



Operation Safety Bulletin

No. OSB-2021-05

Issued by Flight Standards Department of CAAC

December 10, 2021

The Flight Standards Department (FSD) Operation Safety Bulletin (OSB) contains important operation safety information as well as relevant recommended practices. OSBs are designed to direct air operators engaged in new or special types of operations or emergency responses to operate at the highest level of safety in accordance with the rules and regulations. The recommended practices contained in the OSBs are meant to guide the operation of air operators and the oversight of CAAC before relevant regulations or normative documents are developed. Since other alternative methods may also be used, it is needed to note that the recommended practices in these documents are not the only means of compliance.

Subject: Carriage of Cargo in Passenger Cabin (2nd edition)

(English translation is for reference only)

1. Purpose

This bulletin provides air carriers with the guidance of safety risk assessment on transportation of cargo in the passenger cabin during COVID-19 pandemic and relevant technical support for the conduct of such operations at a higher level of safety.

2. Scope

The guidance contained herein is intended for CCAR-121 air carriers engaged in the transportation of cargo in passenger cabin. CCAR-135 air operators engaged in similar operations may also refer to such guidance.

3. Background

Since the outbreak of COVID-19, the passenger cabin has been used to transport cargo to meet the need of epidemic prevention and control and to ensure the smooth flow of global supply chains. Based on recent investigations of safety incidents related to cargo

transportation in passenger cabin as well as previous operational experience and international common practice, the bulletin is revised to ensure greater safety margin for such operations under the “new normal” of epidemic prevention and control.

4. General requirements

4.1 Operational safety

Considering that modern airliners are not initially designed for cargo transportation in passenger cabin and cabin environment is distinctive from an airliner’s belly or a freighter’s main cargo compartment, i.e., a lack of smoke/fire detection system or automatic extinguishing system, relevant operational risks still need to be studied. Therefore, air carriers should conduct a thorough risk assessment and take relevant mitigation measures for such operations, continuously monitor and record any emerging hazards and take immediate corrective measures. In general, the carrier should meet the following general requirements prior to the carriage of cargo in passenger cabin:

- 1) The carrier should be familiar with the operation of cargo transport;
- 2) The carrier should conduct sufficient safety risk assessment in accordance with this OSB;
- 3) Transportation of cargo on cabin floor by changing the cabin configuration (i.e., removing all or part of passenger seats) are not permitted;
- 4) Transportation of both passengers and cargo in the passenger cabin are not permitted;
- 5) Technical support solutions provided by aircraft manufacturers should be strictly followed. Considerations should be given to the impact of loading cargo in passenger cabin on aircraft weight and Center of Gravity, and the limits specified in the Aircraft Flight Manual (AFM) and Weight & Balance Manual (WBM) should be complied with during all stages of such operations.

4.2 Cargo safety

The carrier should conduct adequate risk assessment of the cargo to be carried in passenger cabin and establish a whitelist system for cargo types and the shippers (and their agents).

Loading, restraint and inspection remain three basic elements to ensure cargo safety. The carrier should:

- 1) Provide supplementary training for load controllers and loading personnel, specify responsibilities for cargo inspection before loading, ensure the use of appropriate weight & balance charts and the loading of cargo in strict compliance with weight & balance calculations and load sheet;
- 2) Ensure that the cargo are adequately restrained such that they do not come loose or shift during flight or emergency landing conditions, resulting in CG outside of certified weight and balance limits;

3) Ensure that flight crewmembers or cabin personnel can survey and access all areas of the cabin during all phases of flight and perform regular inspections on cargo safety.

