



Guidelines for the Transport of Cargo in the Passenger Compartment

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1. Request for Approval

- 1.1 Cargo shall only be transported by operators holding valid Cargo transport approvals with aeroplanes certified under the Airworthiness Standard of Large Aeroplanes.
- 1.2 Any operators wishing to apply for an approval to carry cargo in the passenger compartment shall contact the Civil Aviation Authority of Thailand (CAAT) in writing and provide the following:
 - a. Official request letter
 - b. Safety risk assessments with supporting evidences (refer to section 2.1)
 - c. Operating procedures to demonstrate that the requirements set out in this guideline can fully be met.

2. Procedures

- 2.1 Safety risk assessments shall be performed in order to identify hazards, evaluate and mitigate correlated risks related to operating cargo flights using cabin configurations which have been approved for transporting only passengers.;

Some examples of possible risks include, but are not limited to, the following:

- a. Operator's general knowledge of cargo transport;
 - b. The detection of any smoke or fire and firefighting capabilities of personnel in the cabin;
 - c. Qualification and abilities of crew member or other personnel to control and put out fire in the cabin;
 - d. The provision, location and storage of sufficient firefighting equipment such as portable breathing equipment, fire extinguishers etc. for use by personnel carried in the cabin;
 - e. Extended Diversion Time Operations (EDTO)
 - f. Mis-declared / undeclared or hidden dangerous goods
 - g. Unrestricted access to all cargo shipments
 - h. Cargo leakage / spillage
 - i. Unsecured / incorrectly loaded cargo
 - j. Incorrect loading and unloading sequence
 - k. Operational weight and balance limits exceedance
 - l. Qualification of ground staff to prepare and load cargo in accordance with applicable regulations and instructions
 - m. Occupational Health and Safety (OHS) risks associated with the new procedures.
- 2.2 Checks shall be made before take-off, before landing and whenever requested by the captain to ensure that cargo is properly stowed and secured.
 - 2.3 Operators shall establish procedures to manage emergencies in the cabin.

- 2.4 Existing procedures, including emergency procedures, must be reviewed and adapted as necessary.
- 2.5 Operators shall publish temporary revisions to the Operations Manual (OM) to include the new type of operations and the related procedures.

3. Crew Composition

- 3.1 Operations without passengers shall still the presence of crew members to survey and access all areas of the cabin during all phases of flight. Any fire that might occur must be timely detected and effectively fought utilizing the available existing emergency equipment.
- 3.2 Crew members in the cabin have to seat on seats which are not located near the cargo.

4. Loading, Mitigations for Transport of Cargo in the Passenger Compartment including on Passenger Seats

- 4.1 Exact cargo weight and position in the cabin and in the cargo hold shall be reflected in the mass and balance documentation (load sheet).
- 4.2 The pilot-in-command shall be provided with information on the content of all the cargo such as through provision of the cargo manifest or other appropriate documentation.
- 4.3 The operator shall load the aircraft considering the different levels of available fire protections of the loading areas. (i.e. passenger cabin and lower deck cargo compartments).
- 4.4 Cargo must be adequately restrained to ensure the cargo does not come loose or shift during flight or emergency landing conditions
- 4.5 For the bulkheads that have a placard indicating maximum capacity, the cargo items stowed in aft of these bulkheads shall not exceed the maximum capacity indicated in the placard.
- 4.6 The maximum capacity limitations in the required safety placards (on or adjacent to the cargo approved stowage locations) shall not be exceeded. All stowage instructions specified in the placards apply.
- 4.7 The mass of the cargo shall not exceed the structural loading limits of the floor or seats, as published in the aircraft documentation (e.g. Limitation chapter of the Weight and Balance Manual).
- 4.8 The cargo placed in enclosed stowage areas shall not be of such size that they prevent latched doors from being closed securely.
- 4.9 The cargo items shall be stowed only in a location that is capable of restraining it.
- 4.10 The cargo stowage location shall be such that, in the event of an emergency evacuation, it will not hinder aisle access and egress.
- 4.11 The cargo shall not be placed where it can impede access to emergency equipment.
- 4.12 The cargo shall not be placed where it can impede the visual to the safety instruction sign and placard, emergency equipment, exit.

