



Flight Operations Briefing Notes Ground Handling Refueling with Passengers On Board

I Introduction

Refueling operations can be hazardous and, therefore, require the constant attention of all personnel involved. Fortunately, in commercial aviation, accidents associated with refueling operations rarely occur. However, the absence of accidents should not result in complacency, because refueling incidents, such as fuel spillage, frequently occur.

Teamwork is essential to accident prevention, particularly during aircraft refueling operations.

This Flight Operations Briefing Note is designed to provide all personnel, involved in refueling operations, with an overview of the applicable recommendations.

II Background Information/Statistical Data

Only refueling incidents that result in severe aircraft damage or personnel injury are ever reported. Minor incidents are, unfortunately, not reported. However:

- Since 1961, a total of 8 aircraft were damaged during refueling. The types of damage include cases of limited wing damage to cases of aircraft destruction.

(Source: Flight Safety Foundation – Airport Operations Volume 27 N° 2-3 – March-June 2001).

- Injuries related to refueling are rare
- Each year, thousands of fuel spillage events occur worldwide.

A knowledge of fuel ignition characteristics helps identify refueling risks. Fuel can be ignited by auto-ignition, or by an external source:

- Auto-ignition can occur, if the fuel temperature reaches 220°C (428°F), for example if fuel spills over hot parts of an engine, or hot brakes
- An external source can also ignite fuel, if the fuel temperature reaches 40°C (104°F). This threshold is lower, if fuel is sprayed over the ignition source. Therefore, the higher the refueling pressure, the higher the risk.

III Operational Standards

Airworthiness authorities have defined the basic regulations to be applied during refueling or defueling operations with passengers on board, and the role of each applicable team member. This chapter summarizes the main points of these regulations.

III.1 Refueling and Defueling when Passengers are Embarking, On Board, or Disembarking (JAR-OPS 1.305 – FAR 121.570)

Refueling with wide cut gasoline type fuel (JET B, JP4 or equivalent) or when a mixture with these types of fuel might occur, is not permitted with passengers boarding, on board or disembarking.

Refueling with Kerosene (JET A, JET A1 JP8, TS1, RT, TH or equivalent, as approved by the approved Aircraft Flight Manual), is allowed when passengers are boarding, on board, or disembarking.

When passengers are on board the aircraft, precautions must be taken to ensure that they can be evacuated, in the rare case that a fire may occur. These precautions must be taken by the ramp agent, the ground engineer (qualified ground crewmember), the cabin crew, and the flight crew:

- **The ramp agent** must ensure that:
 - The flight crew, cabin crew and engineer are at their stations
 - The area beneath exits intended for emergency evacuation is kept clear
 - The fire service is alerted
 - Passenger boarding / disembarkation is achieved in a controlled manner.
- **The flight crew** must:
 - Establish communication with the ground engineer
 - Inform the cabin crew of the beginning and ending of refueling
 - Listen for fire warning from the engineer
 - Be prepared to initiate passenger evacuation if necessary.

- **The ground engineer** must:
 - Establish communications with the flight crew
 - Inform the flight crew of the beginning and ending of refueling
 - Notify flight crew, if a fire occurs
 - If an emergency evacuation is required, indicate (to the flight crew) the exits that are clear of obstruction. The flight crew must then inform the cabin crew
 - Stop refueling upon flight crew request.
- **The cabin crew** must:
 - Establish communication with the flight crew
 - Inform passengers not to smoke (the "NO SMOKING" sign must be on)
 - Inform passengers to unfasten their seat belts (THE "FASTEN SEAT BELT" sign must be off)
 - Ensure that emergency exits remain clear of obstruction
 - Ensure that the "EXIT" sign is on
 - Ensure that ground servicing (e.g. catering or cleaning) cannot create a hazard, or delay an emergency evacuation.

If fuel vapor is detected inside the aircraft, or if any other hazard occurs, refueling or defueling must be stopped immediately.

Ground servicing activities and work in the aircraft (e.g. catering and cleaning), should be performed in such a manner that they do not create a hazard, and that the aisles and emergency exits remain clear of obstruction.

If passengers have to board or disembark during fueling drills, this must be achieved under the supervision of a responsible, such as the purser, person and the "No Smoking" rules should be reinforced during all such movements. Passengers should not be allowed to stay near the outside of the aircraft.

III.2 Evacuation/Disembarkation

In the case of a fire resulting from fueling operations, or from a large fuel spillage, a precautionary disembarkation or an emergency evacuation may be performed. In both cases, the same recommendations apply.

Information about the incident is provided by the ground personnel, who will inform the flight crew of the nature of the incident. Good communication between ground personnel, the flight crew and the cabin crew is a key factor in achieving a successful evacuation/disembarkation.

