - GOVERNOR FAILURE (para 3.4.10), or **VAR NR** caution indication, whichever is applicable.

CAUTION INDICATIONS**EPU DOOR**

(MISC)

Conditions/Indications

External power receptable access door is open.

Procedure**● ON GROUND**

After EPU starts:

EPU access door

— Close

● IN FLIGHT

LAND AS SOON AS PRACTICABLE

CAUTION INDICATIONS**VEMD FAN**

(MISC)

Conditions/Indications

Failure of VEMD fan has been detected during external CPDS test.

Procedure

Do not start engines.

CAUTION INDICATIONS**VAR NR**

(MISC)

Conditions/Indications

- Selftest of VAR NR monitor box failed
- Rotorspeed is not within expected limits
- Torque split > 15% or
- Power supply for VAR NR system interrupted
- Failure of FCDM or ADC
- Failure of N2 trim motor system
- Failure of VEMD Lane 1

NOTE ● Indication is normal on ground.

- VAR NR caution indication could also be induced by any engine overspeed or underspeed condition. Cross-check the relevant instruments, warning lights and caution indications to determine if such a condition is evident (refer to para 3.4, Engine Emergency Conditions).
- VAR NR caution may come on momentarily during engagement of CAT A or during rapid power or airspeed changes.
- If torque split exceeds 15%, the VAR NR caution indication appears and the MAN pushbutton is yellow illuminated. Torque can be synchronized with the 4-way beep switch on the collective. Once torque split is less than 15%, VARTOMS should return automatically to normal operation.

Procedure

1. VAR NR system NORM/MAN sw
- Push to select MAN mode

EFFECTIVITY *If under CAT B operation*

2. Rotorspeed
- Trim manually to 101% using the 4-way beep switch on the collective. Below 55 KIAS at density altitudes above 6500 ft, trim manually to 104%.

EFFECTIVITY *If under CAT A operation*

2. Rotorspeed
 - Trim manually to 101% using the 4-way beep switch on the collective. Below 55 KIAS trim manually to 104%.

EFFECTIVITY *All***If rotorspeed trimming was successful:**

3. Torque
 - Synchronize
4. Continue flight

If rotorspeed trimming was not successful:

3. Airspeed
 - Reduce IAS to VNE – 25 kt or below
4. Torque
 - Synchronize if possible
5. Continue flight

- NOTE**
- With lower rotorspeed, collective lever inputs should be performed carefully in order to stay within N2/NRO limits.
 - With lower rotorspeed, the HOGE performance is reduced by 120 kg up to 10000 ft DA.
 - With lower rotorspeed, avoid landings with crosswind from the right.

CAUTION INDICATIONS**XMSN CHIP**

(MISC)

Conditions/Indications

Metal particles detected in the main transmission.

Procedure

1. XMSN oil pressure
 - Check in normal range
2. LAND AS SOON AS PRACTICABLE

NOTE Reduce power as much as possible.