Democratic Socialist Republic of Sri Lanka



Civil Aviation Authority of Sri Lanka

General Direction

(Issued under Sec. 121, Civil Aviation Act No. 14 of 2010)

Title: Information and Instructions for Passenger Safety and Brace for Impact Positions during an Emergency for Aircraft and Helicopter Occupants.

Reference No.: CA-GD-2019-OPS S.N. : SLCAGD-006 Date: 01st March 2019

Pursuant to Section 121 of the Civil Aviation Act No.14 of 2010, Director General of Civil Aviation shall have the power to issue, whenever he considers it necessary or appropriate to do so, such General Directions for the purpose of giving effect to any of the provision in the CA Act, any Regulations or Rules made thereunder including the Articles of the Convention on International Civil Aviation which are specified in the Schedule to the CA Act.

Accordingly, I, being the Director General of Civil Aviation do hereby issue the General Directive as mentioned in the Attachment hereto (**Ref: CA-GD-006-0PS-Att-01**), for the purpose of giving effect to the provisions in the aforementioned Act and IS 013 - 2.12, which has been issued to give effect to Annex 6, Part 1, Chapter 4 – Section 4.2 as a recommendation for industry best practise to be used in an emergency situation.

This General Direction shall be applicable to every person holding an Air Operator Certificate issued by Director General of Civil Aviation and his employees engaged in flight operations as per the applicability changed on the overleaf and shall come into force with immediate effect and remain in force unless revoked. This General Direction shall replace and supersede General Direction 006 published on 15th December 2016.

Attention is also drawn to section 103 of the Act, which states inter alia that failure to comply with General Direction, issued by DGCA is an offence.

H.M.C. Nimalsiri Director General of Civil Aviation and Chief Executive Officer

Civil Aviation Authority of Sri Lanka 152/1, Minuwangoda Road, Katunayake.

Enclosure: Attachment No. SLCA-GD-006-Att-01

Page 1 of 1

02nd Edition

General Direction

Title: Information and Instructions for Passenger Safety and Brace for Impact Positions during an Emergency for Aircraft and Helicopter Occupants

1. General

The General Directive is issued for the information and guidance of the AOC holders of Sri Lanka to comply with, when carrying passengers for commercial operations, on the safety-related information and instructions that an operator shall provide to passengers. This has guidance for airworthiness standards related to passenger information signs, markings and placards that shall be located in the cabin during the time of certification.

In commercial operations, pursuant to Implementing Standard 013, Chapter 5.1, the Pilot-in-Command is responsible for the safety of all crewmembers, passengers and cargo on board. Hence, the operators shall ensure that the procedures of operation of aircraft is based on safe, secure, efficient and regular flight operations. If and when emergencies occur in aviation, the survivability of persons on board is dependent on multiple factors. As much as the manufacturer has improved the certification standards of the designs for crashworthiness and ditching to enhance survivability, there is yet the human factors which needs constant improvement to further improve the survivability of persons on board, in case of an incident or an accident involving an aircraft.

It has been proved that the survival rates of the passengers have improved during life threatening situations, when they have been informed in advance of the correct use of equipment to be used, actions to be taken and procedures that they may have to follow in the unlikely event of an emergency situation. The operator therefore should communicate specific and accurate information not only at the onset, but throughout the flight, if and when required, through verbal communication in the form of announcements and even through visual safety information such as safety briefing cards and safety visual signs in aircraft. The procedures should take into consideration the type of passengers that are carried on board including the passengers with reduced mobility, infants, children, elderly, unaccompanied minors to name a few, and persons seated near emergency exit rows.

DEFINITIONS

Able-bodied passengers. Passengers who are clearly physically able and are willing to help cabin crewmembers maintain good order and discipline on board the aircraft.

Cabin crewmember. A crewmember who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crewmember.

Child. A passenger who has reached their second birthday but not their twelfth birthday.

Child Restraint System. (**CRS**) Any device, other than a seat belt, that is designed specifically to protect and restrain an infant or child during all phases of flight. It typically has an internal harness and belt combination. The device needs to interface with the aircraft seat. This includes devices that are secured using the aircraft seat belt as well as systems that secure the device to the aircraft

Page 1 of 60

02nd Edition

seat. The device needs to meet minimum performance standards, as specified by the State of the Operator.

Crewmember. A person assigned by an operator to duty on an aircraft during a flight duty period.

Critical phases of flight. The period of high workload on the flight deck, normally being the periods between the beginnings of taxiing until the aircraft is on the route climb phase and between the final parts of descent to aircraft parking.

Deportee. A person who had legally been admitted to a State by its authorities or who had entered a State illegally, and who at some later time is formally ordered by the competent authorities to leave that State.

Direct access. A direct route or passage from a seat to an exit from which a passenger can proceed without entering an aisle or passing around an obstruction.

Dis-insection. The procedure whereby health measures are taken to control or kill insects present in aircraft, baggage, cargo, containers, goods and mail.

Emergency exit. Door, window exit, or any other type of exit (e.g. hatch in the flight deck, tail cone exit) used as an egress point to allow maximum opportunity for cabin evacuation within an appropriate time period.

Emergency exit row seating. Each seat in a row of seats located at an emergency exit, having direct access to the exit.

Escort. An individual authorized by a Contracting State or an aircraft operator to accompany inadmissible persons or deportees being removed from that Contracting State.

Flight crewmember. A licensed crewmember charged with duties essential to the operation of an aircraft during a flight duty period.

Inadmissible person. A person who is or will be refused admission to a State by its authorities.

Infant. A passenger who has not reached their second birthday.

Oblique-facing seats. Seats installed in the aircraft where the occupant angle relative to the aircraft longitudinal axis is other than those described for forward-facing, rearward-facing or side-facing seats.

Operator. The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Passenger. A person who is not an operating crewmember.

Person with disabilities. Any person whose mobility is reduced due to a physical incapacity (sensory or locomotor), an intellectual deficiency, age, illness or any other cause of disability when using transport and whose situation needs special attention and the adaptation to the person's needs of the services made available to all passengers.

Restraint. A device designed to safely restrain an occupant in his/her seat to prevent injuries resulting from inertia forces or other in-flight forces such as turbulence. A restraint may be a seat belt, safety harness or approved child restraint system.

Safety harness. A webbing-based restraint consisting of at least three anchor points restraining both the pelvis and upper torso.

Seat belt. A webbing-based restraint consisting of two anchor points restraining the pelvis. It is also referred to as a lap belt.

Special categories of passengers. Persons who need special conditions, assistance, or equipment when travelling by air. These may include but are not limited to:

- a) Infants;
- b) Unaccompanied children;
- c) Persons with disabilities;
- d) Persons with mobility impairments;
- e) Persons on stretchers; and
- f) Inadmissible passengers, deportees or persons in custody.

SLOB Briefing: (**passengers with infants**) Seat Belt, , Life Jacket, Oxygen Mask & Bracing Position briefing for persons with special needs

SOLEB Briefing: (visually handicapped person) Seat Belt, Oxygen Mask, Life Jacket, Exit & Bracing Position briefing for persons with special needs.

Unstaffed exit. Emergency exit for which no cabin crewmember has been positioned for the flight.

ABBREVIATIONS AND ACRONYMS

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Reference Documents;

1.	ICAO Doc 10086	Manual on Information and Instructions for Passenger Safety
2.	IS 013	Flight Operations – 2.12 – Passengers
		5 – Duties of Pilot - In - Command
3.	ASN 067	Standing Operating Procedures for Flight Deck Crewmembers
4.	IS 046	Requirements for issue of License for Ground Handling
		Arrangements, Facilities and / or services to aircraft
5.	SLCAP 4300	Cabin Crewmember Manual Standard – chapter 1.9.2
6.	SLCAP 4305	Cabin Crewmember Training Standard -
7.	SLCAP 4500	Part A 10.3.10. Part D Chapter 3 3.1

It is intended that the following reference materials to be used in conjunction with this document:

- 8. Transport Canada Publication, TP 4263, 2004-08 Helicopter Passenger;
- 9. Federal Aviation Administration Advisory Circular (FAA AC) 121-24C, 2003-07-23 Passenger Safety Information Briefing and Briefing Cards;
- 10. FAA Air Carrier Operations Bulletin 1-94-17—Brace for Impact Positions;
- 11. FAA Civil Aerospace Medical Institute (CAMI) DOT/FAA/AM-15/17, 2015-11-19 Effect of Passenger Position on Crash Injury Risk in Transport-Category Aircraft;
- 12. Flight Safety Foundation Cabin Crew Safety Bulletin, January/February 1988 Positions Brace Passengers for Impact to Reduce Injuries and Fatalities;
- 13. Society of Automotive Engineers (SAE) AS8043B, 2008-09-12 Restraint Systems for Civil Aircraft;
- 14. SAE Aerospace Recommended Practice (ARP) 4771, 2008-08-13 Recommended Brace Positions;
- 15. Civil Aviation Publication (CAP) 641, 1995-02-01 Report of the Review of Helicopter Offshore Safety and Survival;
- Advisory Group for Aerospace Research and Development (AGARDograph) No. 305(E), 1989 — Human Factors Relating to Escape and Survival from Helicopters Ditching in Water; and Taber, Michael J., Handbook of Offshore Helicopter Transport Safety — Essentials of Underwater Egress and Survival, Edition 01, 2015-10-07.

1. INTRODUCTION

- 1.1. Cabin Crewmember means any crewmember, other than a flight crewmember, who performs, in the interests of safety of passengers, duties assigned to him/her by the operator or the pilot-in-command of the aircraft. Cabin Crewmembers are primarily on board to ensure safety of passengers in an aircraft. Their training is designed for the purpose of safe and expeditious evacuation of the aircraft and necessary functions to be performed in an emergency or a situation requiring emergency evacuation.
- 1.2. Cabin crewmembers in an aircraft are trained according to SLCAP 4305, to respond to a variety of safety related situations including conducting an evacuation, within 90 seconds.
- 1.3. ICAO Standards address the need for passengers to receive safety information on board an aircraft. The in-depth content and presentation of such information should be internationally harmonized. National regulations should require operators to brief all passengers adequately on safety information applicable to their operation. Accident investigations and studies recognize that passengers tend to be inattentive to safety briefings. Therefore, operators may need to employ novel approaches to present safety

information—to encourage passenger attention and to improve comprehension and retention of the information and instructions.

- 1.4. Accident investigations have shown that deficiencies and inaccuracies in safety information briefings, signs, placards and markings can negatively impact passenger survival rates. Well-informed, knowledgeable passengers have a better chance of surviving life-threatening situations that may occur on board an aircraft. Therefore, the operators shall communicate specific information and instructions to passengers in a variety of methods to facilitate understanding. These methods include briefings and visual safety information (e.g., passenger safety briefing cards and placards).
- 1.5. Annex 8 Airworthiness of Aircraft contains provisions on markings and placards for all aircraft that are applicable to the State of Design as part of the type certification process and subject to approval, acceptance or validation by the State of Registry to demonstrate evidence that an aircraft meets its airworthiness requirements. This document presents guidance for airworthiness standards related to passenger information signs, markings and placards that should be located in the cabin. It also addresses other aspects related to the safety of passengers on board aircraft, including considerations for persons seated at emergency exit rows, recommended brace-for-impact positions and sample commands used by cabin crewmembers to instruct passengers in the event of an emergency. For the purpose of this manual, "State" refers to Civil Aviation Authority of Sri Lanka, unless specified otherwise.

2. PASSENGER SAFETY BRIEFINGS

The operator shall ensure that passengers are made familiar with the location and use of the following: this may be achieved by a Safety Briefing card and by an announcement, prior to departure of every flight.

- a) seat belts;
- b) exits to be used during an emergency;
- c) life jackets, if the carriage of life jackets is prescribed;
- d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed;
- e) emergency exits path lighting ;
- f) instructions and actions to be taken during an emergency;
- g) any other emergency equipment provided for individual use, including passenger emergency briefing cards; and
- h) ensure that all baggage carried onto its aircraft cabin are adequately and securely stowed.

3. CABIN CREWMEMBERBRIEFINGS / ANNOUNCEMENTS

3.1. Safety Briefings

3.1.1 Cabin crewmembers shall conduct verbal and visual safety briefings to provide the necessary information to passengers. Passenger safety briefings include the following but not limited to:

- a) pre-departure briefing;
- b) emergency exit row briefing;
- c) briefings for special categories of passengers;
- d) briefing conducted before take-off, commonly referred to as a safety demonstration;
- e) after take-off briefing;
- f) briefing in the event of turbulence;
- g) pre-landing briefing;
- h) after landing briefing;
- i) transit stop briefing;
- j) re-fuelling briefing;
- k) information and instructions to passengers during abnormal and emergency situations; and
- l) any other briefing(s), as required.
- 3.1.2 The operator shall list the content of each briefing described above and include it in its Operations Manual and/ or Safety and Emergency Procedures Manual as required. Additionally, the operator's cabin crewmember training programme should address the content and conduct of passenger safety briefings.

