

Airbus Flight Operations

Getting to grips with cabin safety



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1. INTRODUCTION

Welcome to '**Getting to Grips with Cabin Safety**'.

This brochure is a comprehensive review of Cabin Crew Emergency Procedures.

The aim of Getting to Grips with Cabin Safety is to provide Operators with guidance to develop procedures to enable them to implement and customize a cabin safety program to suit their own requirements.

The compilation of this Getting to Grips with Cabin Safety brochure involved a global understanding of how safety procedures are used on board aircraft worldwide. This was achieved through extensive research of, studies and articles, accident analysis of aviation authorities worldwide, Airbus in-service experience, and an overview of existing standards and procedures.

No single aviation authority standard is represented by this brochure as there are many different practices exercised by Operators worldwide.

Should any deviation appear between the information provided in this brochure, and that published in the applicable CCOM, AFM, MMEL, FCOM, AMM, the latter shall prevail at all times.



2. MAIN GETTING TO GRIPS CHANGES

The purpose of the present section, called “Main Getting to Grips Changes”, is to provide general overview of the latest Getting to Grips revisions, and to highlight the main changes for the following subjects:

LITHIUM BATTERY FIRES PROCEDURE (4.12.1.)

Following the global action plan launched at industry and at Airbus due to an increase of industrial awareness regarding Lithium Batteries fires, an emergency procedure “Lithium Battery Fire” has been published for the cabin in the Getting to Grips, common to all Airbus aircraft.

OVERHEAD BIN SMOKE/FIRE PROCEDURE (4.17.4)

Smoke/fire in overhead bins may be caused by the contents (i.e. electronic device, spare lithium battery) or electrical malfunction in the Passenger Service Unit (PSU). Therefore, the overhead bin smoke/fire procedure is revised to take into account these factors.

GALLEY SMOKE/FIRE PROCEDURE (4.17.7)

Following a smoke event reported in a trash compactor, a note has been added in the Getting to Grips to emphasize that, if necessary, all the galley inserts can individually be switched off via a dedicated Circuit Breaker.

CREW REST SMOKE FIRE & EVACUATION (4.31, 4.34, 4.37)

The Crew Rest smoke fire and evacuation procedure has been updated in accordance with the Airbus family CCOMs.

EMERGENCY PASSENGER DOOR OPERATION (6.12)

Following several cases of inadvertent slide deployment due to door opening with the slide not disarmed, Airbus wants to notify that there is specific point during the automatic opening of the door where it is possible to counteract the door dumper force. Although, it is important that cabin crew are aware of the fact that attempting to counteract an automatic door opening can induce a risk of injury.

For this purpose, a warning has been added in the Emergency passenger door operation part.

CABIN CREW ACTIONS AT UNUSABLE EXITS (6.13)

Following an event of slide deployment with unusual slope, a recall concerning cabin crew actions at unusable exits has been added in the Getting to Grips.

GROUND EVACUATION PROCEDURE (6.14)

The On Ground Evacuation Procedure has been updated in conformity with the Airbus family CCOMs.

CABIN PRESSURE INDICATOR (8.2)

In service experience shows that several events of residual cabin pressure have been reported and led to violent door opening with potential for serious injuries.

Therefore, this part highlights the importance of considering an accurate check of the cabin pressure indicator before any opening of the door.

CABIN DEPRESSURIZATION PROCEDURE (8.12)

A revised cabin depressurization procedure common to all aircraft has been inserted.

DANGEROUS GOODS / PREVENTION STRATEGIES (10.14)

A recommendation to Operators and cabin crew, about preventive actions concerning dangerous goods information and handling, has been added in the Dangerous goods part.



3. CABIN SMOKE AWARENESS

3.1. INTRODUCTION

The appearance of smoke does not always indicate a fire, and immediate action by the cabin crew can contain the situation and prevent it from escalating.

It is important that cabin crew are aware of smoke indications, and respond and report immediately. Identifying the source of smoke, and taking immediate action, will significantly minimize the risk of fire onboard the aircraft.

The existence of smoke may impact flight operations, cause flight diversions, and may result in delays, cancellations, declared emergencies or evacuations. In addition, the presence of smoke may physically affect passengers and cabin crew, if it is not dealt with rapidly and efficiently.

This chapter addresses the various potential sources of smoke onboard an aircraft.

3.2. IDENTIFYING THE SOURCES OF SMOKE

In the aircraft cabin, only some areas are equipped with smoke detectors, such as the lavatories, the crew rest areas and the Video Control Center. Smoke detection and fire suppression rely on the intervention of the cabin crew.

Keep in mind that the development of an odor, or smoke, takes some time to reach a level that is easily noticeable.

Smoke occurrences in the cabin sometimes involve equipment that is easily accessible to cabin crew, e.g. from a coffeemaker, oven, a seat video screen, or a passenger seat control box.

Sometimes smoke may not be visible to cabin crew, but an unusual odor could make them aware of the smoke. In this case, the odor should be traced to where it is strongest in order to locate the source. Another indication may be an area or surface that is exceptionally hot.

If the source can be identified, and is connected to an electrical source (for example, a coffeemaker), the circuit breaker relating to that coffeemaker should be pulled and the flight crew advised immediately. If the source of the smoke cannot be identified, and is coming from the galley area, isolate the area by using the “galley shutoff”, or by pulling all of the galley circuit breakers to cut off the power source.

In case of smoke emissions from any electrical source the first thing to do is remove the power source and monitor the situation.

Prepare firefighting equipment and keep it available in case the situation deteriorates.

3.3. DIFFICULT TO IDENTIFY SOURCES OF SMOKE

The FAA issued an Advisory Circular entitled ‘In-Flight Fires’ with emphasis on hidden fires, and the importance for cabin crew to:

- Recognize the source of smoke
- Rapidly assess conditions
- Take immediate action to gain access to fires that are behind interior panels by using the hook end of the fire axe or crowbar.

An example of hidden areas can include:

- Sidewall Panels
- Overhead Panels
- Air Ducts
- Ceiling Panels
- Cargo Compartments

Smoke emissions from these areas is a definite sign of a problem.

Many of these “hidden areas” involve wiring, air conditioning, and insulation, and can in fact, hide a potential fire within the aircraft.

Smoke coming-from the seams of a wall panel may indicate electrical arcing¹ that has ignited another piece of material.

¹ A luminous discharge that occurs when an electric current flows between two electrodes or any other two surfaces separated by a small gap and a high potential difference.

Smoke and fumes, due to contamination of the cabin air supply, may also infiltrate the cabin. Items that are in the cargo compartments are another source to consider.

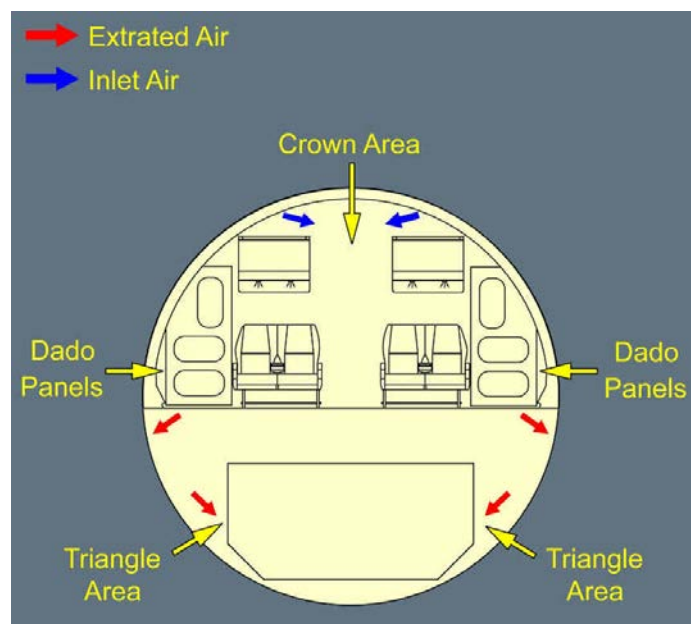
Immediate investigation of odors, fumes, unusual noises, and passenger observations that relate to a smoke occurrence, may save valuable time.

In addition, the National Transportation Safety Board (NTSB) noted in a report that there were shortcomings in recent cases of in-flight fires. In-flight fires on commercial aircraft can present themselves not as visible, localized flames, but in less obvious ways, such as smoke or heat from hidden locations. They expressed concern about the apparent lack of understanding about the use of Halon as a fire extinguishing agent, as evidenced by the reluctance to use Halon because of its presumed ill effects on breathing. In one of the fire events discussed by the NTSB, an available Halon extinguisher was not used as a consequence of the erroneous belief that it 'would take away more oxygen from the cabin'. The safety board pointed out that the Halon concentrations would remain well below the acceptable levels, and that the decomposition products of the fire itself create a far greater hazard.

The diagram below is a typical cross-section of an aircraft. It is important for cabin crew to be aware of the potential sources of smoke onboard the aircraft, and to become familiar with these areas. This enables cabin crew to determine the source of the smoke, and take immediate action.

- **Crown Area.** This area is above the ceiling panels and includes wiring bundles, control surface cables, passenger emergency oxygen system, parts of the air conditioning system, and components of the In-Flight Entertainment System (IFE).
- **Dado Panels.** These are the vents that are in the lower part of the sidewall panels, on each side of the passenger cabin. Most aircraft air conditioning systems supply conditioned air from the cabin ceiling. This conditioned air then flows from the top of the cabin to the bottom, exits via the return grills, and finally leaves the aircraft via the outflow valves.
- **Triangle Area.** This area is below the floor outboard of the cargo area. This area contains hydraulic lines, electrical components and wiring bundles.

Figure 3-1
(Source. Airbus Cabin Crew Operating Manual)



3.4. CIRCUIT BREAKER PHILOSOPHY

Circuit breakers perform a dual function in aircraft electrical systems. Their primary function is to provide protection from overheating. This can occur if there is an overload or a fault on a piece of electrical equipment which may result in the total or partial deactivation of the electrical system.

The secondary function is to facilitate the isolation of specific circuits that do not have an individual ON/OFF switch.

The likely reason for a circuit breaker to trip (release) is due to a fault in the electrical load, or in the associated wiring. A circuit breaker will open, when a predetermined current is detected.

Pulling a circuit breaker will cut off the power source to an electrical item. A circuit breaker that has been “pulled” or “tripped” automatically, should **never** be re-engaged by cabin crew. However, it must be reported to the flight crew and recorded in the cabin defects-log, according to the Operators policy.

Circuit breakers that relate to cabin items, such as lights, and entertainment systems may be used to isolate equipment in the event of smoke and fire, in accordance with the operator’s policy.

Cabin crew should report all electrical failures and malfunctions to the flight crew.

Tripped circuit breaker(s), particularly multiple circuit breakers in galleys or the In-Flight Entertainment System, may indicate a problem in a hidden area of the aircraft where wiring and other components are located.

Re-engaging a tripped circuit breaker may aggravate any electrical damage, and risks affecting other equipment. This may result in a temperature increase and smoke emissions in the area concerned.

Circuit breaker re-engagement has been the cause of some smoke and fire occurrences.

Do not use circuit breakers as ON/OFF switches for equipment.

Figure 3-2

Example of Galley Circuit Breaker Panel



3.5. CABIN TO COCKPIT COMMUNICATION

The importance of effective crew communication cannot be stressed enough, particularly in an abnormal/emergency situation. During the study of many accident and incident reports, crew communication has played an extremely important role and has significantly contributed to the outcome.

In the past, ineffective (or lack of) communication amongst the cabin crew and the flight crew has contributed to the severity of an accident. Equally, effective communication between the flight crew and the cabin crew has made the difference between an accident and an incident.

Effective communication :

- Reduces confusion
- Increases confidence in decision making
- Improves the chance of a successful outcome

The information that the flight crew receives from the cabin crew determines the course of action that the flight crew will take. Therefore, it is vitally important that the flight crew receives a realistic account of the events in the cabin as they occur.

If smoke or fumes are detected in the cabin, the flight crew should be informed immediately.

One cabin crewmember should act as a liaison between the cabin and the flight crew, via the interphone. This is to avoid conflicting information.

The information should be clear and concise, and reflect the conditions in the cabin.

Remember to Keep it Simple.

- Location
- Source (if possible)
- Severity (density, color, odor, how it is affecting people)
- Action taken.

Never underestimate the severity of smoke or fire, when reporting to the flight crew.

Do not mention fire, unless flames are actually visible.

3.6. COMPONENTS OF SMOKE AND PHYSIOLOGICAL EFFECTS

The nature of smoke, its ability to spread quickly, and its chemical components and fumes may cause damage rapidly, and lead to death within a relatively short period of time.

Smoke has the ability to impair judgment and affect performance. The effects of smoke inhalation depend on the individual level of tolerance. Materials that are used in the cabin, such as curtains, plastic, paper, or carpets, release toxic fumes when smoldering.

- **Carbon monoxide (CO).** This is produced when carbon-based items burn. Many items onboard the aircraft are carbon-based.

Effects. Dizziness, headaches, vomiting, impaired alertness, problems of vision and lack of judgment.

- **Hydrogen cyanide.** This is produced when nitrogen based items burn. These include items such as wool, silk and nitrogen-based synthetics.

Effects. The effects are the same as the above-listed for carbon monoxide. However, because hydrogen cyanide interferes with the way oxygen is carried in the body and its effects on the respiratory system, death from cyanide poisoning is relatively quick.

- **Hydrogen chloride & Acrolein.** Both of these chemicals are found in smoke that is produced when electrical wires burn.

Effects. These act as a severe irritant to the eyes and the respiratory tract, causing pain, tears and disorientation.

In some cases, when smoke and toxic gases have been present in the cabin, some crews have had difficulty in verbal communication due to the effects of smoke inhalation on their voice.

3.7. PROTECTION FROM SMOKE INHALATION

Smoke fumes, even when inhaled in small quantities, may be fatal depending on the individual's level of tolerance. If the concentration of smoke and fumes becomes excessive, cabin crew must take action in order to protect passengers and themselves from the effects of smoke inhalation.

- Cabin crew should don a PBE for protection from the effects of smoke inhalation
- Do not open the cockpit door. Every effort should be made to prevent smoke and fumes from contaminating the cockpit
- Move passengers away from the area if possible
- If it is not possible to relocate passengers, encourage them to keep their heads as low as possible to the floor level. (As smoke rises, there is more breathable air at floor level)
- Distribute wet towels or wet cloths to passengers. Instruct passengers to breathe, placing the wet towels/cloths over their nose and mouth. This will help filter out acidic gases such as hydrogen chloride, hydrogen fluoride and hydrogen cyanide, as well as smoke particles.

In the past, smoke occurrences have resulted in aircraft evacuations. Incapacitation due to smoke inhalation, may diminish the ability to evacuate the aircraft and may reduce the chances of survival.

3.8. SOURCES AND SYMPTOMS OF TOXIC GASES

Sources of Toxic Gases		
GAS	SOURCE	SYMPTOMS
CARBON MONOXIDE	Cabin furnishings	Tears, physical incapacitation, disorientation, headache, dizziness, dimmed vision, disturbance of judgement, coma, death from cardiotoxicity.
HYDROGEN CYANIDE	Wool, silk, nitrogen containing synthetics	Tears, physical incapacitation, disorientation, convulsions, nausea, vomiting, weakness, dizziness, nausea, convulsion, coma, death.
HYDROGEN CHLORIDE	Wiring insulation, other cabin materials	Irritation to eyes, nose, mouth.
CARBON DIOXIDE	Cabin furnishings	Increases respiration rate causing an increase in the uptake of other combustion gases.

3.9. SUMMARY

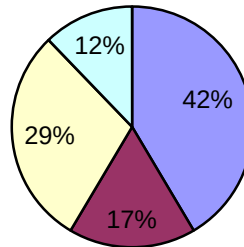
It is important to remember that a smoke occurrence can be a potential fire that if left undetected, can deteriorate within a short space of time.

- Smoke occurrences require cabin crew to respond quickly, to locate the source and notify the flight crew without delay
- When the source of the smoke can be identified, immediate intervention by the cabin crew can minimize the risk to flight safety
- Cabin crew should be aware of the indications of smoke from hidden areas.

3.10. ANALYSIS OF IN-SERVICE OCCURRENCE REPORTS

In-Service Occurrence reports (ISOs) relate to incidents that happen during aircraft operations and are reported back to Airbus by Operators. The following chart refers to in-flight smoke occurrences reported to Airbus.

Easy to locate sources of smoke



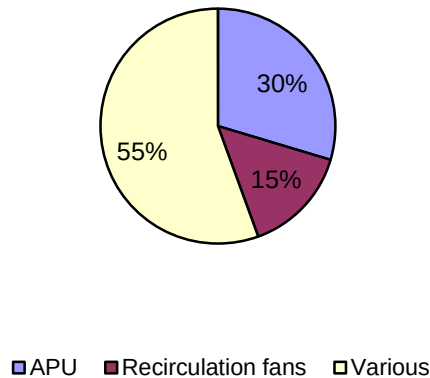
■ Galley Equipment ■ Cabin equipment ■ Cockpit equipment ■ Lavatory smoke

This chart represents the type of smoke occurrences that are easy to identify. The equipment involved, as described in the previous chapter is easily accessible to the cabin crew.

- Galley equipment represents the largest percentage 42%. Coffeemakers and ovens contributed to the majority of smoke occurrences. It is interesting to note that in some of the smoke occurrences involving ovens, an element of human error was involved. One example was paper towels left in the oven were the cause of smoke. Food and grease deposits in the ovens were also a contributing factor in some cases.
- Cockpit equipment included, a closet light unit, Cockpit Door Surveillance System (CDSS) monitor, Multipurpose Control and Display Unit (MCDU) and map reading light.
- Cabin equipment included, IFE screens and lights (ballast, reading and ceiling).
- It is interesting to note that all lavatory smoke occurrences were the result of passengers smoking. In one instance the crewmember smelt the odor but the lavatory smoke detector was not activated, because the passenger was holding a cup over it to prevent activation.

The following chart represents the type of smoke occurrence where it is difficult for cabin crew to identify the source. These types of smoke occurrences contaminate the cabin through the ventilation system and air ducts, or produce smoke from panels that would be difficult for cabin crew to access.

Sources of Smoke that are Difficult to Identify



- The largest portion of the chart is “various”, as there were many different sources of smoke in the cabin that occurred in many different ways. These include bird ingestion, lightening strike, smoke from an oxygen outlet panel, external power receptacle, contamination of an oil filter, damaged wire bundles behind panels and circuit breakers that did not trip for in-operative items.
- The Auxiliary Power Unit (APU) was identified as not only contributing to smoke occurrences, but also as the origin of fumes and odors. The ingestion of anti/de-icing fluids by the APU may cause smoke in the cabin, and can trigger smoke warnings in the cockpit. This kind of contamination goes through the bleed air system and then through the air conditioning, leading to smoke in the pressurized areas of the aircraft.
- Cabin recirculation fans have also contributed to smoke occurrences, and can be the cause of a significant amount of smoke in the cabin.

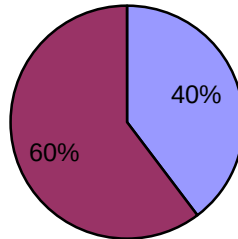
3.11.ANALYSIS SUMMARY OF REPORTED IN-FLIGHT OCCURRENCES

From the analysis, we can see that the cabin crew easily identified 60% of the smoke occurrences reported. However, 40% of smoke occurrences were not easily identifiable, therefore re-enforcing the need for cabin crew to be aware of other possible sources of smoke in the cabin, particularly in hidden areas.

- In the final analysis only one of the smoke occurrences resulted in fire. This was an oven fire that was caused by plastic wrap left on during the cooking cycle.
- Smoke occurrences have resulted in cabin crew and passengers being hospitalized due to smoke inhalation.
- The effects of fumes reported by cabin crew were eye irritation and sore throats.
- The percentage of flights that diverted due to smoke occurrences was 20.60% during the reported year.

- Smoke occurrences have resulted in some full emergency evacuations.

SOURCES OF SMOKE



■ Difficult to identify sources of smoke ■ Easy to Locate sources of smoke

3.12.LIST OF ODORS MOST REPORTED

The following table lists the types of odors that are the most often reported from Airbus operators. The words used to describe the odors reflect the language used in the reports. However, the purpose is to link the odor to its possible source.