If a jetway is used for boarding, it should also be used for evacuation/disembarkation. Jetway provides a safe and efficient way to evacuate an aircraft, and enables passengers to be rapidly be far away from the fire, unlike the escape slides. In this case, the jetway handling agent is responsible for the passengers while they are in the tunnel.

If the stairs are against the aircraft, it is better that passengers use the stairs instead of escape slides. This is because, before deploying escape slides, it is necessary to ensure that the area outside the aircraft is clear of obstruction. However, there may often be obstacles surrounding the aircraft (e.g. fuel truck, catering, baggage handlers, boarding passengers, etc), and any contact with these obstacles or with personnel during escape slide deployment may make the situation worse.

It is possible to use the escape slides to rapidly evacuate the aircraft. However, if escape slides are used, it is very important to verify that there are no obstacles in the area where the escape slide will be deployed. In some cases, it may be necessary to wait for equipment, personnel, or vehicles to move away from the deployment area, before arming the escape slide and opening the aircraft doors.



IV Safety Precautions

Fuel vapors from the aircraft are heavier than the air. These vapors dissipate slowly, therefore, any spark near the refueling area becomes a major fire threat.

During refueling operations, it is recommended to:

- Ensure that the aircraft is properly bonded to the tanker: It sets the same electrical potential between the two vehicles and eliminates the majority of the risks of sparks
- Ensure that the tanker and the aircraft are properly grounded (If a suitable ground is not available, the aircraft can be bonded to the tanker only). Always connect the ground cable to the parking ground point (or to the tanker) before connecting it to a grounding point on the aircraft.
- Ensure that no HF transmission (including HF transmission via the HF DATA LINK pb) is performed during refuelling/defuelling operations
- Synthetic clothes can produce sparks in dry atmosphere. It is better to wear cotton clothes, when approaching areas where there may be fuel vapors
- Be aware that the connection or disconnection of electrical equipment, overheating external lights, the use photographic flash lights, are potential spark sources
- Turn off cellular phones, as a precaution.

This above-listed recommendations are not the only recommendations to be followed. For more information, Operators should also refer to the Airline Operations Policy Manual and to the documentation of the aircraft manufacturer.

Note:

Some Operators authorize passengers to use their cellular phones in the aircraft during refueling, as long as one door is open.

V Prevention Strategies

Operators should develop prevention strategies to take into account all factors associated with refueling operations, as follows:

- The Airline Operations Policy Manual should include a procedure for refueling with passengers on board, and this procedure should be supported by training and documentation
- In the case of a significant fuel spillage near the aircraft, a precautionary disembarkation will save time if an emergency evacuation becomes necessary.
- If a fire starts despite all the precautions taken, it is important to remember that a fire can spread rapidly. Therefore, all applicable personnel must rapidly take action without hesitation. This highlights the importance of training.

VI Summary of Key Points

During any refueling operation with passengers on board, Operators must keep in mind that:

- The accurate application of procedures reduces the risk of accidents
- All applicable personnel must ensure good communication at all times
- Ground equipment should not be near the area of escape slide deployment
- In the case of a large fuel spillage near the aircraft, consider a precautionary disembarkation.

VII Associated Flight Operations Briefing Notes

- **Ground Operations Safety**
- **Crew Communication**
- **Unplanned Ground Evacuation**

VIII Regulatory References

- JAR-OPS 1.305 - Re/defueling with passengers embarking, on board or disembarking
- FAR 121.570 – Airplane Evacuation Capability

IX Airbus References

- A320 / A330 / A340 Cabin Crew Operating Manuals (CCOM) – Refueling / Defueling Procedure with Passengers On Board
- Operations Policy Manual 8.2.1.2 - Refueling and Defueling when Passengers are Embarking, on Board or Disembarking

X Additional Reading Materials / Website References

- Flight Safety Foundation – Airport operations – November-December 2000: Direct Communication Between Flight Crews, ARFF Incident Commanders Can Reduce Injuries
- Flight Safety Foundation – Airport operations – March-June 2001: In Aircraft Fueling, Fire Prevention Requires Strict Compliance With Routine Procedures
- Flight Safety Foundation – Airport operations – March-April 2002: Rapid Deplaning by Airbridge Requires Coordinated Procedures

Note:

These documents can be found on the Flight Safety Foundation website:
<http://www.flightsafety.org>

- IATA - Guidance Material on Standard Into-Plane Fuelling Procedures

Note:

This document can be found on the IATA website: <http://www.iata.org/ps/publications>.

This FOBN is part of a set of Flight Operations Briefing Notes that provide an overview of the applicable standards, flying techniques and best practices, operational and human factors, suggested company prevention strategies and personal lines-of-defense related to major threats and hazards to flight operations safety.

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