4.3 Other safety considerations

It is of the utmost importance that the carrier be familiar with cargo transport before even considering such an operation. Some examples of possible risks include, but are not limited to, the following:

- 1) General knowledge of cargo transport;
- 2) Adverse factors for cabin personnel to detect any smoke/fire and respond to emergencies;
- 3) Qualification and abilities of flight crewmembers or cabin personnel to detect, control and put out fire in cabin;
- 4) The provision, location and storage of sufficient firefighting equipment, such as portable breathing equipment and fire extinguishers for use by cabin personnel;
- 5) EDTO operations;
- 6) The potential for mis-declared / undeclared or hidden dangerous goods within cargo;
- 7) Unrestricted access to all cargo loaded into the cabin;
- 8) Cargo leakage / spillage;
- 9) Unsecured / incorrectly loaded cargo;
- 10) Incorrect loading and unloading sequence;
- 11) Operational weight and balance limits exceedance;
- 12) Qualification of ground staff to prepare weight and balance documents and oversee the cargo loading in accordance with applicable regulations and instructions; and
- 13) Occupational Health and Safety (OHS) risks associated with the new procedures.

4.4 Safety risk assessment

The carrier should conduct a detailed and adequate safety risk assessment to identify hazards, assess and take mitigation measures before such operation. The following table provides a sample of most common hazards, risks and mitigation actions. However, it is important to note that each operation of cargo transport in passenger cabin may have specific characteristics, and the carrier may need to take different mitigations.

Risk Assessment Matrix

Risk likelihood		Risk severity				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

Safety Risk Assessment			
No.	Potential hazards/risks	Risk Index	Possible Mitigations
1	Cabin seats damaged	2E	Secure the surface of the cargo; strictly adhere to cargo weight limits and loading procedures
2	Structures of floor / bulkheads failed	3A	Strictly adhere to cargo weight limits; follow weight and balance load sheet and loading procedures
3	DG Unidentified / mis-declared	3A	Personnel training; strengthen acceptance check and security check; prohibit carriage of any DG in the cabin, except for those which are exempted
4	Leakage of liquid contained in the cargo	2D	Secure cargo packaging to prevent leakage and damage; prohibit loading of wet cargo that are not well-packaged
5	Cargo nonconforming to quarantine requirements	1C	Ensure thorough disinfection
6	Cabin component, facility and equipment damaged due to inappropriate cargo handling	3E	Specific training for loading personnel on handling cargo in the cabin; emphasize work discipline in cargo loading
7	Cargo beyond height limit	4D	Limit the stacking height
8	Cargo not effectively secured	4B	Use cargo seatbag, cargo net, etc.
9	Cargo not properly loaded according to the load sheet	4B	Personnel training; strictly follow the load sheet
10	System function affected by loading location	2B	Personnel training; strictly follow the load sheet

11	Damage to cabin door and other equipment during loading and unloading	2B	Personnel training; manual handling with extra care
12	Personnel injury during loading	3B	Personal protection; appropriate training
13	Accident due to aircraft CG beyond limits during ground handling	3B	Personnel training; loading and unloading in strict accordance with W&B charts and prescribed sequences; use of ground support equipment
14	Cabin door operations by untrained personnel	2C	Use trained personnel
15	Cabin systems overheated due to proximity to cargo	3B	Turn off entertainment systems, seat power systems, unused galley systems and any other heat generating systems that are not required for the operation of the aircraft; set the temperature of the cargo loading area at a relatively low level; set packages to Max Flow
16	Insufficient detecting system of smoke or fire in cabin	5A	Allocate adequate and trained cabin personnel; limit cargo loading capacity; limit the stacking height of cargo; enhance personnel training for smoke/fire watch
17	Cargo fire	3A	Increase the number of cabin firefighting equipment; assess and provide qualified and sufficient cabin personnel
18	Cabin depressurization	2B	Personnel training; carriage of extra portable oxygen bottles to meet the oxygen need of cabin personnel during oxygen system shutdown for cargo safety
19	OSH: Employee Injury	4C	Personnel training; use of appropriate PPE, limit weight of each cargo; use of appropriate GSE

5.Cargo

5.1 Transport of dangerous goods

Dangerous goods of any kind are prohibited to be carried in the passenger cabin, and dangerous goods of “cargo aircraft only” are prohibited to be carried in the belly cargo hold.