DESCRIPTION OF ODORS	PRIMARY CAUSE (MOST REPORTED LISTED FIRST)
Acrid	Electrical Equipment/IFE Engine Oil Leak
Burning	Electrical Equipment Galley Equipment Bird Ingestion
Chemical	Contaminated Bleed Cuts APU Ingestion
Chlorine	Smoke hood Blocked Door Area Drain
Electrical	Electrical Equipment
Dirty Socks	APU or Engine Oil Leaks
Foul	Lavatories
Fuel	APU FCU/Fuel Line
Oil	Engine or APU Oil Leak
Skydrol	Engine Hydraulic
Sulphur	Wiring Avionics Filter Water Contamination Light Bulb

3.13. DRY ICE

Dry ice is a familiar item in aircraft galleys. It is usually used to preserve food items that have to be kept chilled.

Dry ice is solidified carbon. It is subject to the process of sublimation, i.e. the conversion of a solid substance directly into gas (carbon dioxide vapor).

Dry ice gradually releases carbon dioxide, which is not poisonous, but may well present a problem in confined or poorly ventilated areas. Cabin crew should be aware of the

physiological symptoms that are associated with a higher than normal level of carbon dioxide in the air. Symptoms include:

- Headache
- Dizziness
- Shortness of breath
- Muscular weakness
- Drowsiness
- Ringing in the ears

The recovery time is rapid after leaving the affected area. If cabin crew experience these symptoms in-flight they must:

- Leave the affected area
- Notify the Purser and the Flight crew
- Complete a flight report (Air Contamination)
 - Give details of the number of cabin crew affected,
 - The type of symptoms experienced by cabin crew
- Report to the medical department upon arrival

The hazards associated with dry ice onboard the aircraft are considered minimal under normal cabin ventilation conditions.

The following precautions should be taken when handling dry ice:

- Use gloves to handle dry ice – do not let dry ice contact the skin
- Do not let dry ice contact water as it produces smoke

The transport of dry ice is the sole responsibility of the operator.

- - - - -



4. MANAGING ONBOARD FIRES

4.1. INTRODUCTION

Fire is considered to be the most serious in-flight emergency. A study of in-flight fires carried out by the Transportation Safety Board of Canada, in which 15 in-flight fires were studied, revealed that the average length of time between the discovery of an in-flight fire and Controlled Flight into Terrain (CFIT) is 17 minutes.

A fire must be brought under control as soon as possible. Considering how time critical this type of emergency is, it is imperative that no time is lost in trying to fight the fire and minimize the risk to the flight.

Due to the nature of a fire, and its devastating effects on an aircraft, particularly within a confined space, it is important to know what steps should be taken to prevent the fire, and to stop it from spreading.

Any fire, no matter how small, may rapidly become out of control if not dealt with immediately. Therefore cabin crew must take immediate and aggressive action to locate the source of the fire and **put it out**.

In-flight firefighting skills require knowledge, technique and realistic hands on training for cabin crew.

4.2. EASA FIRE AND SMOKE TRAINING STANDARDS

Every aviation authority has its own cabin crew training standards and requirements. In Appendix 1 to Part CC, the fire and smoke training standards for cabin crew operating within the EASA region (Europe), is as follows:

“Fire and Smoke Training. An operator shall ensure that fire and smoke training includes:

1. *Emphasis on the responsibility of cabin crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire*
2. *The importance of informing the flight crew immediately, as well as the specific actions necessary for co-ordination and assistance, when fire and smoke are discovered*
3. *The necessity for frequent checking of potential fire-risk areas including toilets, and the associated smoke detectors*
4. *The classification of fires and the appropriate type of extinguishing agents and procedures for particular fire situations, the techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space*
5. *The general procedures of ground based emergency services at aerodromes."*

In any abnormal/emergency situation onboard the aircraft, the training received by the cabin crew will have a direct impact on crew performance. Training is the most effective way of improving crew awareness and co-ordination, and should include flight crew and cabin crew being instructed in each other's basic emergency procedures, with particular emphasis on smoke and in-flight fires.

Training should give cabin crew the confidence to feel that they have the necessary information and techniques to deal successfully with any type of onboard fire.

4.3. FIRE DETECTION

Fire protection is an integral part of the design of modern aircraft. In the passenger cabin all cabin crew and passenger seats are fire proofed, lavatories are equipped with smoke detectors, and automatic fire extinguishers are located beneath each sink. Crew rest areas are equipped with smoke detectors and extinguishers. Even galley and lavatory waste bin is designed to contain fire. Yet, cabin fires may still occur.

Sometimes a fire may not always be obvious, and smoke and flames may not always be visible, but there may be other indications that a potential fire is in progress. Signs to be aware of include:

- Fumes or unusual odors
- Electrical malfunctions, for example, circuit breakers tripping
- Noises such as popping, snapping or crackling, which may indicate electrical arcing
- Hot spots on sidewalls, floors, and panels should be investigated.

If passengers or cabin crew suddenly develop eye irritation, sore throats, and/or headaches, it may be an indication that gas fumes are present but have not yet reached a level where they are visible.

Cabin crew must immediately investigate any reports from passengers that may indicate a fire.

The aim is to locate and extinguish a fire in the early stages.

Fires can be complex. In order to fight a fire successfully, cabin crew need to know what they may have to deal with, therefore it is important to know a little about fire chemistry and combustion, and the different classes of fire.

4.4. FIRE CHEMISTRY

The principle of fire safety is keeping fuel sources and ignition sources separate.

Combustion consists of four elements:

- **Oxygen:** Needed to keep the fire going
- **Heat:** Needed to ignite material
- **Fuel:** In the form of a combustible material
- A chemical chain reaction, and the result = **FIRE**.

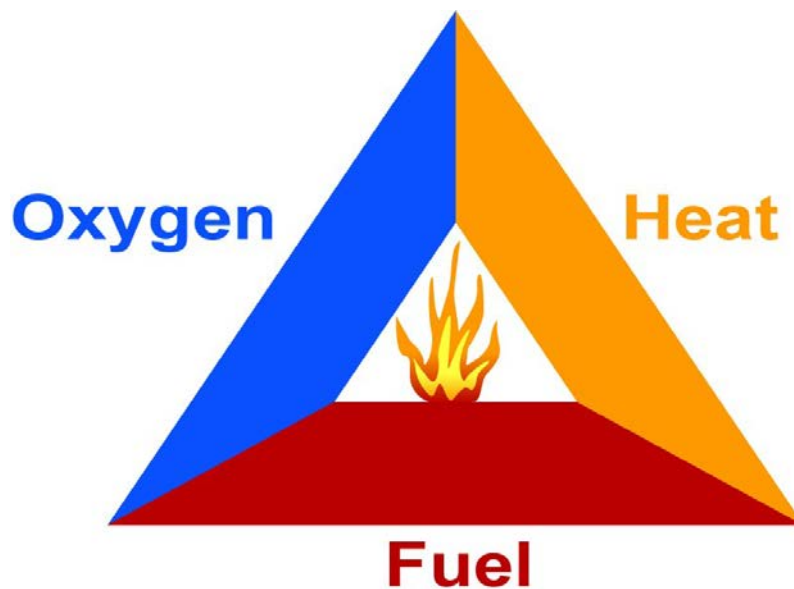


Figure 4-1
The fire triangle

The principle of firefighting is to remove at least one element from the fire, in order to put it out.

Fire has three recognized stages:

1. The Incipient Stage. The preheating stage, when the fire is just beginning and is in slow progress.
2. The Smoldering Stage. When the initial combustion begins. This is the stage where a light haze will appear, or smoke particles may be visible. The smoke particles can be transported away from the source by convection and background air movement.
3. The Flame Stage. When the fire has fully developed, and is spreading rapidly.

A fire will continue until:

- All the fuel has been consumed
- One, or more elements have been removed
- The temperature has been reduced
- The chain reaction has been broken.

4.5. CLASSES OF FIRE

Fires are classed as A, B, C, and D type fires. Onboard an aircraft, classes A, and C are the most commonly encountered. It is important for cabin crew to select the appropriate fire extinguisher, according to the type of fire.



Class A Fires: Wood, paper, cloth and plastic are the fuel source.

This type of fire needs to be cooled and quenched by using water. Water or a water glycol fire extinguisher should be used or any non-alcoholic liquid. For example, juice, tea or coffee will extinguish this class of fire. Class "A" fires need to be quenched and cooled by water, or solutions containing a large percentage of water. Halon can be used if it is the closest extinguisher available, but the area needs to be soaked, with non-alcoholic liquids afterwards.

Smoke. Usually grayish/brown in color. The smoke can be quite dense, depending on the quantity of fuel.



Class B Fires: Contain flammable liquid, hydraulic fluid, oil, tar or aircraft fuel. Extinguishing agents need to have a blanketing effect. A Halon extinguisher would be required.

Smoke. Usually black in color, very thick, very distinct oil/petrol-like odor.



Class C Fires: Involve live electrical equipment. The emphasis is placed on extinguishing the fire with an element that is non-conductive, and avoiding damage to nearby electrical circuitry. Halon extinguisher should be used.

Smoke. Usually light grey, nearly white with a bluish tinge. Very fine smoke can disperse rapidly. Has a distinct acrid odor.



Class D Fires: Involve combustible metals, for example, sodium, magnesium and potassium. Special powder extinguishers are used on this type of fire, because of the possible chemical reaction between the burning and extinguishing agent.

Note: For lithium batteries fires refer to 4.12

Smoke – very dark smoke.

4.6. HALON EXTINGUISHERS

The use of Halon has generated some controversy and misunderstanding during recent years, however the FAA advisory circular AC120-80 'in-flight fires' addresses the subject of Halon use, by stressing the effectiveness of Halon, when fighting in-flight fires.

"NTSB investigations of in-flight fires indicate that cabin crew have been hesitant to use Halon extinguishers during flight because of mistaken ideas about the adverse effects of Halon. In one instance, a flight attendant went to the cockpit to inform the flight crew of a fire and asked the captain whether to spray Halon into a vent where she suspected a fire. The captain instructed her not to use the Halon extinguisher, indicating he was concerned about spraying Halon in the cabin. In another instance, an off-duty company pilot considered using a Halon fire extinguisher, but decided against doing so because he was concerned that the Halon "would take away more oxygen". In each instance, the cabin crew lost critical time and delayed the aggressive pursuit of the fire"

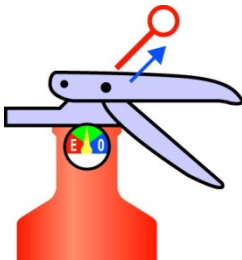
(Source FAA Advisory Circular 120-80)

Halon or BCF (chemical name bromochlorodifluoromethane, are member of the chemical family of Halogenated Hydrocarbons) is a liquefied gas that extinguishes fires by chemically interrupting a fire's combustion chain, as opposed to physically smothering the fire. This is one of the main reasons why Halon is effective when the exact source of the fire cannot be positively determined. A small concentration of Halon in the air as a vapor will prevent a fire from continuing to burn.

Halon is toxic, and cabin crew should take precautions when using a Halon extinguisher in a confined/unventilated area. Portable Breathing Equipment (PBE) should be used.

“The NTSB has expressed concern that the risks of exceeding the maximum recommended levels of Halon gas outlined in AC 20-42C have been over emphasized in crewmember training programs, especially when compared to the risks of an in-flight fire. The NTSB emphasizes, “that the potential harmful effects on passengers and crew [of Halon] are negligible compared to the safety benefits achieved by fighting in-flight fires aggressively”. The toxic effects of a typical aircraft seat fire, for example, far outweigh the potential toxic effects of discharging a Halon fire extinguisher” (AC-120-80)

4.7. HOW TO USE A FIRE EXTINGUISHER



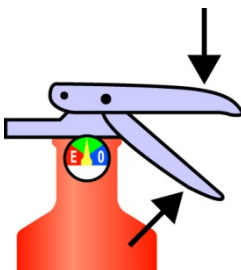
Pull the pin.

Until the pin is released the extinguisher is locked. The pin needs to be removed to release the handle or lever.



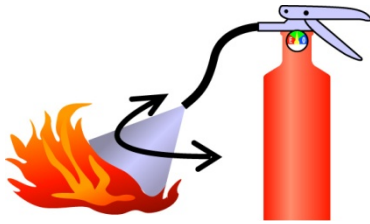
Aim at the base of the fire.

The extinguisher must be aimed at the base of the fire, in order to remove the source of fuel.



Squeeze the top handle or lever.

This will release the extinguishing agent. Releasing the lever will stop the flow. Hand held extinguishers should always be held upright. *(If possible, test the fire extinguisher before using it)*



Sweep from side to side.

Use the extinguisher in a sweeping motion. Initially, stand 8/10 ft away (2.5m). As the fire reduces, move closer with the extinguisher. Always direct the nozzle at the base of the fire.

Using the right technique when fighting a fire is an important part of the process. There are only a limited number of fire extinguishers onboard the aircraft, therefore it is important to maximize their use.

- For the best results, attack the base of the fire at the near edge, progressively working to the back of the fire, by moving the fire extinguisher nozzle in a sweeping motion from side-to-side.
- The fire extinguisher should not be discharged on a burning surface at close range. A distance of 5 to 8 feet (1.5m to 2.5m) should be respected, because the speed of the extinguishing agent being discharged may cause splashing or may scatter burning material.
- The duration of use of a fire extinguisher may be between 8 to 25 seconds depending on the make and model of the extinguisher. The correct selection and use of the extinguisher must be made without delay.
- Have backup extinguishers available to use immediately after depletion, in order to maintain the firefighting effort.

4.8. CREW COMMUNICATION AND COORDINATION

In the event of a fire onboard the aircraft, communication and coordination between the cabin crew and flight crew are essential. If a fire is discovered in the cabin, the flight crew should be informed immediately. One person should maintain contact with the flight crew via the interphone, near to the fire scene.

The method of reporting should be clear and concise, to ensure that the message is understood. Keep it simple and keep to the facts. Tell the flight crew exactly what is happening in the cabin.

- Location of the fire
- Source
- Severity/density of the fire/smoke, including odors and the color of smoke
- Firefighting progress
- Number of fire extinguishers used
- Time firefighting action started.

The flight crew rely on the reports provided by the cabin crew, to determine the course of action to take. The cabin crew must continue to advise the flight crew of the conditions existing in the cabin, and keep them up to date on the firefighting progress.

The following is an extract from an NTSB final report after an onboard fire.

“The board determined that the probable cause of the accident was a fire of undetermined origin, an underestimate of fire severity, and conflicting fire progress information provided to the captain. Contributing to the severity of the accident was the flight crew's delayed decision to institute an emergency descent” (NTSB/AAR-84/09)

4.9. WORKING AS A TEAM

The firefighting procedures require a team of up to three cabin crew. A team effort is the most effective way to combat an onboard fire. The roles are defined as follows:

- **The Firefighter**
- **The Communicator**
- **The Assistant Firefighter**

Crew communication and coordination is important, and the roles of these three cabin crew complement each other, because their tasks are performed simultaneously, in order to optimize the firefighting effort. If for any reason only two cabin crew members are available to perform these tasks, the role of the Communicator and Assistant Firefighter are combined.

- **The Firefighter.** The first crewmember that finds the fire will take the role of the Firefighter. This cabin crewmember shall:
 - Alert other cabin crew
 - Obtain the nearest fire extinguisher
 - Immediately locate the source of the fire
 - Fight the fire
- **The Communicator.** The second cabin crewmember on the scene. The communicator informs the flight crew of the fire/smoke.
 - Location
 - Source
 - Severity/Density (Color of smoke/odor)
 - Firefighting progress
 - Number of extinguishers used
 - Time firefighting action started

The communicator maintains the communication link between the cabin and the flight crew, via an interphone that is near the firefighting scene.

The communicator must provide the flight crew with an accurate description of the firefighting effort and of the situation in the cabin.

- **The Assistant Firefighter.** The third cabin crewmember on the scene. The Assistant Firefighter should:
 - Provide extra firefighting equipment
 - Support the firefighting effort
 - Remove flammable material (e.g. oxygen bottles) from the area

The Assistant Firefighter must be prepared to replace the Firefighter, and exchange roles with the Firefighter, as required.

- **Support cabin crew.** These cabin crew are not directly involved in the firefighting effort, but will be required to provide assistance (e.g. to relocate passengers, administer first-aid, calm and reassure passengers).

After any fire or smoke occurrence, one crewmember should be responsible for monitoring the affected area for the remainder of the flight, and should regularly report to the Purser.

4.10. PASSENGER MANAGEMENT

If there are passengers within close proximity to the fire, move them away from the immediate area. If the amount of smoke or fumes is affecting the passengers, encourage them to cover their nose and mouth with a cloth and instruct them to protect themselves from smoke inhalation. If available, distribute wet towels to the passengers.

If a passenger needs to be treated for smoke inhalation and requires oxygen, the passenger must be moved away from the affected area, before administering the oxygen.

It is important to take into account the reaction of the passengers during an onboard fire. Most passengers will express concern, or may even panic. Therefore, there is a definite need for cabin crew to be present in the cabin to calm and reassure passengers. Cabin crew who are not actively involved in the firefighting effort should remain in the cabin to give assistance where required.

Keep the passengers informed in a calm and reassuring manner, by telling them what is happening. This may help them to prepare psychologically for what may come, particularly in the event of an emergency descent or an evacuation.

4.11. OVEN FIRES

Oven fires deserve a special mention because of the frequency of their occurrence. Many oven fires are preventable.

CAP 789 – Requirements and Guidance Material for Operators, Chapter 31, issued by the Civil Aviation Authority (CAA) in the United Kingdom, addresses the increased amount of reports of oven fires.

The CAA made the following recommendations to operators:

- a. *“Operators should review their current procedures, amending their Operations Manuals where necessary, to ensure that the following items are covered.*
- b. *Cabin crew pre-flight checks should include a requirement for all ovens to be inspected not only for cleanliness but also to ensure that no foreign objects are present;*
- c. *Cabin crew procedures should include a requirement to inspect ovens prior to switching the oven on to ensure that no foreign objects are present;*
- d. *Cabin crew procedures should include guidance as to the steps to be taken following the spillage of food or grease within the oven during a flight, and the entry to be made in the Cabin Defect Log and/or Technical Log as appropriate.*

Operators should remind their catering contractors of the importance of checking oven racks prior to loading ovens to ensure that no foreign objects such as labels, cardboard packaging etc, are attached to the racks.”

For any in-flight fire including oven fires, the principle of firefighter, communicator and assistant will always apply. The emphasis is placed on crew co-ordination and communication to achieve a successful outcome.

When an oven fire occurs, the oven door should be kept closed. Opening an oven door when fire is present is hazardous. Opening the oven door will introduce oxygen from outside that may cause a flash fire.

ALWAYS NOTIFY THE FLIGHT CREW IMMEDIATELY.

The communicator must remain on the interphone and maintain the communication link between the cabin and the flight crew for the duration of the event. An accurate report of the situation existing in the cabin must be relayed without delay.

When an oven fire occurs, the following actions should be taken by the firefighter:

- Keep the oven door closed to deprive the fire of oxygen, in most incidents the fire will extinguish itself
- Switch off the oven power using the ON/OFF pushbutton
- Isolate the electrical power from the oven by pulling the corresponding circuit breaker
- Monitor the situation
- Have a fire extinguisher, protective breathing equipment (PBE) and fire gloves ready to use if the situation deteriorates.

If the situation worsens, or the fire is still present:

- Don PBE and fire gloves for protection
- Open the oven door very slightly, just enough to insert the nozzle of the fire extinguisher
- Insert the nozzle of the fire extinguisher and discharge a small amount of the extinguishing agent
- Close the oven door
- Repeat the procedure, if necessary.

4.12. LITHIUM BATTERY FIRES

The two types of batteries commonly used to power consumer Portable Electronic Devices (PEDs) are lithium batteries (disposable) and lithium-ion batteries (rechargeable). Both these types are capable of ignition and subsequent explosion due to overheating. The resulting fire can flare repeatedly as each cell ruptures and releases its contents.

Based on testing by the Fire Safety Branch of the FAA, the following procedures are recommended for fighting a fire of a lithium type battery-powered PED regardless if the battery is disposable or rechargeable:

- Relocate passengers away from the device. Use Halon, Halon replacement or water fire extinguisher to prevent the spread of the fire to adjacent battery cells and materials
- Pour water, or other **non-alcoholic** liquid, from any available source over the cells immediately after extinguishing the fire.
Only water or other non-alcoholic liquid can provide sufficient cooling to prevent re-ignition and/or spreading of the fire to adjacent batteries. Significant cooling is needed to prevent the spread of fire to additional cells in a battery pack.

