

## **Proposed Equivalent Safety Finding on CS 29.1505 (c)(2)**

### **Applicable to Large Rotorcraft**

#### **Introductory Note:**

The following Equivalent Safety Finding has been classified as an important Equivalent Safety Finding 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."*

#### **Identification of Issue:**

An application has been received for a major non-significant change to the Type Certificate of one CS29 helicopter, for extension of the service ceiling. In defining the extended flight envelope, the Applicant is proposing a VNE reduction curve above the already certified ceiling that doesn't meet the criteria of CS 29.1505(c)(2) for power-off condition, which require to be defined as

- (i) a constant airspeed; or
- (ii) a constant amount less than power-on VNE; or
- (iii) a combination of the two previous criteria for distinct portions of the claimed range altitude.

In fact, above the already certified ceiling, the VNE power-off is reduced as density altitude increases. However, the slope of the VNE power-off curve proposed by the Applicant is different than the one related to power-on condition. Therefore, in this portion of the envelope, VNE power-off is neither a constant airspeed nor a constant amount less than VNE power-on.

The intent of the requirement for definition of the VNE power-off is to provide the crew with a means to easily remember or to unmistakably determine the VNE power-off in any possible flight condition with a minimum mental effort.

The Applicant proposes an equivalent safety finding to address the above mentioned non-compliance to CS 29.1505(c)(2).

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#### **Applicant Proposal:**

The Applicant proposes a VNE power-off which is reduced as density altitude increases. However, the slope of the VNE power-off curve is different than the one related to power-on condition.

### **Applicant Safety Equivalency Demonstration:**

The spirit of the rule is fulfilled since the pilot is constantly aware of the VNE at any altitude and temperature in normal functioning conditions of the displays and the Air Data System. In fact, the avionics system automatically computes and displays, for any combination of pressure altitude and temperature within the certified flight envelope, the VNE value on the airspeed indicator of the Primary Flight Display (PFD), by means of a red line in case of power-on or a red cross-hatched line in case of OEI or power-off.

The same system functionality will be extended up to the new service ceiling, specifically:

1. The VNE value in OEI and power off conditions will be displayed in nominal conditions above the already certified ceiling in the same way as they are below this altitude. No discontinuity or variation to the way the VNE is computed and displayed will be introduced.
2. In case of failure conditions that affect the indication of the current airspeed and the relevant VNE, there is no change in the mitigating measures and/or the emergency procedures that allow restoration of the airspeed and VNE indication. As a general principle, the system design does not force the crew to use the VNE placard after the first failure. As per the current certified flight envelope, there are no failure cases where the pilot has to revert to the placard since the following single failures are not affecting the VNE marking display:
  - Air Data Unit failures will require to select the co-pilot ADU that will recover the correct IAS indication;
  - OAT sensor is redundant so first failure does not affect any IAS indication;
  - Pilot Flight Display unit failure will cause an automatic reversion to the MFD display of the PFD display maintaining the correct IAS indication.
3. The service ceiling extension is not altering the avionic system functioning and its functional failures. The Avionics System Functional Hazard Assessment already include the Functional Failures related to the loss / misleading indication of display data and Air Data System data. These functional failures and their classification are therefore confirmed also for the extended service ceiling.
4. The existing VNE placard on the front panel will be updated, providing a means to calculate the VNE Power on, OEI and Power-Off up to the new service ceiling.