3.2. **Pre-Departure Briefing**

The operator's procedures shall require cabin crewmembers to conduct a pre-departure briefing prior to every flight (including stop-overs). Prior to departure from the gate, cabin crewmember shall brief passengers on the following items:

- a) Carry-on baggage, including, designated stowage locations and special instructions (e.g. place heavier items under the seat instead of in the overhead bin; any restrictions on the stowage of carry-on baggage in emergency exit rows);
- b) Operation of unstaffed exits; and
- c) Other required announcements (e.g., cabin disinsection and the policy on the use and stowage of portable electronic devices)

3.3. Unstaffed Exit Row Briefing

An unstaffed exit is an emergency exit for which no cabin crewmember has been assigned. Therefore, in case of an emergency situation which needs evacuation of aircraft, passengers may operate these exits in the event of an evacuation. The operator shall forward to the DGCA for approval the procedures regarding the criteria that passengers must meet in order to occupy seats located at emergency exit rows. The operator's procedures shall include briefings to passengers seated at unstaffed-exit rows on the operation of the exit and the responsibilities of seating in an unstaffed exit row. Prior to each flight, cabin crewmembers shall brief passengers seated at unstaffed exit rows on the following items:

- a) The importance of the role of the passenger in the event of an emergency, so that passengers seated at unstaffed exit rows are aware of their responsibility to operate the exit;
- b) Request the passengers to verbally accept the responsibility;
- c) The signal/command that would instruct the passengers to open exits. In order to prevent un-commanded opening, the cabin crew member shall also emphasize the 02^{nd} Edition Rev. 00 01st March 2019

need to follow all instructions and to listen closely to the crewmembers commands; and

- d) How to open the exit, including specific aspects of the operation such as:
 - 1) Check for hazards before opening the exit (i.e. fire, water, debris);
 - 2) What to do with the exit hatch, if removable; and
 - 3) The location of placards and the passenger safety briefing card.

NOTE: If the passenger seated at the exit does not take the responsibility of opening the exit for an emergency the crewmember shall change the seat to another passenger who will take the required responsibility.

3.4 Briefings for Special Categories of Passengers (SOLEB / SLOB Briefing)

- 3.4.1 In addition to the standard information provided to all passengers on board, certain passengers may require additional, personalized individual briefings, adapted to suit their specific needs.
- 3.4.2 The operator shall provide individual safety briefings to special categories of passengers and their companion, where applicable. These passengers include, but are not limited to the following:
 - a) Persons travelling with infants;
 - b) Unaccompanied minors;
 - c) Persons with visual disabilities;
 - d) Persons with mobility impairments; and
 - e) Persons on stretchers
- 3.4.3 An individual safety briefing for special categories of passengers shall include the following:
 - a) Information contained in the safety demonstration and the passenger safety briefing card that the passenger may not be able to receive otherwise (e.g., if the passenger is visually impaired) and is necessary for the safety of the person on board the aircraft; and
 - b) Additional information specific to the needs of the passenger, as required.
- 3.4.4 Individual briefings should be given to special categories of passengers prior to take-off, on the first leg of a journey, and prior to landing but may not need to be repeated during subsequent legs if the flight involves short transit stops on the same aircraft.
- 3.4.5 Cabin crewmembers shall brief special categories of passengers to verify their understanding of the following, as applicable:
 - a) Seat belt and other restraint systems:

Page 7 of 60

- 1) use of seat belts and additional features.
- 2) use of child restraint systems (CRS), if applicable. and 02^{nd} Edition Rev. 00 01^{st} March 2019

- 3) means to restrain, "secure" or control service animals, if permitted in the cabin;
- b) Emergency exits:
 - 1) Location of the nearest exit;
 - 2) Location of the nearest alternate exits; and
 - 3) Emergency lighting (emergency escape path lighting, exit signs);
- c) Oxygen during a decompression situation:
- d) Life jacket or individual flotation devices:
- e) Brace position:
 - 1) Most suitable brace position for the passenger based on physical condition; and
 - 2) Commands if bracing is necessary;
- f) Additional assistance during the flight;
- g) Assistance in the event of an emergency situation; and
- h) Additional information: location of seat controls, call button, passenger service unit, and lavatory.
- 3.4.6 In addition to the items covered above, cabin crewmembers shall address the following points, as applicable:
 - a) In the case of a passenger with mobility impairments who would require assistance to move to an exit in the event of an emergency, a cabin crewmember shall ascertain the passenger's specific needs and inform him/her of the following:
 - 1) The most appropriate exit for the passenger;
 - 2) The assistance that the passenger might require reaching that exit;
 - 3) The most appropriate means of providing that assistance;
 - 4) The most appropriate route to that exit; and
 - 5) The most appropriate time to begin moving to that exit
 - b) In the case of a visually impaired passenger:
 - 1) A tactile familiarization with:

- i) The equipment that the passenger may be required to use in the event of an emergency; and
- ii) If requested, the exits; and;
- 2) Inform the passenger of:
 - i) Where the passenger's mobility device, if any, is to be stored;
 - ii) The number of rows of seats separating the passenger's seat from the closest exit and from the alternate exit; and
 - iii) The features of those exits; and
- 3) If the operator carries Braille or large-print versions of its passenger safety briefing cards on board, a copy should be provided to the visually impaired passenger; and
- c) In the case of a passenger who is responsible for another person on board the aircraft:
 - 1) If the passenger is responsible for an infant, or a child occupying a CRS, information on
 - i) The use of CRS, including when the parent/guardian is required to secure the CRS occupant, by phases of flight and when the seat belt sign is illuminated;
 - ii) Instruction that an infant/child cannot share a seat belt with the accompanying parent/guardian;
 - iii) Information on the use of bassinets, including when they are permitted;
 - iv) How to place and secure the oxygen mask on the infant/child's face;
 - v) Use of infant life jackets, if available on board, including the location of the infant's life jacket, how to remove it from its location and packaging, how to assist the infant with donning it and when to inflate it;
 - vi) In case of turbulence, the infant/child needs to be secured in the CRS. If the infant/child is not in the CRS when turbulence is encountered, the parent/guardian is responsible for securing him/her in it;
 - vii) In the event of an anticipated emergency landing or ditching, the most appropriate brace position for the passenger and the need for the infant/child to be secured in the CRS; and
 - viii) In the event of an evacuation, the parent/guardian should remove the infant/child from the CRS and leave the device behind; and
 02nd Edition Rev. 00 01st March 2019

- 2) If the passenger is responsible for a person, other than an infant or child (Eg, passenger with restraints)
 - i) How to assist that person with donning and securing his or her oxygen mask; and
 - ii) How to use that person's personal restraint system, if any, on board the aircraft.

4. SAFETY DEMONSTRATION

- 4.1. The operator's procedures shall require cabin crewmembers to conduct an approved safety demonstration before every flight (including stop-overs). If cabin crewmembers are not part of the operators procedure the safety briefing shall be carried out by the Pilot prior to each Take-off. The safety demonstration may be conducted by cabin crewmember or via a video developed by the operator and presented to the passengers prior to take-off. It shall be specific to the aircraft make, model and series operated for the flight.
- 4.2. The safety demonstration shall include information about the following items but not limited to:
 - a) Use of seat belts and additional features (including when and how to fasten, adjust and release seat belts and or shoulder harnesses; and the need to keep the seat belt fastened while seated throughout the flight to prevent injury in the event of unanticipated turbulence encounters);
 - b) Location and presentation of the passenger safety briefing card and the importance for passengers to review it prior to take-off for safety reasons;
 - c) Location of emergency exits (including a mention that the nearest may be behind the passenger, that exits may be blocked, and the need to identify alternative exits);
 - d) Emergency lighting (emergency escape-path lighting, exit signs);
 - e) Location and use of oxygen masks, if applicable, including:
 - 1) The actions to be performed by a passenger to:
 - i) Obtain a mask;

Page 10 of 60

- ii) Activate the flow of oxygen; and
- iii) Don and secure the mask; and
- 2) The requirement for a passenger to don and secure his/her mask before assisting an infant or another passenger with his/her mask;
- f) The location and use of life jackets or individual flotation devices, if applicable, including:
 - 1)A demonstration of their location (including different stowage locations);
02nd EditionRev. 0001st March 2019

- 2) How to remove life jackets from stowage and packaging;
- 3) The method of donning and inflation, when to inflate life jackets, and the signalling equipment it contains;
- 4) Removal and use of flotation devices such as seat cushions; and
- 5) Donning and inflation of infant life jackets if available.
- g) Restrictions on the use of smoking devices (e.g. cigarettes, pipes, cigars, electronic smoking devices, etc.);
- h) The use and stowage of portable electronic devices (PEDs);
- i) Compliance with crewmembers' instructions, illuminated ordinance signs and posted placards;
- Cabin secured aspects (e.g. correct stowage of carry-on baggage, caution when opening overhead bins, refrain from obstructing aisles and cross-aisles; required position of tray tables, seat backs, footrests, in-flight entertainment system (IFE), window blinds and wearing of footwear, for movement on the surface, take-off and landing);
- k) what to do with carry-on baggage and belongings in case of an evacuation (to be left behind)
- 1) The brace position(s); and
- m) Importance of passengers informing cabin crewmembers of any safety concerns throughout the flight.
- 4.3. In addition to the items listed in section above, the operator may include the following items, as part of the safety demonstration:
 - a) Specific information to passengers in the event of an evacuation:
 - 1) Emphasis on listening to crewmember commands;
 - 2) The importance of speed to evacuate;
 - 3) Count seat rows to know how far to the nearest exit in case of reduced visibility;
 - 4) Stay low if smoke is present in the cabin;
 - 5) Evacuation methods with infants and children;
 - 6) Evacuation through exits without assisting evacuation means (i.e. no slide or slide-raft); and

7) Removal of high-heeled shoes in an evacuation;

Page 11 of 60	02 nd Edition	Rev. 00	01 st March 2019

- b) Security-related information:
 - 1) Not to congregate in galleys or near the flight deck;
 - 2) Unruly passengers will not be tolerated;
 - 3) Passengers may be called upon to assist if there is a security event; and
 - 4) The importance of passengers informing cabin crewmembers of any security concerns throughout the flight;
- c) Passenger management:
 - 1) Policy on alcohol consumption; and
 - 2) Coexistence and wellness in high-density seating;
- d) Use of Wi-Fi, if installed on board; and
- e) Dangerous goods, hazardous materials, including battery-related hazards (crushing, fire).

4.4. If the safety demonstration is conducted live by cabin crewmembers, they should carry it out in accordance with the standard content and sequence contained in the operator's procedures. The operator should equip each aircraft in its fleet with the necessary number of safety demonstration kits, each containing all the equipment and documentation needed to conduct the safety demonstration. During the demonstration, cabin crewmembers shall:

- a) Point out ordinance signs (e.g., no smoking, fasten seat belts, turn off PEDs);
- b) Hold up the seat belt and demonstrate how to fasten and unfasten it;
- c) Point out emergency escape-path lighting;
- d) Point out emergency exits;
- e) Hold up the passenger safety briefing card, demonstrate where it is found and unfold it in clear view of all passengers (including to show both sides if the card is double-sided);
- f) If applicable, demonstrate the use of oxygen, how the drop-down oxygen masks will appear (The cabin crewmember shall don the mask over mouth and nose and show elastic band behind the head; and
- g) If applicable, demonstrate the use of the life jacket, including location, how and when to don and inflate it and the signalling equipment it contains, if applicable.
- 4.5. If the cabin crewmembers complement does not allow crewmembers to be present in each cabin compartment when conducting a live safety demonstration, the demonstration should be repeated until passengers seated in all the cabin compartments, have been briefed.

- 4.6. During the conduct of a safety demonstration, the operator shall prohibit cabin crewmembers from performing any non-safety-related activities. All curtains/dividers shall be opened to provide passengers with an unobstructed view of the demonstration. If the demonstration is done via a video, cabin crewmembers shall verify that the IFE system is functional for all passengers before starting the video. The operator shall have a procedure to apply if the IFE fails (i.e., conduct a live demonstration). There may be a situation where the passengers' visibility of the live demonstration may be limited by monuments (i.e., interior features such as class dividers or closets) or seat type (e.g., suites in first- or business-class cabins). In such a situation, passengers shall be briefed in small groups or individually. To expedite the process, cabin crewmember shall make use of the passenger safety briefing card to illustrate the requirements as mentioned in 5. 4 e, f & g.
- 4.7. During the video demonstration, cabin crewmembers shall be stationed throughout the cabin. After the completion of the demonstration, cabin crewmember should conduct a walkthrough and answer any passenger questions or concerns.
- 4.8. Cabin crewmembers shall not replace the safety demonstration by asking passengers if they are familiar with the operator's equipment, exits and safety and emergency procedures. The safety demonstration shall be completed before take-off. However, a video demonstration should not be conducted during take-off; this may prevent passengers from hearing crewmember instructions/commands in the event of an emergency.