WARNING Do not attempt to pick up and move a smoking or burning device. Do not cover the device or use ice to cool the device. Ice or other materials insulate the device increasing the likelihood that additional battery cells will ignite. Do not use fire resistant burn bags to isolate burning lithium type batteries. Transferring a burning appliance into a burn bag may be extremely hazardous.

4.12.1. LITHIUM BATTERY FIRE PROCEDURE

The roles of the firefighter, assistant firefighter and communicator must be distributed according to the basic firefighting procedure.

In the case of PED or spare lithium battery fire in the cabin or when notified by the flight crew:

- **If there are flames:**
FIREFIGHTING EQUIPMENT..... TAKE
Consider the use of a PBE and fire gloves.
HALON EXTINGUISHER..... DISCHARGE
Halon extinguisher must be discharged to suppress the flames prior to cool down the PED or the Spare lithium battery.
- **When the flames are suppressed or if there are no flames:**
ON PED or spare lithium battery . . . POUR WATER OR NON-ALCOHOLIC LIQUID

The PED or Spare lithium batteries must be cooled down by pouring water or non-alcoholic Liquids.

STORAGE PROCEDURE AFTER A LITHIUM BATTERY FIRE APPLY

WARNING Do not attempt to pick up and move a smoking or burning device

Do not cover the device or use ice to cool down the device. Ice or other materials insulate the device increasing the likelihood that additional battery cells will ignite.

Do not use fire resistant burn bags to isolate burning lithium type batteries.

Transferring a burning appliance into a burn bag may be extremely hazardous.

4.12.2. STORAGE PROCEDURE AFTER A LITHIUM BATTERY FIRE

- **When the PED or the spare battery can be safely moved:**
 FIRE GLOVES. PUT ON
 RECEPTACLE. TAKE
Consider the use of any suitable empty receptacle (e.g. standard unit or lavatory waste bin ...)
 RECEPTACLE FILL WITH WATER OR NON-ALCOHOLIC LIQUID
 PED OR SPARE BATTERY. IMMERSE
Total immersion of the PED or the spare battery will prevent fire re-ignition.
 RECEPTACLE. STORE INTO THE NEAREST LAVATORY
 LAVATORY. SET AS INOPERATIVE
 AFFECTED LAVATORY. MONITOR
The affected lavatory must be regularly monitored for the remainder of the flight to ensure that the device remains immersed.

4.12.3. PAX SEAT SMOKE PROCEDURE

The PAX SEAT SMOKE PROCEDURE is designed to be used for smoke/fires involving any electrical sources such as seat power supply, IFE system...

The procedure includes steps for smoke/fire coming from a PED being trapped into a seat.



These procedures apply to all Airbus aircraft.

The type of smoke/fire from a passenger seat/seat area will determine the class of fire that must be dealt with.

The source of smoke/fire may come from the IFE screen, the ISPSS outlets, the seat boxes located under the passenger seats or a PED being trapped within the seat.

- **If smoke/fire is detected in the seat/seat area:**

CABIN CREW/COCKPIT CREW COMMUNICATION..... ESTABLISH

The cabin crew must update the cockpit crew on the progress of the event.

SOURCE OF THE SMOKE/FIRE.....LOCATE

- **If the smoke/fire is coming from electrical equipment of the seat:**

PED POWER (if installed).....OFF

The PED POWER sw (if installed) is located on the FAP sub-panel.

PAX SYS sw (if installed)..... OFF

The PAX SYS sw (if installed) is located on the FAP, on the VCC/VCI, or in the cockpit.

BASIC FIRE FIGHTING PROCEDURE..... APPLY IF REQUIRED

- **If the smoke fire is coming from a PED:**

PED POWER (if installed).....OFF

The PED POWER sw (if installed) is located on the FAP sub-panel.

The PED POWER sw (if installed) must be switched off if the seat has electrical equipment.

PAX SYS sw (if installed)..... OFF

The PAX SYS sw (if installed) is located on the FAP, on the VCC/VCI or in the cockpit.

The PAX SYS sw (if installed) must be switched off if the seat has electrical equipment.

LITHIUM BATTERY FIRE PROCEDURE.....APPLY

4.13. FIRES IN HIDDEN AREAS

Hidden areas are defined as *“any area inside the pressure shell, which is not readily accessible to the crew, other than a dedicated cargo area.”*

It is important that there is awareness of the possibility of fires in hidden areas that would not be accessible to crew. These are areas where fires may propagate undetected, such as, sidewall panels, floors, bulkheads, ventilation grills and ceiling panels. Indications of hidden fires may be unusually hot surfaces, or smoke being emitted from wall or ceiling seams. Fumes and unusual odors may be another indication. Due to the lack of access to these areas, it is difficult to locate the source, but the threat to flight safety remains the same.

If fire is suspected behind a panel, try to locate a hot spot or an unusually warm area. This is generally a good indicator as to the source of the fire.

Move the back of the hand along the panel to find the hottest area. Using the back of the hand is more sensitive to temperature changes than the palm.

It may be necessary to remove panels to access the area. A crash axe may be used as a lever to lift the panel, or an incision may be made in the panel large enough to place the nozzle of the extinguisher, in order to discharge the agent into the affected area.

“Should I consider cutting or punching a hole in an aircraft cabin wall, ceiling, or floor panel in order to gain access to a fire? If this is the only way to gain access to the fire, yes. In this situation, the risk of damaging equipment behind the paneling and the possibility of creating a bigger problem must be weighed against the catastrophic potential of in-flight fires left unattended”.

(FAA Advisory Circular 120-80)

Indiscriminate use of a crash axe or other instruments to access panels may damage some essential wiring, and damage aircraft systems. Use the hook end of the crash axe to gently tap a hole in the panel and gradually make the hole big enough to insert the nozzle of the extinguisher. A manual release tool (MRT) could also be used. It is necessary that cabin crew are familiar with the different components located behind panels according to the aircraft type and configuration.

Cabin crew must count on their own determination and use all the resources available to fight a fire.

4.14. FIRE RE-IGNITION

Never assume that a fire has been totally extinguished. It may not have visible flames but it may still be smoldering and may re-ignite and develop into a larger, uncontrollable fire in a short space of time.

Following any fire-fighting action, cabin crew must prevent any possibility of re-ignition. On all non-electrical fire debris the use of wet pillows, blankets and non-alcoholic beverages should be used to soak the area, and suffocate the potential of re-ignition.

However, liquids should not be used on electrical items or wiring.

4.15. FIRE PREVENTION

Although every effort is made by the aviation industry to reduce the risk of onboard fires, fires can still occur for different reasons. Effective fire prevention requires that the cabin crew be alert to possible fire hazards and vigilant in the cabin.

Frequent monitoring of the cabin is important to ensure that no smoke or fire is present. There are still many reports of passengers smoking in the lavatories. Frequently monitoring of the lavatories, particularly the waste bins and stowage areas, will help detect a carelessly discarded cigarette, before it creates a hazard.

Galley areas should be monitored frequently to ensure that paper, plastic and other combustible items are not left near warming plates, ovens, bun warmers and other hot galley surfaces.

Any indication of smoke or fire must be dealt with **immediately**.

4.16. SUMMARY

In-flight firefighting requires knowledge, skill, resourcefulness and determination on behalf of the cabin crew, to deal effectively with the challenge of an in-flight fire.

- Cabin crew should be aware of the various indications of fire, smoke alarms, visible smoke, unusual odors, fumes, circuit breaker(s) tripping, and hot spots.
- If an in-flight fire is suspected or is known, cabin crew should take immediate action to locate the source of the fire and aggressively fight the fire.
- Emphasis must be placed on the importance of notifying the flight crew immediately upon discovery of a fire. Maintaining an open line of communication and giving the flight crew a realistic account of events in the cabin.
- Cabin crew should be knowledgeable of the type, location, removal and correct use of fire extinguishers carried onboard their aircraft.
- Emphasis should be placed on dealing with fires within hidden areas of the aircraft. Cabin crew should understand the correct methods/techniques to gain access to these areas.
- The importance of communication, crew co-ordination and teamwork during any type of in-flight emergency.

4.17. CABIN CREW FIRE AND SMOKE PROCEDURES

These procedures apply to **all** Airbus aircraft.

4.17.1. BASIC FIREFIGHTING PROCEDURE

The Firefighter, the Communicator and the Assistant Firefighter perform their roles and actions **SIMULTANEOUSLY**.

FIREFIGHTER

OTHER CABIN CREW ALERT

FIREFIGHTING EQUIPMENTEQUIP

Take the nearest appropriate fire extinguisher. Consider the use of a PBE.

SOURCE OF THE FIRE LOCATE

FIRE EXTINGUISHER DISCHARGE AT BASE OF FIRE

FIREFIGHTING EFFORT MAINTAIN UNTIL THE FIRE IS OUT

• When the fire is out:

AFFECTED AREA DAMPEN

The affected area should be dampened to prevent the fire from re-ignition

WARNING Do not dampen electrical equipment (except in the case of lithium battery fires).

COMMUNICATOR

FLIGHT CREW NOTIFY IMMEDIATELY VIA INTERPHONE

Use the interphone, to prevent smoke from contaminating the cockpit. Give the following information:

- Location
- Source
- Severity/Density (color of smoke/odor and whether it is smoke/fire or both)
- Firefighting progress
- Number of fire extinguishers used
- Time firefighting action started.

COMMUNICATION WITH FLIGHT CREW MAINTAIN

INSTRUCTIONS FROM FLIGHT CREWCOMMUNICATE TO CABIN CREW

ASSISTANT FIREFIGHTER

FIREFIGHTING EQUIPMENTSUPPLY

• If necessary:

REPLACE FIREFIGHTER COMMUNICATE

PBE DON

SUPPORT CABIN CREW

PASSENGERS AND PORTABLE OXYGEN MOVE FROM IMMEDIATE AREA

FIREFIGHTING EFFORT ASSIST AND SUPPORT

PASSENGERS CALM AND REASSURE

• When the fire is out:

DEDICATED CREWMEMBER MONITOR FOR THE REMAINDER OF THE FLIGHT

The affected area must be monitored for the remainder of the flight. Regular reports must be made to the Purser.

4.17.2. OVEN SMOKE/FIRE PROCEDURE

These procedures apply to all Airbus aircraft

Oven smoke/fires may be caused by the oven contents, such as, food or grease deposits. Electrical malfunctions may also be a source.

OVEN DOOR CLOSE

OVEN POWER OFF

Note.

By keeping the oven door closed the fire will usually extinguish itself.

CIRCUIT BREAKER PULL

The applicable circuit breaker is located on the galley's centralized electrical panel.

• IF SMOKE OR FIRE IS STILL PRESENT:

PBE AND FIRE GLOVES DON

(*) OVEN DOOR OPEN SLIGHTLY

Note: Open the oven door slightly, enough to insert the nozzle of the fire extinguisher into the oven

(*) FIRE EXTINGUISHER DISCHARGE

(*) OVEN DOOR CLOSE

FIREFIGHTING EFFORT REPEAT AS NECESSARY

(*) Repeat last three steps of the procedure, as necessary.

4.17.3. LAVATORY SMOKE/FIRE PROCEDURE

These procedures apply to all Airbus aircraft.

Lavatory smoke/fires can be caused by electrical system malfunctions for example, the water heater, toilet vacuum, or may be caused by burning materials usually caused by a carelessly discarded cigarette in the lavatory waste bin.

ALERT PHASE

Each type of aircraft has visual and aural warnings that trigger, when smoke is detected in one of the aircraft lavatories.

The Firefighter, the Communicator, and the Assistant Firefighter perform their roles and actions **Simultaneously**.

FLIGHT CREW

SMOKE LAVATORY SMOKE CREW AWARENESS

Maintain contact with the cabin crew to follow up on the status of the fire.

CABIN CREW PROCEDURE

On the FAP, and/or related AAP, the SMOKE warning indication comes on, with an associated triple chime, repeated every 30 seconds (optionally 10 seconds).

AFFECTED LAVATORY LOCATE

On all AIPs, the affected lavatory is clearly indicated and a red indicator flashes. The amber light, on the respective ACPs, and the outside Smoke/Pax call indicator of the affected lavatory flashes. The affected lavatory is also shown on the FAP.

SMOKE PUSHBUTTON (ON THE FAP or AAP) RESET

To silence the chime, and reset all visual warnings on the ACPs and the AIPs.

Note: The amber smoke indicator of the affected lavatory, the SMOKE RESET pushbutton on the FAP and respective AAP and the indication on the FAP smoke page remain ON until all the smoke has cleared.

WARNING Do not open the lavatory door. First, check the door for heat. Using the back of the hand, feel the panel of the lavatory door, to determine temperature and presence of fire.

LAVATORY DOOR CHECK FOR HEAT

- If the door lavatory panel is cool.

LAVATORY DOOR OPEN SLOWLY WITH CAUTION

SOURCE OF SMOKE/FIRE LOCATE

- If fire is present.

BASIC FIREFIGHTING PROCEDURE APPLY

FIRE EXTINGUISHER DISCHARGE AT BASE OF FIRE

- If door panel is hot:

Note: If the door is hot, the fire is at a critical stage. Have extra firefighting equipment available and ready to use.

PBE DON

FIREFIGHTER PROTECT SELF
Stay low and crouch down, using the door panel as protection against smoke and heat.

(*) LAVATORY DOOR OPEN SLIGHTLY
To insert the nozzle of the extinguisher.

(*) FIRE EXTINGUISHERDISCHARGE

(*) LAVATORY DOOR CLOSE

FIREFIGHTINGREPEAT AS NECESSARY
(*) Repeat last four steps of the procedure, as necessary.

- If situation has cleared:

AFFECTED LAVATORY MONITOR FOR THE REMAINDER OF THE FLIGHT

4.17.4. OVERHEAD BIN SMOKE/FIRE PROCEDURE

These procedures apply to all Airbus aircraft

Smoke/fire in overhead bins may be caused by the contents (i.e. electronic device, spare lithium battery) or electrical malfunction in the Passenger Service Unit (PSU).

The firefighter, the assistant firefighter, the communicator and the support crewmembers must conduct their tasks simultaneously.

- **When smoke is coming from an overhead bin:**

FIREFIGHTER AND ASSISTANT FIREFIGHTER

PBE..... DON

FIREFIGHTER

FIRE EXTINGUISHER.....TAKE

Note: Consider the use of fire gloves.

ASSISTANT FIREFIGHTER

WATER OR NON-ALCOHOLIC LIQUID..... TAKE

Note: Water or non-alcoholic liquid is required if the fire involves lithium battery.

SUPPORT CREWMEMBERS

PASSENGERS..... RELOCATE

COMMUNICATOR

FLIGHT CREW..... NOTIFY IMMEDIATELY VIA INTERPHONE

FIREFIGHTER

OVERHEAD BIN.....CHECK FOR HEAT

Using the back of the hand, feel the overhead bin to determine the temperature and presence of fire.

(*)OVERHEAD BIN..... OPEN SLIGHTLY

Enough to pass the nozzle of the fire extinguisher.

CAUTION: Opening the overhead bin more than necessary can cause contamination of the cabin with smoke, and can result in smoke inhalation.

(*)FIRE EXTINGUISHERDISCHARGE

Note: The fire extinguisher must be discharged into the overhead bin, away from the seat, to prevent debris from contaminating the cabin.

(*)OVERHEAD BIN.....CLOSE AND LATCH

FIREFIGHTING..... REPEAT AS NECESSARY

(*)Repeat last three steps of the procedure, as necessary.

- **When the flames are suppressed:**

FIREFIGHTER

OVERHEAD BIN.....CHECK THE SOURCE OF FIRE

Note: The assistant firefighter must support the firefighter in the case of re-ignition by using fire extinguisher.

- **If source of smoke/fire is coming from a visible PED and/or Spare batteries:**

FIREFIGHTER

ON PED OR SPARE LITHIUM BATTERIES.....POUR WATER OR NON-ALCOHOLIC LIQUID
The PED or Spare lithium batteries must be cooled down by pouring water or non-alcoholic liquids.

- If the source of smoke/fire is coming from an identified item:

FIREFIGHTER

IDENTIFIED ITEM.....TAKE OUT

ON IDENTIFIED ITEM.....POUR WATER OR NON-ALCOHOLIC LIQUID
The identified item must be cooled down by pouring water or non-alcoholic liquids.

- If the source of smoke/fire is coming from a non-identified item:

FIREFIGHTER

OVERHEAD BIN..... EMPTY WITH CAUTION

Note: Empty the overhead bin until the source of smoke/fire is identified.

ON IDENTIFIED ITEM.....POUR WATER OR NON-ALCOHOLIC LIQUID
The identified item must be cooled down by pouring water or non-alcoholic liquids.

STORAGE PROCEDURE AFTER A LITHIUM BATTERY FIRE APPLY

4.17.5. SMOKE/FIRE PROCEDURE HIDDEN AREA OR UNKNOWN SOURCE

These procedures apply to all Airbus aircraft.

Smoke emissions from sidewall panels, ceiling panels and vents may indicate a hidden fire. In some cases, smoke may appear some distance away from the actual source.

BASIC FIRE FIGHTING PROCEDURE APPLY

FIREFIGHTER

SOURCE OF SMOKE LOCATE

REASON FOR SMOKE INVESTIGATE AND DETERMINE

Note: To determine the source of a potential fire, cabin crew should check for hot spots on panels. Use the back of the hand along the panels to feel for the presence of unusually hot areas.

- **WHEN HOT SPOT IS LOCATED:**

AREA ACCESS WITH CARE

CAUTION When gaining access behind panels, be aware of the presence of wiring bundles. Make a careful incision using the hook end of the crash axe or the manual release tool (MRT) to insert the nozzle of the fire extinguisher. Alternatively use the hook end of the crash axe to lever the panel open to gain access.

FIRE EXTINGUISHER DISCHARGE

DEDICATED CREWMEMBER MONITOR THE AREA THROUGHOUT THE FLIGHT
Regular reports must be made to the Chief Purser.

4.17.6. GALLEY SMOKE/FIRE PROCEDURE

These procedures apply to all Airbus aircraft

Galley smoke/fire occurrences can be caused by an electrical equipment malfunction for example, coffee makers, ovens, water boilers etc.

- **If the source of the smoke/fire is identified from a piece of electrical equipment:**

ELECTRICAL POWER OFF

APPLICABLE CIRCUIT BREAKER (CB) PULL

Note : CBs are located on the galley electrical panel.

*Each galley insert has its own C/B installed on one of these panels. If necessary, each galley insert electrical supply can be switched off by pulling the related C/B(s) and/or by using the main galley power OFF switch(es) (if installed).
 Pulling the applicable CB should stop the smoke/fire.*

- **If the source of the smoke cannot be identified:**

GALLEY SHUTOFF

MAIN GALLEY POWER OFF

ALL CIRCUIT BREAKERS PULL

- **If the smoke/fire continues:**

BASIC FIRE FIGHTING PROCEDURE APPLY

4.18. FIRE PROTECTION WIDEBODY AIRCRAFT – A300/A300-600/A310

4.18.1. LAVATORY FIRE EXTINGUISHER

Each lavatory has a small extinguisher bottle installed above each waste container.

4.18.2. DESCRIPTION

The extinguishing system consists of a bottle, an extinguisher nozzle and a local overheat detector.

The bottle contains 120 grams of the chemical products Halon and Freon.

4.18.3. OPERATION

A thermo sensitive sprinkler head comes on automatically, when the temperature exceeds 77°C (170°F).

Note: A temperature plate is located on the internal face of the waste compartment door, which enables the cabin crew to check if the fire extinguisher operated after an unusual increase in temperature.

The cabin crew must check the temperature plate as part of the preflight check.

If the temperature plate is WHITE, the extinguisher is ready for use

If the temperature plate is BLACK, call maintenance personnel to check, as the extinguisher is probably empty.

