Structural Factors influencing the Survivability of Occupants in Airplane Accidents

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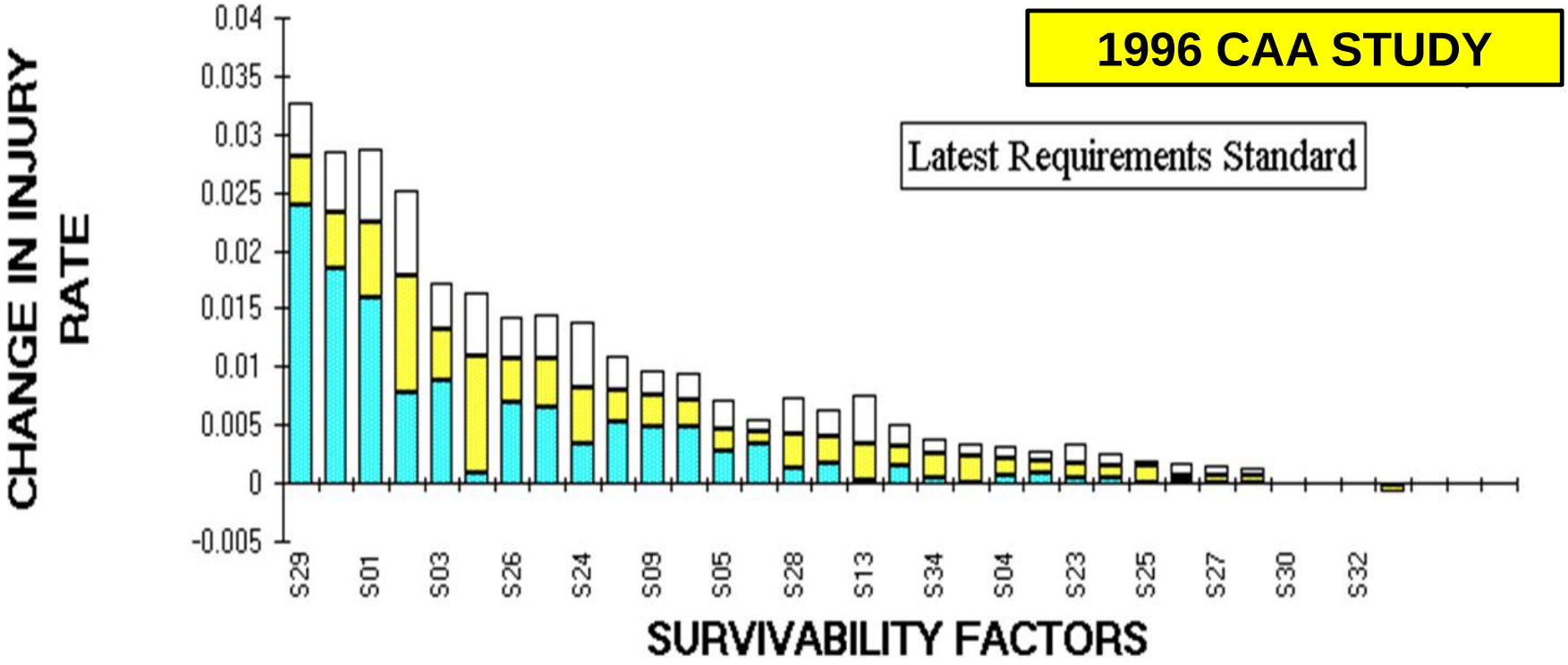
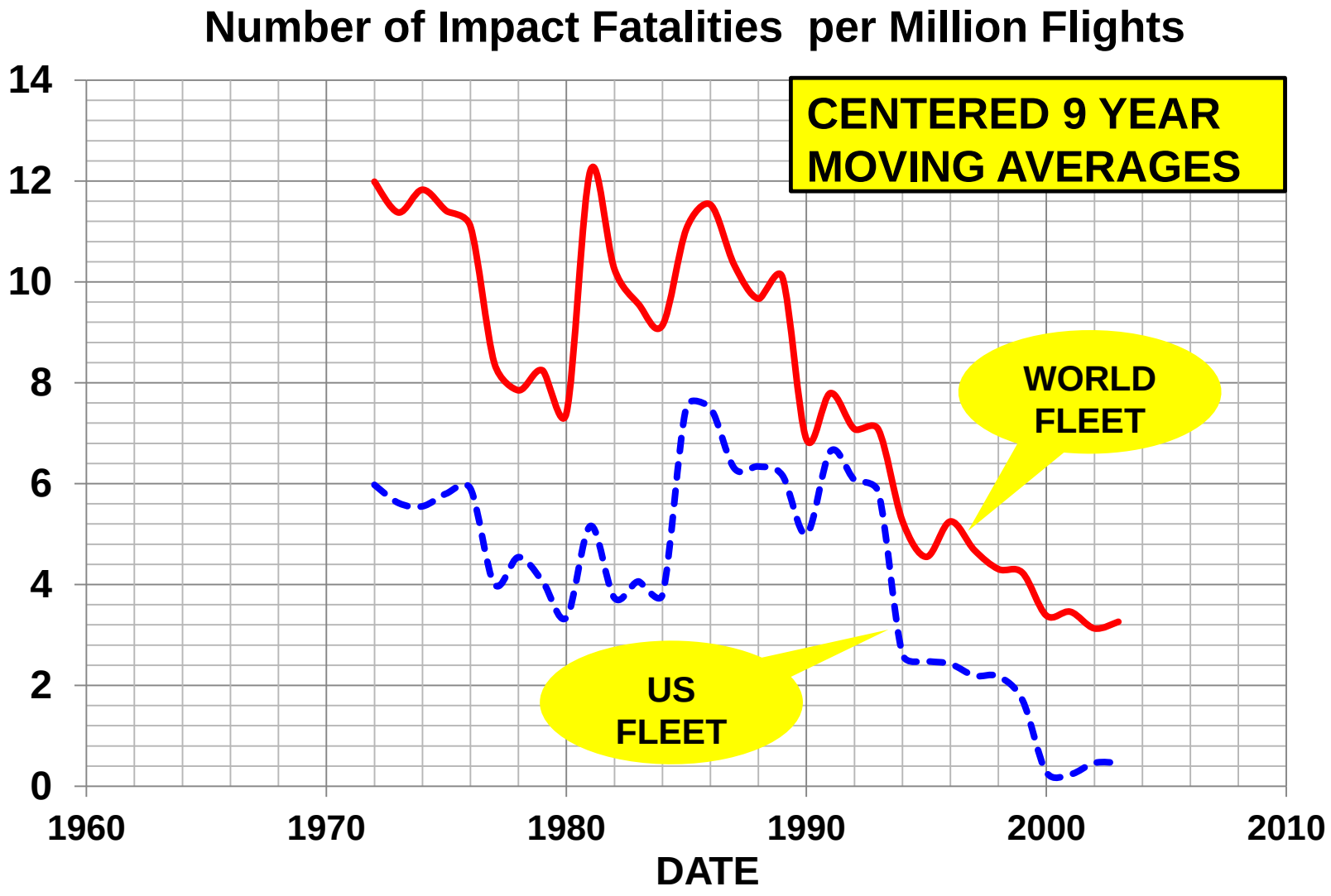
Introduction