When the relevant requirements of CCAR-276 Regulations on the Management of Dangerous Goods in Civil Aviation and the ICAO’s Technical Rules for the Safe Transport of Dangerous Goods by Air are met, the carrier holding a dangerous goods transport permit may transport dangerous goods in the belly in accordance with the permit requirements.

5.2 Cargo preparation

The carrier should follow ICAO guide to consider the type of cargo that is proposed to be loaded in the passenger cabin. All acceptable “special cargo” should be subject to the appropriate regulations.

Specific considerations include:

- 1) Medical supplies might contain items such as mercury thermometer and/or alcohol-based sanitizer, which are classified as dangerous goods;
- 2) Size and weight of the packages and their ability to be loaded into the available bins, bags or alternative methods. This will also include the weight distribution throughout the aircraft in accordance with the load master’s instructions;
- 3) The center of gravity (CG) of the cargo is equal to or lower than the passenger CG shown in the envelope drawing of the seats in use;
- 4) Availability of loading, unloading, shoring, load spreading and restraint equipment;
- 5) Packages should be free of sharp edges as they will be manually loaded;
- 6) Wet cargo should not be loaded in the passenger cabin;
- 7) Cargo and its packaging should comply with the relevant provisions of health and quarantine; and
- 8) The cargo packaging should be able to equalize the pressure so that it can handle the delta pressure during the flight, as applicable.

6. Ground operation

6.1 Loading locations

6.1.1 Approved loading locations

Verified cargo may be carried in approved stowage locations within the passenger cabin. These locations include overhead stowage bins, closets, floor mounted stowage, bulkheads that have a placard indicating maximum capacity, and under seat stowage areas.

6.1.2 Prohibited loading locations

Attention must be given to avoid load share of restrained cargo into the lavatories, rest facility, partition or other fixed structures which are incapable of restraining it.

6.1.3 Locations requiring approval

To load cargo on passenger seats, the carrier should obtain an approval under Section 121.215 of CCAR-121.

6.2 Weight and balance

6.2.1 Computerized weight and balance system

Most of the Weight and Balance (W&B) systems are set to calculate the load in the passenger cabin. If the system is programmed to accommodate the passenger weights only, it is recommended to contact the W&B provider to investigate appropriate solutions to adjust the system for cargo. If possible, it is recommended for W&B systems to set parameters for weight allocation for each row to reduce CG error in final calculation.

6.2.2 Manual load sheet preparation

When the CG impact of the loading of passengers is calculated based on the number of passengers using the current paper trim sheet, manual load sheet should be prepared. When using the cabin sections on the current sheet, the carrier should make necessary revisions, specifying loading locations and adjusting the calculation of the number of passengers to cargo weight.

6.2.3 Loading Instruction Report (LIR)

LIR forms typically do not include the passenger cabin section. It is therefore recommended to detail all information for this Section in the “special Instructions” box, if applicable, noting the cargo loaded in overhead bins and under seats.

In the load planning, it should be considered that the cabin depressurization relief vents should remain unobstructed.

LIR should report, in addition to normal information, detailed instruction on:

- 1) Load quantity per each cabin section;
- 2) Maximum loads for seats, rows, cabin section(s) and / or tie down areas;
- 3) The load quantity and maximum load per overhead bin and coat cupboard;
- 4) Loading / unloading sequence.

Note: The load controller should ensure that only cargo identified with the special handling code “CIC” (cargo loaded in passenger cabin) be planned for loading in passenger cabin.

6.2.4 Aircraft data correction and load control

Notification that if changes in the configuration are introduced, such as a reduction in the quantity of potable water due to no passengers, the correct dry operating weight and CG should be used. The carrier should update basic aircraft data timely to ensure CG within certified weight and balance limits. The final load sheet should be verified further to ensure the operational limits are respected.

The carrier should ensure its relevant internal departments and Weight & Balance department maintain communications on the latest basic aircraft data. Documentation and messaging procedures should be in place for internal communication within itself and external communications with ground handling agent, and load message and handling code should be specified to be distinguishable from the load in cargo hold.