5. AFTER TAKE-OFF BRIEFING

- 5.1. The operator's procedures shall require cabin crewmembers to conduct a briefing once the aircraft is airborne. This briefing is commonly conducted by an announcement made over the public address (PA) system. Cabin crewmembers shall brief passengers on the following items:
 - a) Use of seat belts, including recommending that passengers keep their seat belts fastened when seated, and compliance with fasten seat belt signs;
 - b) Smoking restrictions; and
 - c) Policy on the use and stowage of PEDs.

5.2. **Briefing in the event of Turbulence**

The operator's procedures shall require cabin crewmembers to conduct a briefing when the aircraft encounters turbulence (when the "fasten seat belt" sign is illuminated). This briefing is commonly conducted by an announcement made over the PA system. Cabin crewmembers shall brief passengers on the following items:

- a) The need to return to their seat and fasten seat belts;
- b) The restriction on the use of lavatories; and
- c) The stowage of carry-on baggage.

5.3. **Pre-Landing Briefing**

The operator's procedures shall require cabin crewmembers to conduct a briefing prior to each landing. This briefing is commonly conducted by an announcement made over the PA system. Cabin crewmembers shall brief passengers on the following items:

- a) The use of seat belts or restraint systems;
- b) Cabin secured aspects (e.g. correct stowage of carry-on baggage, refrain from obstructing aisles and cross-aisles, required position of: tray tables, seat backs, footrests, IFE, and window blinds for landing, etc.);
- c) Smoking restrictions;
- d) Policy on the use and stowage of PEDs; and
- e) On flights that are longer than four hours, the location of the emergency exits.

5.4. After-Landing Briefing

The operator's procedures shall require cabin crewmembers to conduct a briefing after landing. This briefing is commonly conducted by an announcement made over the PA system. Cabin crewmember shall brief passengers on the following items, if applicable:

- a) The need to remain seated with the seat belt fastened until the "fasten seat belt" sign is switched off;
- b) The need to keep carry-on baggage stowed until the "fasten seat belt" sign is switched off;
- c) Smoking restrictions;
- d) Policy on the use and stowage of PEDs; and
- e) Instructions regarding safe passenger movement on airport aprons.

5.5. Transit Stop Briefing

The operator's procedures shall require cabin crewmembers to conduct a briefing when the aircraft is on the ground with passengers on board during a transit stop. This briefing is commonly conducted by an announcement made over the PA system. Cabin crewmember shall brief passengers on the following items:

- a) Smoking restrictions; and
- b) Policy on the use and stowage of PEDs.

5.6. **Re-fuelling Briefing**

The operator's procedures shall require cabin crewmembers to conduct a briefing when the aircraft is being refuelled with passengers on board or embarking/disembarking. This briefing is commonly conducted by an announcement made over the PA system. Cabin crewmember shall brief passengers on the following items:

a) Re-fuelling is taking place;

Page 14 of 60

02nd Edition

- b) The need to refrain from:
 - 1) Fastening seat belts;
 - 2) Using lavatories;
 - 3) Walking around the cabin; and
 - 4) Obstructing the aisles and cross-aisles;
- c) Smoking restrictions; and
- d) Policy on the use and stowage of PEDs.

6. ABNORMAL AND EMERGENCY SITUATIONS

- 6.1 The operator's procedures shall require cabin crewmembers to provide information and instructions to passengers during abnormal and emergency situations. The goal is to enhance their reaction and survival in the event of an accident. Abnormal and emergency situations include the following but not limited to;
 - a) Fire, smoke and/or fumes;
 - b) Cabin pressurization problems and decompression;
 - c) Anticipated and unanticipated emergency landing/ditching;
 - d) Evacuation (on land and water);
 - e) Crewmember incapacitation; and
 - f) Rapid disembarkation.

Note: Standard information and instructions specific to each of these situations shall be included in the Operations Manual and /or Safety and Emergency Procedures Manual (e.g., cabin crewmember checklists for preparing the cabin for an emergency landing). Detailed guidance on abnormal and emergency situations is contained in the Cabin Crewmember Training Standard Manual SLCAP 4305.

6.2. Language Requirements

Page 15 of 60

- 1. Information provided to passengers via safety briefings, announcements and the safety demonstration shall be in English and any other language so decided by the operator to promote appropriate communication with passengers.
- 2 The operator should consider the following when selecting language requirements related to safety briefings on international flights, in order to cover the largest percentage of passengers on board:
 - a) The use of English (Mandatory)
 - b) Official language(s) of the State of departure; and 02nd Edition Rev. 00

c) Official language(s) of the State of destination.

The operator should consider the language(s) of the passengers on board and assign language-qualified cabin crewmembers or interpreters on board the aircraft, on specific routes. In addition, the operator shall verify that emergency exit-row occupants comprehend the language spoken by the crewmember as required.

6.3. **Considerations for Operations without Cabin Crewmember**

On flights where cabin crewmembers are not been carried as part of the crew, flight crewmembers should be responsible for providing passengers with the standard briefing material presented in this chapter specific to the aircraft make, model and series operated for the flight. The operator may consider alternative means of transmitting the information (e.g., electronic means, videos, and pre-recorded announcements), particularly in single pilot operations. This may reduce the workload for flight crewmembers, particularly during critical phases of flight.

7. PASSENGER SAFETY BRIEFING CARD

7.1. General

- a) In compliance to Annex 6, Part I, paragraph 4.2.11.1.(e) and Implementing Standard 13 section 2.12 requires that passengers be made familiar with the location and use of different types of emergency equipment. One delivery method for this information is the passenger safety briefing card.
- b) The passenger safety briefing card shall provide information on exit locations and the use and location of emergency equipment. Additionally, it shall include relevant safety and emergency procedures that, when followed correctly, can significantly improve a passenger's survival following an accident. Information shall be presented in a visual and pictorial format that assists passengers to respond to an emergency situation as quickly and effectively as possible. The passenger safety briefing card is also an important tool that cabin crewmembers can use to individually brief passengers during an anticipated emergency.
- c) The pictograms depicted in the passenger safety briefing card is meant to supplement the information provided to the passengers during the passenger safety briefing(s), as described and is not, however, intended to replace it.

7.2. **Regulatory Considerations**

The operator shall provide passenger safety briefing cards as approved by the DGCA for each passenger on board its aircraft. In addition, section 8.4 below (Content) has the minimum content that shall be included on the passenger safety briefing card and guidelines related to its design and location on board the aircraft.

7.3. **Design, Layout and Location**

- 7.3.1. The operator should give consideration to the design, layout and location of the passenger safety briefing card to promote quick comprehension of its content, in a self-explanatory manner, and to allow passengers to easily see and retrieve it. The passenger safety briefing card shall have Human Factor Principals in the design and contents.
 - a) Systems, equipment and the actions required to operate them shall be depicted pictorially or diagrammatically. Procedures requiring several steps shall be presented in correct sequence, and the sequence shall be clearly identified (e.g., numbered steps). The use of international symbols are encouraged.

Note: Examples of international symbols can be found in the following documents: The International Organization for Standardization (ISO) standard ISO 3864 — Graphical symbols — Safety colours and safety signs — Part 1: Design Principles for Safety Signs and Safety Markings; The American National Standards Institute ANSI Z535.3-2011 — Criteria for Safety Symbols; and The Society of Automotive Engineers (SAE) Aerospace Recommended Practice (ARP) Document No. 3-1 3-2 SAE ARP577E — Emergency, Instruction and Information Placards — Internal and External.

- 7.3.2. All depictions should be simple and easy to understand. Steps should be taken to verify that any symbols used in a passenger safety briefing card are easily recognized and understood by naïve test subjects. Passenger safety briefing cards shall be approved by DGCA for comprehension in accordance with recognized standards. Examples of testing methods can be found in the following documents:
 - a) ISO 9186 Graphical symbols Test methods
 - b) ANSI Z535.3-2011 Criteria for Safety Symbols Annex B General Procedures for Evaluating Candidate Safety Symbols.
- 7.3.3. The passenger safety briefing card shall have a conspicuous title or symbol identifying itself as safety or emergency instructions. The card should include colours to draw the attention of the passengers, versus only black and white.
- 7.3.4. The design of the passenger safety briefing card shall make it easy to identify the aircraft type. On the cover page, the top quarter of the panel shall contain text in a large font that identifies the aircraft make, model and series—ideally, colour coded. The emphasis shall be placed on aircraft make, model and series versus the operator's name or logo. If the operator has multiple aircraft makes, models and series in its fleet, it should colour code the different aircraft makes, models and series to ensure that employees restocking the cards on aircraft use the corresponding card as exit locations or emergency equipment could vary between the different aircraft makes, models and series in the operator's fleet.
- 7.3.5. The card should be made of a durable material. The operator shall have a process to verify that correct cards are on board and to remove and replace damaged cards from the aircraft. This process also applies to self -adhesive safety information placards located on seat back tray tables.
- 7.3.6. The passenger safety briefing card shall be large enough so that when placed in its normal location on board the aircraft (as determined by the operator and approved by the DGCA), the seated passenger can see it easily and retrieve it.

Page	17	of	60
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Note: If the safety briefing card is too large and sits behind a tray table, it may be difficult to access it. The passenger may need to open the tray table to remove the card from stowage. If the card is too small, it may slip out of the sight of the passenger, when it is in its usual location.

- 7.3.7. The operator may use a self-adhesive safety information placard located on the seat back tray table or another part of the seat in front of the passenger. This type of placard may be necessary as some operators may not have seat back pockets or other locations for stowage of the traditional passenger safety briefing card. If this type of placard is used instead of a removable hardcopy passenger safety briefing card, it should be placed at eye level when the passenger is seated. This type of placard uses pictograms only because of limited space. Although space is limited, the placard should contain at a minimum the items listed above and meet criteria and design principles referenced.
- 7.3.8. As content could be limited in this format, the operator may need to add extra information to the content of the verbal passenger safety briefing to cover all required items.

7.4. **Content**

- 7.4.1. The information on the passenger safety briefing card shall be specific to the make, model and series of aircraft on which it is used, reflect the specific systems and equipment installed as well as procedures relevant to the systems and equipment on that particular aircraft make, model and series. The passenger safety briefing card shall contain the minimum information as outlined below, but not limited to:
 - a) Cabin secured aspects:
 - 1) Correct stowage of carry-on baggage;
 - 2) Caution when opening overhead bins;
 - 3) Refrain from obstructing aisles and cross-aisles;
 - 4) Required position of tray tables, seat backs, footrests, IFE and window blinds for movement on the surface, take-off and landing;
 - b) The use of seat belts and additional features:
 - 1) When and how to fasten, adjust and release seat belts and or shoulder harnesses; and
 - 2) Information on the use of CRS;
 - c) The Location and use of oxygen masks, if applicable, including:
 - 1) The actions to be performed by a passenger in order to:
 - i) Obtain a mask;
 - ii) Activate the flow of oxygen; and

Page 18 of 60

02nd Edition

Rev. 00

- iii) Don and secure the mask; and
- 2) The requirement for a passenger to don and secure his/her own mask before assisting to the infant or another passenger with his/her mask;
- d) The Location and use of life jackets or individual flotation devices, including:
 - 1) A demonstration of their location (including different stowage locations);
 - 2) How to remove life jackets from stowage and packaging;
 - 3) Method of donning and inflation, when to inflate life jackets, and the signalling equipment it contains;
 - 4) Removal and use of flotation devices such as seat cushions; and
 - 5) Donning and inflation of an infant life jacket
- e) Emergency exits (including over-wing exits):
 - 1) Location;
 - 2) Method of operation, including what to do with the exit hatch, if removable;
 - 3) Checking for hazards before opening the exit (i.e. fire, water, debris);
 - 4) Unusable exit and alternative egress routes in case of unusable exit(s);
 - 5) Leaving carry-on baggage behind;
 - 6) Method of egress through exits without assisting evacuation means;
 - 7) Awareness of exit height; and
 - 8) Awareness of propellers;
- f) Escape paths and evacuation routes:
 - 1) Depiction of routes to the exits inside the aircraft;
 - 2) Emergency lighting system (the form, function, colour and location of the floor proximity emergency escape path markings);
 - 3) Movement on a double-deck aircraft;
 - 4) Movement via the wing to the ground or water; and
 - 5) Movement on the ground or water away from the aircraft;
- g) Assisting evacuation means:

Page 19 of 60

1) Location of available equipment (e.g. life-raft, slide-raft); 02nd Edition Rev. 00