- 4.13 The cargo shall be checked to ensure proper stowage in the following instances (at the minimum):
 - a. Before take-off,
 - b. Before landing,
 - c. Under orders of the Pilot in Command (PIC).
- 4.14 The aisles shall remain free of cargo to enable access to the seats and the goods in case of smoke or fire.
- 4.15 Any smoke/ fire within the cabin must be easily detected and effectively fought using the existing emergency equipment. Thoroughly briefed crew members (not part of the flight crew) shall be on-board to survey and access all areas of the cabin during all flight phases. There must be an adequate number of trained crew members acting as fire-fighter (not part of the flight crew) with sufficient amount of firefighting equipment. This equipment may be stowed in the cabin using existing stowage provisions (overhead bins, stowage's) provided that the location is identifiable for the crew. Specific details must be coordinated with the CAAT.
- 4.16 Crew members in the cabin should use existing cabin crew seats and must not share seat rows with cargo. There must be a clear separation of areas occupied by occupants and those fitted with cargo during taxi, take-off and landing. At least one empty seat row between cargo and reserved occupant seats must be established.
- 4.17 'Under seat stowage' is allowed only if the seat is equipped with a restraint bar system and the cargo items can be placed fully underneath the seat. The loading of the cargo under each seat should not exceed 9 kg (20 lbs.).
- 4.18 The cargo packaging shall be able to equalize the pressure so that it can handle the Delta Pressure (DP) during the flight, as applicable.
- 4.19 All smoke and fire detectors shall be maintained as per Maintenance Manual instructions.
- 4.20 The Air Conditioning system shall be set taking into account the nature of the cargo transported in the cabin and the number and distribution of cabin occupants.
- 4.21 If nets are used to restrain cargo items, these nets should be European Technical Standard Order (ETSO) approved and any load limitations of these nets including their attachment means should be adhered to. Any deformation of these nets due to the mass of the cargo items restrained under emergency landing, flight or ground loads should be evaluated for contact to other objects in the cabin and be shown not to block emergency evacuation paths nor access to emergency equipment.

5. Airworthiness Aspects for Transport of Cargo in the Passenger Compartment

5.1 Operators may transport cargo in the passenger compartment without design change approval as long as the cargo is placed in the approved stowage locations within the passenger compartment as follows:

- a. Overhead stowage bins
- b. Stowage compartments
- c. Floor mounted stowage (e.g. doghouses)
- d. Bulkheads that have a placard indicating maximum capacity
- e. Under seat stowage areas

For permanent use, a design change approval is required as detailed in 5.3.

5.2 The temporary transportation cargo in the passenger compartment including on passenger seats shall only be approved when the operator can demonstrate that the conditions described in 4. and the technical guidance which can be found in Annex 1 of this guideline document can be fulfilled.

5.3 Transport of cargo in the passenger cabin under a design change approval

In order to allow transport of cargo on a permanent basis beyond the 6 months limitation a design change approval is required. Except for what allowed by paragraph 5.3.1 below, for transport of cargo restrained on seats as well as in case removal of seats are necessary to allow fixation of cargo onto the aircraft structure, a Major Change or STC application is required.

The type of cargo to be transported in the passenger cabin would need to be under control (no unidentified cargo) and assessed beforehand in the frame of the Supplemental Type Certificate (STC) assessment process.

5.3.1 Transport of medical supplies restrained on passenger seats

- a. In the context of the emergency situation created by the Covid-19 pandemic, Approved Design Organizations may reclassify such modification as “Minor Change” and approve such modifications, under their Design Organization Approval (DOA) - privileges, allowing the transportation of medical supplies (e.g. masks, gloves, clothing, etc.) restrained on passenger seats, provided that the transported medical supplies are not classified as dangerous goods. This has to be indicated in the approval documents and Aircraft Flight Manual (AFM) Supplement.
- b. The applicability of these design changes is to be restricted to non-exported airplanes. The DOA shall introduce this limitation in the design change approval sheet.