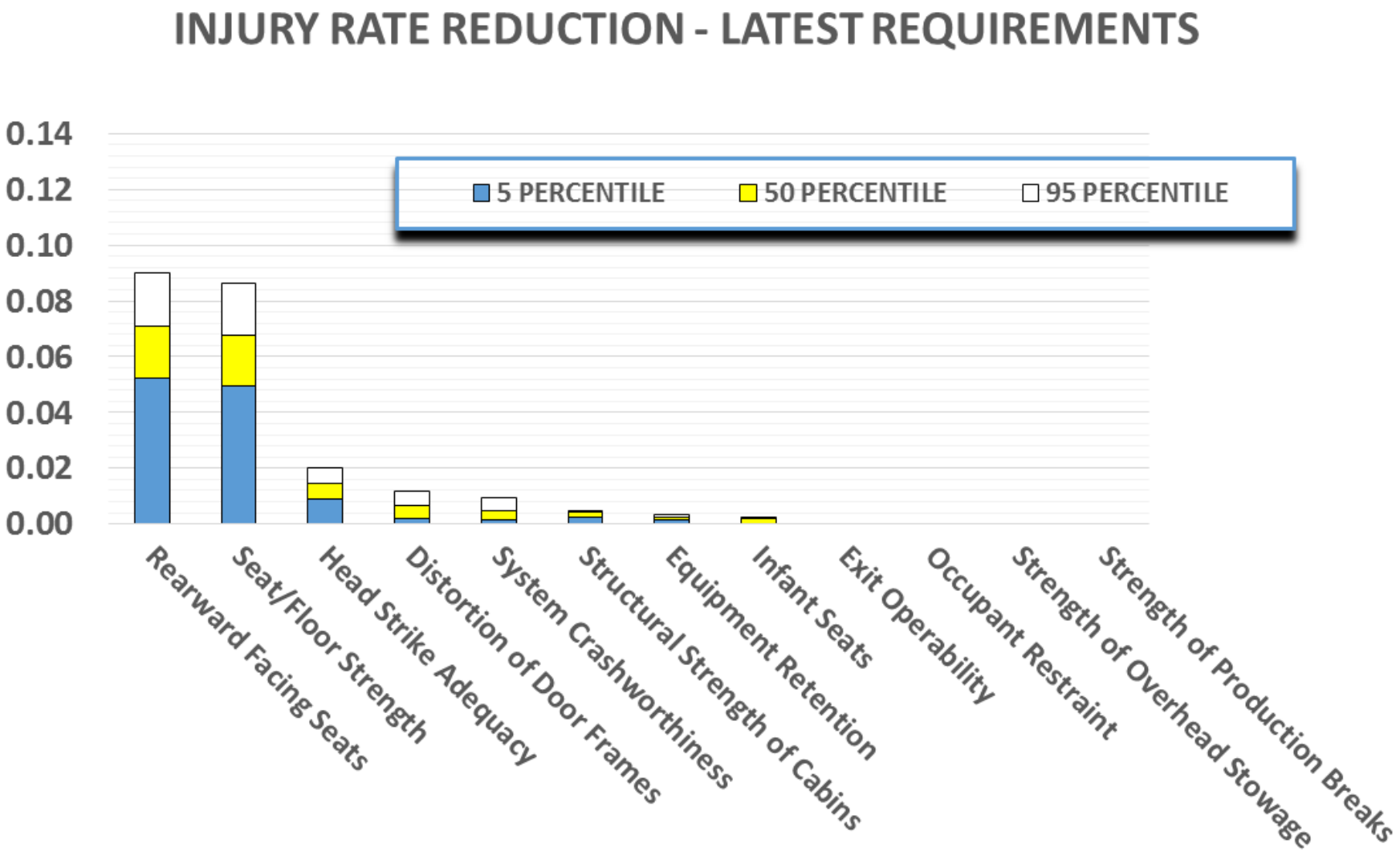
Bar Chart Showing the Change in Injury Rate from Survivability Factor Improvement



