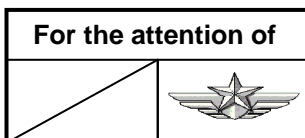


# SAFETY INFORMATION NOTICE

**SUBJECT: HYDRAULIC POWER**

**HELICOPTER WITH SINGLE HYDRAULIC POWER SYSTEM - Hydraulic failure training**



AIRCRAFT CONCERNED	Version(s)	
	Civil	Military
AS350	B, BA, BB, B1, B2, B3, D	L1
AS550		A2, C2, C3, U2
AS355	E	

The purpose of the revision of this "Safety Information Notice" is to inform the customers and operators that the video describing the good practices related to the hydraulic failure training procedure has been completed with a quiz to check for good understanding of this procedure.

The analysis of various incidents and accidents that have occurred during the hydraulic failure training phases on helicopters equipped with a single hydraulic power system has shown that the majority of these incidents and accidents were the result of a loss of control at low speeds due to a lack of understanding or a lack of compliance with the training procedure described in Supplement 7 of the Flight Manual.

The following errors are the most frequent:

- simulation of a failure in hover flight or at low speed,
- flight maneuvers at low speed without hydraulic power,
- landings performed from a hover flight phase instead of a running landing,
- etc.

In order to provide a practical tool to better understand and comply with the hydraulic failure training procedure, Airbus Helicopters has created a training video. The procedure was filmed from the cockpit of an AS350 B3e (AS350 B3 with Arriel 2D engine) equipped with a single hydraulic power system. The video shows the different phases and steps in the procedure, and also points out the errors to be avoided. The various training phases and instructions described in the video are applicable to all versions of the Ecureuil equipped with a single hydraulic power system\*\*.

The flight crew for this training exercise is an instructor pilot and a trainee pilot. The video is mainly intended for instructor pilots.

In addition to this video, Airbus Helicopters has introduced a questionnaire to check your understanding of the hydraulic failure training procedure.

The video and the quiz are available on the Airbus website through the link below:  
<https://www.airbus.com/helicopters/safety/SafetyVideo-e-learnings.html#instructors>

The quiz is available directly through the link below:  
[http://www.helicopters.airbus.com/website/en/ref/Hydraulique-Failure\\_508.html](http://www.helicopters.airbus.com/website/en/ref/Hydraulique-Failure_508.html)

Airbus Helicopters highly recommends watching this video and repeating the quiz before each hydraulic failure training session (Type Rating, Recurrent Training, Instructor Training, etc.).  
This video and the quiz can also be used as an additional training tool during theoretical hydraulic failure courses.

In addition to this video, Airbus Helicopters has revised Supplement 7 of the Flight Manual concerning the hydraulic failure training procedure, and also Section 3 concerning the Flight Manual emergency procedures. Both revisions to the AS350 B3e Flight Manual have been approved by EASA. The purpose is to further emphasize compliance with the important training phases, without actually changing the procedure.

Airbus Helicopters hereby informs you that the details provided in this update to the AS350 B3e Flight Manual are applicable to all versions of the Ecureuil equipped with a single hydraulic power system\*\* and that the other Flight Manual versions will be progressively modified so that they are consistent with the AS350 B3e Flight Manual.

You will find enclosed with this "Safety Information Notice" the update to the Flight Manual concerning the AS350 B3e version. For other versions of aircraft, the hereafter enclosed update of AS350 B3e FLM Section 3 and Sup 7, have to be used for information purpose only\*\*, pending the official issue of the relevant FLM.

\*\* : Take into account the differences that may exist between the versions: position and designation of controls (test pushbutton and hydraulic cutoff switch), the associated alarms (gong, intermittent or steady alarm), presence or not of twist grip, etc.