A300/A300-600/310 Lavatory Fire Extinguisher
Figure-4-2

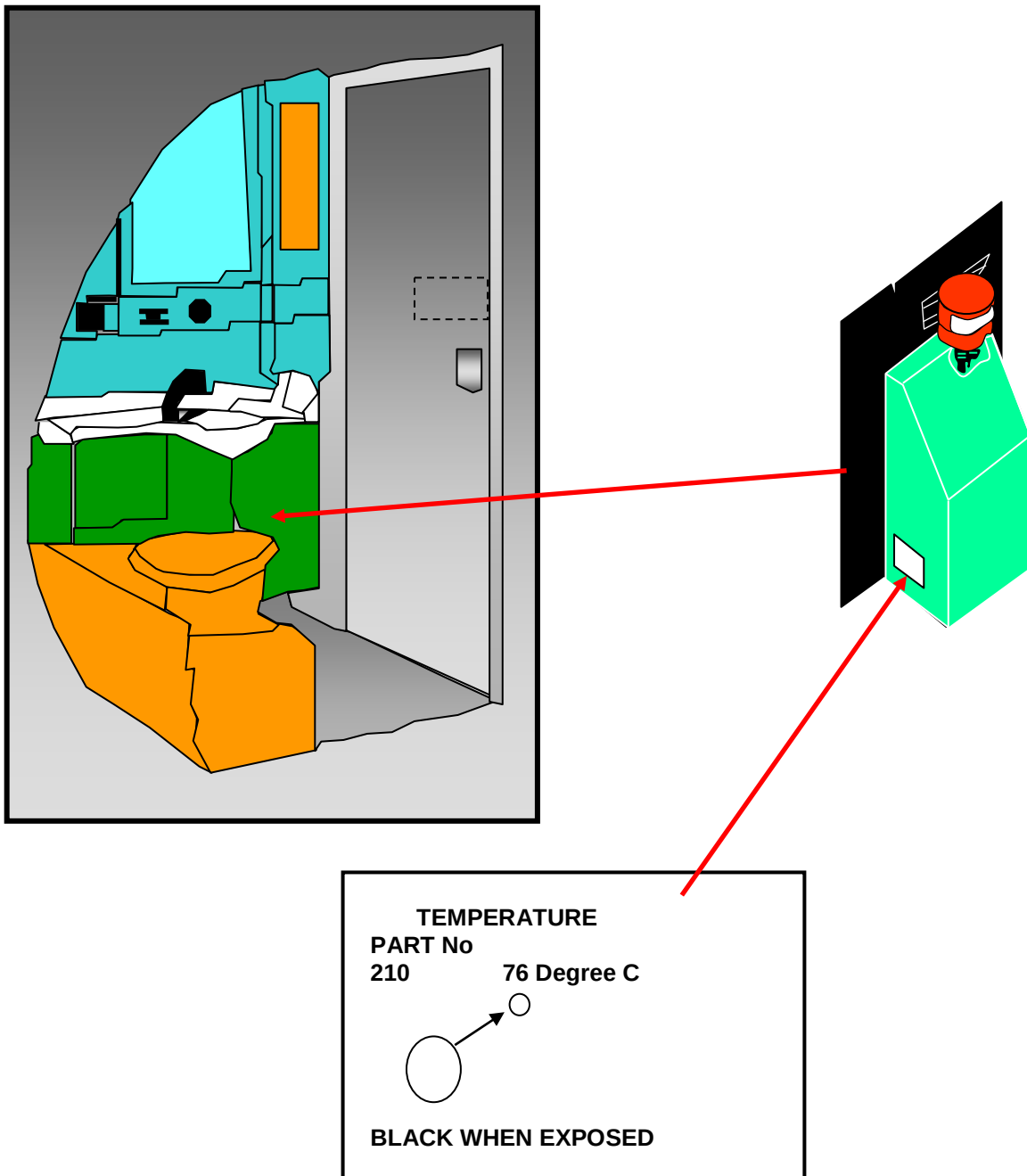
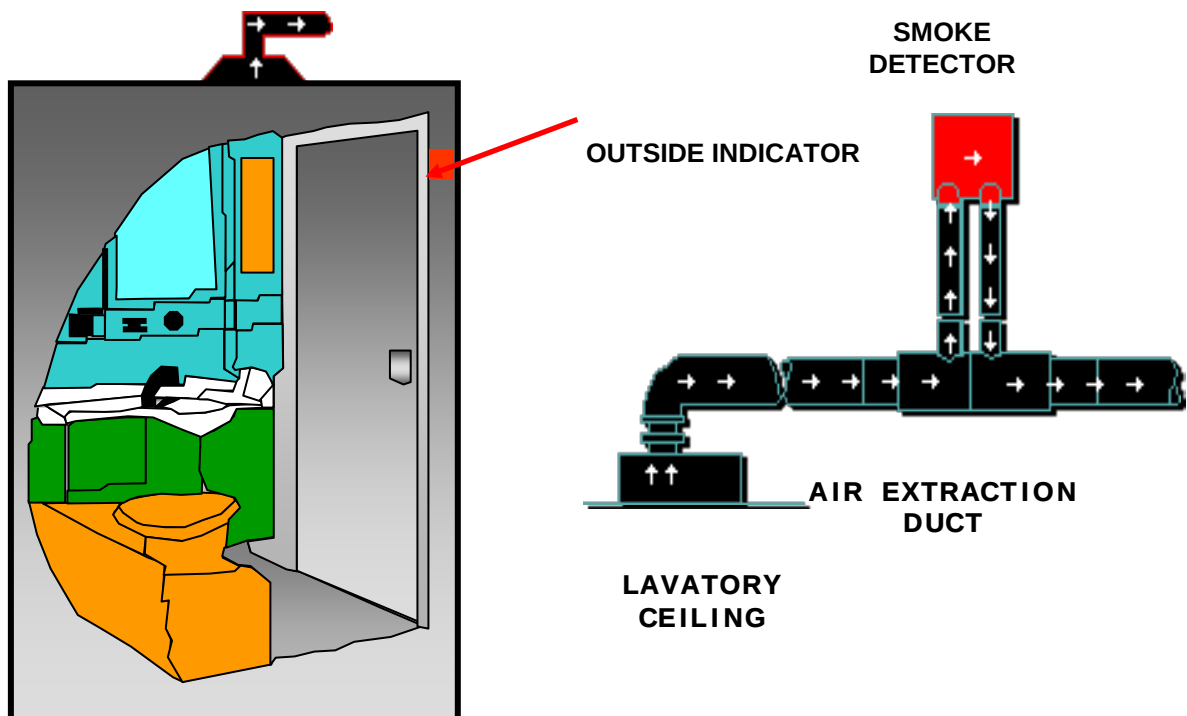


Figure 4-3

Lavatory Smoke Detector A300/A310



Warning light pushbuttons are located at the Purser's and the aft cabin crew station. When the smoke warning light is on, the cabin attendant priority call system is activated.

In addition, a test pushbutton is located at the Purser's station.

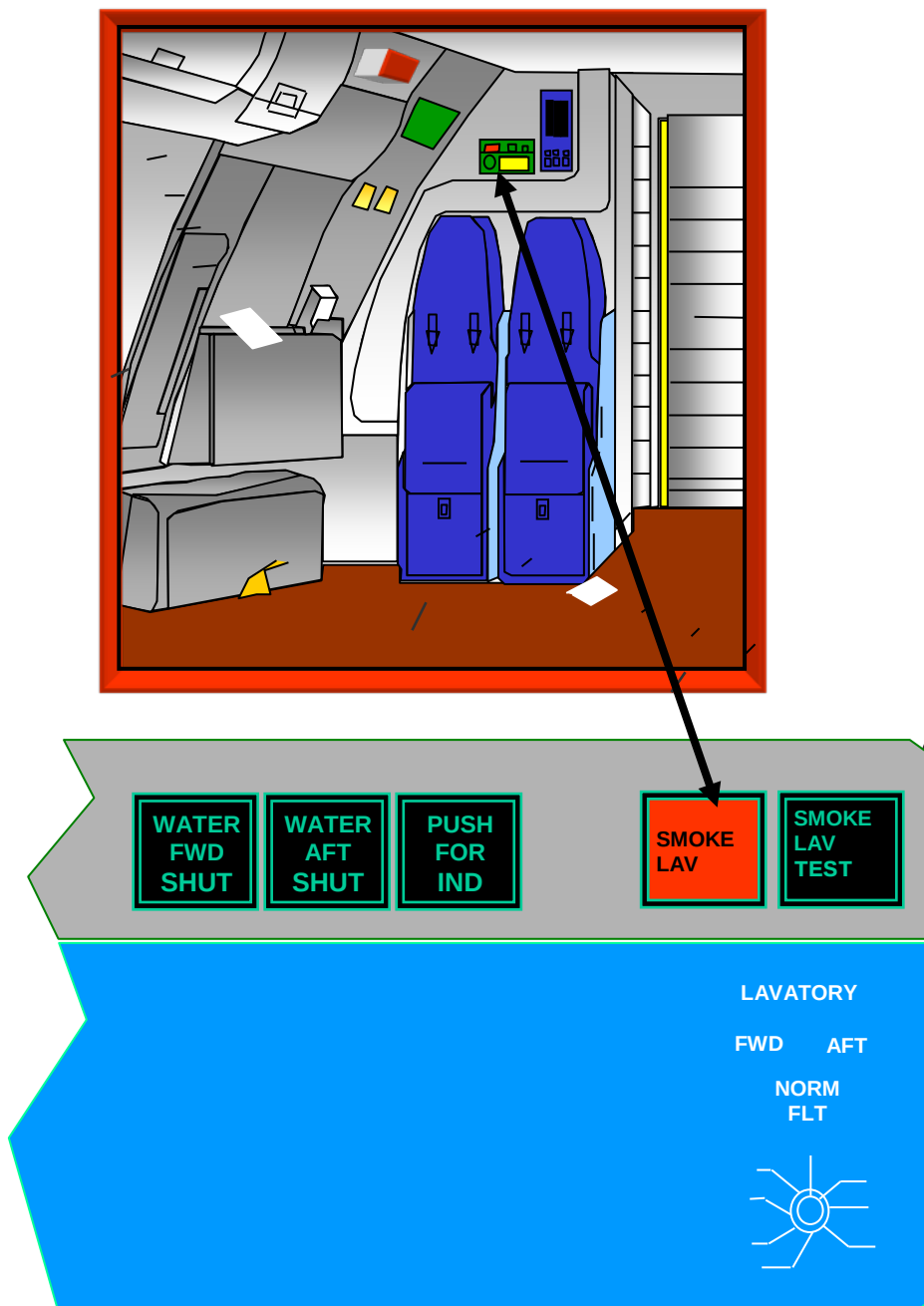
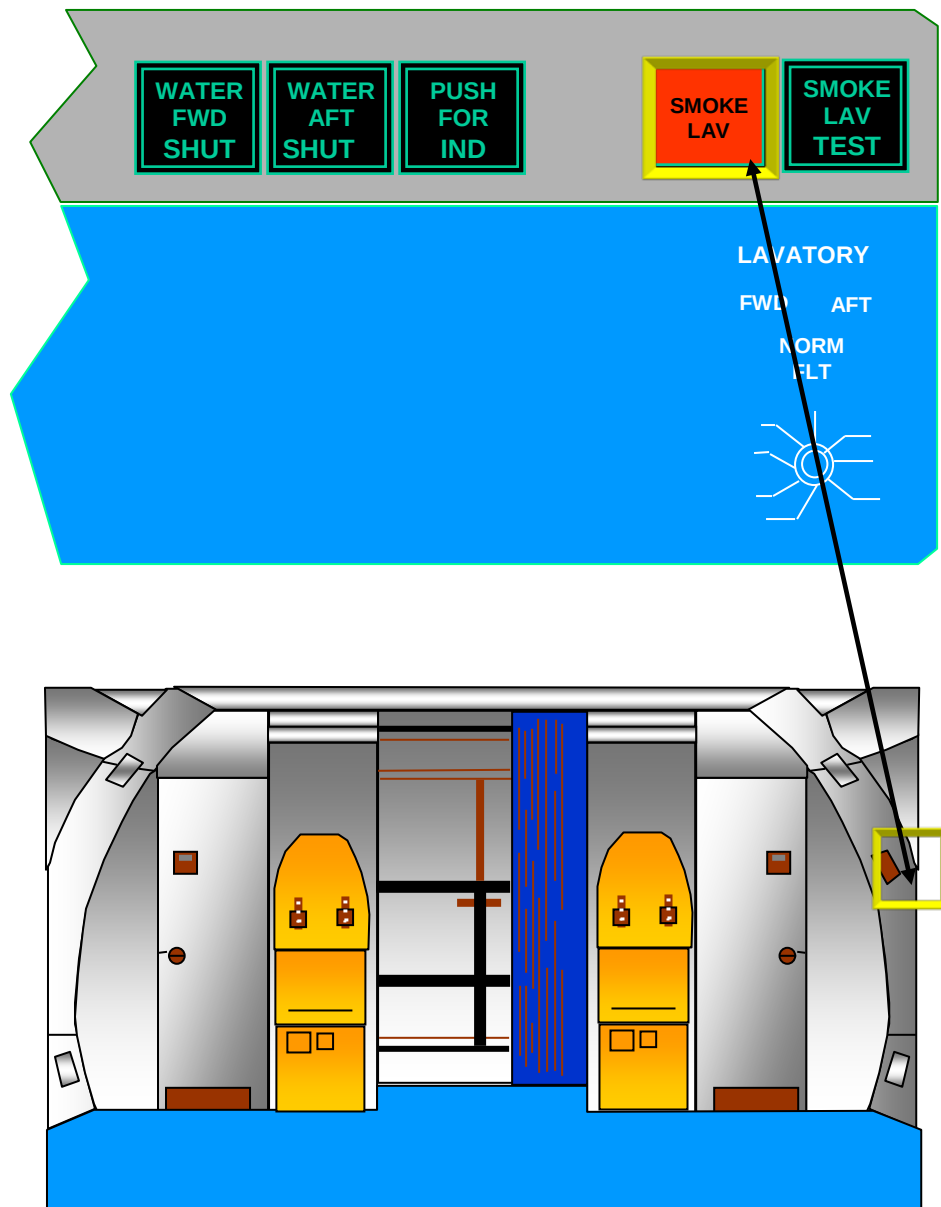


Figure 4-4

A300/A310 Smoke Warning Indication Aft Cabin Crew Station



4.19. A300/A310 - LAVATORY SMOKE DETECTION SYSTEMS AND DESCRIPTION

No.	Configuration	System reaction
I	Standard	Corresponding red warning light on lavatory flashes SMOKE LAV at FWD Purser and AFT ATT station flashes (Repetitive) Hi/Lo chime is broadcast White CAPT CALL lights at ATT stations come on (not 2LH/RH) Green LEDs of keyboard at ATT stations come on Red light at all ACPs come on
II	Standard with an additional interface to the cockpit	Corresponding red warning light on lavatory wall flashes SMOKE LAV light at FWD Purser and AFT ATT station flashes (Repetitive) Hi/Lo chime is broadcast White CAPT CALL lights at ATT stations come on (not 2LH/RH) Green LEDs of keyboard at ATT stations come on Red light at all ACPs come on Warning light and/or message activated in cockpit
III	Standard with direct operation of the respective amber area call light	Corresponding red warning light on lavatory wall flashes SMOKE LAV light at FWD Purser and AFT ATT station flashes (Repetitive) Hi/Lo chime is broadcast White CAPT CALL lights at ATT stations come on (not 2LH/RH) Green LEDs of keyboard at ATT stations come on Red light at all ACPs come on Amber light at respective ACP flashes A repetitive tone is emitted from the detector (only Jamco) The red LED on the smoke detector lights (only Jamco)
IV	Standard with Pulse Generator and Signal Counter, additional relays in system LN and chime activation	Corresponding red warning light on lavatory wall flashes SMOKE LAV light at FWD Purser and AFT ATT station flashes 3x Hi chime sounds Amber light at respective ACP (zone) flashes for 60 seconds Warning light and ECAM message activated in cockpit.

4.20. WIDEBODY FLEET CABIN CIRCUIT BREAKER PANELS

There is one circuit breaker panel in the forward cabin, and one circuit breaker panel in the aft cabin. Circuit breakers that relate to cabin items, such as lights, and entertainment systems are on these panels, and may be used to isolate equipment in the event of smoke and fire, in accordance with the operator's policy.

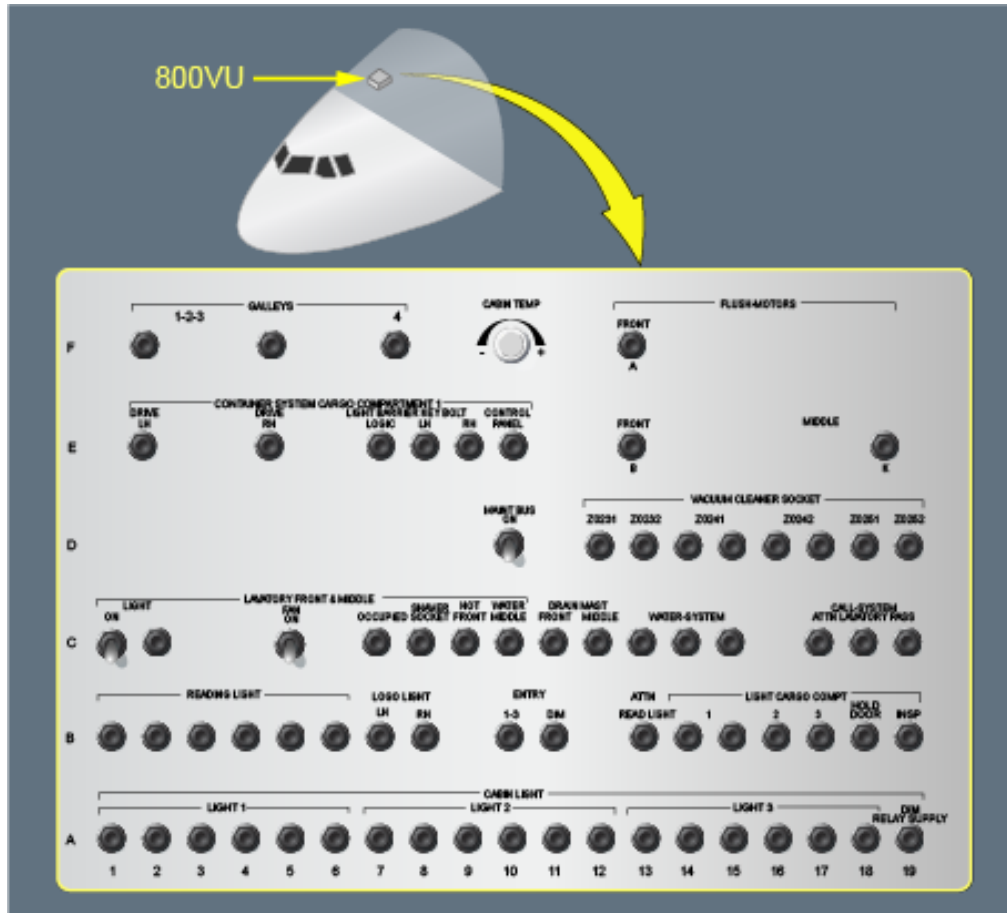
As Airbus aircraft are customized to our operator's requirements, the circuit breaker panels illustrated on the following pages are only to provide an overview of the panels.