6.2.5 Documents filed to Pilot in Command

In addition to the load sheet, it is also recommended to provide the details of the cargo (cargo manifest) loaded in the cabin to the pilot in command. It is recommended to provide the pilot in command (PIC) loading instructions in conjunction with the Layout of Passengers accommodation (LOPA) to ease identification of no loading areas and cabin sections (i.e. Oa, Ob etc.).

6.2.6 Supplementary training for load controller and loading personnel

In accordance with its weight and balance program for such operations, the carrier should develop supplementary procedures for extra processes, cargo coding and manifesting, etc., based on the sorting of changes to the computerized weight & balance system, weight and balance load sheet and LIR, and provide relevant training for load controller, load master, loading personnel and ground handling agent.

6.3 Loading and unloading of cargo

6.3.1 General rules for loading cargo

The following rules should be observed for loading cargo in the passenger cabin:

- 1) Cargo to be loaded in the passenger cabin should be within the additional restrictions for each location.
- 2) Ensure visibility, identification and being protected from sources of heat;
- 3) Ensure the cabin depressurization relief vents are unobstructed;
- 4) Sidewall (floor) vents should have adequate clearance (minimum 5 inches) around them for decompression.
- 5) Ensure decals indicating the location of emergency equipment are not obstructed; ensure emergency equipment is not obstructed;
- 6) Ensure aisles and evacuation routes are clear;
- 7) Always adhere to the loading sequence as reported in the Loading Instruction report (LIR).

Note: As a rule, for tipping prevention is recommended, start to load the cabin from FWD (front) to AFT (back) and unload from AFT (back) to FWD (front).

- 8) Checks should be made before take-off, before landing and whenever the fasten seat belt signs are illuminated as well as under orders of pilot in command to ensure that cargo is properly stowed and secured;
- 9) Load master (or equivalent) is to oversee the loading and unloading of cargo in the cabin.

6.3.2 Additional limits to cargo at different loading locations

6.3.2.1 Additional limits to existing loadable locations

These locations include overhead stowage bins, closets, floor mounted stowage, bulkheads that have a placard indicating maximum capacity, and under seat stowage areas. In these cases, the following limitations typically apply:

- 1) Stowage maximum capacity should not be exceeded;
- 2) If the cargo is stored under the seats, then the seat should be equipped with a restraint bar system and the cargo placed fully underneath the seat. The mass of each piece of cargo should not exceed 9 kg (20 lb);
- 3) Items should not be stowed against bulkheads that are incapable of restraining articles against movement forward, sideways, or upwards and unless the bulkheads carry a placard specifying the maximum capacity;
- 4) Cargo should not be placed where it can impede access to emergency equipment;
- 5) The maximum capacity limitations in the placards of the cargo approved stowage locations should not be exceeded.
- 6) Cargo placed in enclosed stowage areas should not be of such size that they prevent latched doors from being closed securely.

6.3.2.2 Additional limits to load cargo on passenger seats

It is recommended that all seats be covered with protective material. Materials should be selected to meet the 12 second vertical burn requirement, such as coated fiberglass cloth with good tear and puncture resistance, Kevlar or Nomex cloth, fire blocking felt (as used in seats), previously removed worn seat covers, etc.

Typically, loading cargo on passenger seats also needs to meet the following requirements:

- 1) Ensure seatbacks are in the upright position; position the seat belts behind the seat cushions; where possible, fold up the inner arm rests;
- 2) The cargo on the seat should be loaded in such a manner as to be easily identifiable and accessible to the crew. The cargo load should not extend above the maximum height of the passenger seat in the fully upright position;
- 3) Mass of cargo loaded on the seats should not exceed seat limitation. The loading on each seat must not exceed 77 kg (170 lb).
- 4) The maximum width of the cargo loaded on the seats should not exceed the width of the seat row, i.e. it should not occupy the existing aisle space in passenger cabin.

