New Brace Position for Cabin Crew and Passengers: Optimizing Survival in an Accident

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Overview

• ICAO “Manual on Information and Instructions for Passenger Safety”
• Work undertaken by ICAO and IBRACE
• Cabin crew and passenger brace positions
• Positions to avoid and unacceptable ones
• Other specific brace positions, limitations and special considerations
New ICAO Guidelines – Doc 10086

- Passenger safety briefings
- Passenger safety briefing card
- Information signs, markings & placards
- Occupancy of emergency exit rows
- Instructions for brace positions
- Brace and evacuation commands
- Carry-on baggage in evacuations and other considerations
ICSG : A Joint Industry-Regulatory
Occupant Survivability

- Occupant survivability is linked to 3 phases of accident
  1. Surviving crash sequence
     (i.e., impact forces, deceleration and secondary impacts)
  2. Evacuating aircraft
  3. Surviving post-evacuation environment
     (e.g., sea, jungle, mountainous region)

- Occupants seriously injured during crash sequence may be unable to evacuate
  - and may suffer fatal injuries as result
Brace-for-impact Position

• Goal is to reduce aircraft occupant’s injuries during crash sequence

• Brace position serves two purposes
  – Reduces flailing by having fwd-facing occupant flex, bend, or lean forward over legs in some manner
  – Reduces secondary-impact injuries
Work Undertaken

• April 2016
  – ICAO Cabin Safety Group (ICSG)
  – Brace position experts unable to reach consensus

• May – October 2016
  – ICAO Ad Hoc Group on Brace Position
  – Monthly teleconferences

• November 21, 2016
  – Meeting in London of 13 experts
  – Founding of IBRACE
iBRACE

• International Board for Research into Aircraft Crash Events
  -- https://en.wikipedia.org/wiki/International_Board_for_Research_into_Aircraft_Crash_Events

• Members from aviation, engineering, clinical medicine and HF

• Purpose: to produce an internationally agreed, evidence-based set of brace- for-impact positions
  -- for passengers and cabin crew members
  -- in variety of seating configurations
  -- to be submitted to ICAO through ICSG
Brace Position For Cabin Crew

Brace position in fwd-facing cabin crew seats, without and with bulkhead
Brace Position For Cabin Crew (2)

Brace position in rearward-facing cabin crew seats, without and with bulkhead
Brace Position for Passengers

Fwd-facing passenger seats equipped with lap strap seat belt only
Positions to Avoid

• Do not rest head on crossed forearms
  – risks fracturing both forearms

• Do not rest head on hands
  – risks fracturing both hands/fingers

• Avoid having head tilted backward
  – neck should not be extended
  – but should be bent forward to reduce risk of injury to neck and/or larynx

*These recommendations are based on medical SMEs interpretation and opinion*
Unacceptable Brace Positions
Infants & Children

- Brace positions presented in Doc 10086 apply to occupants of height of more than 125 cm (49 in)

- Infants and children whose weight is less than 26 kg (60 lbs) and whose height is less than 125 cm (49 in) should occupy approved CRS on board
  - in a seat of their own seat
  - in line with recommendations found in Doc 10049

- CRS provides ELoS to infants/children as to adult pax with seat belts

- Not possible for parent to physically restrain an infant/child during impact
Other Brace Positions

- Doc 10086 presents proposed brace position for pregnant women or passengers who have physical or special limitations
  - occupying fwd-facing passenger seat fitted with lap strap seat belt only

- Recommendations are not based on any testing but on a combination of medical SMEs’ interpretation and opinion

- Special considerations for persons with disabilities and attendants
  - ABPs or attendants accompanying persons with disabilities should adopt appropriate brace position
  - and refrain from assisting person with disabilities
Limitations & Special Considerations

• Brace position recommended by ICAO is designed for
  – Fwd-facing pax seats fitted with lap strap seat belt only

• Not currently possible to offer recommendations for
  – Pax seated other types of seats
  – Double cabin crew seats

• Because of lack of evidence

• Also not suitable for helicopters
  – as crash dynamics differ significantly from fixed-wing aircraft
In Closing

• Appropriate brace positions can reduce injuries & increase survival

• ICAO published recommended brace positions for pax & crew

• Limitations in recommendations due to lack of evidence

• IBRACE needs support to develop further recommendations
For more information, visit: www.icao.int/cabinsafety

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