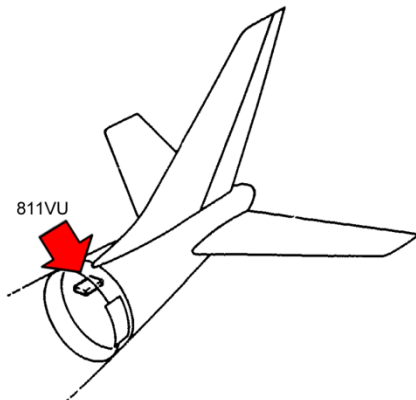
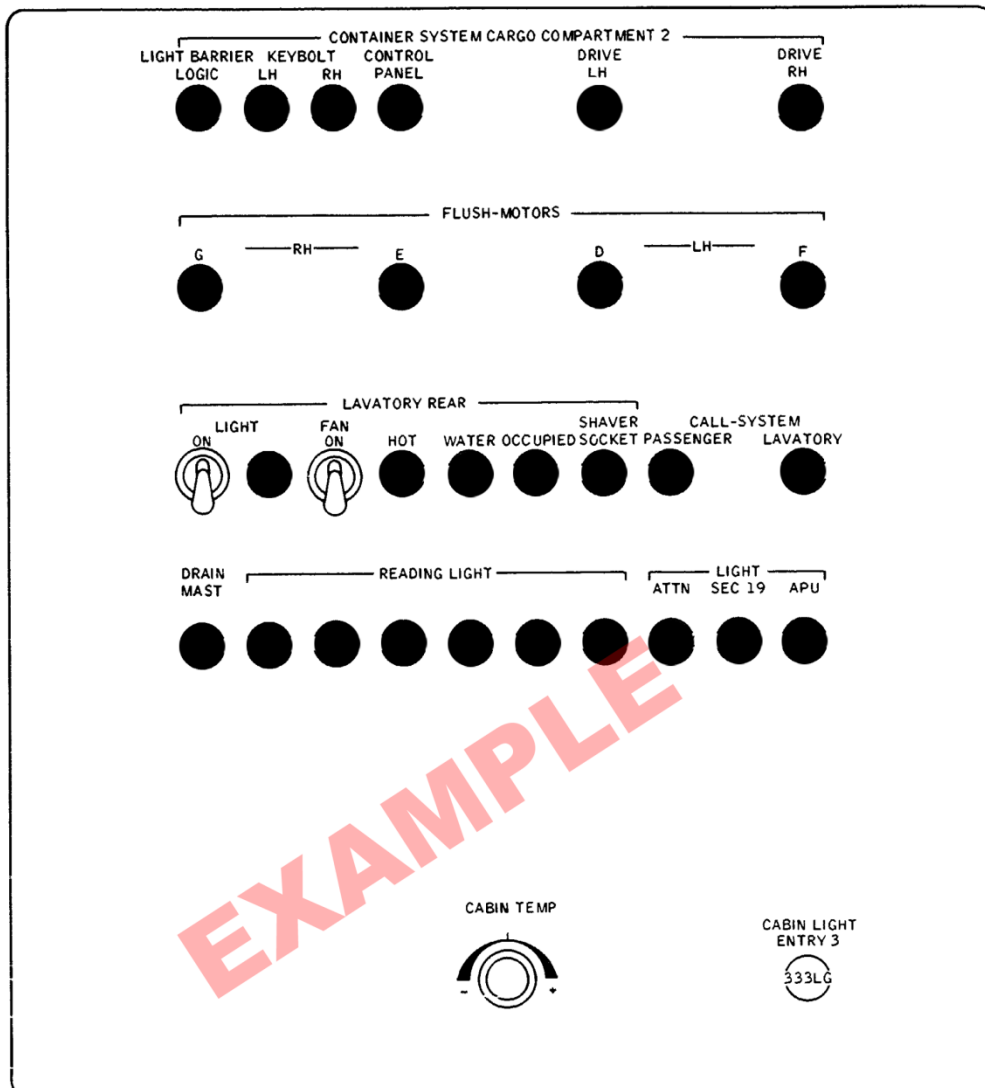
Please contact your engineering department if you wish to have your operators customized circuit breaker panel configuration.

CAUTION

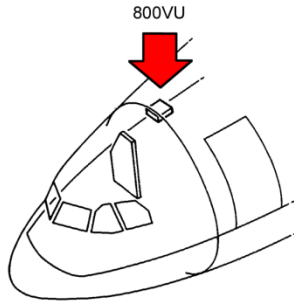
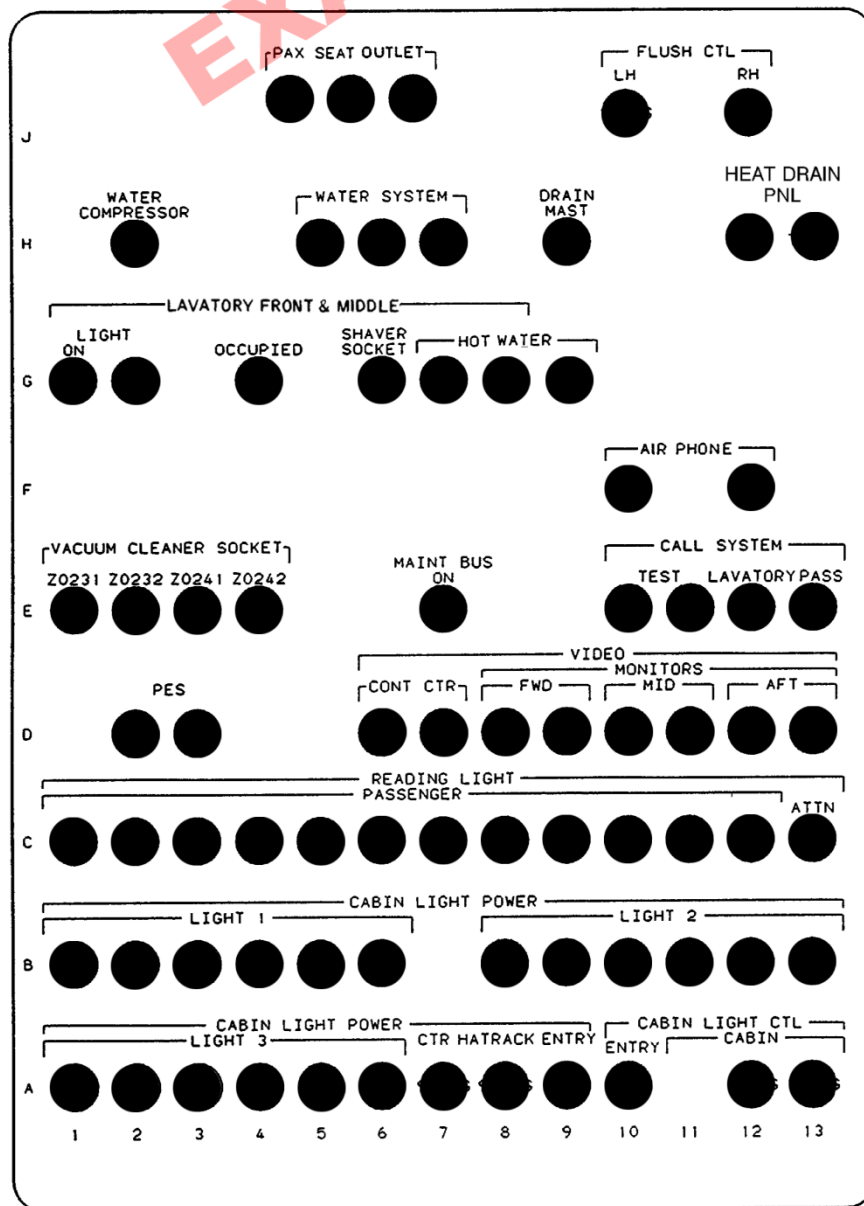
It is not permitted to reset a tripped C/B. If you reset it, you can cause an overload to another system.

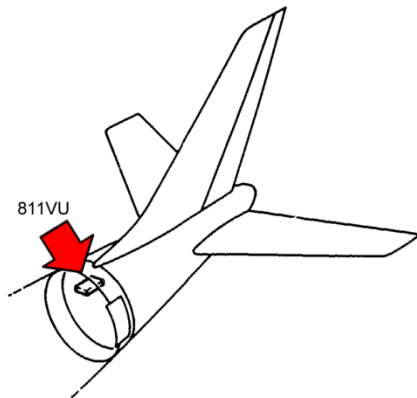
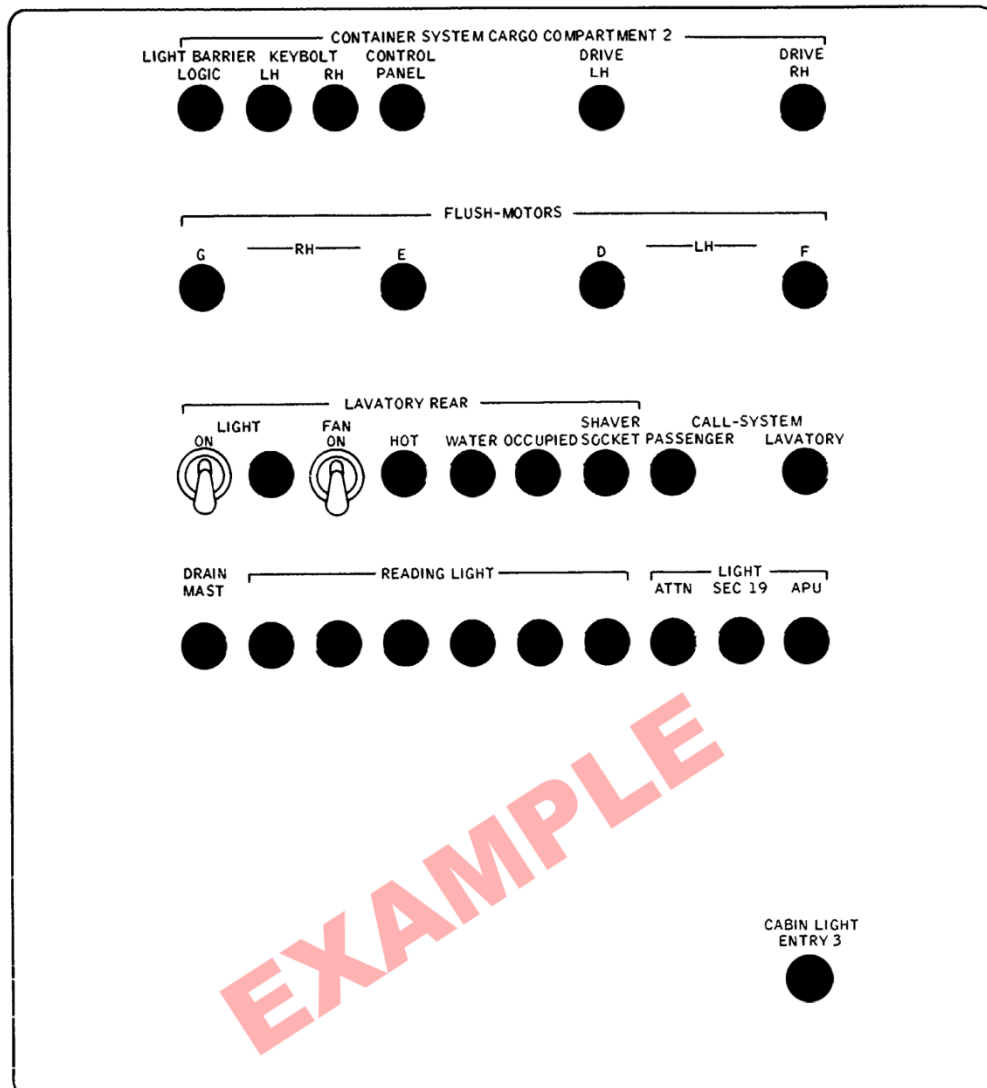
4.20.1. A300 CABIN CIRCUIT BREAKER PANELS



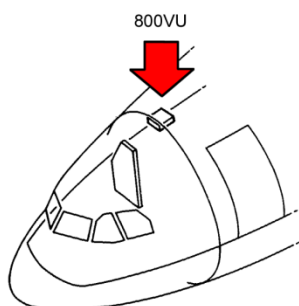
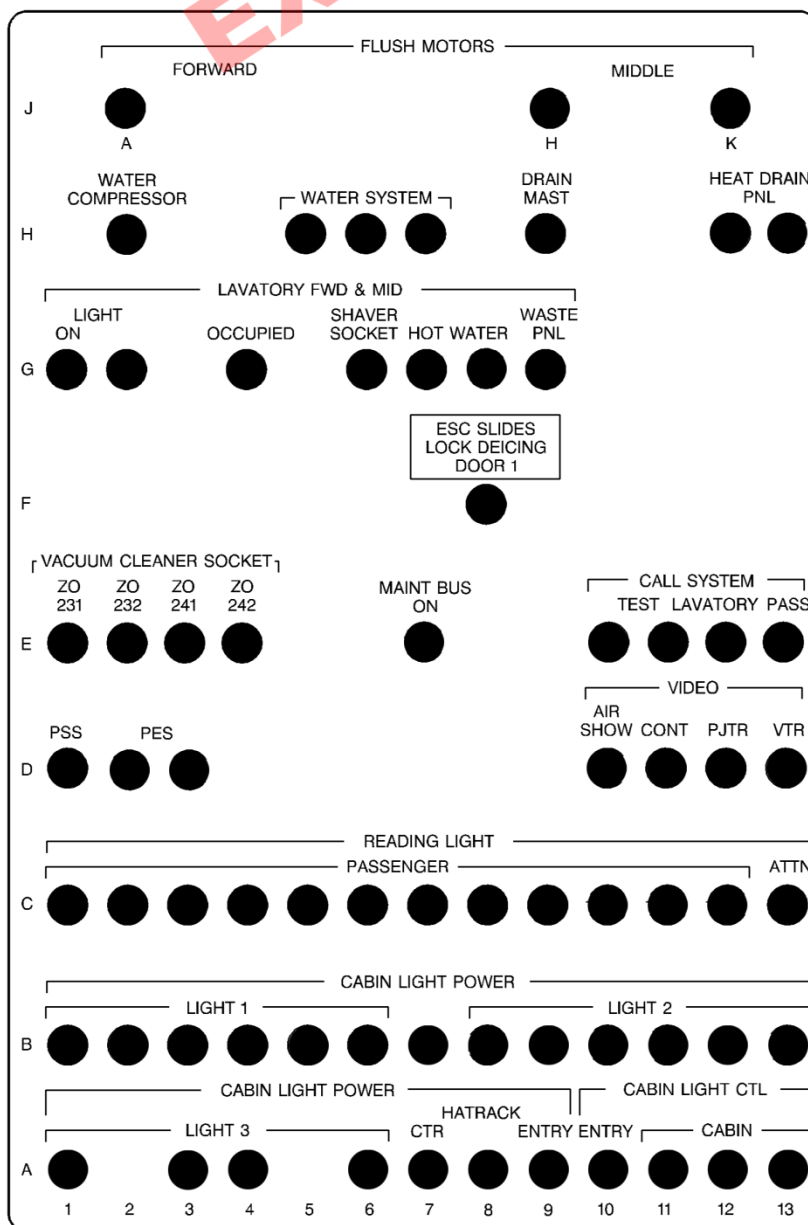


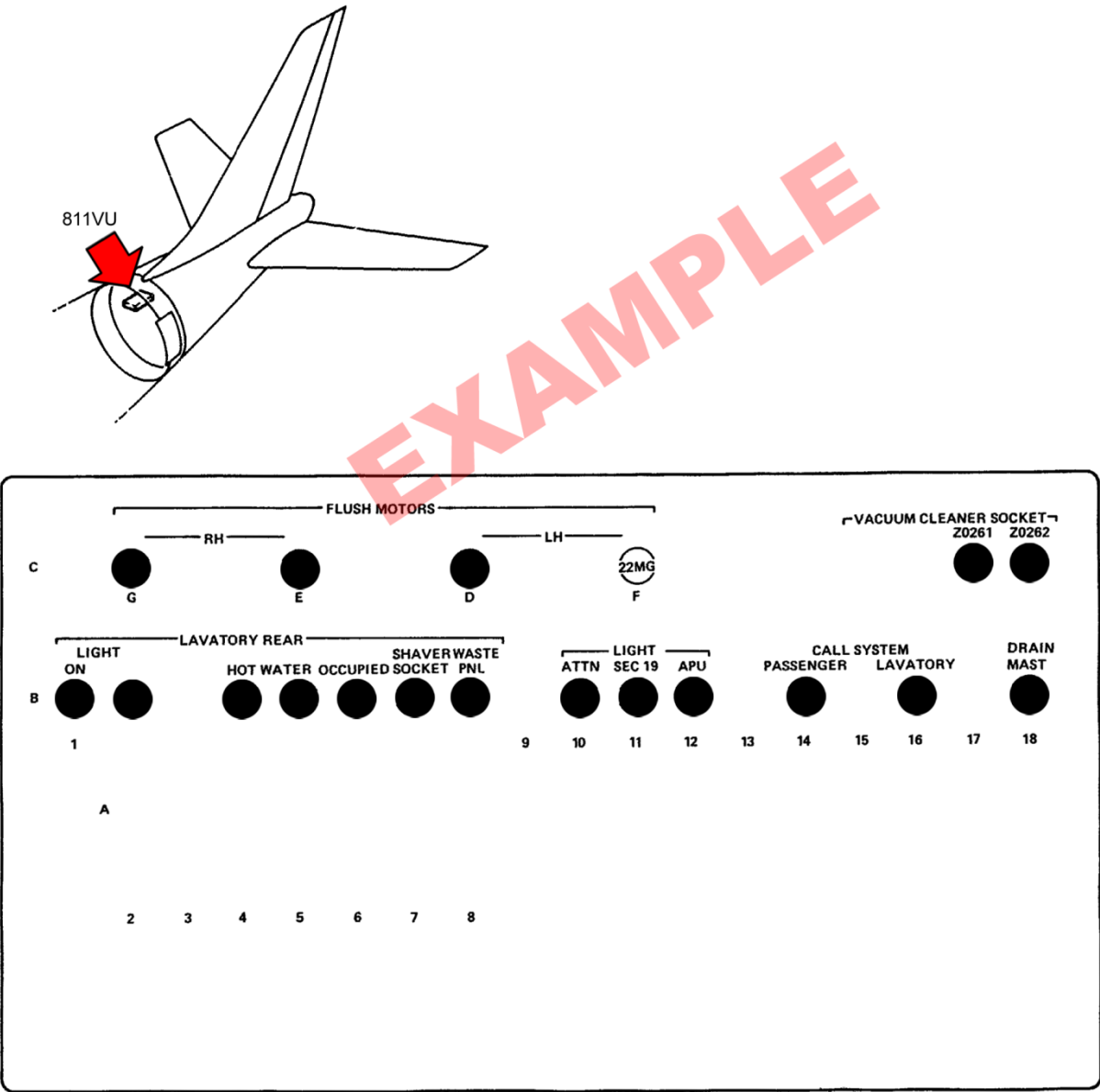
4.20.2. A300-600 CABIN CIRCUIT BREAKER PANELS





4.20.3. A310 CABIN CIRCUIT BREAKER PANELS





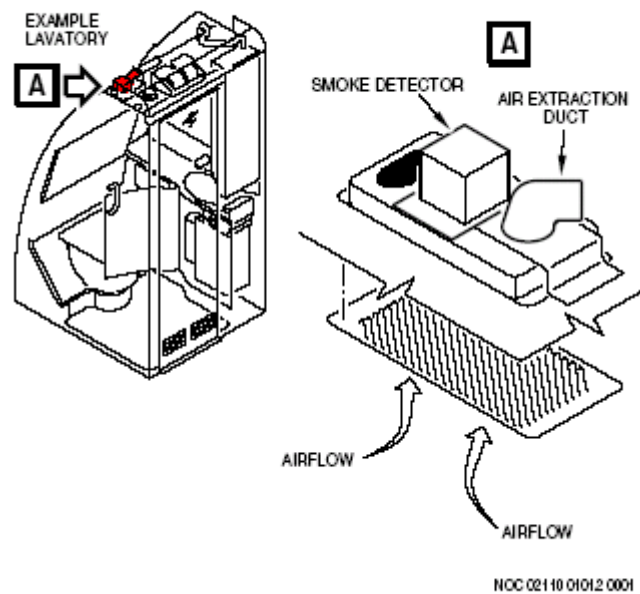
4.21. SINGLE AISLE AIRCRAFT FIRE PROTECTION (A318/A319/A320/A321)

4.21.1. LAVATORY SMOKE DETECTION

A smoke detector is located in each lavatory. The smoke detectors are connected to the CIDS (Cabin Intercommunication Data System) by the CIDS-SDF (CIDS Smoke Detection Function), and the Flight Warning Computer (FWC).

Figure 4-5

Lavatory Smoke Detection System



If smoke is detected, the system gives a visual and aural warning to the flight crew and the cabin crew.

The warnings in the cockpit are:

- A repetitive chime
- A red master warning light
- A smoke warning indication on the ECAM upper display unit.

