

CABRI G2

SERVICE LETTER 19-001

Throttle management during simulated engine failure

It is recommended to keep this letter with the Flight Manual

Introduction

Two recent accidents have highlighted the risks associated with incorrect throttle management during simulated engine failure.

In both cases (one simulated engine failure on take-off and one simulated engine failure in the hover), incorrect management of the twist grip has led to an engine/rotor resynchronization at the end of the maneuver, with low rotor RPM, causing a loss of control in yaw.

The purpose of this Service Letter is to raise flight instructors' awareness about the risk of loss in control in yaw following a simulated engine failure.

Pitch/Throttle correlator and idle

The Cabri G2 is equipped with an efficient engine governor, capable of regulating the engine RPM regardless of the power setting, including during an autorotation.

In order to ease the engine governor's task and to lower the pilot's workload in case of an engine governor failure, the Cabri G2 is also equipped with a pitch/throttle correlator that automatically opens the throttle when the collective lever is raised, even if the twist grip is not rotated.

The correlator can be deactivated to allow the collective lever to be raised entirely without opening the throttle. To do so, the pilot must rotate the twist grip closed, all the way to the idle mechanical stop, beyond the engine idle position.

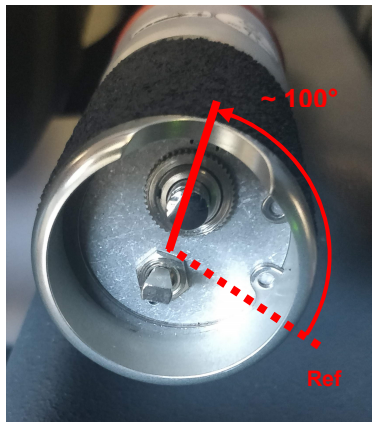
During the rotation of the twist grip, engine idle will be reached prior to reaching the idle mechanical stop.

This results in a “dead band” within which the throttle will remain at idle regardless of the twist grip position, provided the collective lever is positioned on the lower stop.

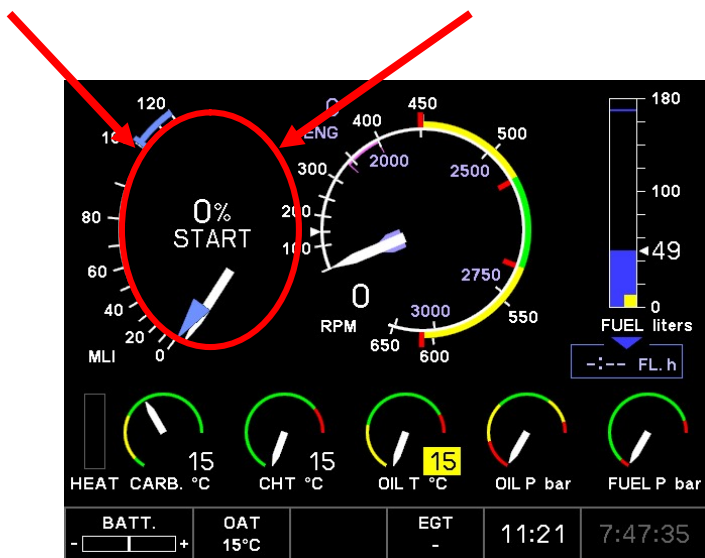
The “dead band” angular range is about **100°**.



*Collective on lower stop
Twist grip reaching the « dead band »
Throttle in idle position*



*Collective on lower stop
Twist grip in idle mechanical stop position
Throttle in idle position*



If the throttle twist grip is not completely closed against the idle mechanical stop, the correlator will open the throttle when collective will be raised.

Simulated engine failure cases

The simulated engine failure cases covered by this Service Letter are the following:

- Full down autorotation starting from 500 ft AGL or higher,
- Simulated engine failure on take-off leading to a running landing,
- Simulated IGE hover engine failure.

In all 3 cases:

- The flight instructor initiates the maneuver by retarding the twist grip,
- At the end of the maneuver, the student raises the collective to decrease the rate of descent before contacting the ground, causing a loss of rotor RPM.

In all cases above, if the flight instructor does not entirely retard the twist grip to the idle mechanical stop, the correlator will open the throttle when the collective will be raised, as explained earlier.

If the throttle opens enough, it will result in an engine/rotor resynchronization, i.e. main rotor torque, which will need to be counteracted by the tail rotor.

In addition, the governor is automatically disengaged when engine RPM drops below 2000 RPM and re-engaged above this threshold.

During simulated engine failure, the governor is usually not manually switched off for the following reasons:

- In case of power recovery, the governor will ease the pilot's task,
- The governor switch is on the pilot collective lever without direct access by the flight instructor.

If the throttle is opened enough to increase RPM beyond 2000 RPM, the governor will be re-engaged and will open the throttle quickly since the rotor/engine RPM will most likely be low.

Note that the tail rotor efficiency very much depends on the rotor RPM. Low rotor RPM resulting in low tail rotor efficiency, as depicted in Service Letter **SL 19-002**.

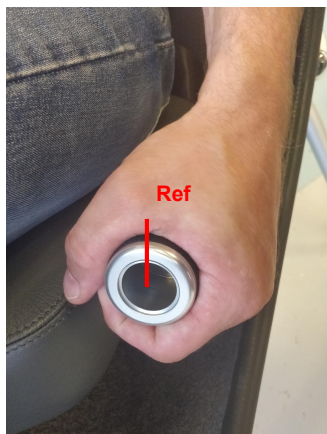
As such, the torque associated with the engine/rotor resynchronization may not be controllable by the tail rotor.

This can lead to a loss of control in yaw, either in flight very close to the ground (simulated engine failure in the hover), or on the ground with a risk of a runway excursion during a running landing (standard full down autorotation or simulated engine failure on take-off).

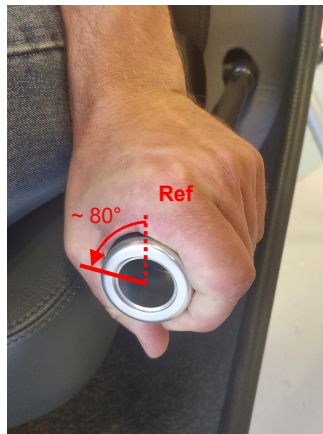
Closing the twist grip for a simulated engine failure

The correlator design requires a twist grip angular range of about **160°** between a powered flight position and the idle mechanical stop.

On a regular twist grip and with the hand positioned normally, it is only possible to reach about **80°** toward the idle position:



Normally positioned hand



*Maximum twist grip rotation
from a normal position toward
idle*

In order to rotate the twist grip from a powered flight position to the idle mechanical stop, the flight instructor has 2 options:

1. Position the hand in a normal way and close the twist grip in 2 motions, which is not compatible with simulated engine failures on take-off or in the hover because there is not enough time available,
2. Anticipate the move by positioning the hand below the twist grip, as shown below. This position allows to reach the idle mechanical stop in one single motion.



Anticipation of closing movement

Recommendation

When practicing simulated engine failures, flight instructors must always make sure the twist grip is completely retarded to the idle mechanical stop.

In order to achieve that position, Helicoptères Guimbal recommends flight instructors to position their hand below the twist grip to close it in one single motion, particularly when practicing simulated engine failures on take-off or in the hover.

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