



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

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WATS 2018

Orlando, USA, 17-19 April 2018

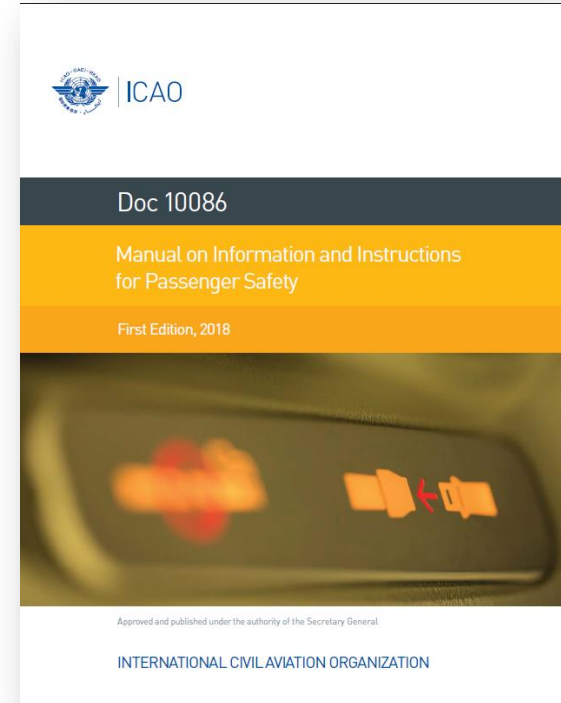
# Overview

- 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





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# 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](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



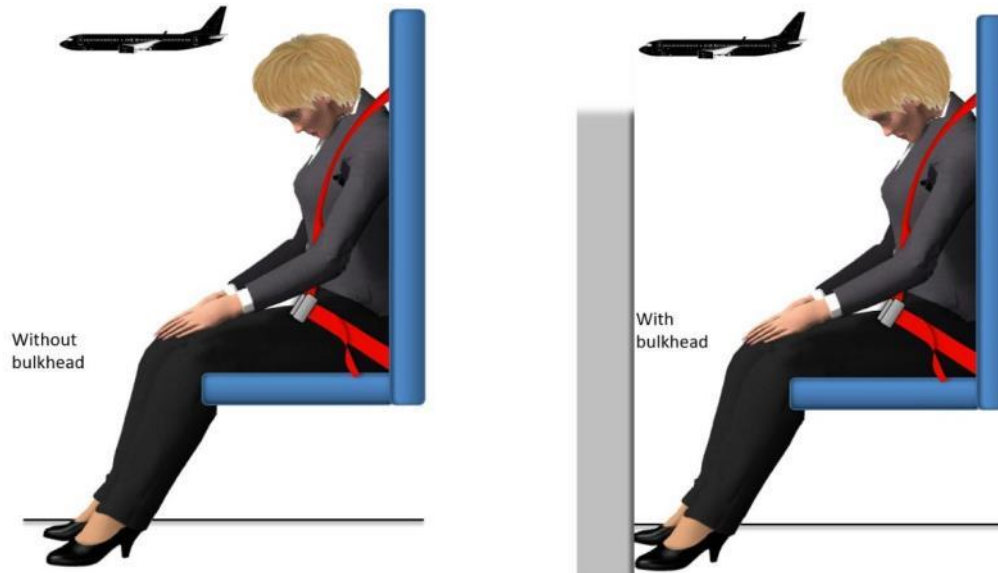
iBrAce

The logo features the text 'iBrAce' in a black, sans-serif font. The letter 'i' is lowercase, while 'BrAce' is uppercase. A stylized red and white airplane tail fin is integrated into the letter 'B', pointing upwards and to the right. The logo is set against a white background with a subtle reflection effect below it.



# 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



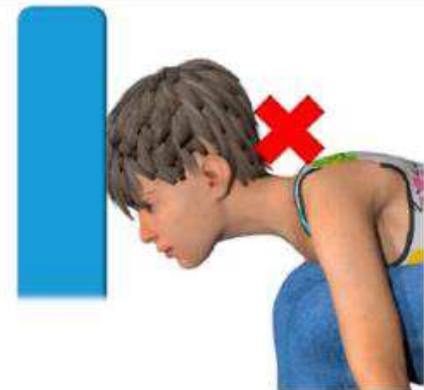
# Brace Position for Passengers

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





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