

Proposed Temporary Deviation on Helicopters AW189 MGB OEI 30 seconds rating counter.

INTRODUCTION

The hereby presented Temporary Deviation has been classified as important and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states: "2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

STATEMENT OF ISSUE

AgustaWestland have applied to EASA for certification of the AW189 helicopter that incorporates a 30 seconds / 2 minutes Main Gear Box power rating structure. In addition an automatic control to prevent the Main Gear Box 30 second limit exceedance is also implemented.

This second feature is only active when operating OEI (the determination of the OEI condition is made by the engine control software) and enables an automatic power reduction from the 30 second to the 2 minute transmission OEI rating without crew intervention whilst exploiting the full power rating available.

Following an engine failure ('OEI' caption generated on PI scale), with a torque requirement which is greater than 135% the '2.5m' caption is displayed above the PI scale to indicate that the aircraft is being operated with a torque level within the 2.5 minute power range.

If the torque required increases above 155% entering the 30 seconds rating, the '30s' counter is displayed (replacing the '2.5m' caption above the PI scale) and the '2.5m' caption is moved and presented in gray alongside the PI scale. A countdown starts (from '30s' to '0s') providing that torque remains above 155%.

If, after initial 155% exceedance, the torque required is reduced so that it falls below 155% (but remains above 135%), the '2.5m' caption is re-introduced above the PI scale and the "displayed" 30 second counter is stopped and the time remaining is displayed in grey alongside the PI scale. However, the engine counter that triggers the automatic power reduction feature still continues to run, leading to a mismatch between the information displayed to the pilot and the actual engine torque available.

If at any time, after exceeding 155%, the torque required is reduced so that it falls below 135%, all the counters are zeroed, and the 30 second counter and '2.5m' caption is removed from the PI scale.

According to the published single pilot OEI procedures (CAT A, CAT B and Fly-Away) following an engine failure the pilot will manage the emergency condition by flying the aircraft maintaining NR at 101% (102% being the nominal speed) for all stabilized paths of the emergency procedures, always assuring the usage of the maximum available power in all the flight regimes.

With respect to the automatic transition from the 30 second transmission OEI limit to the 2 minute transmission OEI limit, no specific additional cues (other than those detailed above) are provided to the aircrew.

The counter presented to the crew could be inconsistent if the 30 seconds rating is not fully used, after the first entrance, and cannot be relied upon as a means of determining power usage and remaining time available.

The CDS current 30 sec counter logic doesn't provide compliance with CS 29.1305(a)(25) since the means to alert the pilot when the 30 sec time interval expires is inconsistent and could be misleading in the above described conditions. Furthermore, compliance with CS29.1309(c) is also affected, in particular the requirement that "Systems, controls, and associated monitoring and warning must be designed to minimize crew errors which could create additional hazards" in relation to the automatic torque limiter function.

A dedicated SW change is identified, proposed and will be implemented in order to:

1. synchronize the displayed counters with the actual 30 sec / 2 min power ratings usage and expiration;
2. provide adequate cues to the pilot when the automatic power reduction is activated.

As the initial design proposed by AgustaWestland will not allow full compliance with 1305(a)(25) and 1309(c) requirements AgustaWestland has been required to modify it and, pending the modification, AgustaWestland has defined the following compensating factors allowing the Agency to grant AgustaWestland a time-limited deviation of 18 months:

- *The potential associated inconsistency and misleading situation is associated with an actual OEI condition that is considered remote (estimated occurrence in the order 10^{-5} per flight hour).*
- *The RFM emergency procedures that cover the most critical OEI conditions are such that this potential situation should not be encountered if the prescribed procedures are correctly followed.*
- *The possible inconsistency and misleading situation is not considered catastrophic or hazardous since full use of the 30 seconds rating is always available even though only a portion of the rating has been actually used and FADEC has already timed out the access. In this case, any collective pull with an associated NR droop to 95% or below, will remove the FADEC 2 minute limiter and 30 seconds power will be again available.*
- *The number of expected in-service aircraft in the first 18 months will be in the order of 30 units and in the first months of the entry into service the helicopters will be operated under the supervision of the AgustaWestland Type Rating Training Organization to deliver the required training to the Customers, further reducing the real exposure time into passenger transport operations. In the same 18 months period of the derogation, the foreseen maximum flight hours, eventually accumulated by the Fleet Leader, is not expected to exceed 1000/1200 FH, giving a margin of 100% on the probability of occurrence considering the full size of the fleet (30 H/C).*