- 2) The location, removal and use of available life-raft(s);
- 3) Method of activation of the slide-raft(s);
- 4) Method of boarding the life-raft or slide-raft including with infants and children;
- 5) Method of egress through exit including with infants and children; and
- 6) Removal of high-heeled shoes in an evacuation;
- h) Brace position:
 - 1) Appropriate method based on the seat type; and
 - 2) Alternative brace positions (e.g. for expectant mothers, infants, children, tall or large individuals);
- i) The use and stowage of PEDs;
- j) Restrictions on the use of smoking devices (e.g. cigarettes, pipes, cigars, electronic smoking devices, etc.); and
- k) Any other relevant safety aspects, as required by the DGCA.
- 7.4.2. No advertisements or promotional items shall be included on the passenger safety briefing card. It shall only contain safety-related information. Anytime a specific crewmember is reflected on the card or sequence, the figure in the pictogram should clearly reflect a uniformed crewmember.
- 7.4.3. Any change to the approved Safety Briefing card shall be notified to DGCA and approved. If an operator modifies or changes the information included on its passenger safety briefing card, it shall evaluate the content and take steps to verify passenger comprehension.
- 7.4.4. On flights where cabin crewmembers are not required, additional information shall be included, such as the following:
 - a) Location of first-aid kits;
 - b) Location of fire extinguishers that are accessible to passengers;
 - c) Location of emergency locator transmitter(s), if removable from the aircraft (if applicable); and
 - d) Location of survival equipment, and if the stowage compartment is locked, the means of access or location of the key. (as applicable)

7.4.5. Language Requirements

- 1. Information on the passenger safety briefing card shall be clear and presented in an understandable manner. If text is necessary on the passenger safety briefing card, it shall be in English and in any other language(s) which the operator deems necessary. The operator should consider providing specific safety briefing cards for special categories of passengers, such as persons with disabilities. Examples include braille or large character cards.
- 2. Pictograms (also referred to as pictographs) are the recommended media type for passenger safety briefing cards, in lieu of text.
- 3. To ensure consistency and to minimize confusion for passengers, the information provided on the passenger safety briefing card shall be comparable to the instructions on the passenger safety information signs, markings and placards installed in the cabin. Pictograms shall be identical across all of these. The operator shall review the content of the passenger safety briefing cards, passenger information signs, markings and placards to ensure that it is essentially the same and is presented in the same manner.

8. PASSENGER INFORMATION SIGNS, MARKINGS AND PLACARDS

8.1. **Overview of CAASL Provisions**

- 8.1.1. IS 015 paragraph 2.2 d), contains requirements on the information and instructions that must be transmitted to passengers on board aircraft. An aircraft must be equipped with the means of ensuring that the following information and instructions are conveyed to passengers:
 - a) When seat belts are to be fastened,
 - b) When and how oxygen equipment is to be used if the carriage of oxygen is required;
 - c) Restrictions on smoking;
 - d) Location and use of life jackets or equivalent individual flotation devices where their carriage is required; and
 - e) Location and method of opening emergency exits.
- 8.1.2. In addition to the above, the following information should be conveyed to passengers, where applicable:
 - a) The recommendation that seat belts be fastened whenever seated;
 - b) The position of the seat back, head rest, foot rest and tray table for movement on the surface, take-off and landing;
 - c) The stowage of IFE screens and/or entertainment controls;
 - d) The restrictions on carry-on baggage stowage; and

Page 21 of 60

02nd Edition

Rev. 00

e) The use and stowage of PEDs, including stowage restrictions for laptop computers (e.g., not in a seat pocket)

9 **CERTIFICATION REQUIREMENTS**

- 9.1. Airworthiness standards published by DGCA shall encompass requirements for passenger information signs, marking and placards found inside the cabin. They should stipulate that the aircraft must contain specified signs, markings and placards, as well as any additional information, instrument markings and placards required for the safe operation of systems and equipment for which there are unusual design, operating or handling characteristics. Signs, markings and placards are subject to applicable standards set out by the State of Design as part of the type certification process and approved, accepted or validated by the State of Registry to demonstrate evidence that the aircraft meets its airworthiness requirements. Operators shall also comply with DGCA's requirements related to the signs, markings and placards on board their aircraft, which may be additional to the standards of the State of Design and State of Registry (e.g., specific language requirements for placards). The operator may wish to add additional placards not required by DGCA. Individual operator requests for additional placards will be subjected to DGCA's approval.
- 9.2. Signs, markings and placards shall possess the following characteristics, in order to be deemed suitable:
 - a) Be legible;
 - b) Be easy to understand;
 - c) Be located in an obvious place and clearly visible;
 - d) Not be easily erased, removed, disfigured, or obscured ;
 - e) Include both a locator (at eye level to attract attention) and a marker (at the exact location, if that location is at floor-level for example);
 - f) Have adequate letter to background contrast (e.g., black on white);
 - 1) For emergency equipment placards, red on white or vice-versa should be used;
 - g) Use symbols (pictograms) versus words, as much as possible;
 - 1) If words are used, English language (and/or languages required as part of the airworthiness standards) shall be used;
 - 2) If words are used, imperative sentences shall be used (i.e. expressing a command, such as "pull tab to open"); and
 - 3) If pictograms are used, international symbols are encouraged, to promote harmonization.

Note.—other colours may be used to depict other safety equipment (e.g., green for medical equipment/first aid kits).

02nd Edition

Section 9.3 provides detailed guidance on the content of signs, marking and placards, which should be found in the cabin. (*Figures in this chapter are provided courtesy of Airbus, Bombardier, Boeing and Embraer*).

9.3. Use of Pictograms

- 1. A pictogram is a symbol representing a concept, object, activity, place or event by illustration. Pictography is a form of writing in which ideas are transmitted through drawing. Pictograms are characterized by their simplified style, which omits all details that are unnecessary to the desired communication.
- 2. Pictograms are the recommended media type for signs, markings and placards (versus text). Pictograms are used to overcome the issue of passengers not being able to read or understand the language of a textual sign, marking or placard which would result in them missing out on information that may be critical for the safety of flight or to prevent personal injury. The use of pictograms for signs, markings and placards promotes global comprehension of their meaning and helps surpass language barriers. Pictograms that clearly express the intent of the sign, marking or placard are considered acceptable by DGCA.
- 9.3.1 In order to be considered acceptable, a pictogram should meet all the criteria listed above and have a minimum size that will allow a person to understand the information that the pictogram is relaying under all relevant combinations of lighting conditions and viewing distance. Since colour perception decreases with darker lighting conditions, pictograms shall be designed to be readable and comprehensible even in a monochrome style. Colours shall only give additional information and shall be used to categorize signs, markings and placards according to their meaning.

Note: SAE Document No. ARP577E contains general and detailed guidance on written instructions, pictorial instructions, minimum picture and word size, placard and background colour combinations and placard placement. SAE Document No. ARP503F – Emergency Evacuation Illumination provides guidance on the provision of adequate illumination to permit aircraft occupants to locate, proceed to, operate and use emergency exits, slides, life jackets, life-rafts, slide-rafts and survival equipment.

9.3.2 Each pictogram needs to be clearly understood by a broad population of different educational and cultural backgrounds. Therefore, comprehension tests should be conducted to ensure that pictograms are well understood. Since the understanding of a pictogram may depend on the individual background and experience of a person, the tests should involve persons from the concerned target groups of the pictograms. The tests should be designed and conducted in such a way that the results give a clear indication of the probability that the intended meaning of a pictogram is understood.

Note: The International Organization for Standardization (ISO) standard ISO 9186 – Graphical symbols – Test methods defines a valid test procedure. Guidance can also be found in ANSI Z535.3-2011 – Criteria for Safety Symbols – Annex B – General Procedures for Evaluating Candidate Safety Symbols.

These standards should be used to develop test plans to prove comprehensibility of pictogram-based cabin placards. The comprehension of a pictogram may depend on the environmental context. This is particularly true for pictograms that refer to specifics of aircraft or cabins, with which people from the travelling public may not be very familiar. Those pictograms should be tested in a realistic environment (e.g., in a mock-up of an aircraft cabin).

- 9.3.3 Standardization of the layout of pictograms is essential to ensure their comprehension by the travelling public. Some original equipment manufacturers have standardized pictograms that may be used to communicate information in passenger information signs, markings and placards. Standardized pictograms promote the harmonization of signs, markings and placards with the goal of achieving global comprehension by the travelling public of the safety critical information they provide. Inconsistencies in pictograms installed across different aircraft shall be avoided in order to avoid misunderstandings by passengers and confusion for crewmembers.
- 9.3.4 As part of the layout standardization, a common colour scheme should be applied throughout all signs, markings and placards. Based upon the ISO 3864 Graphical Safety Colours and Safety Signs standard, describing safety colours and safety signs for graphical symbols, and aiming at commonality with recent aviation standards, examples of a validated colour scheme are as follows:
 - a) Firefighting equipment should be shown in red colour;
 - b) Medical equipment and means of escape should be shown in green colour;
 - c) Warnings should be accentuated by a yellow triangle;
 - d) Prohibitions should be marked in red; and
 - e) Mandatory actions should be marked in blue.
- 9.3.5 This colour scheme is continued for contour lines that have been introduced to cluster the graphic elements on a placard and to separate them from elements of adjacent markings or placards:
 - a) Placards related to firefighting equipment should have a red contour;
 - b) Placards related to medical equipment and means of escape should have a green contour;
 - c) Placards showing prohibitions should have a red contour;
 - d) Placards showing mandatory actions should have a blue contour; and
 - e) Placards related to other indications or instructions should have a grey contour.

10 CONTENT OF SIGNS, MARKINGS AND PLACARDS

10.1 Seat belt use

Signs that notify occupants when seat belts must be fastened shall be installed in the cabin. The flight crewmembers shall be able to operate them from the flight deck. When illuminated, the "fasten seat belt" sign shall be legible to each person seated in the cabin, under all probable conditions of cabin illumination and for any seat position such as 02^{nd} Edition Rev. 00 01^{st} March 2019

upright, reclined, swivelled or tracked. The sign shall be readable by a person with 20/20 vision. To read the sign, the head may be moved about to normal positions, but not rotated backward (tilted). This evaluation shall be conducted with 5th percentile female to 95th percentile male occupants. Figure 01 presents an example of a "fasten seat belt" sign.



Figure 01 - Example of a "Fasten Seat Belt" Sign (Courtesy Of Airbus)

10.2 Safety and emergency equipment

Marking and placards for safety and emergency equipment are addressed as part of the certification process. However, the operator shall also seek compliance with published regulations, as applicable. Each safety or emergency equipment control to be operated by the crewmember in the event of an emergency situation (e.g., controls for automatic life-raft releases) shall be clearly marked showing how it is to be used. In addition, each location (e.g., overhead bin or compartment) that carries any fire extinguishing, signalling or other life-saving equipment (e.g., portable oxygen bottles) shall be marked accordingly. Stowage provisions for required safety and emergency equipment shall be clearly marked to identify the contents and facilitate the easy removal of such equipment. Figure 02 illustrates an example of a placard for safety and emergency equipment.



Figure 02 - Example of a Placard for Safety and Emergency Equipment (Courtesy Of Airbus)

Survival equipment (e.g., life jackets) shall be marked for identification and method of operation. When carried on board, each life-raft should have clearly marked operating instructions. Figure 03 presents an example of life-raft marked operating instructions.

WARNING HANDLE LIFE RAFT WITH CARE NEVER INFLATE INSIDE THE AIRCRAFT INFLATION PROCEDURES

1. LIFT FLAP TO EXPOSE THE SNAP HOOK

- 2. ATTACH SNAP HOOK TO THE INDICATE ASSIT HANDEL LOCATED
- NEXT TO FORWARD EXIT DOOR
- 3. THROW LIFE RAFT OVERDOARD
- 4. LIFE RAFT WILL INFLATE AUTOMATICALLY AFTER LINE IS OUT
- 5. IF CALM SEA, YANK LINE TO INFLATE
- 6. KEEP LIFE RAFT ALONGSIDE AIRCRAFTAND BOARD
- 7. KEEP LIFE RAFT AWAY FROM SHARP PROTRUSIONS

Figure 03 - Example of Life-Raft Marked Operating Instructions (Courtesy Of Embraer)

10.3 **Restrictions on smoking**

- 10.3.1 If smoking is prohibited on board the aircraft, at least one placard or sign shall be installed, stating the smoking prohibition. The placard or sign shall be legible to each occupant seated in the cabin, under all probable conditions of cabin illumination and for any seat position such as upright, reclined, swivelled or tracked. The sign shall be readable by a person with 20/20 vision. To read the sign, the head may be moved about to normal positions, but not rotated backward (tilted). This evaluation shall be conducted with 5th percentile female to 95th percentile male occupants.
- 10.3.2 If smoking is permitted, at least one sign shall be installed to notify occupants when smoking is prohibited. The flight crewmember shall be able to operate the sign(s) from the flight deck. When illuminated, the "no smoking" sign shall be legible to each occupant seated in the cabin, under all probable conditions of cabin illumination and for any seat position such as upright, reclined, swivelled or tracked. The sign shall be readable by a person with 20/20 vision. To read the sign, the head may be moved about to normal positions, but not rotated backward (tilted). This evaluation shall be conducted with 5th percentile female to 95th percentile male occupants. Figure 04 illustrates an example of a "no smoking" sign.



