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
U.S. Registered Rotorcraft Accidents FY83 - FY14

Accidents have slowly decreased.

Fatal Accidents have not.
Percentage of Rotorcraft Accidents with a Fatality
Estimated U.S. Rotorcraft Fatal Accident Rates Per 100,000 hours – 10 Year Look Back

Historic rotorcraft flight hours extracted from FAA’s General Aviation and Part 135 Activity Survey. Years 11 & 14 based on FAA’s FY2015-2035 Forecast.
2013-14 FAA Fatal Accident Study

- Rotorcraft Directorate and Civil Aerospace Medical Institute (CAMI) Collaboration

- Reviewed "cause of death" data covering:
  - 5 years of autopsy reports
  - 97 fatal helicopter accidents (Part 27 a/c: 87 of 97)

- Analysis included:
  - Contribution of post-crash fire to fatalities for cases of rotorcraft with & without crash resistant fuel tanks
  - Statistical comparison of the frequency of blunt force injury patterns compared to previous research
2013-14 FAA Fatal Accident Study

• **Post crash fire**
  - For Part 27 rotorcraft fatal accidents where a fully crash resistant fuel system was *not* installed:
    • Present in 39% of fatal accidents
    • Contributed to a fatality in 20% of the cases when present
    • No significant differences between different makes/models

• **Blunt force trauma**
  - Studied frequency of skeletal & organ injury patterns
    • No statistically significant change over last 10 years
    • Core body region and head most frequently cited
    • Existing rule, if incorporated, would have offered increased protection to same body areas cited in fatal accidents
Long Term Historical Perspective

• For 25 years (1989-2014) since the increased blunt force trauma rule became effective:
  – ≈ 4,200 rotorcraft accidents with ≈ 9,000 total occupants
  – Only 2% of a/c in those accidents met rule’s requirements
  – The other 98% of a/c in those carried ≈ 8,800 occupants
  – Over 1,300 fatal injuries to the ≈ 8,800 occupants
FAA and NTSB Safety Recommendations

- July 22, 2015, FAA Safety Recommendation for initiating retroactive rule requiring crash resistant fuel systems for all rotorcraft manufactured after January 1, 2020
- July 23, 2015, NTSB Safety Recommendation to require, for all newly manufactured rotorcraft regardless of the design’s original certification date, that crash resistant fuel systems be installed
Regulations Identified

- Many rotorcraft in production today are older type designs not incorporating safety enhancements.
- The regulations affected include:
  - dynamic seat systems,
  - maintaining a survivable volume for occupants,
  - restraining large items of mass above and behind the occupant,
  - crash resistant fuel systems.
Rotorcraft Occupant Protection Tasks

- Recommend how occupant protection standards should be made effective for newly manufactured rotorcraft
- Present cost/benefit analysis
- Follow-on task
  - Recommend how to incorporate rotorcraft occupant protection improvements and standards into the existing rotorcraft fleet