



EASA
European Aviation Safety Agency

Continued Integrity Verification Program (CIVP)

Rodrigo Martin Gomez
Transmissions and Structures Expert

Rotorcraft & VTOL Structures Workshop
19-20 February 2019





Background

- AC 27.602/29.602 states “The objective of identifying critical parts is to ensure that critical parts are controlled during design, manufacture, and **throughout their service life** so that the risk of failure in service is minimized by ensuring that the critical parts maintain the critical characteristics on which certification is based.”
- However, there is little detailed guidance regarding how to control critical parts during their service life.
- Feedback of in-service findings to the design organization of the helicopter OEM provides useful information that can help verify assumptions made at the time of certification remain valid throughout the service life of each critical part.
- Critical part failures have caused accidents in recent years, some of which could potentially have been prevented if CIVP had been implemented.
- This process would have ensured that feedback from operators, maintenance organizations and repair & overhaul facilities was provided to the design organizations of the affected helicopters and that design engineers performed regular reviews of this information and delivered protective/corrective actions accordingly.



Background

- Safety recommendations addressing the principles of CIVP:
 - CAA UK:
 - UK.CAA-2014-003: Procedures to monitor and track the efficiency and reliability of maintenance interventions when these are used to assure the safety target of the rotorcraft.
 - UK.CAA-2014-022: Adopt critical parts life monitoring and assessment requirements of CS-E, covering: residual and vibratory stresses, manufacturing plan and examination expired parts.
 - UK.CAA-2014-024: Additional guidance to improve standardisation of critical part classification to minimise inconsistencies in the instructions for continued airworthiness (ICA).
 - AIB Norway:
 - NORW-2018-002: ICA and associated procedures for critical parts on helicopters to maintain the design integrity after being subjected to any unusual event.
 - NORW-2018-008: Review and improve the existing provisions and procedures applicable to critical parts on helicopters in order to ensure design assumptions are correct throughout its service life.
- EASA CM-S-007 issued 19 August 2015 to address the continuous verification of the integrity of rotorcraft critical parts.
- EASA is considering revising CS-27/29 to address this subject.