Figure 04 - Example of a "No Smoking" Sign (Courtesy Of Airbus)

10.3.3 Lavatories shall have "no smoking" or "no smoking in lavatory" placards located on each side (inside and outside) of the lavatory door and shall be at eye level and clearly visible to the occupants. A placard shall be located on, or adjacent to, the door of each receptacle

used for the disposal of flammable waste materials that indicates disposal of cigarettes is prohibited in the receptacle. Examples are presented in Figures 05 and 06 respectively.



Figure 05 - Example of a "No Smoking" Placard (Courtesy Of Airbus)



Figure 06 - Example of a Placard On A Disposal Receptacle (Courtesy Of Airbus)

10.4. Emergency exits

10.4.1 Each emergency exit designated for use by occupants in the event of an evacuation, its means of access and its means of opening shall be clearly marked. The markings used shall enable occupants to identify and locate each exit from a distance equal to the width of the cabin. In addition, means shall be provided to assist the occupants in locating the exits in conditions of dense smoke. Figure 07 presents an example of emergency exit markings.





- 10.4.2 The location of each emergency exit shall be indicated by a sign visible to occupants, as they approach along the main aisle (or aisles). Requirements shall include the following:
 - a) An emergency exit locator sign above the aisle (or aisles) near each exit, or at another overhead location if it is more practical because of low headroom (a single

rage 27 01 00	Page	27	of	60
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sign may be used to indicate more than one exit if each exit can be seen readily from the sign);

- b) An emergency exit marking sign next to each exit (a single sign may be used to indicate two exits if they can both be seen readily from the sign);
- c) A sign on each bulkhead or divider that prevents fore-and-aft vision along the cabin to indicate emergency exits beyond (and obscured by) the bulkhead or divider. If this is not possible, the sign shall be placed at another appropriate location; and
- d) Each sign may use the word 'exit' in its legend in place of the term 'emergency exit' or a universal symbolic exit sign. The design of exit signs must be chosen to provide a consistent set throughout the cabin.
- 10.4.3. The location of the operating handle and instructions for opening each exit from inside the aircraft shall be shown in the following manner (refer to Figures 08 and 09 for examples):
 - a) A marking, on or near the exit that is readable from a set distance (typically about 76 cm or 30 inches)
 - b) The operating handle for Type A, Type B, Type C or Type I exits should be selfilluminated with a set initial brightness (typically of at least 160 microlamberts) or be conspicuously located and well illuminated by the emergency lighting even in conditions of occupant crowding at the exit;
 - c) For Type A, Type B, Type C, Type I or Type II exits with a locking mechanism released by rotary motion of the handle, clear markings indicating:
 - 1) A red arrow, with a shaft at least three-fourths of an inch wide and a head twice the width of the shaft, extending along at least 70 degrees of arc at a radius approximately equal to three-fourths of the handle length;
 - 2) That the centre line of the exit handle is within ± 2.5 cm or 1 inch of the projected point of the arrow when the handle has reached full travel and has released the locking mechanism;
 - 3) The word "open" in red letters (typically 2.5 cm or 1 inch high), placed horizontally near the head of the arrow; and
 - d) For each Type III exit, placards that:
 - 1) Are readable by all persons seated adjacent to and facing a passageway to the exit;
 - 2) Accurately state or illustrate the proper method of opening the exit, including the use of handholds. The method of opening the exit should take into account the ergonomics of the exit design (e.g. if the exit is to be operated from the seated position, then this shall be clearly depicted); and
 - 3) If the exit is a removable hatch, state the weight of the hatch and indicate an appropriate location to place the hatch after removal.



Figure 08 - Example of Emergency Exit Operating Handle And Instructions – Inside Aircraft (Courtesy Of Boeing)



Figure 09 - Example of a Type III Exit Placard (Courtesy Of Bombardier)

- 10.5 Each emergency exit that is required to be opened from the outside, and its means of opening, shall be marked on the outside of the aircraft (refer to Figure 10 for an example). In addition, the following should apply:
 - a) The outside marking for each emergency exit on the side of the fuselage shall include a coloured band outlining the exit (typically a two-inch band);
 - b) Each outside marking including the band, shall have colour contrast to be readily distinguishable from the surrounding fuselage surface; and
 - c) For exits other than those in the side of the fuselage (e.g., ventral or tail-cone exits), the external means of opening, including instructions if applicable, shall be conspicuously marked in red, or bright chrome yellow if the background colour is such that red is inconspicuous. When the opening means is located on only one side of the fuselage, a conspicuous marking to that effect shall be provided on the other side.



Figure 10 - Example of Emergency Exit Operating Handle and Instructions – Outside Aircraft (Courtesy Of Bombardier)

- 10.6. If the aircraft has internal doors, each door that must be used in order to reach any required emergency exit shall have a suitable placard stating that the door is to be latched in the open position during take-off and landing (except for the flight-deck door).
- 10.7. Emergency lighting, including illumination of emergency exit marking and locating signs, interior lighting in emergency exit areas, and floor proximity escape path marking, shall be installed in accordance with the applicable airworthiness standards.

10.8 **Over-wing markings**

An escape route shall be clearly established from each over-wing emergency exit and covered with a slip resistant surface except for flap surfaces suitable as slides. Unless a means for channelling the flow of evacuees is provided, the escape route surface shall have an adequate reflectance (typically of at least 80 per cent), and be defined by markings with an appropriate surface-to-marking contrast ratio (typically of at least 5:1). Exterior emergency lighting shall be provided at each over-wing emergency exit, in accordance with the illumination values defined in the applicable airworthiness standards. Figure 11 presents an example of over-wing markings.

02nd Edition



Figure 11 - Example of Over-Wing Markings (Courtesy Of Embraer)

10.9 Baggage and cargo compartments

Each baggage and cargo compartment shall have a placard stating any limitations on contents, including weight, that are necessary under the loading requirements (refer to Figure 12 for an example). Typically, under-seat, baggage restraint systems designed for the storage of carry-on articles weighing not more than 9kgs (20 pounds) are excluded from the requirement for a loading-limitation placard. Compartments displaying "no stowage" placards need not have a weight-limit placard.



Figure 12 - Example of Baggage Compartment Placard (Courtesy Of Airbus)

11. OCCUPANCY OF EMERGENCY EXIT ROWS

11.1. General

11.1.1. An emergency exit is a door, window exit or any other type of exit (e.g., hatch in the flight deck, tail cone exit) used as an egress point to allow maximum opportunity for cabin evacuation within an appropriate time frame. Emergency exit row seating encompasses each seat in a row of seats located at an emergency exit, having direct access to the exit. In some instances, cabin crewmembers may not be positioned at these exits for a flight. When emergency exits are not assigned to cabin crewmembers, they are referred to as unstaffed exits (or self-help exits). Unstaffed exits may be floor-level exits or window exits, such as

Page 31 of 60

those located at the over-wing. Passengers are expected to operate unstaffed exits in the event of an evacuation.

11.1.2. The criteria for selecting passengers who may be seated in an emergency-exit row (staffed or unstaffed) shall be decided by the operator.

11.2 Emergency Exit Row Occupancy

The operator should establish procedures on emergency exit row occupancy, including for unstaffed exit rows during critical phases of flight. The operator shall also establish procedures to ensure that seats located at emergency exit rows are not occupied by passengers whose presence in those seats could adversely affect the safety of passengers or crewmembers during an evacuation.

11.3 Responsibilities of Unstaffed Exit Row Occupants

- 11.3.1. The operator's procedures shall include a means to communicate the responsibility of unstaffed exit row occupants to passengers including the importance of the role of such passengers in the event of an emergency situation. Passengers seated at unstaffed exit rows shall be briefed on their responsibility including:
 - a) Verbally accepting the responsibility to operate the exit;
 - b) Locating the emergency exit;
 - c) Comprehending the instructions for operating the exit;
 - d) Knowing when and how to open the exit;
 - e) Following all instructions given by a crewmember, including the signal or command to evacuate;
 - f) Checking for hazards before opening the exit; and
 - g) Stowing (or otherwise disposing of) the exit hatch, if removable, so that it will not impede the use of the emergency exit.

Note.—In the event of an anticipated emergency landing or ditching, cabin crewmembers may assign additional responsibilities to passengers seated at emergency exit rows. Detailed guidance can be found in the Cabin Crewmember Training Standard Manual SLCAP 4305.

11.4 Selection Criteria to Occupy an Emergency Exit Row

02nd Edition

- 11.4.1. The operator's procedures shall include criteria that passengers must meet in order to be eligible to occupy seats located in an emergency exit row. Such criteria are necessary so that a passenger's presence at an emergency exit row does not adversely affect the safety of other occupants during an evacuation. Passengers seated in emergency exit rows must meet the following criteria as far as practicable:
 - a) Be physically capable of operating the emergency exit;
 - b) Be capable of understanding the printed and spoken instructions in English;
 - c) Be able to determine if the exit is safe to open visually;
 - d) Have sufficient mobility, strength and dexterity to reach, operate and stow (or otherwise dispose of) the exit hatch, if removable;

- e) Be able to receive aural information from the crewmember and to communicate that information to other passengers orally;
- f) Be of an age to ensure that he/she has the physical, cognitive and sensory capacity to operate the exit;
- g) Not be responsible for another person, as this can hinder the opening of the exit;
- h) Not be travelling with any animal in the cabin (service, emotional, and/or pet);
- i) Not have a condition that might cause him/her harm by opening the exit; and
- j) Not have any other condition that might slow the opening of the exit, the flow of passengers or impede the pathway
- 11.4.2. The operator's procedures shall clearly indicate persons who may not, under any circumstance, occupy an emergency exit row seat. These include the following:
 - a) Passengers who do not/will not accept responsibility for the emergency exit;
 - b) Passengers who do not meet the criteria as listed in section 11.4.1 above; and
 - c) Passengers under escort, such as inadmissible persons, deportees or prisoners.
- 11.4.3. It may be difficult for the operator or its cabin crewmembers to assess a passenger's abilities and language comprehension. The operator shall have procedures in place for ground personnel and cabin crewmember to further validate the selection criteria and occupancy restrictions of an emergency exit row (e.g., passengers with physical disabilities, language comprehension, and communication abilities).

11.5 Language Requirements

- 11.5.1 Time is critical during an emergency situation. In addition to operating the emergency exit, passengers seated in an emergency exit row must understand the verbal commands of the crewmember during the evacuation process. These commands vary depending on the nature and location of the accident, potential fire, or other danger outside or inside the aircraft. Therefore, it is critical that passengers seated in emergency exit rows understand all commands of the crewmember (e.g., when to, and when not to, open exits).
- 11.5.2 Passengers are expected to open unstaffed exits during an evacuation. As mentioned above cabin crewmembers are required to brief all passengers seated in emergency exit rows by informing them of the location and use of the emergency exits in the event of an evacuation. This requirement may not specify a designated language for the briefing. Therefore, the unstaffed exit row briefing may be conducted in any language that is mutually understood by both the cabin crewmember and the passenger. The operators shall ensure that the procedures are in place to ensure that the unstaffed exit row briefing is conducted in a language that is understood by all passengers seated in the exit row.

11.6 Unstaffed Exit Row Briefing

- 11.6.1. Briefings are an integral part of passenger safety and, as such, an educational opportunity. Specific unstaffed exit row briefings should be included, as part of the operator's procedures, to provide the necessary information to passengers on the operation of exits and the responsibilities of seating in emergency exit rows where cabin crewmembers are not present. These briefings lead to increased passenger awareness, improved performance in an evacuation, and a higher level of safety.
- 11.6.2. Means of communicating the information required in the unstaffed exit row briefing might include, but are not limited to, the following:
 - a) Electronic communication of emergency exit row occupant responsibilities (e.g., use of technology— PEDs, kiosks, online check-in) ; and
 - b) Electronic verification and validation of acceptance of responsibilities—if not successful, a passenger should not be permitted to occupy a seat in that row.

12. INSTRUCTIONS FOR BRACE POSITIONS

12.1 Brace-for-Impact Position

- 12.1.1. Occupant survivability is linked to three phases of an accident:
 - a) surviving the crash sequence (i.e., the impact forces, consequent deceleration and secondary impacts);
 - b) evacuating the aircraft; and
 - c) surviving the post evacuation environment (e.g., sea, jungle, mountainous region). Occupants who are seriously injured during the crash sequence may be unable to evacuate and may suffer fatal injuries as a result (e.g., if occupants are unconscious or have a broken leg and the aircraft is on fire).