- 5) Mass of cargo loaded on the seats should be evenly distributed across the seat row;
- 6) Actual weight of cargo and even load distribution should be used to ensure that the aircraft flight manual (AFM), aircraft Weight and Balance Manual and minimum flight weight limits or equivalent are never violated;
- 7) The center of gravity (CG) of the cargo is equal to or lower than the passenger CG shown in the envelope drawing of the seats in use as reported in the manufacturer weight and balance manual or similar documents;
- 8) Cargo load should be appropriately accounted for in the weight and balance system and any aircraft operational limit is respected;
- 9) Cabin personnel must not share seat rows with cargo; at least one empty seat row between cargo and occupied passenger seats must be maintained.

6.3.3 Equipment for loading and unloading of aircraft

Typically, equipment designed to access aircraft passenger cabin doors is not meant to be used for loading cargo. Nevertheless, all possible measures should be in place to prevent injury to personnel and damage to aircraft, especially near the cabin door.

The recommended equipment is:

- 1) Elevating Equipment;
- 2) Passenger Stairs

Elevating equipment, which is typically used for boarding and loading either Passengers with Reduced Mobility (PRM) and/or catering, can be also used for loading cargo safely through the passenger door.

When using passenger stairs to load cargo into the cabin, appropriate consideration should be made according to the size and weight of each package to be loaded. It is recommended to distribute loading personnel at different positions on the stairs and proceed to load the shipments by moving the packages from the ramp upwards. This recommendation is intended to mitigate the risk of slips, trips and falls.

Note: Belt loaders and high loaders are not designed to dock to an aircraft cabin door. Where such equipment is used the potential risks (falling from height and aircraft damage) should be adequately mitigated.

6.4 Restraint of cargo on passenger seat

If the carrier has obtained the Administration approval for Section 121.215 of CCAR-121, it should use an appropriate restraint program to secure the cargo to ensure compliance with all applicable regulatory requirements:

- 1) Ensure that cargo shipments are accessible to the flight crew or cabin personnel in case of emergency;
- 2) Avoid heavy items and/or shipments with sharp edges;
- 3) Restrain cargo on every row of seats using devices specified by relevant regulations;
- 4) Ensure quick release of restraint to implement firefighting procedure in the event of fire.

7.Operation

7.1 Operational personnel

7.1.1 Flight crew

Since there may be differences in operating procedures between flights with cargo in the passenger cabin and passenger flights in the event of an emergency (e.g., cabin fire, cabin depressurization), The carrier should evaluate, where appropriate, develop emergency operating procedures, and complete relevant training for flight crews.

7.1.2 Cabin personnel

When transporting cargo in the passenger cabin, there should be dedicated personnel in the cabin to maintain surveillance of the cabin fire, perform timely fire-fighting procedures, and ensure that the cargo is secured. It is recommended that the carrier use cabin crew members who have been trained specifically for the transport of cargo in the passenger cabin. If the carrier uses other personnel to perform such tasks in the passenger cabin, they should be properly trained and possess relevant qualifications.

The number of cabin personnel carried should be determined by consideration of:

- 1) the duration of the flight, fatigue management and work shift;
- 2) the size of the passenger cabin;
- 3) workload;
- 4) the amount and type of cargo carried in the passenger cabin; and
- 5) the number of persons required to carry out normal and emergency cabin procedures.

7.2 Responsibilities of operational personnel

7.2.1 Flight crew

Flight crew members are required, in addition to their normal duties, to

- 1) except as provided in Paragraph 2) of this Section, no flight crewmember in duty period or rest period may not undertake the duties (e.g., cargo monitoring, in-flight surveillance) assigned for cabin personnel, except for cabin door operations or the organization of emergency evacuation when necessitated.
- 2) It is recommended that the pilot in command undertakes a physical check of the cabin before acceptance of the final load sheet to ensure the compliance with relevant provisions of the OSB.