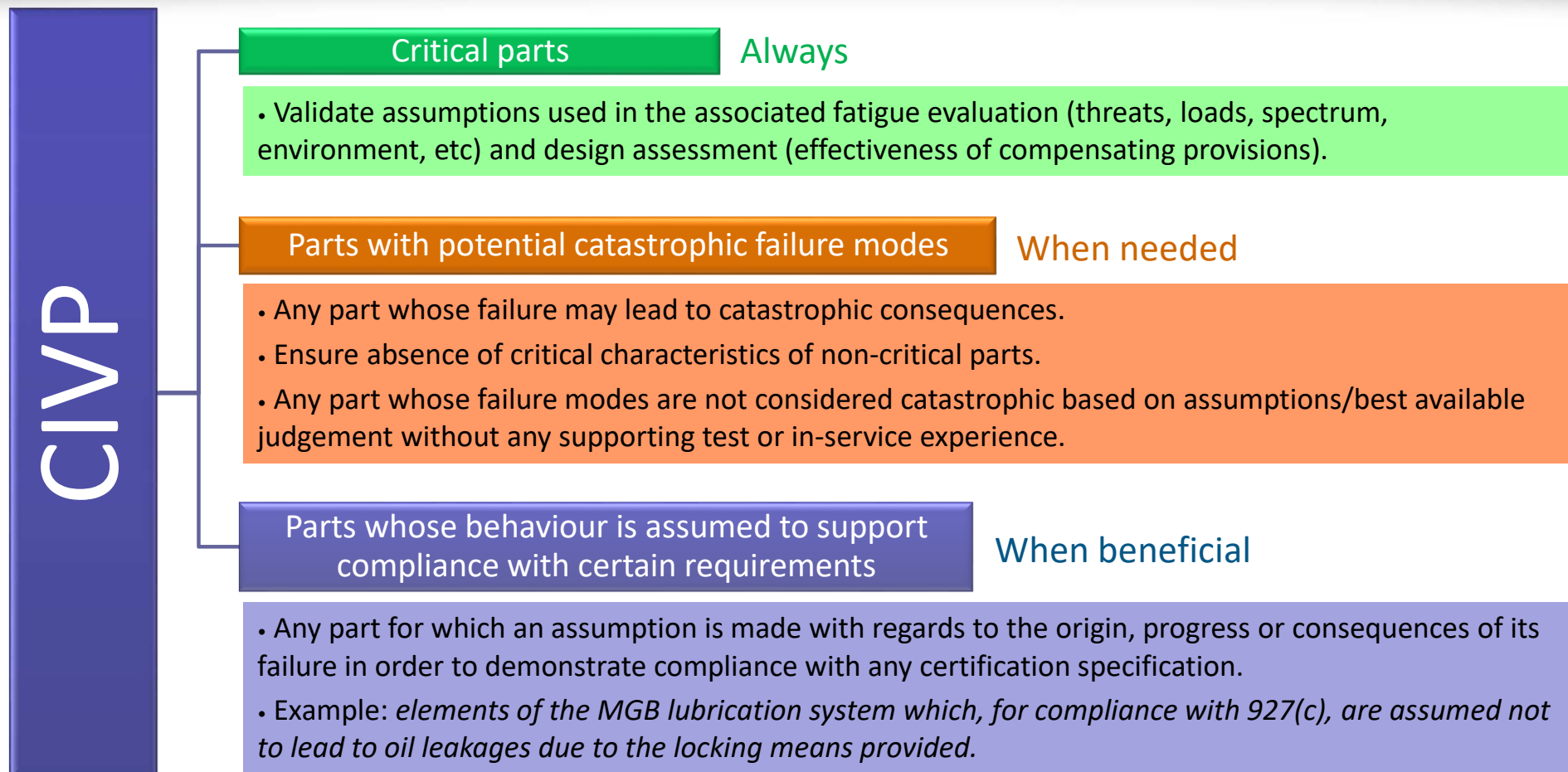


CIVP concept

- The objective of a Continued Integrity Verification Program (CIVP) is to ensure the continued validity of the assumptions made when finding compliance with CS-27 / CS-29.
- In particular, CIVP is considered of particular benefit to ensure all considerations included in the demonstration of compliance with CS 29.547(b), CS 27/29.571, CS 27/29.573 and CS 29.917(b) for the rotors and rotor drive systems are maintained during the complete service life of these parts.
- This program should address the following for applicable components:
 - Evaluation of the effectiveness of associated design, maintenance and monitoring provisions.
 - Validation of operating conditions and environment.
 - Verification of assumptions related to flaws, damages and degradation mechanisms.



CIVP concept - Applicability





CIVP approach

- Develop and perform a Continued Integrity Verification Programme (CIVP) addressing all applicable components.
- The programme of the CIVP should be agreed with the agency during certification.
- The CIVP should ensure information from all parties involved (production, maintenance and operation) is collected and made available for the design organization to be reviewed and acted upon.
- CIVP should be a continuous process. Components included in CIVP at the time of certification can be excluded later on if sufficient experience is gathered to ensure the level of safety of the part will be maintained throughout the life of the product. Additionally, parts may need to be added along the process.



CIVP approach

- The CIVP can then be supported by (not an exhaustive list):
 - Analysis of occurrence reports.
 - Analysis of unscheduled removal rates.
 - Strip reports / Analysis at overhaul.
 - Additional inspection (non-destructive and/or destructive) on selected high time and rejected components, as well as early retirements.
 - Feedback from lead customers.
 - Audits of subcontractors and suppliers of critical parts.
 - SPC data of manufacturing processes affecting critical characteristics.
 - Review of concessions.
 - Changes in utilization and operating environment.
 - Operator / TCH working group activities.
 - Health and Usage monitoring data.



EASA
European Aviation Safety Agency

Thank you for your attention!

Any questions....?

Your safety is our mission.

An agency of the European Union