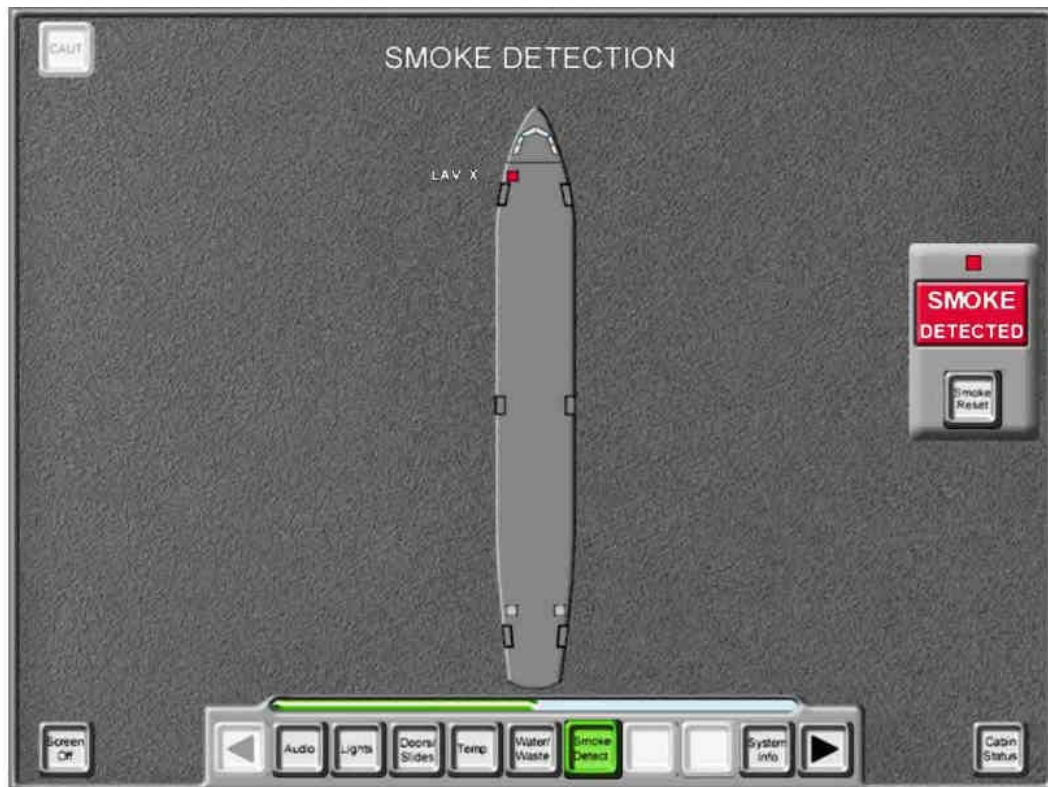
The cabin warnings are:

- A repetitive triple chime (every 30 seconds) from all the cabin loudspeakers, and all attendant station loud speakers
- A red flashing indicator light and a steady text (SMOKE LAV X) on all Attendant Indication Panels (AIPs)
- An amber light flashes on the related Area Call Panel (ACP)
- An amber light flashes on the related lavatory wall
- A red indication SMOKE LAV on the Forward Attendant Panel (FAP) or the related Additional Attendant Panel (AAP)

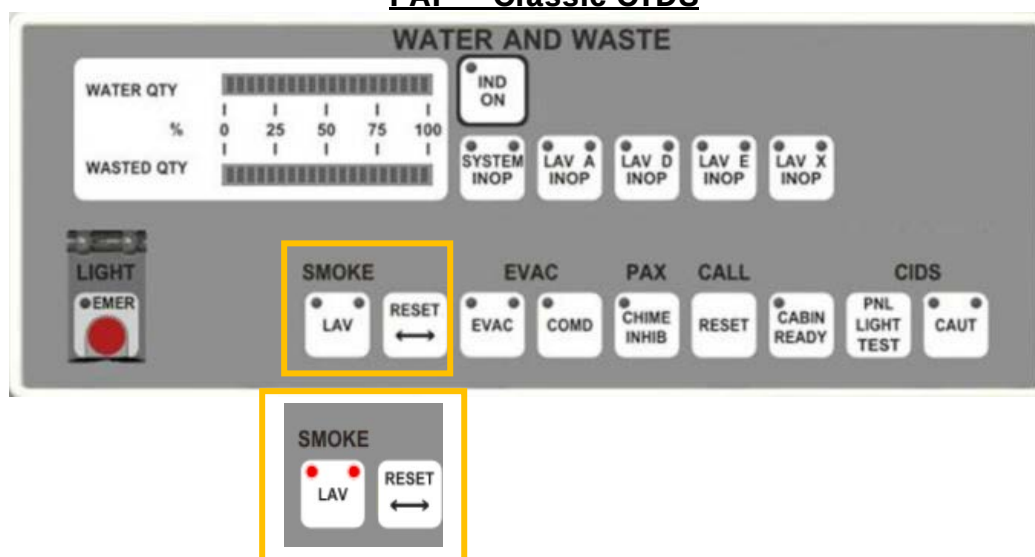
Figure 4-6

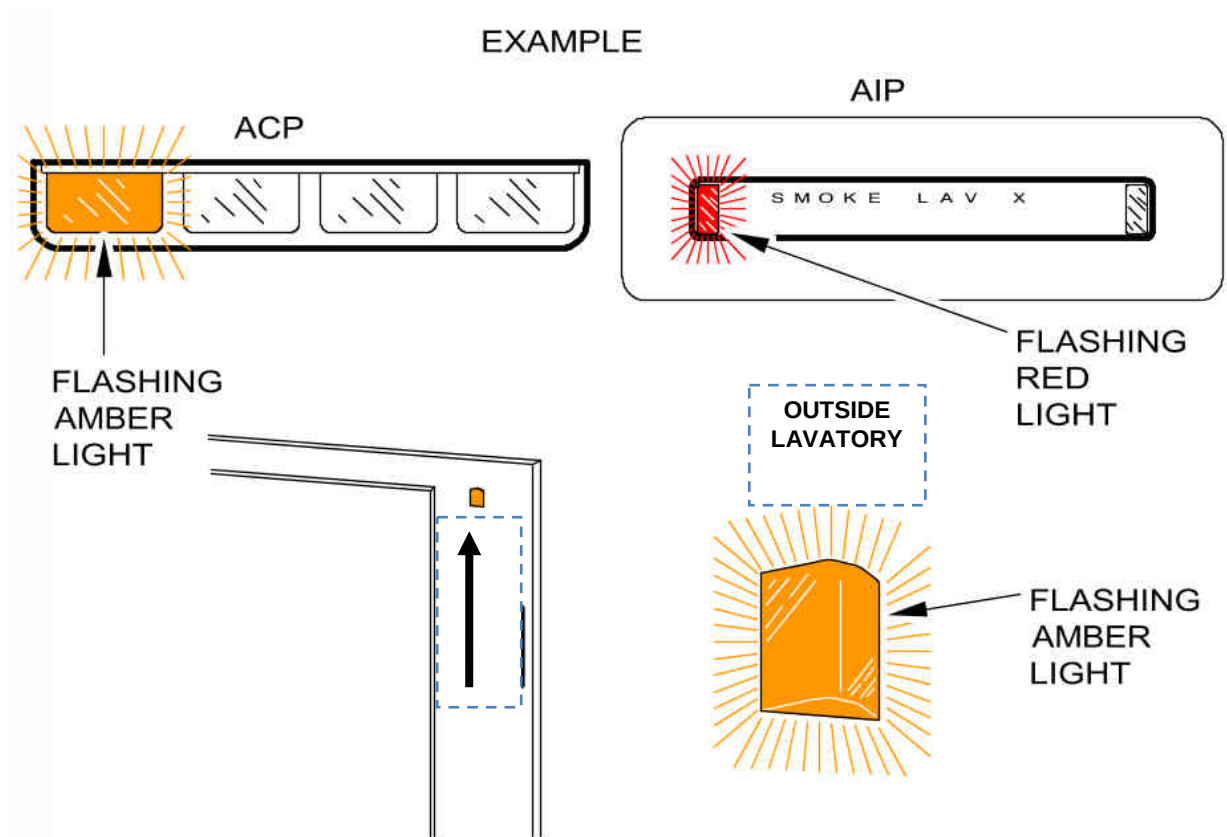
Smoke Warning Cabin Indications

FAP – Enhanced CIDS

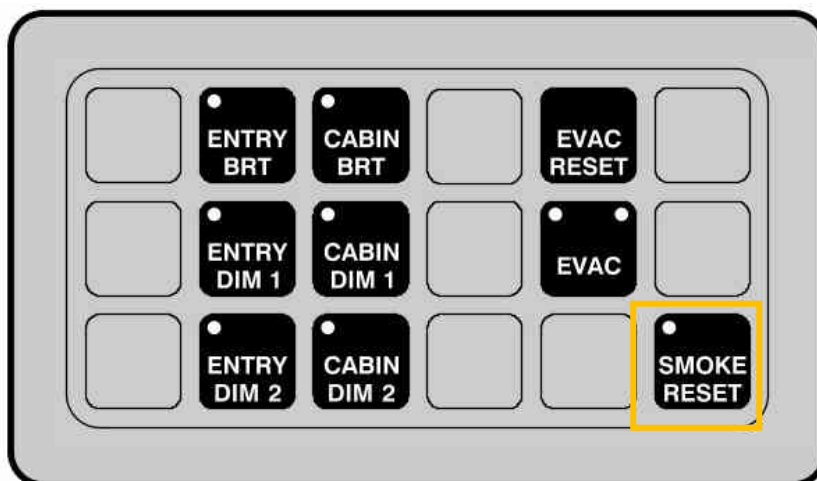


FAP – Classic CIDS





EXAMPLE OF AAP



By pressing the LAV SMOKE/RESET pushbutton on the FAP or on the related AAP, the aural and visual warnings and indications on the ACP and AIP are turned off. The indication on the FAP/AAP and the amber light outside the lavatory wall disappear, as soon as the density of smoke drops below the threshold of the respective smoke detector.

4.21.2. SINGLE AISLE WASTE-BIN FIRE EXTINGUISHER

GENERAL

Each lavatory has a waste bin fire extinguisher.

LOCATION

There is a fire extinguisher above the waste bin in each lavatory.

Note: The indicator on the gauge must be in the green area to ensure full operation in the case of a fire.

DESCRIPTION

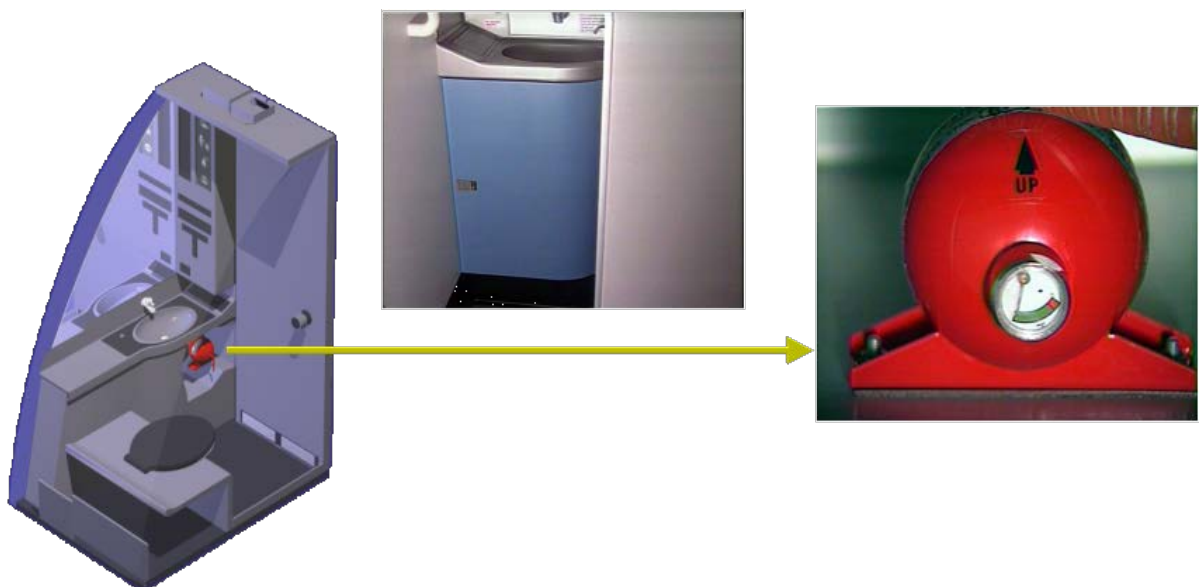
Each fire extinguisher has these main components.

- A spherical container with a mounting bracket
- A discharge tube with a fusible plug
- A pressure gauge that indicates extinguisher status
- An identification label

OPERATION

Figure - 4-7
Lavatory Fire Extinguisher

If a fire is detected in the waste bin, the fire extinguisher operates automatically. When the temperature in the waste bin increases to approximately 79 °C (174.2 °F), the fusible plug that is in the end of the discharge tube melts, and lets the agent flow into the waste bin.



4.22. A318/A319/A320/A321 CABIN CIRCUIT BREAKER PANELS

Circuit breakers are installed to protect the electrical circuits and their related components.

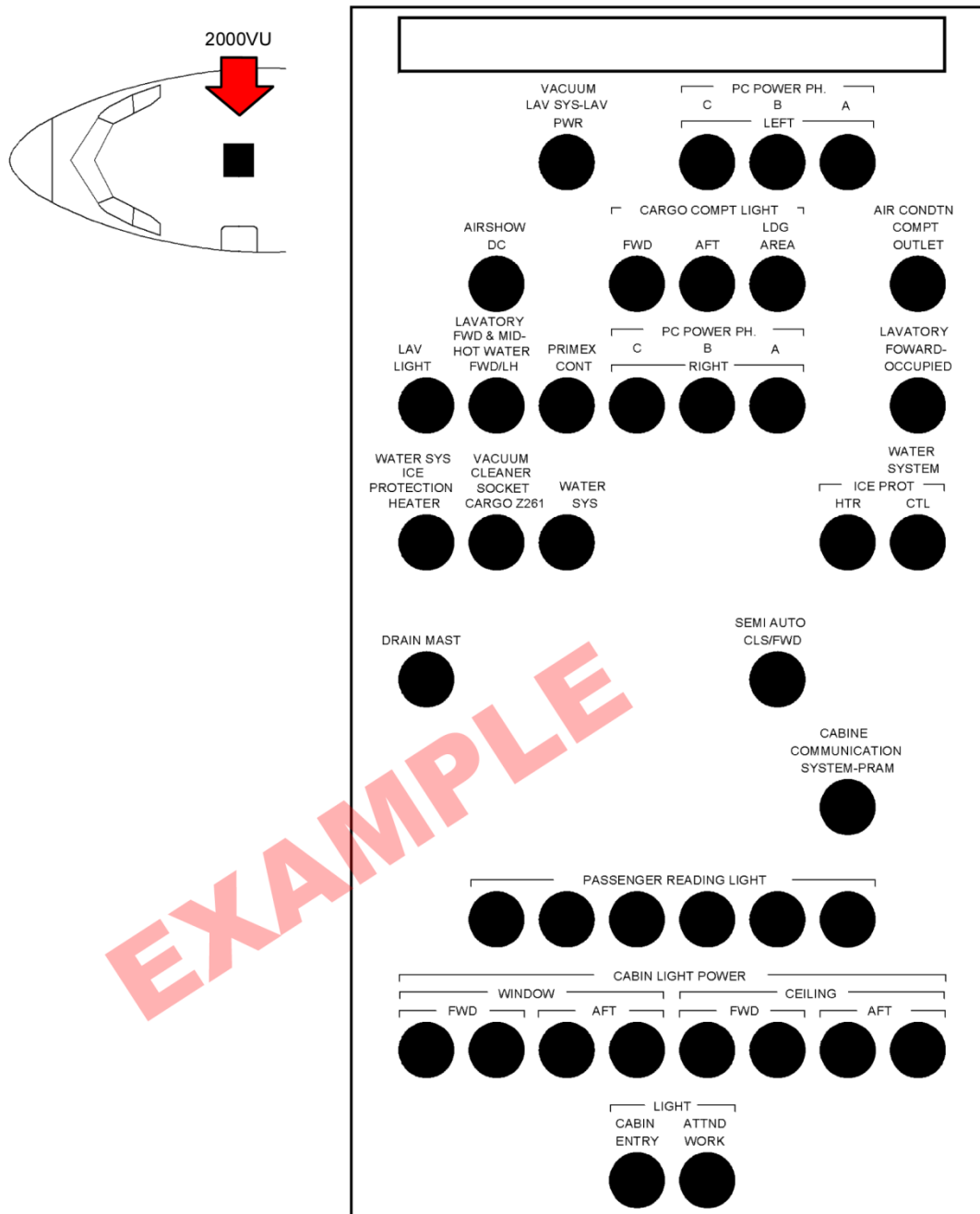
There is one circuit breaker panel in the forward cabin, and one circuit breaker panel in the aft cabin. Circuit breakers that relate to cabin items, such as lights, and entertainment systems are on these panels, and may be used to isolate equipment in the event of smoke and fire, in accordance with the operator's policy.

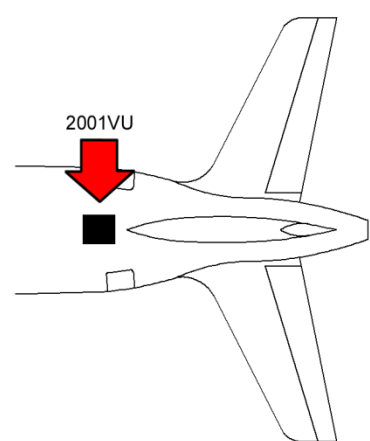
As Airbus aircraft are customizable, the circuit breaker panels illustrated on the following pages are only to provide an overview of the panels.

Please contact your engineering department if you wish to have your operators customized circuit breaker panel configuration.

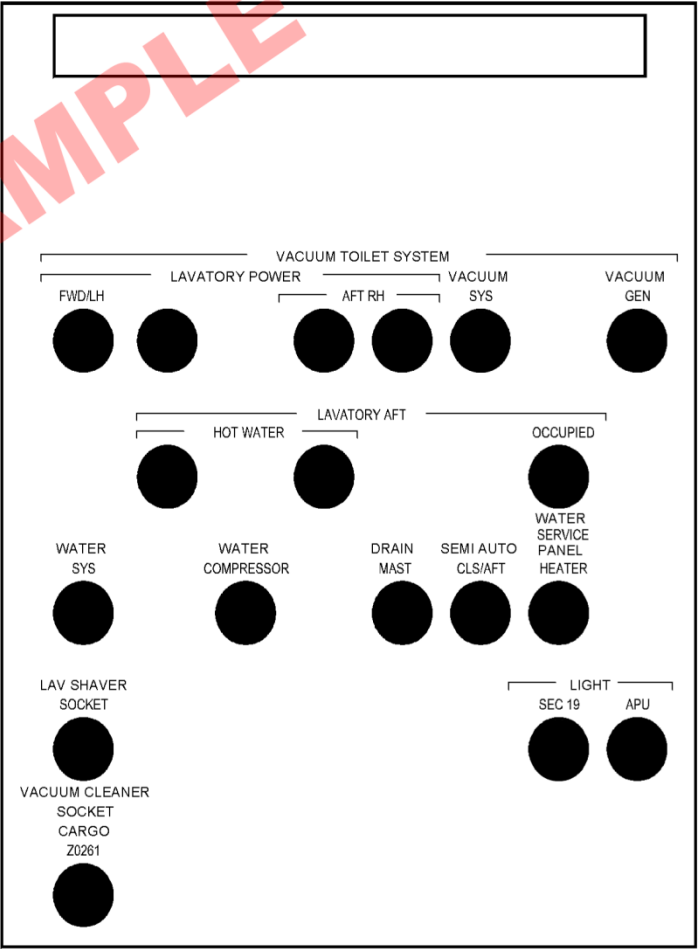
CAUTION

It is not permitted to reset a tripped circuit breaker (C/B). If it is reset, it can cause another system to overload.





