



Flight Operations Briefing Notes

Cabin Operations

Cabin Smoke Awareness

I Introduction

It is important that cabin crewmembers be aware of indications of smoke, report them to the flight crewmembers and respond to. All crewmembers must take all reports of smoke in the cabin seriously. They must immediately identify the source of smoke, and take the appropriate actions in order to significantly minimize the risk of fire onboard the aircraft.

It is wise to treat a smoke occurrence as fire, until it has been proven otherwise. The cabin crewmembers must remember that the development of an odor, or smoke, takes some time before it can be detected.

Additional information on how to deal with in-flight fire events is provided in the Flight Operations Briefing Note [Managing Fire in the Cabin](#).

II Background Information

Analysis of in-service events involving smoke in the cabin has shown:

- Cases where the cabin crewmembers detected the source of smoke easily
- Cases where the cabin crewmembers detected the source of smoke with difficulty.

In most cases, the cabin crewmembers reported that the source of smoke was easily identified.

The following are the areas where the cabin crewmembers can easily detect the source of smoke:

- Galley equipment (ovens, coffeemakers) represented the most common source of smoke
- Cabin equipment (e.g. a seat screen or seat control malfunction)
- Lavatories.

The following are areas where it is difficult for the cabin crewmembers to detect the source of smoke:

- Air conditioning
- Sidewall panels
- Ceiling panels.

Smoke coming from the above areas may be attributed to:

- The Auxiliary Power Unit (APU)
- Cabin recirculation fans
- Cargo compartments
- Crew Rest Compartments
- Electrical wiring
- Engine Air Bleed (e.g. Bird ingestion, ...).

Sometimes human error is a contributing factor to some smoke occurrences, such as:

- Putting a flammable item in an oven (e.g. plastic wrapping left on food during the cooking cycle, ...)
- Leaving an empty coffeemaker on a hot plate
- Placing a flammable item close to a source of heat (e.g. plastic cups next to a hot oven)
- Forgetting to check the cleanliness of oven pre-flight (i.e. papers or food grease left in the oven)
- Smoking in the lavatories.

If it is not possible for the cabin crewmembers to immediately detect the source of smoke, the following consequences may occur:

- Fire
- Emergency evacuation
- Hospitalization of cabin crewmembers and/or passengers due to smoke inhalation
- Flight delays, In-flight Turn Back (IFTB), diversions.

III Operational Standards for a Smoke Occurrence

When the cabin crewmembers identifies and locates smoke, they must apply the appropriate procedures in order to stop the smoke and prevent a fire.

Smoke can come from different areas of the aircraft. These areas can be identified as either "easy" or "difficult" sources of smoke.

The "Easy" Sources of Smoke

The cabin crewmembers must take the following actions:

- Shut off the electrical power by pulling the corresponding circuit breaker, and shutting off the power, if applicable
- Inform the flight crew immediately
- Closely monitor the situation
- Prepare a fire extinguisher, Protective Breathing Equipment (PBE) and fire gloves in case the situation deteriorates.

The "Difficult" Sources of Smoke

The cabin crewmembers may have limited or no access to areas such as sidewall, ceiling panels, or air conditioning, and may have no way of visually monitoring them.

If smoke comes from any of these areas, the cabin crewmembers must take the following actions:

- Inform the flight crew
- Closely monitor the situation
- Prepare a fire extinguisher, Protective Breathing Equipment (PBE), fire gloves in case the situation deteriorates.

Protection from Smoke

Smoke can impair judgment and affect performance. When inhaled even in small quantities, it can be fatal depending on an individual's level of tolerance. Materials that are used in the cabin release toxic fumes when smoldering, such as:

- Carbon monoxide (CO)
- Hydrogen cyanide
- Hydrogen chloride and Acrolein.

The cabin crewmembers must take the following actions, in order to protect everyone on board, from the negative effects and consequences of smoke inhalation:

- Do not open the cockpit door, unless it is necessary. Take necessary action to prevent smoke and fumes from contaminating the cockpit
- Move passengers away from the smoke source area. If this is not possible, encourage the passengers to remain at a low level where the air is clearer
- Use wet towels, a wet cloth, or a head rest cover to reduce some of the effects of smoke inhalation. Instruct passengers to hold the wet towel/cloth over their noses and mouth and breathe through it.

In addition, the cabin crewmembers should use Protective Breathing Equipment (PBEs) to protect themselves.