Number of Impact Fatalities – Worldwide & US

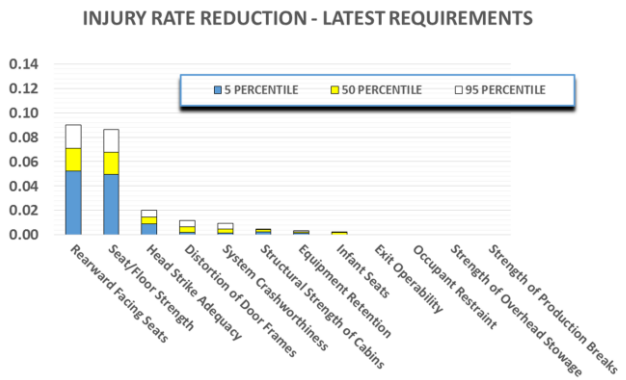


Analysis


INJURY RATE REDUCTION - LATEST REQUIREMENTS
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
5 PERCENTILE
50 PERCENTILE
95 PERCENTILE
Rearward Facing Seats
Seat/Floor Strength
Head Strike Adequacy
Distortion of Door Frames
System Crashworthiness
Structural Strength of Cabins
Equipment Retention
Infant Seats
Exit Operability
Occupant Restraint
Strength of Overhead Stowage
Strength of Production Breaks