- c. Since this kind of installation is a change in the scope of operation of the aeroplane, and in the absence of dedicated operational requirements covering this kind of operation, the installation and the procedures for operation have to be addressed taking into account the specific configuration of each aeroplane model affected.

6. No Exemption for Transport of Dangerous Goods

- 6.1 Dangerous goods shall not be carried in the passenger cabin and always be carried in the hold and shall be transported under the conditions established by the Technical Instructions.
- 6.2 Operators need to be cautious of potential hidden dangerous goods that medical supplies and similar cargo shipments may contain.

It is recommended that 'Transport of Cargo in the Passenger Compartment' guidelines by EASA for the required process, including but not limited to the content of the safety risk assessment, crew composition and procedures, and other aspects should be referred to.

Documents published by the industry (aircraft Original Equipment Manufacturers (OEM), SAE) to provide guidance on how to transport cargo in the passenger cabin are referenced in Annex 2.

Annex 1

Further Guidance for Transport of Cargo in the Passenger Cabin

Restrictions to the Kind of Cargo:

- a. No Dangerous goods.

In addition, the operator must have a process to prevent excepted quantities of lithium batteries contained in, or packed with, equipment from being stowed in the cabin.

Cabin Preparation:

- a. Passenger convenience systems (IFE, in-seat power, galley systems and any other heat generating systems) will have to be disabled or deactivated.
- b. Supplemental oxygen systems will have to be removed from the PSU channels, without leaving any opening, or should be deactivated.
- c. Portable oxygen cylinders and PBEs located in the stowage compartments in the cabin areas in which cargo is transported will have to be removed.
- d. Portable devices containing lithium batteries, including the emergency locator transmitters, will have to be removed from the cabin areas in which cargo is transported.

Cargo Loading:

- a. It is not required to install a 9g barrier and a smoke barrier to protect the flight deck and cabin occupants. Cargo must be restrained so that each cargo installation meets 25.561 and other applicable structural requirements.
- b. In each section of the cabin where cargo is transported:
 - there must be at least one longitudinal aisle meeting the minimum width dimensions specified in 25.815 for aeroplanes with a seating capacity of 10 or less passengers.
 - Cargo must be loaded so that there is sufficient access to the cargo to allow effective fire-fighting.
 - For twin-aisle aeroplanes in which seats are not removed and are used to restrain cargo, there must be an unloaded seat row to allow crossing from one aisle to the other. To the extent possible the unloaded seat row must be located at equal distance from the available cross-aisles required by 25.813.
- c. Floor path marking may be removed or obscured by cargo in areas that are not going to be used as evacuation paths by the cabin occupants.
- d. Features that allow decompression must be maintained, i.e. pallets or cargo must not obstruct decompression vents or flow.

- e. When cargo is loaded on the floor, the height of the cargo shall not exceed 50 inches (approximately the height of a typical economy class seat). Limitations applicable to the mass, distribution and method of restraint of the cargo must be established based on guidance from the aircraft OEM.
- f. Cargo loaded on a seat must not exceed 50 lbs per seat place and must not extend above the seatback height. Potential restraint methods might include (see also appendix):
 - **Seat tracks** (after removing the plastic row-to-row track cover), based on guidance from the aircraft OEM. Attach netting over the seat and boxes. Secure the net to the seat track. Ensure that the net is moderately taut so as to maintain an aisle width for in-flight surveillance of smoke and fire.
 - **Seat belts or seat belt shackles.**
Add additional strapping attached to or going around the forward and top side of the boxes. This strapping to be attached to the buckled and cinched down seat belt (seat belt does not go around box since it doesn't adequately restrain the box in forward and up directions).
 - **Seat beams** (located immediately below the seat bottom cushion)
Strap the forward and top side of the boxes to the forward and aft beams by routing the straps under the seat.
 - **Seat**
Strap the forward and top side of the boxes to the front legs and to the aft legs by looping the straps around the legs.