7.2.2 Cabin personnel

- 1) The responsibilities of cabin personnel should be clearly defined. A person should be nominated as the “in charge” who is responsible for coordinating communication between the cabin and flight deck and response during any emergency situation;
- 2) All cabin personnel should be familiar with the correct methods and means of restraint;
- 3) Entertainment systems, seat power systems, unused galley systems and any other heat generating systems that are not required for the operation of the aircraft, should be isolated (or closed) before cargo loading and during all phases of such operations;
- 4) Frequency of checks in-flight should be increased (at least every 15 minutes) to allow fire watch and fighting procedures to be accomplished;
- 5) Pre-flight equipment checks should be completed;
- 6) Cabin inspection and flight deck security should be completed;
- 7) Checks should be made to ensure proper placement and restraint of cargo before take-off/landing or as directed by the captain, and after experiencing bumps;
- 8) Any abnormalities related to cargo load should be immediately reported to the pilot in command.

7.3 Training

7.3.1 General training on cargo transport

Flight crew and cabin personnel may not be familiar with cargo transport. The carrier should provide general training to all operational personnel involved, which should include, but are not limited to:

- 1) This OSB;
- 2) The difference between passenger transport and cargo transport;
- 3) Responsibilities and working procedure for all positions;
- 4) Load sheet, loading instruction, LIR and LOPA;
- 5) Approaches to cargo handling, stowage and restraint;
- 6) Training for transport of dangerous goods.

7.3.2 Training on cabin equipment and procedures

All cabin personnel should be trained in cabin equipment and procedures. On-site practical training is preferred and should not be substituted by online training.

These include, but are not limited to:

- 1) Entertainment system, air conditioning system, galley and other service equipment;
- 2) Cabin emergency equipment;
- 3) Cabin emergency procedure, such as fire watch/fighting procedures;
- 4) Cabin inter-phone system and procedures.

7.3.3 Training on procedure differences (if applicable)

The standard cargo operating procedures of the flight crew and cabin crew (such as depressurization and fire-fighting procedures) may differ from those for passenger operations. The carrier should carefully review and evaluate these differences under the guidance of the manufacturer and complete supplementary training on these differences for the flight crew and cabin personnel as required before operation to ensure proper disposition and handling of emergencies.

7.4 Other operational considerations

7.4.1 Cabin temperature

The flight crew should set the temperature of the cargo loading area at a relatively low level during operation. The recommended temperature setting is at 18°C-19°C or at minimum cabin temperature.

7.4.2 Ventilation

Configure the maximum number of passengers (if equipped with “passenger dial”), or set packages to Max Flow (if so equipped).

7.4.3 Cabin heat source

Entertainment systems, seat power systems and any other heat generating systems that are not required for the operation of the aircraft, should be isolated (or closed) before cargo loading and during all phases of such operations, and an appropriate entry should be made in the aircraft technical logbook.

7.4.4 Emergency equipment

As the passenger cabin is loaded with a large amount of cargo, The carrier should conduct a comprehensive safety risk assessment to determine whether the number and location of existing onboard emergency equipment such as hand portable extinguisher and Protective Breathing Equipment (PBE) can meet the needs of fire suppression in the event of an emergency such as smoke or fire in the cargo. The carrier should provide portable oxygen equipment and protective equipment (e.g., fire-resistant gloves) for each cabin personnel responsible for cabin fire watch and fighting procedure. Generally, at least a certain number of hand portable extinguishers should be provided in appropriate locations of the passenger cabin according to the cargo to be transported.

7.4.5 Rest facilities

The carrier should reserve a sufficient number of in-flight rest facilities that meet the requirements of Section 121.481 of CCAR 121 for use by the flight crew and cabin personnel during rest periods.

8. Effectiveness and Cancellation

Transport of Cargo in Passenger Compartments (OSB-2020-01) issued in 2020 shall be repealed and superseded by this OSB on January 1, 2022. The carrier that has changed their cabin configuration (i.e., removing all or part of the seats in the cabin) should establish a whitelist system for cargo type and the shippers (and their agent) as of the effective date of this OSB, and restore the cabin configuration by June 28, 2022.

Without further notice, this OSB shall expire after December 31, 2022.