Note; Historical data in the ICAO Accident/Incident Data Reporting System (ADREP) show that the majority of accidents are survivable.

To enable the physical evacuation of the aircraft, it is important that occupants take actions to minimize the potential for injuries during the crash sequence. One action that occupants can take to contribute to their survival is to assume an appropriate brace-forimpact position. This is an action where a person pre-positions his/her body against whatever he/she is most likely to be thrown against, and which may significantly reduce injuries sustained.

12.1.2. The goal of a brace-for-impact position, commonly referred to as the brace position, is to reduce an aircraft occupant's injuries during a crash sequence. Injuries may result from the initial impact(s) of the aircraft against terrain, or obstacles when an occupant's body and limbs flail around the fixed point of the seat belt. Injuries may also result from secondary impact—the impact(s) between a body segment, such as the head or a flailing limb, and whatever it might hit during the crash sequence. Head injuries are often associated with secondary impact during an accident and can be the cause of, or a factor contributing to, fatalities. The brace position serves two purposes:

Page 34	of 60
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- a) It reduces flailing by having the forward-facing occupant flex, bend, or lean forward over his/her legs in some manner; and
- b) It reduces secondary-impact injuries by pre-positioning the body, predominantly the head, against the surface that it would otherwise strike during that secondary impact, thus reducing the momentum of the head and other parts of the body.

12.2 **Research on Brace Positions**

- 12.2.1 Since the 1960s, extensive research has been conducted on brace positions using anthropomorphic dummies in a series of sled-impact tests. The aim of such research is to determine the most beneficial passenger brace position in forward-facing, economy-type aircraft seats. Research shows that a reduction of secondary impact by prepositioning the body, predominantly the head, against the surface it would otherwise strike during impact can minimize the potential for injuries during the crash sequence.
- 12.2.2 Results from internationally recognized research studies on the brace positions were used to determine the recommended brace positions presented in this chapter. Studies to note on this subject are referenced in the appendix to this chapter. Some of the following recommendations for positions are based solely on the positions tested. Other recommendations are based on interpretation and opinion of the subject matter experts (SMEs) involved in the testing, either from an engineering or medical perspective.
- 12.2.3. All the images in this chapter are provided by the International Board for Research into Aircraft Crash Evaluation (IBRACE).

12.3 **Brace Position for Cabin Crewmembers**

12.3.1. Cabin crewmembers occupying a single or double cabin crewmembers seat (commonly referred to as a jump seat) shall adopt one of the following brace positions where possible, based on the orientation of the seat. In the event of an emergency, they shall not hold PEDs or any other item(s) while seated on cabin crewmembers seats. Cabin crewmembers shall not be holding anything in their hands, so they can respond to the situation either by verbal communication using the Public Address (PA) system or interphone or by releasing themselves from their safety harnesses, as appropriate. They shall not conduct any other duties while in the brace position, to avoid distractions. Cabin crewmembers shall be alert and immediately available to respond to a situation that may arise. They shall remain in the brace position until the aircraft comes to a complete stop.

12.3.2. Forward-facing cabin crewmember seat

In a forward-facing cabin crewmember seat, cabin crewmembers shall brace according to the following instructions, as shown in Figure 13:

- a) Slide back in the seat as far as possible towards the backrest; ensuring that upper and lower back is against the backrest;
- b) Securely fasten seat belt and shoulder harness:
 - 1) Tighten firmly;

- 2) Seat belt and harness straps must not be twisted;
- 3) When tightening the shoulder harness, make sure that the seat belt (lap strap) remains low across the hips and that the buckle is positioned correctly, as per manufacturer instructions;
- c) Place chin on chest;
- d) Rest hands on thighs;
- e) Place feet and legs slightly apart;
- f) If there is no bulkhead within forward reach, keep feet flat on floor and stretch out legs as far as possible; or
- g) If there is a bulkhead within forward reach, keep feet flat on floor and slide them forward until the tips of the toes touch the bulkhead (do no push feet against the bulkhead).



Figure 13 - Brace Position in Forward-Facing Cabin Crewmember Seats, without and with a Bulkhead

12.4 **Rearward-facing cabin crewmember seats**

- 12.4.1. In a strictly horizontal crash, the aircraft occupant's feet move in the direction of the deceleration. In the case of cabin crewmember sitting in rearward-facing (aft-facing) cabin crewmember seats, the feet will, therefore, move towards the back of the cabin crewmember seat. This could cause injuries to the heels if they were to strike the seat frame. However, in the event of a more vertical crash, the possibility of injury to the legs increases if the legs and feet are under the seat and the floor is displaced upward, or the seat flexes downward. In addition, in a vertical crash, there is the concern that if the feet are not flat on the floor, then the extra weight of the unsupported legs will be transmitted into the pelvis and spine, increasing the possibility of damage to those areas. Since the crash direction (vector) is not known before a crash, the recommended position is the one that should reduce more of the risk of injury, which is to place the feet flat on the floor with knees bent at 90 degrees.
- 12.4.2. Cabin crewmembers shall brace according to the following instructions, as shown in Figure 14:

- a) Slide back in the seat as far as possible towards the backrest; ensuring that upper and lower back is against the backrest;
- b) Securely fasten seat belt and shoulder harness:
 - 1) Tighten firmly;
 - 2) Seat belt and harness straps must not be twisted; and
 - 3) When tightening the shoulder harness, make sure that the seat belt (lap strap) remains low across the hips and that the buckle is positioned correctly, as per manufacturer instructions;
- c) Lean back and keep head against the backrest/headrest;
- d) Cross arms in front of the chest (do not hold the shoulder harness straps);
- e) Place feet and legs slightly apart;
- f) Place feet flat on the floor; and
- g) Keep knees bent at 90 degrees.



Figure 14 - Brace Position in Rearward-Facing Cabin Crewmember Seats, without and with a Bulkhead

Note.—there are currently no studies that have used double cabin crewmember seats. Therefore, no recommendations have been made in this document.

12.5 Brace Position for Passengers

12.5.1. Although extensive research has been conducted on passenger brace-for-impact positions, no single position has been determined. There is great variation in passenger characteristics and abilities, in-seat class characteristics, seat pitch and direction of travel. Other variables include restraint design and airbags, and experimental testing protocols. In cases where the recommended brace position cannot be achieved, it is possible to identify a few general

principles that will allow an appropriate brace position to be selected on the basis of factors which can be predetermined.

- 12.5.2 Forward-facing passenger seats equipped with a lap strap seat belt only
- 12.5.2.1. This section describes how to adopt the brace position for a person occupying a forwardfacing passenger seat fitted with a lap strap seat belt only. The instructions presented may be used by cabin crewmember to brief passengers during cabin preparation for an anticipated emergency landing or ditching. Passengers should remain in the brace position until the aircraft comes to a complete stop or until directed by the cabin crewmember to evacuate the aircraft.
- 12.5.2.2. In a forward-facing passenger seat fitted with a lap strap seat belt only, passengers should brace according to the following instructions, as shown in Figure 15:
 - a) Sit as far back as possible;
 - b) Fasten seat belt and tighten firmly (low across the hips to prevent submarining when a passenger slides forward under a loosely fitted seat belt. The seat belt should not be twisted);
 - c) Tuck chin onto chest;
 - d) Bend forward ("roll up into a ball");
 - e) Place head against the seat in front, and
 - f) Place hands on top of head, or
 - g) Place arms at sides of lower legs or hold lower legs (holding onto the lower legs may provide a more stable position); and
 - h) Place feet flat on the floor, as far back as possible; or
 - i) If passengers are seated at a bulkhead row or cannot reach the seat in front:
 - 1) Bend forward and place hands on top of head; or
 - 2) Bend forward and place arms at sides of lower legs or hold lower legs.



Figure 15 - Brace Positions in Forward-Facing Passenger Seats Equipped with a Lap Strap Seat Belt Only

Page 38 of 60	02 nd Edition	Rev. 00	01 st March 2019

12.5.3 When adopting the brace position, passengers should avoid certain positions, as shown in Figure 16. The passenger should avoid having the head tilted backward, that is, the neck should not be extended, but should be bent forward to reduce the risk of injury to the neck and/or larynx. The passenger should not rest their head on the crossed forearms, which risks fracturing both forearms. The passenger should not rest their head on their hands, which risks fracturing both hands/fingers. These recommendations are based on medical SMEs interpretation and opinion.



Figure 16 - Positions to avoid when adopting The Brace Position

12.5.4 Some brace positions are unacceptable as they increase the risk of injury to persons occupying a forward facing passenger seat fitted with a lap strap seat belt only, as shown in Figure 17. Passengers should avoid upright positions, as their head may hit the surface in front during the secondary impact. Passengers should avoid stretching out their arms or legs and pressing them against a surface in front of them. Passengers should also refrain from trying to physically restrain a child or another passenger in an adjacent seat or assisting another person in maintaining a brace position, as this may increase the risk of injury (refer to section 13-15 for guidance on brace positions for children and infants). These statements are based on the results of some sled-impact tests, examinations of survivors and victims of crashes, and medical and engineering SMEs' interpretations and opinions.



Figure 17 - Examples of Unacceptable Brace Positions

12.6 Special considerations for other seating configurations

The brace position recommended in this chapter is designed for forward-facing passenger seats fitted with a lap strap seat belt only. It is not currently possible to offer specific recommendations for passengers seated in the following types of seats, because of a lack of evidence:

02nd Edition

- a) Forward-facing, economy-type seats with a seat pitch less than 71 cm (28 inches) equipped with a lap strap only;
- b) Forward-facing seats equipped with a lap strap and shoulder harness with diagonal strap;
- c) Oblique-facing seats equipped with a lap strap only in which is embedded an airbag;
- d) Oblique-facing seats equipped with a lap strap and shoulder harness with diagonal strap;
- e) Side-facing seats equipped with a lap strap and shoulder harness with diagonal strap;
- f) Rearward-facing seats equipped with a lap strap only;
- g) Rearward-facing seats equipped with a lap strap and shoulder harness with diagonal strap; and
- h) Side-facing seats equipped with a lap strap only.

Note; the brace position recommended in this chapter is designed for aircrafts. It is not suitable for helicopter operations as crash dynamics differ significantly between fixed-wing aircraft and helicopters.

13. CHILDREN

- 1) Generally, children occupying passenger seats should adopt the same brace positions as adults. Due to their small stature, the flail envelope of children is smaller than that of adults so they are less likely to suffer secondary impact with the interior of the aircraft.
- 2) The lap strap should be placed low on the child's torso, just above the legs at the hips. If the lap strap cannot be adjusted so that it is tight on a small child, the child may sit on a pillow or blanket in order to raise the child so that the lap strap will fit securely. The pillow should not be placed behind the child.
- 3) Children seated in a forward-facing seat should bend forward over the lap strap and rest their head on the seat cushion between their legs, or bend their head forward, over the edge of the cushion, as appropriate for their height. This is done to reduce head flailing, as shown in Figure 18.



Figure 18 – Forward-facing seat, lap strap only, child

4) Children seated in an aft-facing seat should sit upright with head firmly against the seat back. Arms should be placed on the arm rests. If arm rests are not available, hands can be positioned on lap, as shown in Figure 19.



Figure 19 – Aft-Facing Seat, Lap Strap Only, Child

14. OCCUPANTS OF CHILD RESTRAINT SYSTEMS

The brace positions presented in this chapter apply to occupants of a height of more than 125 cm (49 in). In line with the recommendations found in the Manual on the Approval and Use of Child Restraint Systems (Doc 10049), infants and children whose weight is less than 26 kg (60 lbs.) and whose height is less than 125 cm (49 in) should occupy an approved child restraint system (CRS) on board aircraft, in a seat of their own. The use of a CRS provides an equivalent level of safety to infants and children as that afforded to adult passengers wearing seat belts. It is not possible for a parent, or guardian, to physically restrain an infant or child, especially during a sudden acceleration or deceleration, unanticipated or severe turbulence or impact. In the event of an anticipated emergency landing or ditching, the infant or child needs to be secured in the CRS until the evacuation commences (reference Doc 10049 for additional information.)

