



Federal Aviation
Administration

Update on the Rotorcraft Occupant Protection Working Group (ROPWG)



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Background

- **Issue**

- U.S. helicopter accidents over the past few decades have steadily decreased, while fatal helicopter accidents and fatalities remains virtually unchanged

- **Contributing Factor**

- Slow incorporation of occupant protection requirements into the overall U.S. rotorcraft fleet
- Rules in effect for 20+ years, but percentages of rotorcraft that meet requirements is low
 - Crash resistant fuel systems: 16% of U.S. fleet
 - Increased blunt force trauma protection: 10% of U.S. fleet



Regulations Identified

- **Many rotorcraft in production today are older type designs not incorporating safety enhancements.**
- **The regulations affected include**
 - **Crash Resistant Seats and Structures (CRSS)**
 - 27/29.562 dynamic seat systems,
 - 27/29.561 maintaining survivable volume for occupants, and restraining large items of mass above/behind occupant
 - 27/29.785 seats, safety belts, harnesses
 - **27/29.952 Crash Resistant Fuel Systems (CRFS)**
 - CRFS drop test
 - Fuel tank load factors, breakaway fittings, etc.



ROPWG Tasking

- **ARAC Tasking defined in Federal Register Notice dated November 5, 2015**
- **Current Tasks 1 and 2 cost-benefit analysis for Direct Incorporation of rules**
 - Original deadline was May, 2016, less than 3 months after ROPWG was formed
 - ARAC gave 9-month extension at the May, 2016 meeting to present the initial cost-benefit report
 - Report submitted to ARAC in early November, 2016
- **Results not publicly available yet**



Preliminary ROPWG Findings-CRFS

- **Accidents with 27/29.952 **compliant** fuel systems from 1995-2015 in the NTSB database were reviewed**
 - Each crash docket was separately reviewed
 - Each crash was scored for impact severity (None, minor, moderate, severe and extreme)
 - If PC fires occurred, they were rated as fuel spillage, contained in engine compartment or ground foliage
 - Only fuel spillage fires were included in the dataset
- **There were 58 crashes of aircraft with compliant fuel systems:**
 - No reported fuel spillage fires up through the severe level of crash
 - Of the 9 crashes that occurred at the extreme level, only 3 had fuel spillage fires
 - No extreme level crash had survivors
- CRFS: Crash Resistant Fuel Systems 27/29.952
- CRSS: Crash Resistant Seats & Structure 27/29.561; 27/29.562; 27/29.785



Effectiveness of CRFS Confirmed by ROPWG

From ROPWG
Presentation to ARAC
September, 2016

- Rotorcraft certificated to Part 27/29.952 are preventing post-crash fires up to the extreme crash severity level
- Even at the extreme level, post-crash fires did not occur in 3 of the nine cases
- Based on these data, nearly all thermal injuries would be expected to be prevented in crashes of 27/29.952 compliant rotorcraft through the severe level of impact
- These results are similar to studies conducted on US Army helicopter crashes



Preliminary ROPWG Findings- CRSS

From ROPWG
Presentation to ARAC
September, 2016

- A similar study of helicopter crashes occurring between 2006 and 2015 was conducted to assess the expected benefits of CRSS
- FAA AVP assisted in scoring the 58 crashes that met the initial study criteria – primarily sufficient data to score the accidents
- Of these crashes, all but 15 were eliminated from consideration either because of lack of data or because they determined that CRSS rule changes would not have changed the outcome of the crash
- Scoring these crashes resulted in a substantial estimated benefit for implementing CRSS



Preliminary ROPWG Findings- CRSS

From ROPWG
Presentation to ARAC
September, 2016

- **How the estimated benefit compares to the estimated costs of implementation of CRSS remains under study**
- **There are several open issues including:**
 - Determination of operator increased costs
 - Number of helicopters affected
- **It is clear that implementation will require structural changes to most non-compliant helicopters**
 - Structural changes are potentially expensive due to requirement to change materials/design
 - Limited gross weight particularly of light helicopters
 - For some current helicopters CRSS implementation could be impractical resulting in discontinuation of those models



Major ROPWG Conclusions

- **NTSB accident data collection is inadequate to accurately determine benefits provided by the introduction of crash safety upgrades**
- **A significant finding of this project is that implementation of a CRFS compliant with 27/29.952 should eliminate most, if not all post-crash fires in survivable accidents**
- **Adding full CRSS to an existing production helicopter will be difficult, if not impossible for some platforms. However, many severe or fatal injuries could be prevented.**



FAA Reauthorization Bill, 2016

- **US Congress added the following language:**
 - SEC. 2105. CRASH-RESISTANT FUEL SYSTEMS.
Not later than 1 year after the date of enactment of this Act, the Administrator of the Federal Aviation Administration shall evaluate and update, as necessary, standards for crash-resistant fuel systems for civilian rotorcraft.
- **What does this mean for the ROPWG?**
 - Rulemaking process
 - CRFS and CRSS together?
- **What does this mean for the industry?**



What are the Options for Next Tasks?

- **As defined in Federal Register Tasking**
 - The FAA will task the ROPWG either to make specific written recommendations on how
 - 1) all
or
2) part } of the existing occupant protection standards (XX.562/XX.952, etc.)
 - or 3) to propose new alternative performance-based occupant protection safety regulations
 - for newly manufactured rotorcraft that will be effective via §§ 27.2 and 29.2.



ROPWG Next Steps

- **ROPWG Report went to ARAC in November**
- **ARAC Meeting – December 15, 2016**
 - Will review, reach consensus and
 - Return to working group
 - Accept
 - Accept with dissenting position from ARAC
 - Forward to FAA after acceptance by ARAC
- **FAA receives final Task 2 report**
 - Cost-benefit report is intended to be one source of information to the FAA in directing the scope for the next tasking assignment to the ARAC ROPWG.



ROPWG Next Steps

- **With FAA Next Tasking...**
 - Work with FAA and EASA representatives “to make specific written recommendations on how” to implement standards
 - Within 12 months, report back to ARAC and FAA with proposals and cost/benefit for Future Manufacturing
 - Followed by 6 months, report back to ARAC and FAA on “on incorporating rotorcraft occupant protection improvements and standards into the existing rotorcraft fleet”



ROPWG Team

- **Martin R. Crane – FAA Representative**
- **Laurent Pinsard & Rémi Deletain – EASA Representatives**
- **Dennis F. Shanahan, M.D., M.P.H. – ROPWG Chairman**
- **19 Representatives from OEMs, operators, vendor, aviation associations, and consultants**

