ICAO and the upper age limit for professional pilots

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I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation.
Plan

• Explain the current ICAO upper age limit for professional pilots
• Two 60-64 year olds should be permitted to be at the controls simultaneously
  – At present only one pilot over 60 years is permitted
• An upper age limit of 65 years should be maintained, for the moment
Current ICAO requirements

- Upper age limit is 65 years (increased from 60 years in 2006)
  - Standard for PICs
  - Recommendation for co-pilots
  - Only one pilot over 60 to be at controls at any time
    - “One over one under” rule
- 2013 – ICAO proposes
  - deletion of “one over one under” rule
Possible current age combinations:

- PIC: 64 years, Co-pilot: 59 years
- PIC: 59 years, Co-pilot: 64 years
- PIC: 64 years, Co-pilot: 64 years
Science – does it support amending the “one over one under” rule?

• Medical
  – General population living longer (mainly because of decreased cardiovascular mortality)
    • Reduced smoking, improved treatments
    • Pilots live longer than the general population
  – But risk of illness (and incapacitation) still increases with increasing age

• Performance
  – Pilot performance will eventually decrease with increasing age
The problem with getting old (1)
Getting old (2)

![Graph showing disease risk increasing with age]

DISEASE RISK vs AGE
But....

In many countries health is improving...
Taking a closer look at the science.....

1. Medical aspects
All cause death rates per million population, England and Wales, Males, 2010

1% mortality per year

Age group

UK office for National Statistics
Annual Male Incapacitation Rate (all cause) of commercial pilots by age group, UK, 2004

Evans S and Radcliffe S-A. The annual incapacitation rate of commercial pilots; Aviat Space and Env Med; 83; 1; 2012
Many states use 1% per annum (or something similar) as the benchmark against which fitness is assessed for pilots who have developed a medical condition.
Risk of two 64 year olds becoming incapacitated simultaneously

- Assume incapacitation risk of a 64 year old is 1% per year (\(=1\% \text{ in } 10^4 \text{ hours} = 0.01 \text{ in } 10^4 \text{ hours} = 1 \text{ in } 10^6 \text{ hours}\) = \(1 \times 10^{-6} \text{ per hour}\)

- Risk of a double incapacitation ("catastrophic failure") in one hour of flight for two 64 year olds is \(1 \times 10^{-6} \times 10^{-6} = 1 \times 10^{-12}\)

- EASA and FAA, large aircraft:
  - average probability per flight hour of a "catastrophic failure" (resulting in multiple fatalities) must be "extremely improbable" i.e. average probability per flight hour of the order of \(1 \times 10^{-9}\).
Assessing incapacitation risk....

- Not an exact science but:
- Assessment of risk of double incapacitation could be in error by a factor of 1000....
  - and a risk of $1 \times 10^{-9}$ per hour for a “catastrophic failure” (double incapacitation) would still be achieved
- In comparison to the margin of safety available, the increase in risk of incapacitation between 59 and 64 years is small
- **Conclusion:** Two 60-64 year olds should be permitted to operate together
Taking a closer look at the science

2. Performance aspects.

See Captain Sternstein’s Presentation (next up)
Conceptually...
Summary – Science: Incapacitation

• General population is living longer – is healthier
• Medical incapacitation risk increases with increasing age
  – Difficult to predict individual risk
  – But change in risk from 59 to 64 years small
• The current mitigations for incapacitation risk up to age 65 appear to be acceptable
  – Six monthly medicals over 60 years (annual below 60)
  – Two pilot operations only for over 60s
  – Incapacitation training
  – Many flights have > 2 pilots
Summary – Science: Performance

• Pilot performance will eventually decrease with increasing age
  – But variation in effects of age/experience
• The current mitigations for possible performance decrement up to age 65 years appear to be acceptable i.e.
  – Simulator checks
  – Line checks
Two 60-64 year olds should be permitted to be at the controls simultaneously.
Why not abandon the upper age limit?  
AsMA position paper, 2004

"On review of the existing evidence, the Aerospace Medical Association concludes there is insufficient medical evidence to support restriction of pilot certification based on age alone."

The objective of this paper is to review and interpret the recent scientific literature dealing with pilot age and
Why not abandon the upper age limit?

• Sensitivity & specificity of screening tests in over 65s is uncertain
  – Seizure, onset of atrial fibrillation, stroke...
• With increasing risk of medical incapacitation and performance degradation reliability of screening becomes more important
• With no age limit - potential for every career to end in “failure”.
  – Change in culture needed
An upper age limit of 65 years should be maintained until:

- We have better information on ability of tests to identify higher risk individuals in over 65s (incapacitation and performance)
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