**3 HYDRAULIC ALARMS**

WARNING PANEL	CORRECTIVE ACTIONS
<p style="text-align: center;"><b>HYDR</b></p> <p>Loss of hydraulic pressure</p> <p style="text-align: center;">or</p> <p>Hydraulic pressure &lt; 30 bar (435 psi)</p>	<p style="text-align: center;"><b>WARNING</b></p> <p><b>DO NOT USE [ACCU TST] PUSHBUTTON AS THIS WILL DEPRESSURIZE THE YAW LOAD COMPENSATOR RESULTING IN HEAVY PEDAL CONTROL LOADS.</b></p> <p><b>FAILURE TO COMPLY WITH THE FOLLOWING PROCEDURE MAY LEAD TO LOSS OF CONTROL.</b></p> <p>• <b>HIGE, Takeoff, Final:</b> (if landing within 30 sec. is possible)</p> <ol style="list-style-type: none"> <li>1. Land normally</li> <li>2. Twist grip..... IDLE position</li> <li>3. Collective ..... LOCK</li> <li>4. Shutdown procedure..... Apply</li> </ol> <p>• <b>In flight:</b></p> <ol style="list-style-type: none"> <li>1. Set and maintain angle of bank below 30°</li> <li>2. Avoid abrupt maneuvers</li> </ol> <p>Then, smoothly:</p> <ol style="list-style-type: none"> <li>3. IAS ..... SET between 40 and 60 KIAS (74 km/h and 111 km/h)</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Hydraulic failure safety speed: 40 to 60 KIAS (74 km/h and 111 m/h)</b></p> <p><u>Once hydraulic failure safety speed is established:</u></p> <ol style="list-style-type: none"> <li>4. Hydraulic cut-off switch (collective grip) ..... OFF</li> </ol> <p style="text-align: center;"><b>WARNING</b></p> <p><b>AS CONTROL LOADS INCREASE, BE CAREFUL NOT TO INADVERTENTLY MOVE TWIST GRIP OUT OF FLIGHT POSITION (TWT GRIP LIGHT OFF).</b></p> <p>Pilot has to exert forces:</p> <ul style="list-style-type: none"> <li>- On collective increase or decrease around no force feedback point,</li> <li>- On forward and left cyclic.</li> </ul>

APPROVED

350 B3e

**3.6**

18-15

Page 6

**LAND AS SOON AS POSSIBLE**

**NOTE**

Accumulators will compensate hydraulic pressure loss for a limited operation of the main rotor controls allowing to secure flight conditions and to establish hydraulic failure safety speed.

Airspeed may be increased beyond safety speed as necessary but control loads will increase with speed.

**Approach and landing:**

**WARNING**

**DO NOT ATTEMPT TO CARRY OUT HOVER FLIGHT OR ANY LOW SPEED MANEUVER BECAUSE THE INTENSITY AND DIRECTION OF THE CONTROL FEEDBACK FORCE WILL CHANGE RAPIDLY.**

**FAILURE TO COMPLY MAY RESULT IN POOR AIRCRAFT CONTROL AND POSSIBLE LOSS OF CONTROL.**

**Over a clear and flat area:**

- Set IAS between 40 and 60 KIAS (74 km/h and 111 km/h)
- Perform a flat approach into the wind
- Make a slow no-hover slow running landing at around 10 kt ground speed (18.5 km/h)
- Do not hover or taxi without hydraulic pressure

**After landing:**

- Twist grip ..... IDLE position
- Collective ..... LOCK
- Shutdown procedure ..... Apply

APPROVED

350 B3e

**3.6**

18-15

Page 7

## 1 GENERAL

This procedure describes hydraulic failure training for an AS350 equipped with a single hydraulic system.

### 1.1 DESCRIPTION OF ACTUAL LOSS OF HYDRAULIC PRESSURE

- **HYDR** flashes + "Gong"
- The main rotor servos are temporarily fed by the 3 accumulators giving hydraulic assistance for a limited operation of the main rotor flight controls allowing to reach the safety speed in case of hydraulic failure.
- Then the pilot must switch off the hydraulic cut-off switch on the RH collective grip (1) and apply the emergency procedure.
- The tail rotor control is assisted by a yaw load compensator with one rechargeable accumulator that provides continuous assistance on RH pedal.