Page	41	of	60
i uge	- T	01	00

02nd Edition

- 1) A child restraint system shall be installed on a forward-facing passenger seat. This includes installing the child restraint system in the appropriate forward- or rearward-facing direction as indicated on the label for the size of the child.
- 2) Occupants of approved child restraint systems should remain in those systems in preparation for an emergency landing.
- 3) Occupants seated in approved child restraint systems should be braced in accordance with the instructions of the manufacturer of the device. If no instructions are available, the principles of bracing previously described should be followed.
- 4) Aft-facing child restraint systems usually provide even support to the infant's torso and head. Therefore no additional brace for impact efforts are necessary

15. LAP-HELD INFANTS

- 1) CAASL recommends that infants be restrained in an approved child restraint system for all phases of flight. However, in the event that there are lap-held infants in a forward-facing or aft-facing passenger seat, the following procedures may be used, as shown in Figure 20.
- 2) For forward-facing seats with a lap strap only, the infant should be held sitting upright (so that his/her back is in a "vertical" position) and face the adult. A larger infant may need to straddle the adult's hips.
- 3) The adult should place one arm around the infant's torso and the other arm should be supporting the infant's head.
- 4) The adult should then lean forward and rest the top of their head firmly against the seat back in front of them so the infant is held in the space formed between the adult and the forward seat back. It is very important for the adult to lean forward as much as possible to protect the infant. The closer the adult is to the seat back head, the better.
- 5) An infant should not be placed across the adult's lap (in a horizontal position), as this could result in the infant's head impacting the arm rests or fuselage wall during lateral aircraft movements.



Figure 20 – Forward-Facing Seat, Lap Strap Only, High Density Seating, Adult Holding Infant

Page 42 of 60	Page	42	of	60	
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02nd Edition

Rev. 00

Note: The brace position for an adult holding an infant in aircraft with low density seating with forward-facing seats and lap straps only, the brace position described above should be adopted; however, the adult should lean forward as much as possible with one arm around the infant's torso and the other arm supporting the infant's head.

- 6) For forward-facing seats with a lap strap and shoulder harness, the infant should be held sitting upright (so that his/her back is in a "vertical" position) and face the adult. A larger infant may need to straddle the adult's hips. The adult should place one arm around the infant's torso and the other arm should be supporting the infant's head, as shown in Figure 21.
- 7) The adult should sit in the upright position, resting chin on sternum. The adult's head should be tucked down as far as possible to try to eliminate secondary impact of the chin with the sternum.



Figure 21 – Forward-Facing Seat, Lap Strap and Shoulder Harness with Single Diagonal Strap, Adult Holding Infant

8) The brace positions described above would also apply to aft-facing passengers holding an infant, except that the passenger would sit upright with their head against the seat back, as shown in Figure 22.







Figure 23 – Aft-Facing Seat, Lap Strap and Shoulder Harness with Single Diagonal Strap, Adult Holding Infant

16. PREGNANT WOMEN OR PASSENGERS WHO HAVE PHYSICAL OR SPACE LIMITATIONS

This section presents a proposed brace position for pregnant women or passengers who have physical or special limitations and are occupying a forward-facing passenger seat fitted with a lap strap seat belt only, as shown in Figure 24. Recommendations are not based on any testing but on a combination of medical subject matter experts' (SMEs) interpretation and opinion.

a) Slide back in the seat as far as possible towards the backrest; try to ensure lower back is against the backrest;

Page 44	of	60
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02nd Edition

01st March 2019

- b) Fasten seat belt low and tight; belt must not be twisted; ensure that the seat belt is below the belly, so that it applies its forces to the pelvis. ;
- c) Place legs as wide apart as possible to assist with forward bending. Bend forward, leaning against the seat in front, if possible;
- d) Place hands on the back of the head one on top of the other; do not interlock fingers; tuck elbows in. Alternatively, place arms at the side of the lower legs;
- e) If there is no seat in front, bend over and either place hands on the back of the head or place arms at the side of the lower legs; hold lower legs; and
- f) Keep feet flat on the floor with lower legs positioned slightly rearward of the knees, if possible.



Figure 24 – Forward-Facing Seat, Lap Strap Only, High Density Seating, Pregnant Passenger



Figure 25 – Aft-Facing Seat, Lap Strap Only, High Density Seating, Pregnant Passenger

Note: The high density seating brace position may be easier for pregnant women and passengers who have physical limitations or space limitations to assume than the low density seating brace position. These passengers may benefit from being relocated to aft-facing seats, when available.

17. AFT-FACING SEATS EQUIPPED WITH A LAP STRAP ONLY

- 1) Sit upright with head firmly against the seat back, or bulkhead, behind. Arms may be placed on the arm rests. If arm rests are not available, hands can be positioned on lap.
- 2) Hands should not be clasped behind head or neck because this may increase stress on the neck due to the mass of the arms and hands as they react during impact, as shown in Figure 26.



Figure 26 – Aft-Facing Passenger Seat, Lap Strap Only

17.1. Aft-facing Seats Equipped with a Lap Strap and Shoulder Harness

- 1) For aft-facing seats equipped with a lap strap and shoulder harness, follow the same procedures as for a forward-facing seat with lap strap and shoulder harness, except that the head should be placed firmly against the head rest.
- 2) Hands should not be clasped behind head or neck because this may increase stress on the neck due to the mass of the arms and hands as they react during impact, as shown in Figure 27.







Figure 28 – Aft-Facing Crew Member Seat, Lap Strap and Shoulder Harness with Dual Upper Torso Straps.

18. SIDE-FACING SEATS EQUIPPED WITH A LAP STRAP ONLY

- 1) Whenever possible, occupants should be relocated to forward-facing or aft-facing seats. Side facing seats without lateral support for the whole body, including the legs, do not provide good protection from impact loads.
- 2) When forward-facing or aft-facing seats are not available, bend over and lean toward the front of the aircraft, then rest upper torso and head against whatever might be contacted to help reduce head flailing.

Page 47 of 60

02nd Edition

Rev. 00

18.1 Side-facing Seats Equipped with a Lap Strap and Shoulder Harness

1) Place crossed arms over chest and tuck hands and thumbs under armpits, and bend head forward.

19. HELICOPTER OCCUPANT BRACE POSITIONS

19.1 Onshore Helicopter Occupant Brace Positions

- 1) Occupants in forward-facing seats equipped only with a lap strap should adopt the standard forward-facing brace positions for fixed-wing occupants (Figures 29).
- 2) Occupants in forward-facing seats with shoulder harness should adopt an erect brace position with the arms crossed over the chest and the chin tucked down, resting in the space created between the arms. Fingers should be tucked under the houlder straps of the shoulder harness, if possible. Thumbs should be facing up, and not tucked under the shoulder harness. Knees should be pressed together, feet slightly apart and heels slightly forward of the seat. This brace position provides the occupant with the best impact protection and also minimizes the risk of disorientation.



Figure 29 – Forward-Facing Seat, Lap Strap and Shoulder Harness with Dual Upper Torso Straps, Onshore Helicopter Occupant

3) Onshore helicopter occupants in aft-facing seats with a shoulder harness should adopt an erect brace position with the arms crossed over the chest. Fingers should be tucked under the shoulder straps of the shoulder harness, if possible. Thumbs should be facing up, and not tucked under the shoulder harness. Knees should be pressed together, feet slightly apart and heels slightly forward of the seat. Head should be placed firmly against the head rest or seat back, as shown in Figure 30.



Figure 30 – Aft-Facing Seat, Lap Strap and Shoulder Harness with Dual Upper Torso Straps, Onshore Helicopter Occupant

19.2 Offshore Helicopter Occupant Brace Positions and Instructions for Underwater Egress

- 1) The crash dynamics for helicopters, particularly ditching in water, are different than for fixed-wing aircraft. Helicopters tend to crash vertically or, under autorotation conditions, at more acute angles to the surface of the water or ground. The vertical component of the crash forces can be much greater than the forward component. Disorientation is likely if the helicopter sinks and rolls and is intensified by inrushing water, which destabilizes the whole body in the seat. In an attempt to address the effects of disorientation caused by sudden immersion and inversion and the effects of in-rushing water, Transport Canada Civil Aviation suggests forming a manual physical reference point by maintaining a positive grip on the aircraft seat with the hand furthest from the emergency exit. The manual physical reference point allows the occupant to form a mental image of which way to proceed to an emergency exit after an accident and will aid in the development of automatic performance in an emergency. The hand closest to the exit can then be used to locate and jettison the exit.
- 2) For offshore helicopter operations, occupants are required to wear a helicopter passenger transportation suit throughout the trip to and from the offshore installation or vessel. An occupant in a forward-facing seat wearing a helicopter passenger transportation suit in a seat equipped only with a lap strap should bend forward and rest their head and chest against their upper legs. The head should be face down in the occupant's lap and not be turned to one side. The arm closest to the emergency exit should be wrapped under the occupant's legs. The hand furthest from the emergency exit should grip the edge of the aircraft seat with the elbow tucked in close to the occupant side. If there is an arm rest, the elbow should be tucked next to the body and not placed on or over the arm rest. Knees should be pressed together, feet slightly apart and heels slightly forward of the seat, as shown in Figure 31.



Figure 31 – Forward-Facing Seat, Lap Strap Only, Offshore Helicopter Occupant

3) An offshore helicopter occupant in an aft-facing seat wearing a helicopter passenger transportation suit in a seat equipped only with a lap strap should adopt an erect brace position with arms extended and both hands gripping the edge of the aircraft seat. The occupant should avoid locking out their elbows in making contact with the front edge of the seat. Knees should be pressed together, feet slightly apart and heels slightly forward of the seat, as shown in Figure 32.



Figure 32 – Aft-Facing Seat, Lap Strap Only, Offshore Helicopter Occupant

4) Offshore helicopter occupants wearing a helicopter passenger transportation suit in a seat with a shoulder harness should adopt the same brace positions as illustrated in Figures 29 and 30 for onshore helicopter occupants. After impact, the hand closest to the exit should lower to reach for the seat edge in order to landmark the exit. The occupant should then reach for the exit door/window frame with the hand closest to the exit and keep that hand on the exit while the opposite hand releases the shoulder harness. The occupant should then egress head first, without kicking their feet.

Page	50	of	60
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Note: Although in general, passengers and crew members are advised not to hold on to the restraint system as it can introduce slack into the system, for offshore helicopter occupants in a seat with a shoulder harness, CAASL recommends maintaining a positive grip on the restraint system with the fingers (thumbs should be facing up) in order to assist the occupant with egress upon impact. By maintaining a grip on the restraint system, the occupant need only slide his/her hand down the harness to unfasten their safety belt. Doing this may save time and reduce or limit the effects of disorientation caused by a helicopter sinking and rolling

20. Additional Resources

- 20.1. This section presents existing guidance material developed by States that can be used to determine brace positions for passengers and cabin crewmembers. This guidance includes, but is not limited to, the following:
 - a) Canada: Transport Canada Civil Aviation (TCCA) Advisory Circular TCCA AC 700-036 – Brace for Impact Positions for all Aircraft Occupants
 - b) United States: The Federal Aviation Administration (FAA) Advisory Circular AC 121-24D – Passenger Safety Information Briefing and Briefing Cards
- 20.2. The documents cited in this section can be found in the ICAO Cabin Safety Library, on the Organization's website: www.icao.int/cabinsafety.

Appendix 1 Research Studies on Brace Positions

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21. BRACE AND EVACUATION COMMANDS

21.1 General

When an emergency situation arises, passengers may not be able to see exits from their seated position because of the cabin configuration, environmental factors such as smoke in the cabin, or communication and lighting system failures. They may not be aware of the need to evacuate or may panic. Cabin crew shall reinforce the need for passengers to take action to increase the chances of survival, by shouting brace commands or directing passengers toward exits.

21.2 Brace Commands

- 21.2.1. The brace position is determined to be the most effective protective position for passengers to adopt in order to mitigate the potential for injury during impact. The most appropriate brace position may vary according to seat orientation, seat belt installation (e.g., shoulder harness, airbag) or cabin configuration. Brace commands need to reflect the appropriate brace position.
- 21.2.2. When the need to brace is determined, a command is normally given by the flight crew. This command serves a dual purpose: advising the cabin crew that impact is imminent and advising passengers of the need to brace. Cabin crew may need to supplement this command with shouted commands to keep passengers in the brace position during impact and until the aircraft has come to a stop. Commands shall be delivered loudly, assertively, repeatedly and consistently. They should also be well paced so as not to cause confusion, taking into consideration the tone of voice, languages used and the number of cabin crew shouting commands at the same time.
- 21.2.3. Research* shows that the word "brace" is poorly associated with passengers' understanding of the correct brace position to adopt in the event of an impact. Directional instructions such as "bend over" and "heads down" are more likely to yield the desired behaviors. For a person occupying a forward-facing passenger seat fitted with a lap strap seat belt only, a typical brace command is "heads down, stay down". More generic commands may be used in mixed cabin configurations where seats or brace positions may differ. In such instances, attention should be drawn to the appropriate brace position through a verbal briefing and supplemented by the passenger safety briefing card. Refer to the appendix of this chapter for sample brace commands.