Use of Circuit Breaker

Circuit breakers are safety devices, that are designed to interrupt the flow of electrical current to prevent the overheating of wiring and connectors when overloads or short circuits occur. They also help to isolate specific circuits that do not have any other switching device.

A circuit breaker will trip, when a predetermined electrical current is detected. A thermal sensing element (e.g. bi-metal) opens the circuit.

The cabin crewmembers should pull the circuit breaker related to equipment when they see smoke coming from this equipment.

Pulling a circuit breaker will cut off the power source to an electrical item. A circuit breaker is pulled or has tripped automatically, must **never** be re-engaged by the cabin crewmembers.

If a circuit breaker trips, this may indicate a problem. In addition, this problem may be located in an area that is not visible.

Re-engaging a tripped circuit breaker may cause more electrical damage and increase the risk of damage to other equipment.

The cabin crewmembers must never use circuit breakers as "ON/OFF" switches for equipment.

Crew Communication / Coordination

If there is smoke in the aircraft, effective crew communication is essential. The information that the cabin crewmembers provides to the flight crew will determine the course of action that the flight crew will take.

The cabin crewmembers must inform the flight crew immediately in order to:

- Limit confusion
- Increase confidence in decision-making

- Improve the chances of a successful outcome.

Only one cabin crewmember should act as a liaison between the cabin and the flight crew, via the interphone, so as to avoid conflicting information.

This cabin crewmember should report:

- Location of smoke
- Source (if possible)
- Severity (density, color, odor, how it is affecting people in the cabin)
- Any actions taken.

Never underestimate the severity of smoke and fire, when reporting to the flight crew. Do not mention fire, unless flames are visible.

In the event of smoke in the cabin, the following actions should be taken by the cabin crewmember who noticed the smoke:

- Inform the other crewmembers
- Obtain the nearest firefighting equipment in the cabin
- Locate the source of smoke
- Closely monitor the situation.

The other cabin crewmembers must also be ready to perform their assigned duties if the smoke develops into a fire.

The in-flight fire fighting procedures are further detailed in the Flight Operations Briefing Note [Managing Fire in the Cabin](#).

IV Operational and Human Factors Involved in the Detection of Smoke

When smoke is detected in the cabin, the cabin crewmembers must immediately try to identify the source.

IV.1 Operational Factors involved in the Detection of Smoke

Some areas are equipped with smoke detection devices which will alert both flight crewmembers and cabin crewmembers when smoke is detected.

Smoke Detectors

There is a smoke detector in all lavatories. If smoke enters into the measuring chamber of a smoke detector, a visual and aural warning is transmitted to the cabin and cockpit.

Visual Indications in the Cabin

Visual indicators appear on the following systems in order to notify to the cabin crewmembers that smoke is detected:

- All Attendant Indication Panels (AIP)
- The applicable Area Call Panel (ACP)
- The associated lavatory wall
- The Forward Attendant Panel (FAP)
- The Aft Attendant Panel (AAP).

Aural Indications in the Cabin

The following aural indicators will simultaneously trigger, with the visual indicators:

- A repetitive chime from all the cabin loudspeakers
- A repetitive chime from all attendant station loudspeakers.

IV.2 Human Factors involved in the Detection of Smoke (Situational Awareness)

The cabin crewmembers must also use their senses (hearing, touch, smell, vision) to detect smoke. Sometimes, the cabin crewmembers may not see any smoke, but may recognize such indications as:

- An abnormal noise in the cabin
- An abnormally warm surface
- An unusual odor.

Sense of Hearing

Cabin crewmembers and passengers may hear abnormal (snapping, crackling) noises, and should report them. These noises could be caused by electrical arcing of wiring.

Sense of Touch

When trying to find the source of smoke, the cabin crewmembers should use the back of their hands to check the temperature and/or heat of the various panels and/or doors.

Sense of Smell

The following abnormal odors may indicate the presence of smoke:

- Acrid odor: Electrical equipment, engine oil leak
- Burning: Electrical or galley equipment, bird ingestion
- Chemical odor: Contaminated bleed cuts, Auxiliary Power Unit (APU) fluid ingestion
- Chlorine: Smoke hood, blocked door area drain
- Electrical odor: Electrical equipment
- Fuel odor: APU, Flush Control Unit (FCU)/Fuel line
- Oil: Engine or APU oil leak
- Sulphur odor: Wiring, avionics filter water contamination, light bulb.