EXAMPLE



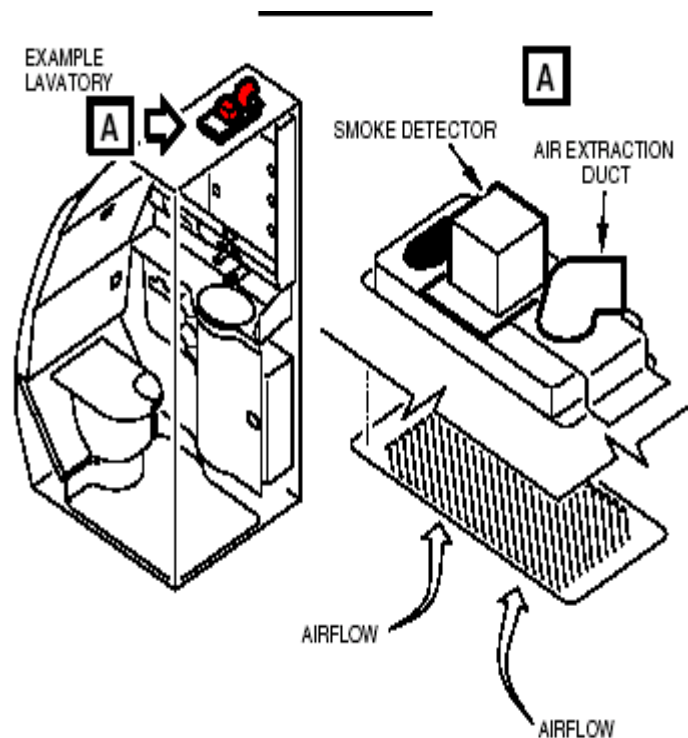
4.23. LONG RANGE AIRCRAFT FIRE PROTECTION

4.23.1. A330/A340 LAVATORY SMOKE DETECTION

One smoke detector is installed in each lavatory extraction duct. If smoke enters into the measuring chamber of the detector, a warning signal is transmitted through CIDS to the cockpit and the cabin.

Figure 4-8

Lavatory Smoke Detection System



Smoke Indications in the Cockpit and Cabin

If smoke is detected, the system gives a visual and aural warning to the flight crew and the cabin crew.

The warnings in the cockpit are:

- A repetitive chime
- A red master warning light
- A smoke warning indication on the ECAM upper display unit.

The cabin warnings are:

- A repetitive triple chime (every 30 seconds) from all the cabin loudspeakers, and all attendant station loud speakers
- A red flashing indicator light and a steady text (SMOKE LAV X) on all Attendant Indication Panels (AIPs)
- An amber light flashes on the related Area Call Panel (ACP)
- An amber light flashes on the related lavatory wall

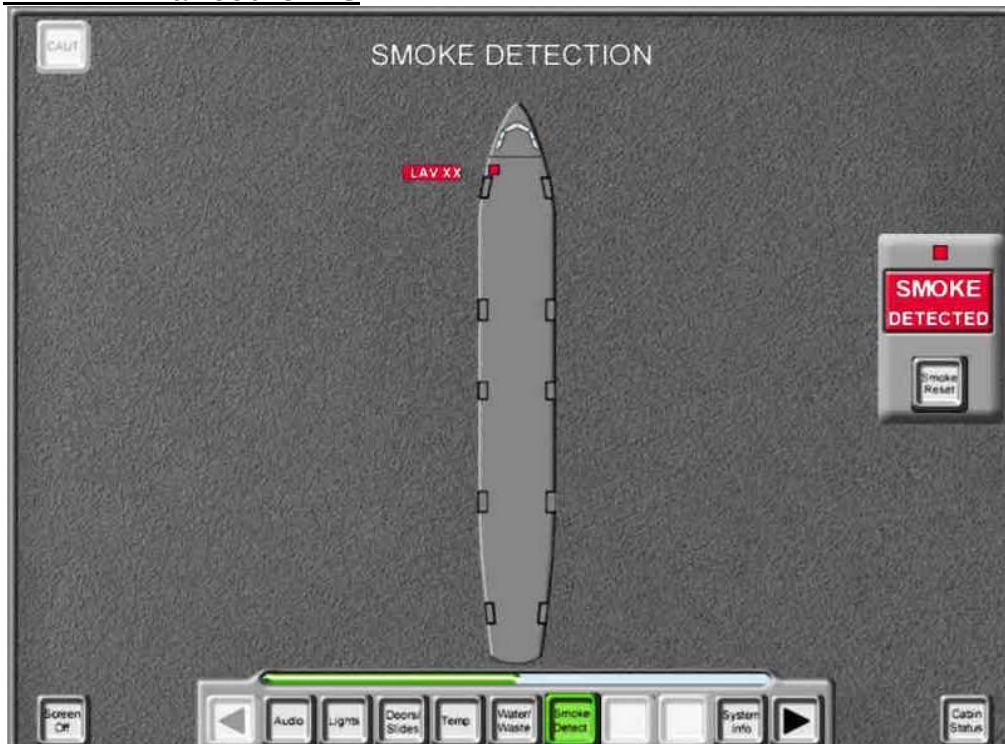
A red indication SMOKE LAV on the Forward Attendant Panel (FAP) or the related Additional Attendant Panel (AAP).

Figure 4-9
Lavatory Smoke Indications

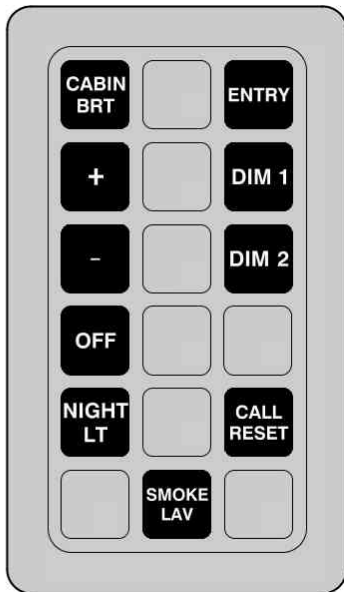
FAP – Classic CIDS



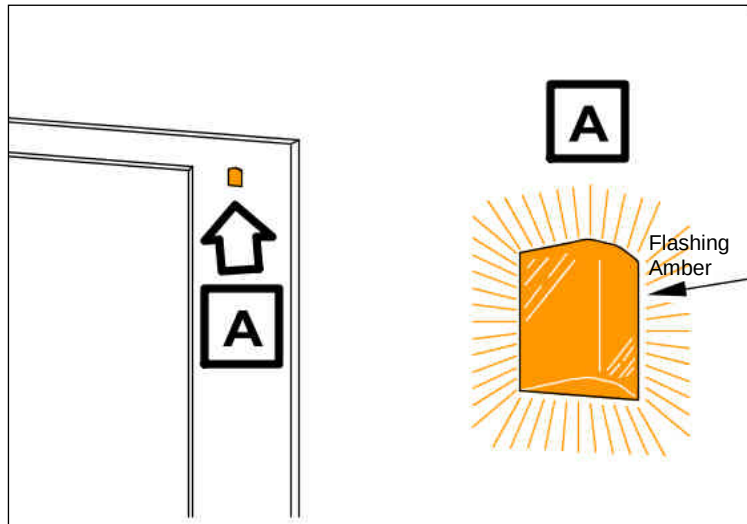
FAP – Enhanced CIDS



Example -AAP



Outside Affected Lavatory Door



Attendant Indication Panel (AIP)



By pressing the LAV SMOKE/RESET pushbutton on the FAP or on the related AAP, the aural and visual warnings and indications on the ACP and AIP are turned off. The indication on the FAP/AAP and the amber light outside the lavatory wall disappear, as soon as the density of smoke drops below the threshold of the respective smoke detector.

4.23.2. VIDEO CONTROL CENTRE (VCC) SMOKE PROCEDURE FOR A330/A340

Aircraft Fitted with VCC Smoke Detection System on FAP

FLIGHT CREW

SMOKE CAB VIDEO 1(2)(3)(4) SMOKE **CREW AWARENESS**
Maintain contact with the cabin crew.

CABIN CREW PROCEDURE

On the FAP, or related AAP, the SMOKE warning indication comes on, with an associated triple chime, repeated every 30 seconds (optionally 10 seconds)

CABIN CREW **INFORM AND COORDINATE WITH FLIGHT CREW**

PAX SYS SWITCH **OFF**
The PAX SYS switch is located in the cockpit, on the VCC and, as an option, on the FAP.

BASIC FIRE FIGHTING PROCEDURE **APPLY**

SMOKE PUSHBUTTON (ON THE FAP or AAP IN YOUR ZONE) **RESET**
To silence the chime, and reset all visual warnings on the ACPs and the AIPs.

Note: Only the Smoke Detection light on the FAP hard key and the respective AAP panel remain on until all smoke has dissipated.

CABIN CREW **MAINTAIN CONTACT WITH FLIGHT CREW**
The cabin crew should maintain contact with the flight crew to monitor the status of the smoke.

- If confirmed that the smoke is coming from the VCC:

CBs VIDEO CONTROL CENTER. AC1, AC2, AC3, DC **PULL**
This enables the isolation of the VCC electrical supply. These circuit breakers are on the 5001VE circuit breaker panel, located in the overhead panel, near the cockpit door.

- When all the CBs for the video control center have been confirmed as pulled:

PAX SYS **.NORM**
This enables the restoration of the IPSS power supply for the remainder of the flight

If the VCC IS NOT equipped with smoke detection

CABIN CREW **INFORM AND COORDINATE WITH THE FLIGHT CREW**

***IFE Switch** **OFF**
The IFE switch is located on the VCC panel and enables the isolation of the IFE/VCC electrical supply.

BASIC SMOKE PROCEDURE **APPLY**

CABIN CREW **MAINTAIN CONTACT WITH FLIGHT CREW**
The cabin crew should maintain contact with the FLIGHT CREW to monitor the status of the smoke.

- If situation has cleared:

(AFFECTED) VCC **CHECK PERIODICALLY**
To ensure that the VCC remains clear of smoke.

If the VCC IS equipped with smoke detection on the VCC panel

On the VCC smoke control panel, the smoke warning indication comes on, with a red indicator warning and an alarm horn.

CABIN CREW **INFORM AND COORDINATE WITH FLIGHT CREW**

***IFE SWITCH** **OFF**
The IFE switch is located on the VCC panel and enables the isolation of the IFE/ VCC electrical supply.

SMOKE PROCEDURE **APPLY**

HORN INTERRUPT PUSHBUTTON **PUSH**
To silence the horn in the cabin.

CABIN CREW **MAINTAIN CONTACT WITH FLIGHT CREW**
The cabin crew should maintain contact with the flight crew to monitor the status of the smoke.

- **If situation has cleared:**

(AFFECTED) VCC **CHECK PERIODICALLY**
To ensure that the VCC remains clear of smoke.

Note: The denomination of the IFE switch(es) depends on the cabin configuration.

The IFE switch(es) are the following:

- **PASSENGER ENTERTAINMENT SYSTEM/COMMUNICATIONS (PES/COM) Main switch**
- **VCC Main Power switch**
- **PES Main switch**

4.24. A330/A340 CABIN CIRCUIT BREAKER PANELS

Circuit breakers (CBs) are installed to protect the electrical circuits of their related components.

There is one circuit breaker panel in the forward cabin, and one circuit breaker panel in the aft cabin. Circuit breakers that relate to cabin items, such as lights, and entertainment systems are on these panels, and may be used to isolate equipment in the event of smoke and fire, in accordance with the operator's policy.

A cover protects each circuit breaker panel to prevent unauthorized access.

The VE panels have rows of circuit breakers. The function of each circuit breaker is shown below the related circuit breaker. The location of the circuit breaker is defined through a matrix (Letter x Number).

-A letter (A, B, C...) for the circuit breaker row,

-A number (1,2,3...) for the circuit breaker column.

Example.

If a circuit breaker is installed in row C on position 8 (column 8) the related location is called C8.

In this case the circuit breaker C8 protects the electrical circuit, which is responsible for the cabin lighting on the right hand window side in the middle of the cabin area.

CAUTION

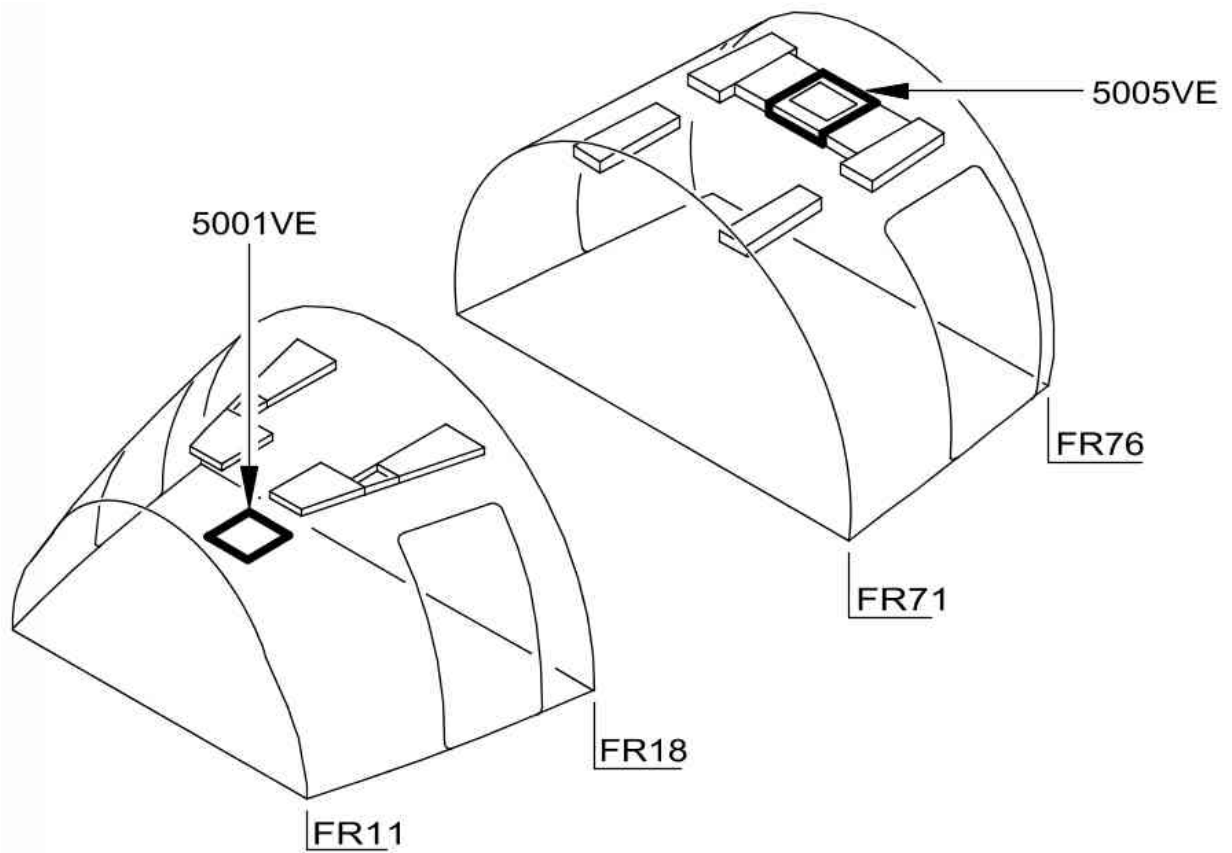
It is not permitted to reset a tripped CB. If it is reset, it can cause another system to overload.

As Airbus aircraft are customized to our operator's requirements, the circuit breaker panels illustrated on the following pages are only to provide an overview of the panels.

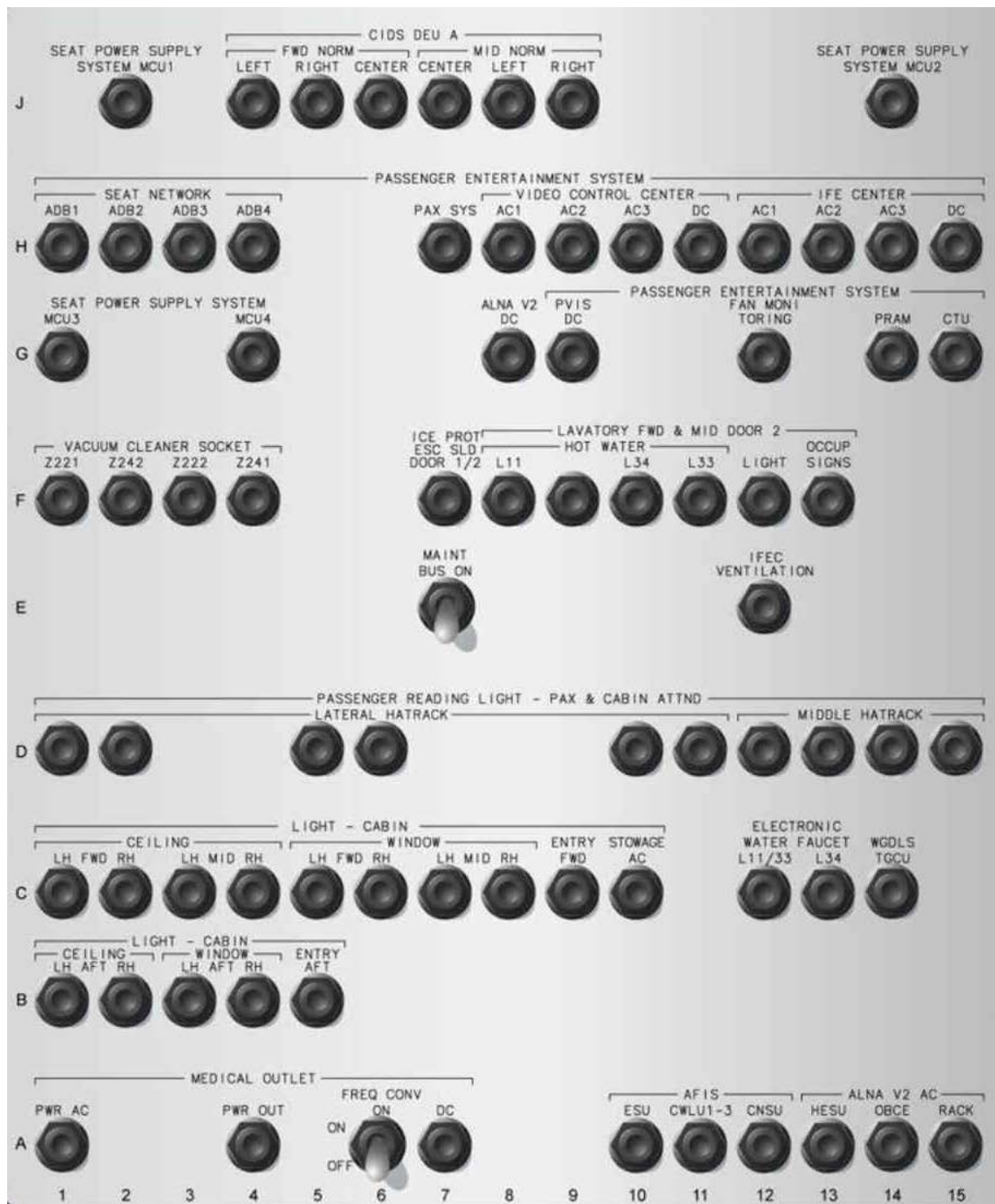
Please contact your engineering department if you wish to have your operators customized circuit breaker panel configuration.