Safety Equipment:

Portable oxygen equipment must be provided for each crew member whose duties on board include fire detection and fire-fighting in the cabin. The equipment shall meet 25.1439 (b) and 25.1443(e) and must be carried by the cabin occupants during their inspections.

- a. Appropriate protective garments (e.g. fire gloves, etc.) shall be stored adjacent to the crew member's stations.
- b. In addition to the extinguishers already installed in the cabin, the following fire extinguishers shall be available:
 - Two Underwriters Laboratories (UL)2A (2-1/2 gallon) rated water portable fire extinguishers, or an equivalent amount of water, and
 - At least two fire extinguishers with a minimum UL 4A-80B:C rating or equivalent. Four UL 2A-10B:C extinguishers is considered equivalent.
 - Extinguishers should be located next to firefighters station(s) or at other locations that the operator determines would be more effective in providing fire protection.

Environmental Control System (ECS) Settings:

Normal Procedures

ECS settings shall be adapted considering the number aircraft occupants. If the ECS system is configured with Gasper outlets they should be in close / off position at all phases of flight.

Emergency Procedures

In the event of a fire in the cabin it must be ensured that packs are set to low flow. The existing Smoke, Fire, Fumes FCOM procedures (which includes possible divert, don oxygen masks, establish crew communications, re-circulation fans switched off, Smoke Fumes Checklist) must be followed.

Procedures and documentation:

Existing procedures, including emergency procedures, must be reviewed and adapted as necessary.

The Limitations Section of the Airplane Flight Manual (AFM) must be revised as required to include the following:

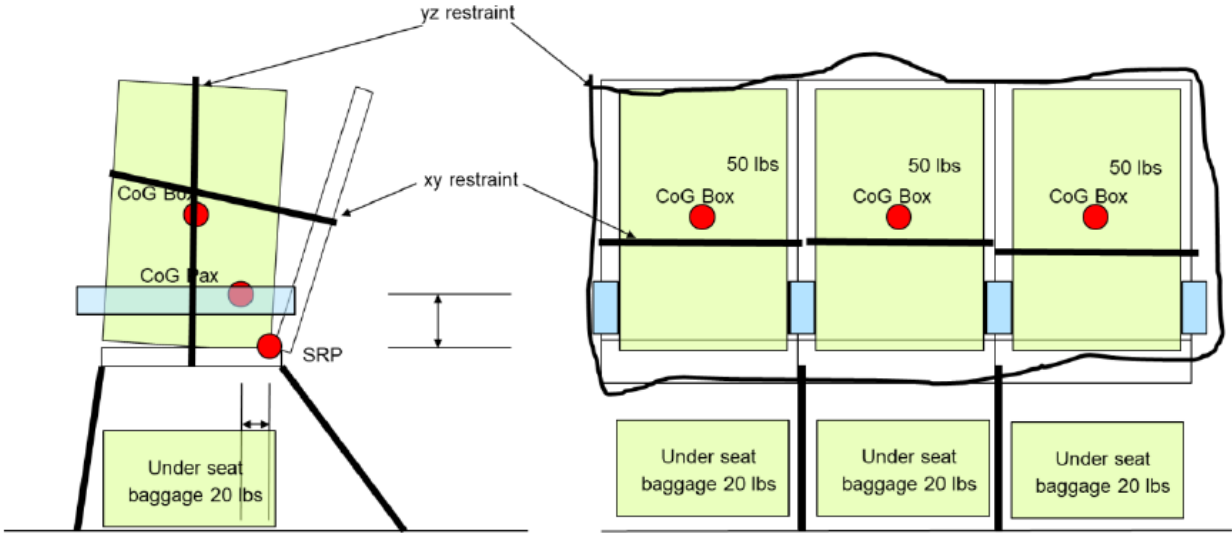
- a. Minimum number of additional crew members in the cabin:
 1. Minimum of two additional crew members whose duties are to detect and fight a fire, and relay information to the flight crew.
 2. For twin aisle and other large long range airplanes, a minimum of 3 additional crewmembers will likely be needed. Additional crewmembers above 3 should be justified based on a risk assessment. The number of cabin occupants should be minimized to the number necessary to satisfy item 1.
- b. The additional crew members must be trained on:
 1. Fire-fighting procedure
 2. Use of the emergency equipment, including portable oxygen systems
 3. Operation of emergency exits and evacuation procedures
- c. The additional crew members must make a visual inspection of the cargo on a regular basis including prior to Taxi, Take-off and Landing (TT&L).
- d. When making the inspection required above, the additional crew members must carry portable oxygen equipment (see section Safety Equipment).
- e. Provisions must be available to allow the flight crew members to notify the crew members in the cabin in case of a decompression.
- f. Seats that must be occupied during TT&L and emergency scenarios such a turbulence or decompression (possibly ensuring visibility of cargo).
- g. A new cabin fire emergency procedure based on manual fire-fighting.