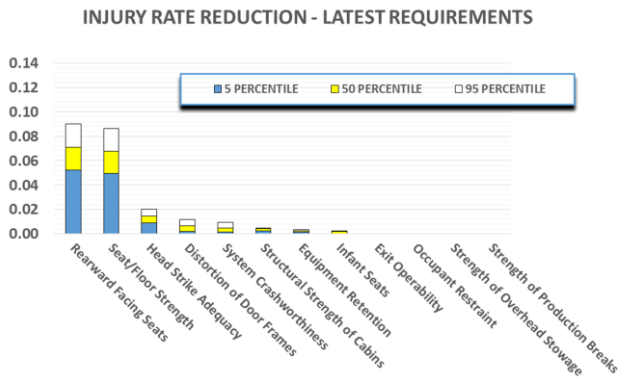
Rearward Facing Seats

- **Ranks in the top two of all of the Survivability Factors considered in this study.**
- **This Survivability Factor is assessed to reduce the total number of Injuries by approximately 7% and the number of Fatalities by approximately 5%.**



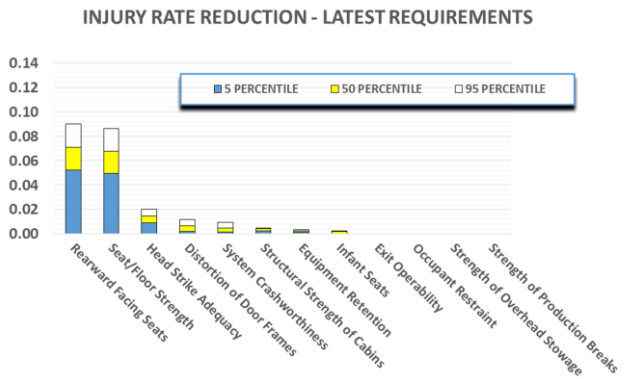
Seat/Floor Strength

- Similar to Rearward Facing Seats Ranks in the top two of all of the Survivability Factors and reduces Injuries by approximately 7% and Fatalities by approximately 5%.
- 27 of the accidents, analyzed involved damage to seats, seat rails and floors with a direct adverse effect on the survivability of occupants.



Head Strike Adequacy

- **This Survivability Factor features relatively highly based on the quantitative analysis, ranking 3rd in terms of Injury Rate Reduction.**



Other Issues – Limited Potential Benefit

- **Distortion of Door Frames Ranks in the Top 4 for Injury Reduction.**
- **System Crashworthiness - Ranks in the Top 4 for Injury Reduction, however further improvements unlikely to yield significant benefits.**
- **Structural Strength of Cabins Although it was noted as an issue in several accidents unlikely that it would yield any significant improvement.**
- **Equipment Retention Unlikely that it would yield significant benefit but 15 accidents where it was an issue.**
- **Infant Seats Does not feature highly in injury reduction – proportion of infants on the airplane is likely to be low.**