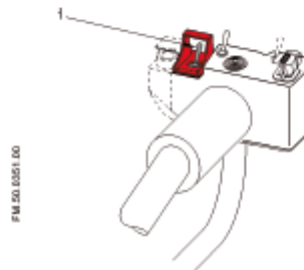


Figure 1: Hydraulic cut-off switch (RH collective grip)

Switching off only the hydraulic cut-off switch on the RH collective grip has the following effects:

- The hydraulic pump pressure is by-passed.
- The main rotor accumulators are immediately discharged, cyclic and collective control loads are significantly increased (it is necessary to discharge the main rotor accumulators to avoid non-homogenous main rotor cyclic flight control loads).
- RH pedal control loads remain low as the tail rotor load compensator remains pressurized.

**1.2 DESCRIPTION OF HYDRAULIC FAILURE TRAINING PROCEDURE**

- The training for the loss of hydraulic pressure procedure is divided in two separates steps:
  - First step: Hydraulic failure simulation by instructor and trainee initial reaction
  - Second step: Hydraulic failure emergency procedure handling and completion by trainee
  
- Training procedure recommendations:
  - It is recommended to avoid training with heavy aircraft weight as higher weight leads to higher control loads.
  - To minimize pilot's fatigue, the hydraulic training procedure should be performed close to an airfield that is suitable for a running landing.
  - In case of a go-around during hydraulic failure training procedure, it is recommended to abort the training and to reset the hydraulic cut-off switch to ON.

**NOTE**

When resetting the hydraulic cut-off switch to ON, be prepared for a significant decrease of cyclic and collective control loads.

**1.2.1 First step: Hydraulic failure simulation by instructor and trainee initial reaction****NOTE**

Upon instructor advice and training conditions and purposes, the first simulation step of the training procedure may be skipped.

In this step:

- The failure simulation is activated by the instructor pilot.
- The trainee recognizes the associated alarms and rejoins the hydraulic failure safety speed with the assistance of the main rotor accumulators.
- Once hydraulic failure safety speed is established, the instructor pilot restores hydraulic system to normal operation.

APPROVED

350 B3e

**SUP.7**

18-15

Page 2

**1.2.1.1 Hydraulic failure simulation procedure by instructor**

To simulate a hydraulic pressure loss, the instructor press the [ACCU TST] (2) guarded pushbutton (SCU):

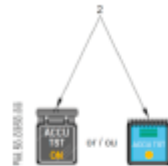


Figure 2: [ACCU TST] guarded pushbutton (SCU)

**NOTE**

The [ACCU TST] action is not part of the hydraulic failure emergency procedure and should be performed by the instructor for simulation only.

Activating the [ACCU TST] pushbutton has the following effects:

- **HYDR** flashes + "Gong" for each flash.
- The hydraulic pump pressure is by-passed (no more hydraulic pressure in the main rotor control circuit) simulating so the hydraulic pressure loss.
- The main rotor servos are temporarily fed by the 3 accumulators giving hydraulic assistance for a limited operation of the main rotor flight controls as in case of an actual pressure loss.

This simulation mean introduces an undesired side-effect not part of the actual hydraulic failure:

- On tail rotor control: Pressing the [ACCU TST] removes all tail rotor control hydraulic assistance.
- On yaw pedals: Control loads increase immediately.

**1.2.1.2 Hydraulic failure safety speed by trainee**

- When **HYDR** lights up, trainee sets airspeed to hydraulic failure safety speed, between 40 and 60 KIAS (74 and 111 km/h).

**1.2.1.3 Hydraulic system reconfiguration to normal mode by instructor**

- Once hydraulic safety speed is established, instructor pilot restores hydraulic system to normal operations by resetting [ACCU TST] to OFF position.

APPROVED

350 B3e

**SUP.7**

18-15

Page 3

**1.2.2 Second step: Hydraulic failure emergency procedure handling and completion by trainee**

In this step:

- Trainee checks hydraulic failure safety speed is established.
- Trainee applies hydraulic failure procedure for landing.

**2 LIMITATIONS**

The limitations specified in the basic Flight Manual and in the Flight Manual Supplements remain applicable and are supplemented or modified by the following:

**2.1 CREW EXPERIENCE**

Instructors shall be properly trained and with recent experience to perform hydraulic failure training exercises with trainees.