Appendix to Annex 1

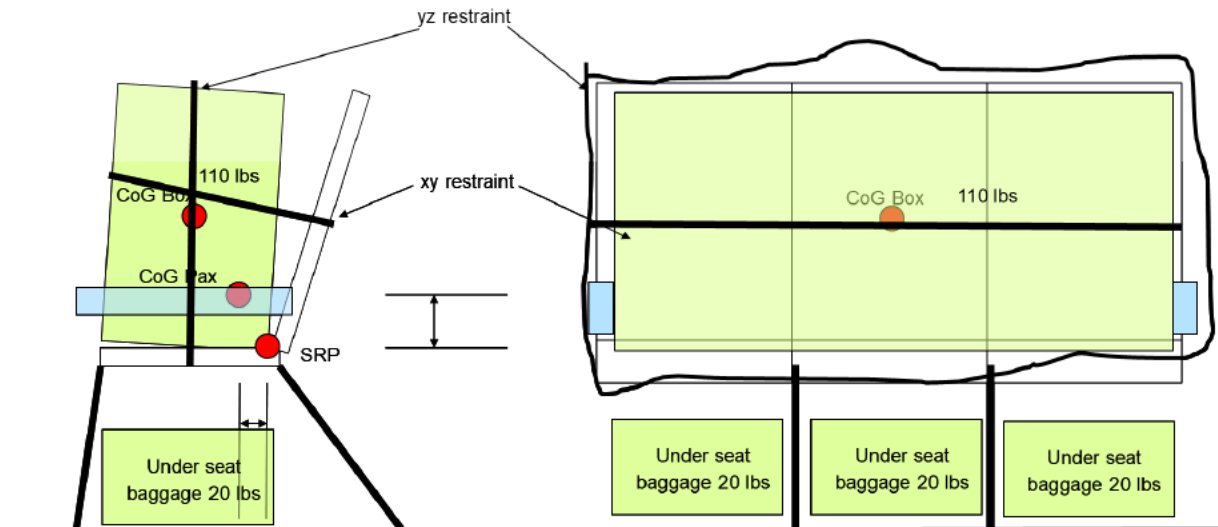
Max z height should not be higher than top of seat backrest

Min capability of strap: $3 \times 25 \text{kg} \times 9 \times 9,81 \times 1.33 = 8807 \text{N}$

Loading configuration with 1 box (max 50 lbs) per seat place:



Loading configuration with 1 box (max 110 lbs) per triple seat:



Annex 2 – Industry Guidance

The following documents were sent by certain aircraft Original Equipment Manufacturers (OEM) to provide guidance on how to transport cargo in the passenger cabin:

- Airbus SAS : FOT-999-0028-20-00
- ATR: OIM2020/003
- The Boeing Company : MOM-MOM-20-0239

Guidance on how to restrain cargo on seats can be found in SAE ARP 4049 Cargo Restraint on Aircraft Passenger Seats – Main Passenger Cabin.