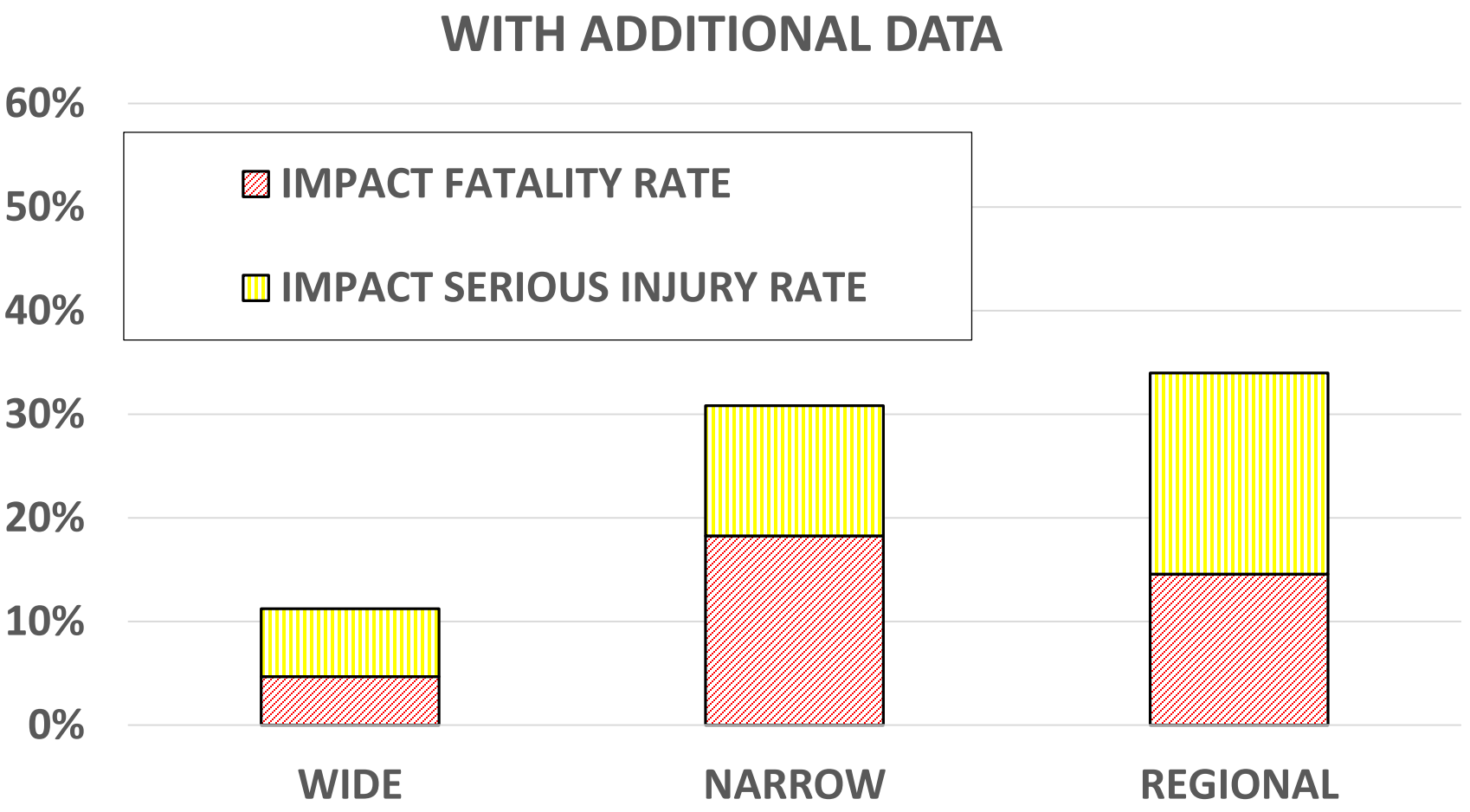
Other Issues – No Potential Benefit

- **Exit Operability No instances were found where the door mechanism was damaged by impact forces.**
- **Occupant Restraint (Adequacy Of Seat Belts) - No passenger seat belt failures resulting in occupant injuries were identified.**
- **Strength of Overhead Stowage No instances were found in the accidents analyzed of overhead stowage detachment resulting in occupant injuries.**
- **Strength of Production Breaks Insufficient information was contained in the accident reports to determine the location of the Production Break relative to any fuselage ruptures.**