*D. Johnson, "Studies reveal passenger misconceptions about brace commands and brace positions, cabin crew safety," Flight Safety Foundation, Vol. 33, No. 3 (May–June 1998), p. 5

21.3. **Evacuation Commands**

- 21.3.1 After landing, if the flight crew determine that an evacuation is not required, they may give a command instructing passengers to remain seated. If an evacuation is deemed necessary, cabin crew commands to initiate the evacuation shall instruct passengers to take the following actions:
 - a) Release seat belts and stand up;
 - b) Retrieve and don life jacket or other flotation device (in case of unanticipated ditching);
 - c) Leave all personal belongings on board; and
 - d) Move into the aisle and prepare to go to the nearest available exit.
- 21.3.2 Once cabin crew members open the exits and verify that assisting evacuation means (e.g., slide, slide-raft) are ready for use; they shall instruct passengers to move towards the usable exits. At exits equipped with dual-lane slides, cabin crew members shall instruct passengers to divide into two lines at the doorway to evacuate as many passengers as possible simultaneously in pairs. Where an exit is unusable for any reason, cabin crew members shall block the exit and give positive commands directing passengers to an alternative usable exit.
- 21.3.3 Evidence from evacuations has shown that significant numbers of passengers attempt to take carry-on baggage with them when evacuating an aircraft—contrary to cabin crew instructions. Such passenger behavior can present a significant hindrance to egress, injury to other passengers and damage to slides. Cabin crew commands shall include instructions to leave all personal belongings on board; these shall be repeated during the evacuation. Refer below for guidance on additional procedures regarding carry-on baggage in evacuations.
- 21.3.4 In an evacuation on land, commands for passengers to leave the aircraft will vary according to the method of escape (e.g., using slides versus the aircraft's wing flaps). Cabin crew should instruct passengers to move away from the aircraft. The operator may need to adapt the evacuation commands according to the aircraft type and situation.
- 21.3.5 In an evacuation on water, commands for passengers to leave the aircraft will vary according to the type of flotation devices and the method of escape (e.g., slide-raft versus life-raft). In the event of an unanticipated ditching, cabin crew members need to provide additional commands to passengers (e.g., to find and retrieve flotation devices, remove high-heeled shoes), as appropriate. Refer to the appendix of this chapter for sample evacuation commands.

21.4 Language Requirements

Commands shall be transmitted in the language of the operator and English, as determined by the operator. Not all passengers will speak English or the chosen language. Therefore, visual cues may be necessary to support shouted commands

Appendix 2 Sample Brace and Evacuation Commands

Action	Specific element	Sample command
Brace for impact	Forward-facing passenger seat fitted with a lap strap seat belt only	"Heads down, stay down" or "Bend over, heads down"
Evacuation initiation	Not applicable	"Release seat belts and get up" "Leave everything behind "
Unplanned ditching initiation	Locating and donning life jacket or floatable seat cushion	"Grab life jacket, don life jacket" "Grab seat cushion, bring it with you"
While exit is being prepared	Preventing premature use	"Stand back" "Hold the people back"
Exit opened	Single-lane slide	"Come this way"
	Dual-lane slide	"Come this way" "Form two lines"
	Unusable exit	"Exit blocked" "Go that way" "Turn around" (if passengers need to go in the opposite direction in the cabin)
Evacuation on land	Using slide	"Jump and slide" "Move away" or "Sit and slide" (for slides on the upper deck or with a ramp) "Move away"
	Onto wing with a staffed exit	Step out" "Follow the arrows"
	From exit directly to ground (no	Sit down" "Jump down"
	slide)	Sit down - Jump down

Attachment No. SLCA-OD- 000				
Unanticipated emergency situation using able-bodied passengers (ABPs) command	Enlist help of ABPs	"You and you help"		
Use of flotation devices	Using life jacket	"Inflate life jacket" (as passengers exit aircraft, not before)		
	Using seat cushion	"Grab seat cushion" "Arms through the straps" "Hold to chest"		
Evacuation on water	Into water	"Jump, swim away"		
	Onto wing at staffed exit	"Step out" "Follow the arrows"		
	Onto slide-raft	"Crawl onto raft" "Sit to the sides"		
	Into slide-raft	"Climb into raft"		

22. CARRY-ON BAGGAGE IN EVACUATIONS AND OTHER CONSIDERATIONS

22.1 Safety impact with Carry-on Baggage

Air travel today encourages more carry-on baggage in the cabin. This is a result of marketing initiatives, commercial pressures and passenger perception. Additionally, manufacturers are producing aircraft with larger overhead bins, capable of storing more baggage. Passengers are unaware of the risks associated with excess carry-on baggage or the risks associated with taking their baggage during an evacuation. The consequences could include impeding an orderly and timely evacuation, damaging a slide, and increasing the risk of injury. Many evacuations have shown that passengers have a tendency to attempt to retrieve their belongings in an evacuation—despite cabin crewmembers repeatedly instructing them to leave behind carry-on baggage. Such situations may lead to passenger management and crowd control issues in an evacuation, as passengers insist on taking their belongings with them. This chapter contains recommendations to manage carry-on baggage issues in the event of an evacuation. It also addresses considerations related to passenger education and filming of emergency situations on board.

22.2 **Operator Policy and Procedures**

The operator's carry-on baggage policy and procedures shall address the following:

- a) The stowage of carry-on baggage:
 - 1) In such a manner to help prevent falling from overhead bins and causing injury;

- 2) So as not to cause obstruction to emergency exits and safety and emergency equipment;
- 3) So as not to exceed the maximum placarded weight limitations of the stowage compartments or overhead bin;
- b) The management of carry-on baggage during an evacuation;
- c) Passenger awareness of the operator's carry-on baggage policy; and
- d) The management of excess carry-on baggage.

22.3 Carry-on Baggage during Evacuations

- 22.3.1. Passengers will endeavour to collect their personal belongings before evacuating the aircraft, particularly when the threat to life is not immediately evident to them. The operator shall be prepared for this eventuality and have a strategy in place to mitigate the risks involved with passengers removing carry-on baggage during an evacuation. Such strategies include the following:
 - a) Reinforcing and emphasizing the requirement to leave personal items behind by including it in the passenger announcements made in the following situations:
 - 1) Pre-flight safety briefing;
 - 2) Emergency briefing; and
 - 3) Before landing on every flight;
 - b) Clear illustrations in the passenger safety briefing card emphasizing that carry-on baggage must not be taken in an emergency situation;
 - c) Simple, clear cabin crewmembers commands to leave carry-on baggage behind during an evacuation; and
 - d) Training of cabin crewmembers in human response during emergency situations and how to influence passengers to leave their carry-on baggage.
- 22.3.2. The operator shall identify the accepted action for the cabin crewmembers to take in the event that passengers ignore their instructions. The following should be considered:
 - a) Forcibly removing carry-on baggage at the exit, including:
 - 1) Build-up of items subsequently blocking exit routes;
 - 2) Slowed rate of egress due to confrontation;
 - 3) Injury to cabin crewmembers from hoisting baggage over seatbacks away from the exit; and

- 4) Physical confrontation with passengers preventing the continuation of evacuation procedures;
- b) Throwing carry-on baggage outside the aircraft:
 - 1) Injury to persons outside the aircraft;
 - 2) Injury to cabin crewmembers performing the task; and
 - 3) Damage to ground equipment or slide; and
- c) Allowing passengers to take items that they insist on taking:
 - 1) Slowed rate of egress;
 - 2) Injury to passenger or others using the slide;
 - 3) Injury to persons assisting at the bottom of the slide;
 - 4) Damage to the slide; and
 - 5) Build-up of debris at the bottom of the slide.

23. CABIN CREWMEMBER TRAINING

- 23.1. Cabin crewmembers training (initial, recurrent, requalification etc.) shall include competency-based training as this will assist in addressing expected or possible passenger behaviour during an evacuation. Training programmes shall emphasize the management of scenarios where passengers bring carry-on baggage to the exit during an evacuation.
- 23.2. The training environment should promote critical thinking and independent decisionmaking among cabin crewmembers, when the situation dictates.
- 23.3. The operator shall include the following points in the training programme:
 - a) Passenger behaviour in emergency situations;
 - b) Cabin crewmembers decision-making;
 - c) Situational awareness;
 - d) Risk assessments during emergency situations;
 - e) Cabin crewmembers assertiveness;
 - f) Anticipation of likely evacuation issues;

02nd Edition

- g) Cultural awareness and how that affects passenger behaviour;
- h) Service and emotional support animals and how they affect passenger behaviour;

Page 57 of 60

Rev. 00

01st March 2019

- i) Cabin conditions that influence behaviour during an evacuation (e.g., smoke-filled cabin creates urgency whereas no smoke or visible fire may lead to lack of urgency);
- j) Passengers with reduced mobility; and
- k) Family travel (e.g., parents and children may be split up in the cabin).

Note.—Guidance on the development of cabin crewmember training is contained in the Cabin Crewmember Training Standard Manual SLCAP 4305

23.4 Ground Personnel Training

Ground personnel should receive training on carry-on baggage allowances. This training shall enable ground crewmember to identify excess carry-on baggage and intercept it before it reaches the aircraft.

23.5 **Passenger Education**

Passenger education can help decrease the risks associated with excess carry-on baggage and persons taking their belongings in an evacuation. Education can be undertaken through a variety of different means, such as:

- a) Publication of the carry-on baggage policy on the operator's website;
- b) Articles on this topic included within on-board media such as magazines, entertainment programmes;
- c) Content included in safety demonstrations and on-board announcements; and
- d) IFE seat messaging systems.

23.6 Filming of Emergency Situations

Technological and social advances have allowed an increase in passenger recording of events during an evacuation or other emergency situations on board aircraft. Although recordings may benefit subsequent investigations, they may also lead to delays during the evacuation process, increasing the risk(s) of injury or death. In order to prevent instantaneous social media postings of an emergency situation in flight, any access to Wi-Fi and telephone systems on board can be switched off. The operator should establish policies and procedures to deal with these events in a manner that does not obstruct or hinder the required actions of cabin crewmembers during an emergency.

List of Figures

Figure 01	Fasten Seat Belt Sign	
Figure 02	Safety & Emergency Equipment Placard	
Figure 03	Life-raft Marked Operating Instructions	
Page 58 of 60	02 nd Edition	Rev. 00

01st March 2019

- Figure 04 No Smoking Sign
- Figure 05 No Smoking Placard
- Figure 06 Disposal Receptacle Placard
- Figure 07 Emergency Exit Markings
- Figure 08 Emergency Exit Operating Handle and Instructions Inside Aircraft
- Figure 09 Type III Exit Placard
- Figure 10 Emergency Exit Operating Handle and Instructions Outside Aircraft
- Figure 11 Over-wing Markings
- Figure 12 Baggage Compartment Placard
- Figure 13 Brace Position in Forward-facing Cabin Crewmember Seat, without and with a Bulkhead
- Figure 14 Brace Position in Rearward-facing Cabin Crewmember Seat, without and with a Bulkhead
- Figure 15 Brace Position in Forward-facing Passenger Seats Equipped with a Lap Strap Seat Belt Only
- Figure 16 Positions to Avoid when Adopting the Brace Position
- Figure 17 Unacceptable Brace Positions
- Figure 18 Forward-facing Seat, Lap Strap Only, Child
- Figure 19 AFT-facing Seat, Lap Strap Only, Child
- Figure 20 Forward-facing Seat, Lap Strap Only, High Density Seating, Adult Holding Infant
- Figure 21 Forward-facing Seat, Lap Strap and Shoulder Harness with Single Diagonal Strap, Adult Holding Infant
- Figure 22 AFT-facing Seat, Lap Strap Only, Adult Holding Infant
- Figure 23 AFT-facing Seat, Lap Strap and Shoulder Harness with Single Diagonal Strap, Adult Holding Infant
- Figure 24 Forward-facing Seat, Lap Strap Only, High Density Seating, Pregnant Passenger
- Figure 25 AFT-facing Seat, Lap Strap Only, High Density Seating, Pregnant Passenger
- Figure 26 AFT-facing Passenger Seat, Lap Strap Only
- Figure 27 AFT-facing Passenger Seat, Lap Strap and Shoulder Harness with Single Diagonal Strap
- Figure 28 AFT-facing Crewmember Seat, Lap Strap and Shoulder Harness with Dual Upper Torso Strap
- Figure 29 Forward-facing Seat, Lap Strap and Shoulder Harness with Dual Upper Torso Straps, Onshore Helicopter Occupants
- Figure 30 AFT-facing Seat, Lap Strap and Shoulder Harness with Dual Upper Torso Straps, Onshore Helicopter Occupants
- Figure 31 Forward-facing Seat, Lap Strap Only, Offshore Helicopter Occupants
- Figure 32 AFT-facing Seat, Lap Strap Only, Offshore Helicopter Occupants

List of Appendix

- Appendix 1 Research Studies on Brace Positions
- Appendix 2 Sample Brace & Evacuation Commands

24. CONTACT OFFICE

Issued under the authority of:

H M C Nimalsiri Director General & Chief Executive Officer Civil Aviation Authority of Sri Lanka

For more information, please contact:

Capt. Lushan Fernando Director – Aircraft Operations Civil Aviation Authority of Sri Lanka dops@caa.lk 0112358914

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