



# EASA

European Aviation Safety Agency

## EASA Occupant Protection

*Laurent PINSARD*  
*EASA Senior Structures Expert Rotorcraft*

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# Occupant Protection - Requirements

## **CS27/29.952 Crash Resistance Fuel System (CRFS).**

- Systems must be shown to be capable of sustaining the following loads:
  - Dynamic deceleration loads under drop height of (at least) 15.2m (50 ft) under conditions described in CS 29.952(a).
  - Static ultimate inertial load factors defined in CS 29.952(b)
  
- **CS 27/29.561, 562, 785 Crash Resistant Seat and Structure (CRSS)**
  - CS 27/29.561 Cabin installation/ protection. Items of mass and occupant must be restrained under the required ultimate inertial load factors.
  - CS 27/29. 562, 785 dynamic and static requirement for Seat combined with anthropomorphic criteria (HIC) .



# Occupant Protection. History & Issue.

In the 1980s and 1990s the certification requirements of FAA 14 CFR Part 27 and Part 29 were amended to require newly certified rotorcraft to incorporate features to ensure occupant protection.

However, rotorcraft certified with pre-amendment certification basis (for CRFS and CRSS) have not been required to meet these improved occupant protection regulations and many are still in production today.

**⇒ Low incorporation rate of these Occupant Protection requirements in the rotorcraft fleet.**

Examples of rotorcraft with occupant protection requirement not required: AS350 B3, A109, A119, R22, R44, BEL 206, BELL407, MD 500N...



# Occupant Protection - EASA Activities

- **Safety Recommendations** 2013
- **ARAC ROPWG (FAA - Martin CRANE Presentation)** 2015
- **Preliminary Impact Assessment (EASA rulemaking)** 2016



# Occupant Protection – Safety Recommendations CRFS

Accident R-44 (VH-HWQ) 21/03/2013 Australia

ASTL-2015-030 & ASTL-2015-029

*Recommendation to increase the number of rotorcraft equipped with crash-resistant fuel system (production and retrofit)*

Accidents EC130B4 (N356AM) 06/03/2015 and AS350B3e (N390LG) 03/07/2015, US.

*“Once Airbus Helicopters completes development of a retrofit kit to incorporate a crash-resistant fuel system into AS350 B3e and similarly designed variants, prioritize its approval to accelerate its availability to operators.”*



# Occupant Protection – Safety Recommendations CRFS

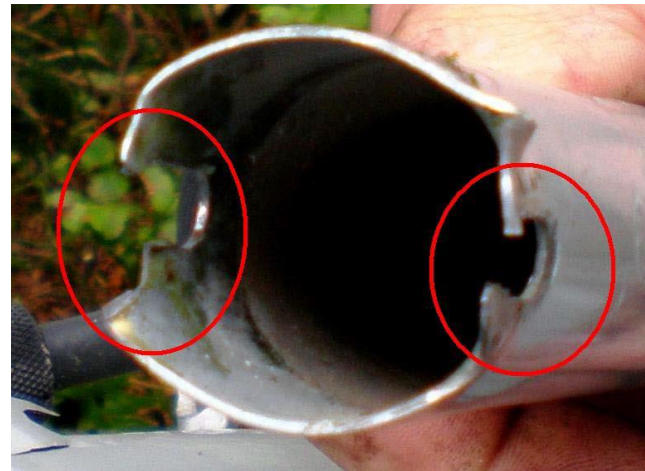
## Airbus Helicopter Position.

- CRFS compliant to 27.952 already in the basic configuration on EC130T2 since entry into service, the same Fuel system is available as an option on AS350B3e.
- Compliance with 27.952 for operations with this system and without installation under the fuel tank area is under certification via an AH STC, to be available as an option for newly manufactured H/C and for in service retrofit.



# Occupant Protection – Safety Recommendations CRSS.

Accident to Bell 204B (OE-XBT) on 23/07/2010 at Hinterthal, Austria. *helicopters should be fitted with impact resistant pilot seats corresponding at least to the applicable certification requirements CS 27 (FAR 27) and CS 29 (FAR 29)*





# Occupant Protection – Preliminary Impact Assessment.

## PIA Objectives

Determine the appropriate actions that EASA should take to address existing and potential future safety issues that arise from the operation of rotorcraft.

Identify risk mitigation for CRFS & CRSS by Implementing:

- CRFS requirement CS27/29.952 for newly manufactured and rotorcraft,
- CRSS requirements CS27/29.561, 27/29.562 and 27/29.785 for newly manufactured and rotorcraft.
- Or any alternative...





# Occupant Protection – Preliminary Impact Assessment.

- PIA includes
  - Impact analysis
    - CRFS & CRSS Safety improvement (based on EU registered rotorcraft)
    - Implementation cost level (data from ARAC activities).
    - OEM one-off Cost per prevented fatality.
- European accident statistics from 2006 to 2015 show
  - For CRSS most of the recorded accidents with fatalities are related to CS-27 small rotorcraft
  - No post-crash fires reported for rotorcraft fully compliant with the latest CRFS requirements in CS 27/29.952.
  - 51 fatalities involving CS 27 rotorcraft that do not have the CRFS requirement vs only 3 fatalities involving CS 29 rotorcraft not compliant to CRFS requirement.



# Occupant Protection - Issues.

- The implementation of the CRFS & CFSS could result in a operation limitations (weight penalties)
- Accident Investigation reports do not systematically contain the necessary information to evaluate the protection level provided (deformation of the cabin, seat configuration, injuries).



# Occupant Protection - Conclusions

- Safety Recommendations will triggered the number of rotorcraft equipped with CRFS and CRSS.
- From the PIA investigation there is evidence that the cost-effectiveness (cost per prevented fatalities) varies significantly between small and large rotorcraft.
- Any EASA actions in the scope CRFS and CRSS should take into consideration the FAA rulemaking activities that result from the ARAC Rotorcraft Occupant Protection Working Group (ROPWG) recommendations.