Other Issues addressed in the study-

- The Influence of Aircraft Size
- 16 g Dynamic Seats

The Influence of Aircraft Size on Occupant Survival

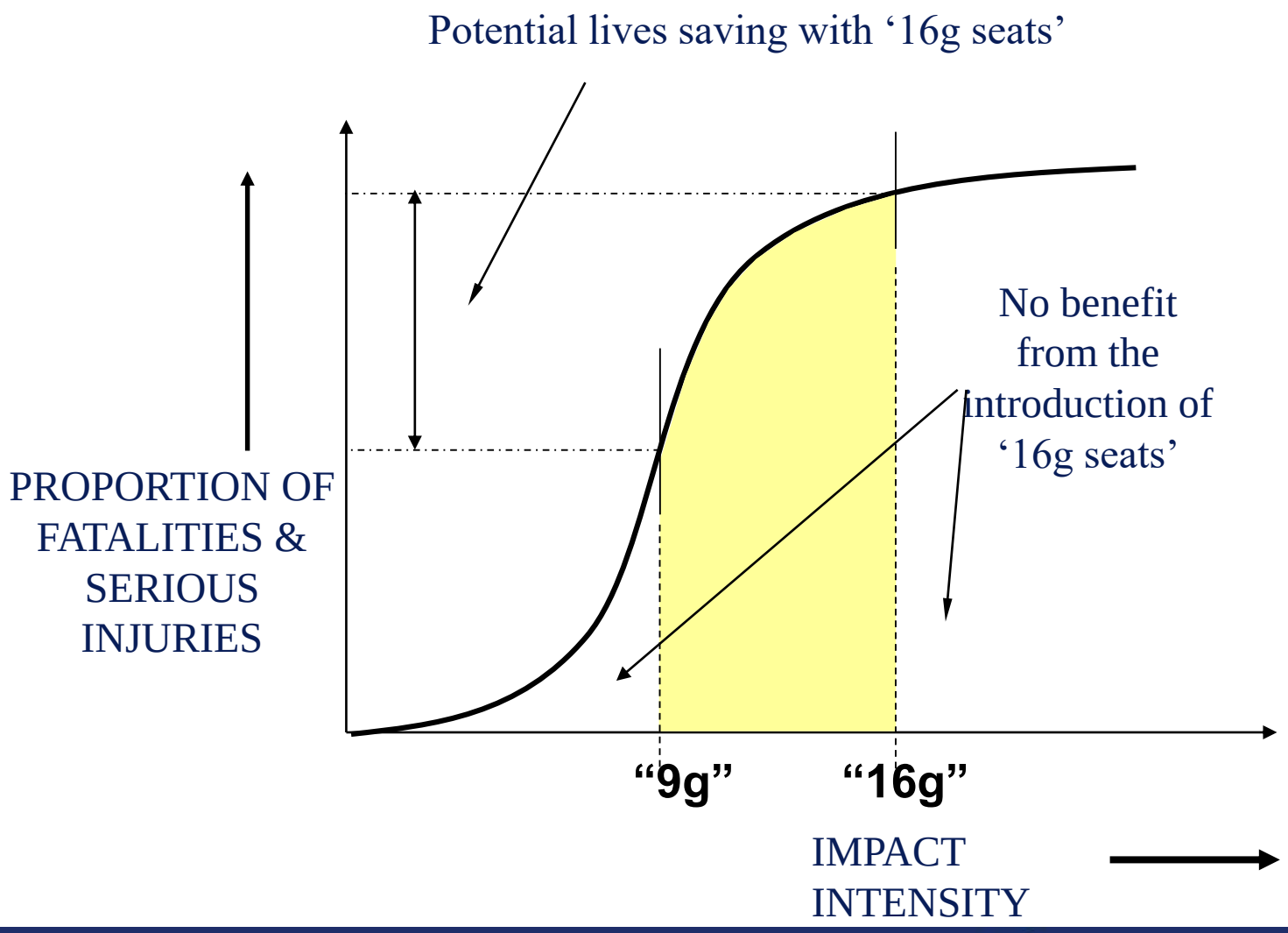


Based on limited data!!!

16 G DYNAMIC SEATS

- ✓ **Whilst it is likely that 16 g seats have provided a positive benefit in injury reduction, there are currently insufficient accident data to quantify the degree of improvement that is likely to have been achieved.**

16 G DYNAMIC SEATS



DATABASE & REPORT AVAILABILITY

- ✓ **Report to be downloadable from the FAA website**