Sense of Vision

The different panels (Attendant Indication Panels, Area Call Panel...) dispatched through the cabin help the cabin crewmembers to detect the presence of smoke in the aircraft.

V Operational and Human Factors Affecting Operational Standards

The analysis of in-service events shows that operational standards may not be effective or may be not applicable, due to the following:

- Ineffective detection of smoke:
 - Odors or smoke may take some time to develop before it can be detected
 - Recirculation of smoke through air conditioning.
- Inadequate procedure
- Incorrect application of the procedure:
 - A cabin crewmember resets a tripped circuit breaker without informing the flight crew about the incident
 - A cabin crewmember does not put an inoperative flag or indicator on a faulty circuit breaker.

- Lack of training:
 - The cabin crewmembers are not proficient enough to accurately perform their respective duties in the event of smoke
 - The cabin crewmember is not proactive or, hesitates to apply the required procedure
 - A cabin crewmember does not know what procedure should be applied (e.g. The crewmember opens the door of an oven that is emitting smoke, ...).
- Lack of Operator policy:
 - The Operator does not have a policy regarding the use of circuit breakers (C/B).
- Ineffective communication with flight crew:
 - A cabin crewmember does not accurately inform the flight crew, by declaring the presence of a fire, without having seen flames. It may cause the flight crew to decide to perform an unnecessary emergency landing
 - Important cabin crewmembers and passengers information may not always be taken into account by the flight crew (odors, noises...).

VI Prevention Strategies

It is important to remember that the source of smoke may quickly develop into an on-board fire, if left undetected. Therefore, both the operator and the cabin crewmembers should take the following preventive actions:

- The cabin crewmembers should perform a complete pre-flight check including ovens and galleys to ensure that they are clean (papers or any flammable items left in it)
- The cabin crewmembers should frequently monitor the cabin, galleys (ovens) and lavatories (waste bins)
- The cabin crewmembers should have good knowledge of the cabin configuration and of all smoke procedures.
- Operators should provide training and documentation about these smoke-related procedures
- Operators should ensure that cabin crewmember are medically apt for the flight (e.g. A cabin crewmember does not have a cold that may affect his/her ability to detect the odor of smoke)
- Finally, operators should adopt a "Hands-off" policy about tripped circuit breakers. This is to prevent cabin crewmembers performing tripped circuit breakers resets, in any circumstance, and to encourage them to immediately report tripped circuit breakers to the flight crew. Tripped circuit breakers indicate the existence of an abnormal electrical situation, and the possible existence of smoke and/or fire.

VII Summary of Key Points

It is important to note the following key points:

- Operators should develop their policies for cabin safety matters related to smoke in the cabin
- Operators should plan regular training courses and exercises for its cabin crewmembers. Training exercises should be performed in “realistic” environments such as in mock-up aircraft, to help the cabin crewmembers to become familiar with cabin smoke events
- Operators should implement the recommendations issued by aviation authorities in their procedures and training
- Documentation should be reviewed and updated regularly so that the cabin crewmembers have the most accurate operational standards for smoke events
- All smoke related events must be recorded using both a flight report and a technical/cabin logbook entry
- Operators should collect information about incidents that occur during operational flights. This information should be analyzed in order to enhance their procedures and their cabin crew training.

VIII Associated Flight Operations Briefing Notes

The following Flight Operations Briefing Notes provide additional information about this subject:

- [Effective Briefings for Cabin Operations](#)
- [Crew Communication](#)
- [Managing Fire in the Cabin](#)

IX Regulatory References

- FAA - AC 120-80 In-Flight Fires
- JAR-OPS 1.1015 – Cabin Crew Training Standards

X Airbus References

- A318/A320/A321, A330, A340 & A380 Cabin Crew Operating Manuals (CCOM)
- Getting to Grips with Cabin Safety (Brochure)
- Smoke for Pilots and Cabin Crews (e-briefing)

XI Additional Reading Materials / Websites References

- Transport Canada – TP 12295E – Flight Attendant Manual Standard
- Transport Canada – TP 12296E – Flight Attendant Training Manual

Note:

These manuals are available on the Transport Canada website: <http://www.tc.gc.ca/>.

- Flight Safety Foundation – Publications - Cabin Crew Safety – March-April 2004 – When Circuit Breakers Trip, A Hands-Off Policy Prevents Fires

Note:

This FSF publication and other FSF Cabin Crew Safety Bulletins are available on the Flight Safety Foundation website: <http://www.flightsafety.org/home.html>.

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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