**2.2 OPERATING LIMITATIONS**

A thorough flight risk assessment taking in account trainee's experience and operational conditions (weather conditions, day/night conditions, ...) shall be performed before training.

Hover and low speed maneuvers are prohibited with hydraulic off.

Angle of bank more than 30° is prohibited with hydraulic off.

No passenger other than observers with training related duties shall be admitted on board.

**3 EMERGENCY PROCEDURES**

The emergency procedures specified in the basic Flight Manual and in the Flight Manual Supplements remain applicable.

APPROVED

350 B3e

**SUP.7**

18-15

Page 4



#### 4 NORMAL TRAINING PROCEDURES

The normal procedures specified in the basic Flight Manual and in the Flight Manual Supplements remain applicable and are supplemented or modified by the following:

##### STEP 1: HYDRAULIC FAILURE SIMULATION

**WARNING**

**THE [ACCU TST] PUSHBUTTON SHALL NEVER BE ACTIVATED WHEN THE HYDRAULIC CUT-OFF SWITCH (RH COLLECTIVE GRIP) IS IN OFF POSITION.**

In steady cruise flight conditions:

- |                    |   |
|--------------------|---|
| 1. Instructor..... | Activates [ACCU TST]<br>Check <b>HYDR</b> flashes + "Gong"<br>[ACCU TST] light on |
|--------------------|---|

When **HYDR** lights up:

- |                  |  |
|------------------|--|
| 2. Trainee ..... | Set and maintain angle of bank below 30°<br>Avoid abrupt maneuvers<br>Set airspeed to hydraulic failure safety speed, between 40 and 60 KIAS (74 and 111 km/h) |
|------------------|--|

Once hydraulic failure safety speed is established:

**WARNING**

**IF THE [ACCU TST] PUSHBUTTON IS NOT RESET TO OFF, HYDRAULIC ASSISTANCE CANNOT BE RESTORED.**

- |                    |   |
|--------------------|---|
| 3. Instructor..... | Reset [ACCU TST] to OFF position:<br>Check [ACCU TST] light off and <b>HYDR</b> within 3 sec. |
|--------------------|---|

**NOTE**

Hydraulic assistance can be restored at any time during the simulation step by resetting [ACCU TST] to OFF.

APPROVED

350 B3e

**SUP.7**

18-15

Page 5

**STEP 2: HYDRAULIC FAILURE PROCEDURE COMPLETION**
**WARNING**

**MAINTAIN ANGLE OF BANK BELOW 30° AND DO NOT ATTEMPT TO CARRY OUT HOVER FLIGHT OR ANY LOW SPEED MANEUVER BECAUSE THE INTENSITY AND DIRECTION OF THE CONTROL FEEDBACK FORCE WILL CHANGE RAPIDLY. FAILURE TO COMPLY MAY RESULT IN POOR AIRCRAFT CONTROL AND POSSIBLE LOSS OF CONTROL.**

**AS CONTROL LOADS INCREASE, BE CAREFUL NOT TO INADVERTENTLY MOVE TWIST GRIP OUT OF FLIGHT POSITION (TWT GRIP LIGHT OFF).**

1. Trainee ..... Check airspeed set between 40 and 80 KIAS (74 and 111 km/h)

When ready for a significant cyclic and collective control loads increase:

2. Trainee ..... Set hydraulic cut-off switch (RH collective grip) to OFF  
 Check **HYDR** flashes + "Gong"  
 Control loads increase
3. Trainee ..... Complete hydraulic failure emergency procedure

After landing:

4. Hydraulic cut-off switch ..... Reset to ON (RH collective grip) to restore hydraulic assistance before subsequent takeoff or hovering  
 Check **HYDR** within 3 sec

**NOTE**

**Instructor shall remain ready to restore hydraulic assistance as necessary.**

**Hydraulic assistance can be restored at any time during hydraulic failure procedure completion step by resetting the hydraulic cut-off switch to ON (RH collective grip).**

**5 PERFORMANCE DATA**

The performance data specified in the basic Flight Manual and in the Flight Manual Supplements remain applicable.

APPROVED

350 B3e

**SUP.7**

18-15

Page 6