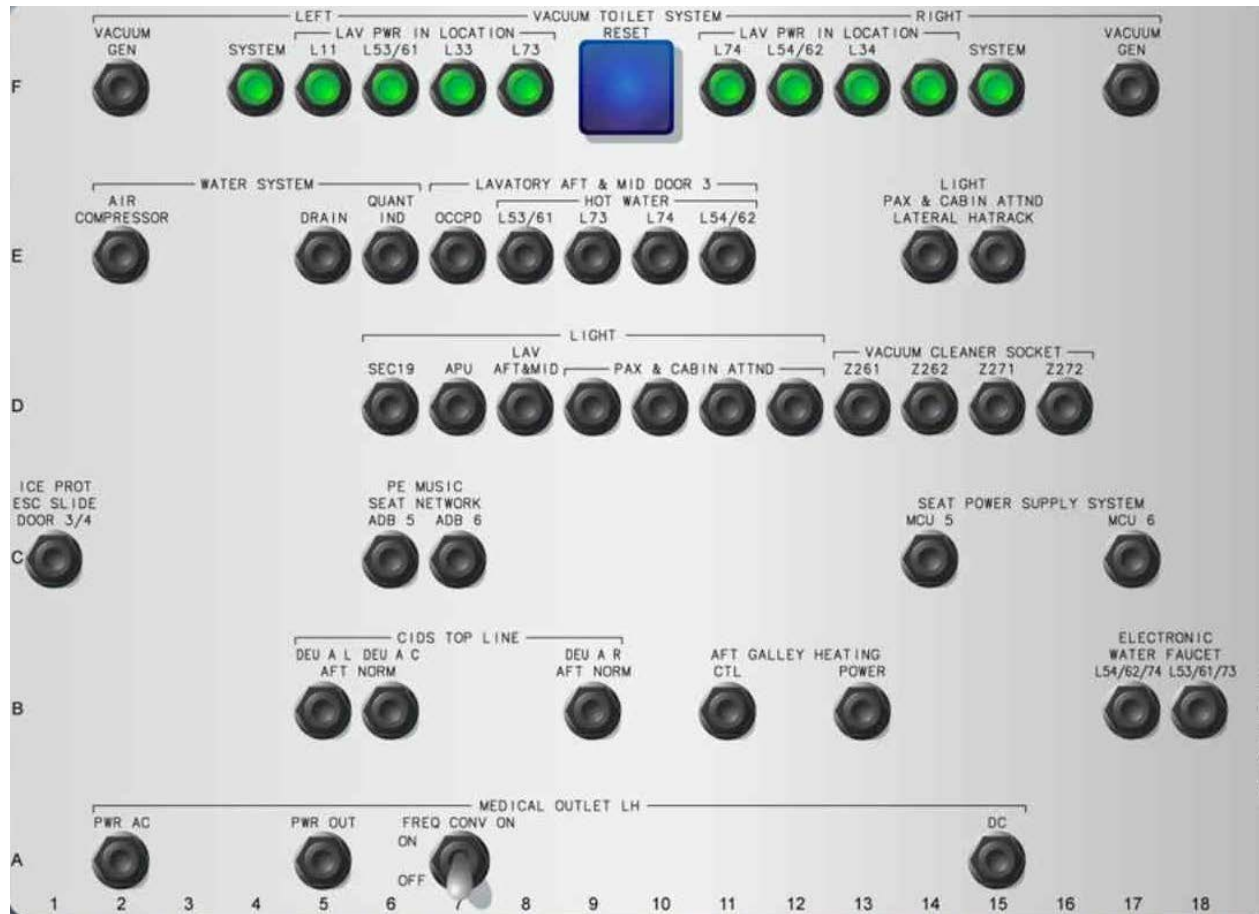
A330 / A340 Location of CB Panels



EXAMPLE OF 5001VE (Forward) CB PANEL



EXAMPLE OF 5005VE (AFT) CB Panel



4.25. VCC SMOKE PROCEDURE – ENHANCED CABIN

A330/A340 (ENHANCED CABIN)/ A340-500/A340-600

FLIGHT CREW

SMOKE CAB VIDEO 1(2)(3)(4) SMOKE **CREW AWARENESS**
 Maintain contact with the cabin crew.

CABIN CREW PROCEDURE

On the FAP, or related AAP, the SMOKE warning indication comes on, with an associated triple chime, repeated every 30 seconds (optionally 10 seconds)

CABIN CREW **INFORM AND COORDINATE WITH FLIGHT CREW**

PAX SYS SWITCH. **OFF**
The PAX SYS switch is located in the cockpit, on the VCC and optionally on the FAP.

BASIC FIRE FIGHTING PROCEDURE **APPLY**

SMOKE PUSHBUTTON (ON THE FAP or AAP) **RESET**
To silence the chime, and reset all visual warnings on the ACPs and the AIPs.

Note Only the Smoke Detection light on the FAP hard key and the respective AAP panel remain on until all smoke has dissipated.

CABIN CREW. **MAINTAIN CONTACT WITH FLIGHT CREW**
The cabin crew should maintain contact with the flight crew to monitor the status of the smoke.

- If confirmed that the smoke is coming from the VCC:

CBs VIDEO CONTROL CENTER. AC1, AC2, AC3, DC **PULL**
This enables the isolation of the VCC electrical supply. The CBs are located in the overhead panel 5001VE in the ceiling near the cockpit door.

- When all the CBs for the video control center have been confirmed as pulled:

PAX SYS **NORM**
This enables the restoration of the In-seat Power Supply System (IPSS) for the remainder of the flight.

4.26. CREW REST COMPARTMENTS – A330/A340, A350 & A380

Depending on the aircraft configuration and at the airline's request, a crew rest compartment (CRC) is installed to enable the flight crew and cabin crew to relax and/or sleep during the flight. There are different types of CRCs available:

Flight Crew Rest Compartment (FCRC) - is usually located close to the cockpit.

Cabin Crew Rest Compartment (CCRC) - is located in the aft area of the cabin.

Lower Deck Mobile Crew Rest Compartment (LDMCRC) - an underfloor crew rest area integrated into a container in the cargo compartment and accessible via a specific staircase. This feature is also available on the A380 incorporating two containers in the cargo compartment and is referred to the Lower Deck Cabin Crew Rest Compartment (LDCRC).

Bulk Crew Rest Compartment (BCRC) - A permanent underfloor crew rest area installed in the bulk crew rest compartment.

Dock-on Crew Rest (DCR) - an under floor crew rest area integrated into a container and only accessible via other lower deck facilities. There is no staircase associated with this crew rest compartment.

4.27. CREW REST COMPARTMENT - NORMAL OPERATION

A preflight inspection of the emergency equipment and a security check of the crew rest compartment should be completed before each flight departure.

WARNING

1. During the flight, the occupancy of the crew rest compartments is limited to the total number of bunks and/or seats that are installed in the compartment
2. The crew rest compartments may only be used by operating cabin crew trained in the use of emergency equipment, emergency procedures and the systems of the crew rest compartments
3. Smoking is prohibited in the crew rest compartments
4. The crew rest compartment is limited to the stowage of the cabin crew personal baggage only. The stowage of cargo or passenger baggage is prohibited.

During taxi, takeoff, final approach landing, the crew rest compartments must be.

- Unoccupied
- Doors closed and locked.

During the flight, when the crew rest compartments are occupied, the occupants must ensure that their seat belts are fastened while seated or lying down.

4.28. LOWER DECK CREW REST COMPARTMENTS (LDCRC)

The stairwell hatch must remain open, and secured with the hatch retainers, at all times when the lower deck crew rest compartment is occupied.

To isolate the lower deck crew rest compartment from cabin noise, the stairwell door should be closed, but the stairwell hatch must remain open and secured.

In case of smoke or fire in the lower deck crew rest compartment or in the cargo compartments, the stairwell hatch must be closed, in order to isolate these compartments.

CAUTION

The LDCRC stairwell hatch may only be closed when the LDCRC is unoccupied / evacuated

A post-flight security inspection of the crew rest compartments must be performed before the cabin crew disembark from the aircraft.

Figure 4-10
Bulk Crew Rest Compartment (BCRC)

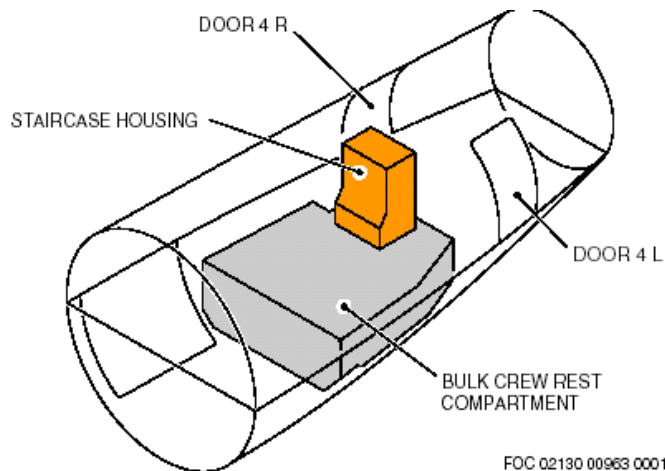
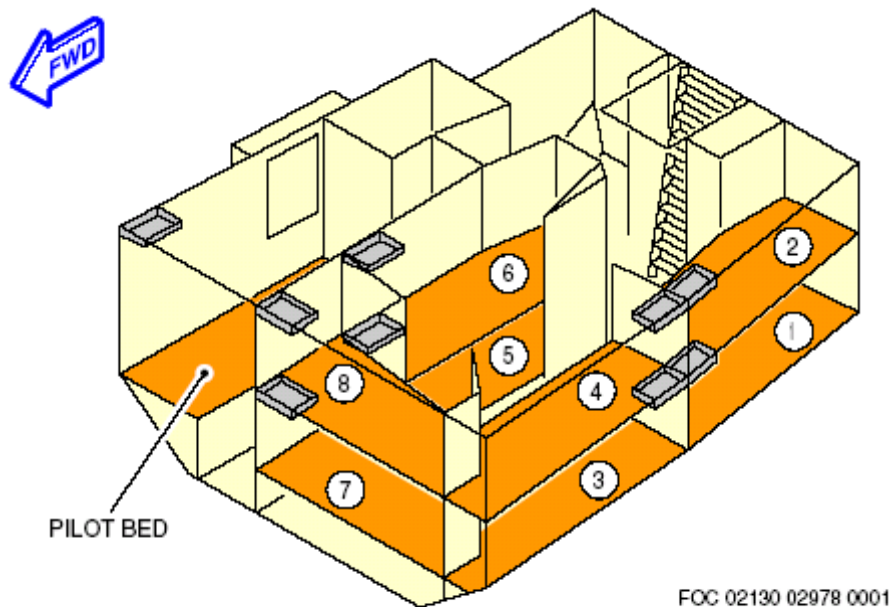


Figure 4-11

Full Bulk Crew Rest Compartment (FBCRC)



FOC 02130 02978 0001

Note: The service units are shown in grey color.

4.29. CREW REST SMOKE DETECTION - LDMCR

The connected smoke detectors permanently analyze the ambient air in the crew rest compartment. The Smoke Detection Control Unit (SDCU) triggers and stores the following alarm signals:

- The optical alarm indicator corresponding to the smoke detector flashes when smoke is detected
- The warning horn triggers intermittently
- The lighted signs RETURN TO CABIN and DO NOT OPEN HATCH and the smoke indicator in the cockpit are activated.

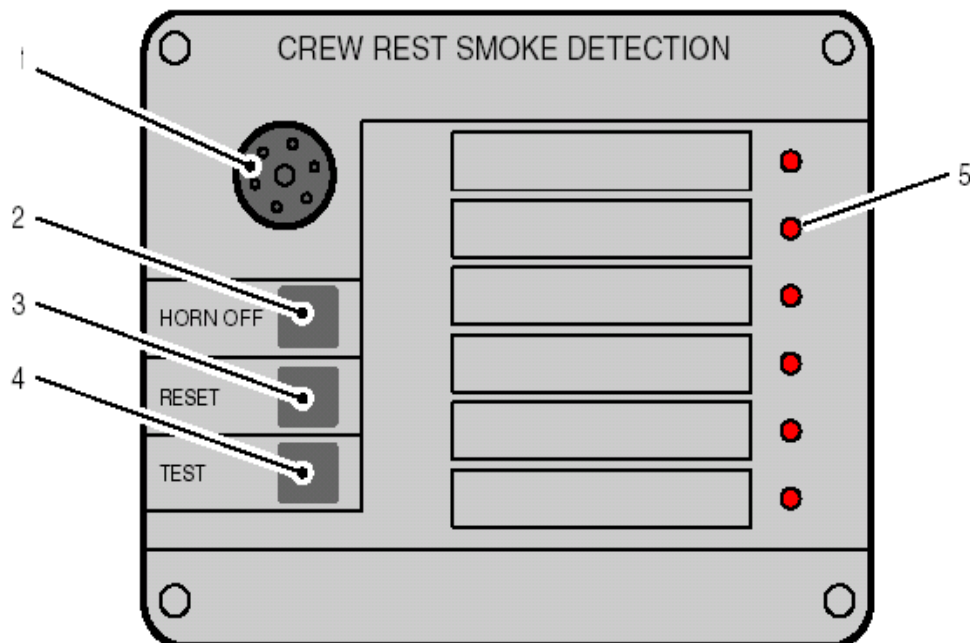


Figure 4-12

Crew Rest Smoke Detection (CRSD) Control Unit

1. Warning horn
2. HORN OFF pushbutton
3. RESET pushbutton
4. TEST pushbutton
5. Smoke detector channels with optical alarm indicators (LEDs).

Pushbutton Operation

- HORN OFF pushbutton

Pressing this pushbutton stops the warning horn chime

Note: The HORN OFF pushbutton is not active until the horn completes the first triple chime. Wait until the first triple chime is over, before pressing the pushbutton.

- RESET pushbutton

Pressing this pushbutton deactivates:

- The optical alarm indicator
- The lighted LEAVE LDMCR and DO NOT OPEN HATCH and the smoke indicator in the cockpit

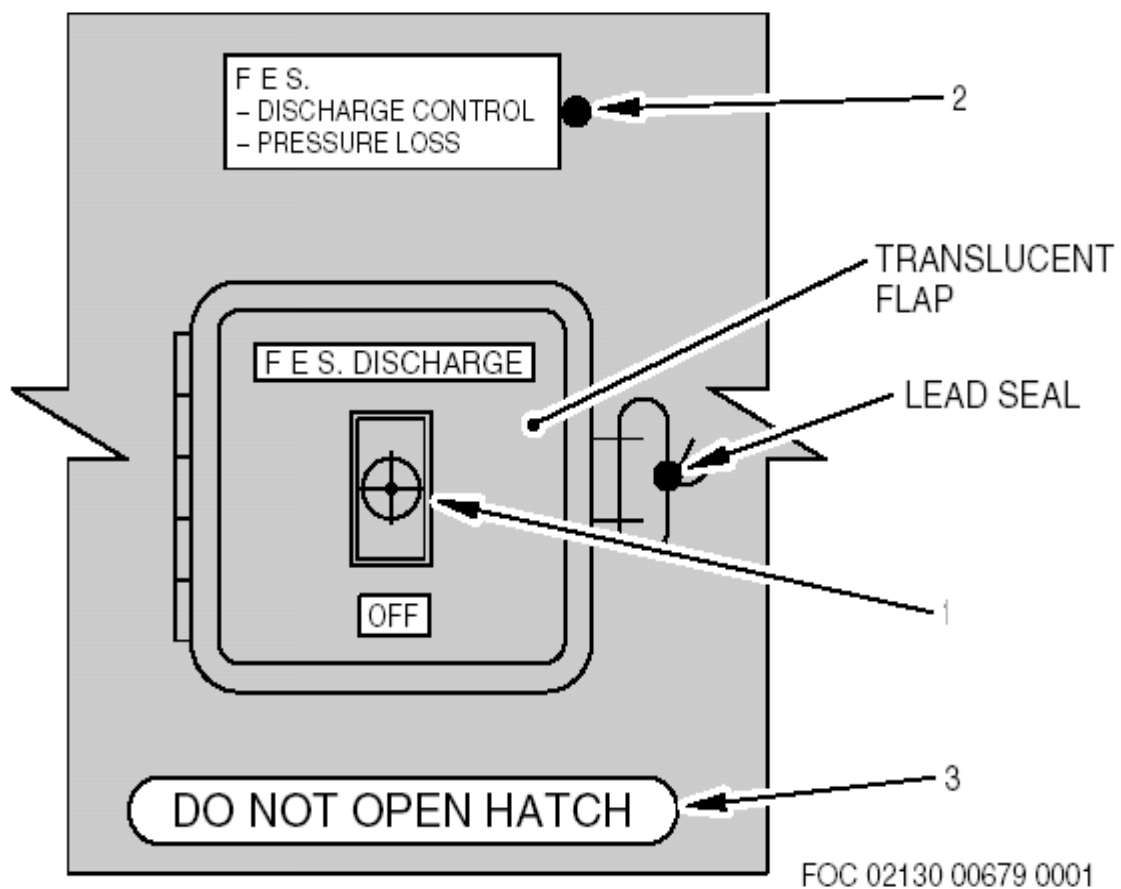
- TEST Pushbutton

Pressing this pushbutton results in testing the smoke detection control unit and all the connected smoke detectors.

4.30. CREW REST FIRE EXTINGUISHING SYSTEM (FES) - LDMCR

Figure 4-13

FES Discharge Panel



1. FES discharge switch
2. FES control indicator (red LED)
3. Lighted sign DO NOT OPEN HATCH

The FES discharge panel is in the staircase housing.

HOW TO OPERATE THE FIRE EXTINGUISHING SYSTEM

WARNING Before starting the FES discharge ensure that:

- All cabin crew have evacuated the LDMCR
- The exit hatch and the emergency exit hatch must be closed and locked

To start the FES discharge:

1. Remove the lead seal
2. Turn the cover flap to the open position
3. Press the FES discharge switch to the DISCHARGE position.

The DO NOT OPEN HATCH sign comes on.

The FES control indicator lights up to indicate the extinguisher discharge.

4.31. LDMCR / LDCRC / CCRC SMOKE/FIRE PROCEDURE

A330 / A340 / A340-500 / A340-600

SMOKE WARNING PRINCIPLE

- **When smoke is detected in the LDMCR**

- **In the LDMCR:**

On loudspeakers a low 30 s repetitive chime sounds, after a repetitive triple chime sounds every 30 s (optionally : every 10 s).

On the CRSD control unit, the red indicator of the applicable smoke detector flashes.

The air conditioning isolation valve closes, the Low Flow buzzer sounds for 30 s.

On the AIP, the "SMOKE <location>" message appears, and red indicator flashes.

All "LEAVE LD-MCR" signs illuminate.

The light intensity switches to 100 %.

- **In the staircase housing:**

The visual "DO NOT OPEN HATCH" warning appears in the staircase housing (when both the emergency exit and exit hatches are closed).

• **In the cabin:**

On the FAP and respective AAP, the SMOKE RESET button comes on, the FAP Smoke page shows the location and a low, repetitive, triple chime sounds every 30 s (optionally : every 10 s).

On the respective ACP's, the amber light flashes.

On all AIP's, the "smoke <location>" message appears, and red indicator flashes.

On the staircase housing, the amber smoke indicator flashes.

COCKPIT CREW

SMOKE CAB REST SMOKE. CREW AWARENESS

Maintain contact with the cabin crew to follow up on the status of the fire.

CABIN CREW PROCEDURE

STAIRCASE HOUSING DOOR. FEEL FOR HEAT AND OPEN THE DOOR VERY SLOWLY

LDMCR SEARCH FOR PRESENCE OF SMOKE AND OF FIRE

Search all bunks, closets and stowage compartments.

• **If smoke or fire is not visible in LDMCR, the smoke warning is unjustified.**

CRSD control unit HORN OFF pushbutton PRESS

To silence the CRSD horn.

SMOKE DETECTOR RED INDICATOR NOTE WHICH ONE IS FLASHING

To inform the ground maintenance personnel which smoke detector triggered the spurious smoke warning.

CRSD CONTROL UNIT PRESS the RESET pushbutton

To reset the concerned red indicator and the lighted signs "LEAVE LD-MCR/BCRC" and "DO NOT OPEN HATCH".

SMOKE RESET PUSHBUTTON (on FAP, or respective AAP) RESET

To silence the chime in all the cabin and LDMCR, and to reset the visual warning on the respective ACPs, AIPs.

Note: The amber Smoke indicator, the Smoke reset pushbutton on the FAP and respective AAP and the indication on the FAP Smoke page remain ON until all smoke has dissipated.

• **If smoke or fire is visible.**

LDMCR EMPTY. CHECK

BASIC FIREFIGHTING PROCEDURE APPLY

Use a portable fire extinguisher.

- If unable to extinguish the fire using the portable fire extinguisher.

EXIT HATCH AND EMERGENCY EXIT HATCH CLOSE AND LOCK

FES SWITCH SET TO ACTIVE POSITION

To manually activate the Fire Extinguishing System. The FES switch is located in the staircase housing. Break the seal, and lift the plastic cover to access the FES switch.

SMOKE PUSHBUTTON (ON FAP OR RESPECTIVE AAP) RESET

To silence the chime in all the cabin and LDMCR, and to reset the visual warning on the respective ACPs, AIPs.

Note: The amber Smoke indicator, the Smoke reset pushbutton on the FAP and respective AAP and the indication on the FAP Smoke page remain ON until all smoke has dissipated.

WARNING The main exit hatch and the emergency exit hatch must remain closed until arrival.

LDMCR MONITOR FOR THE REMAINDER OF THE FLIGHT

A380

SMOKE WARNING PRINCIPLE

- When smoke is detected in the LDCRC.
- In the LDCRC:
 - Loudspeaker: A single low chime will sound repeatedly for 30 s. Following the single low chime, a repetitive triple chime (smoke alarm) will sound every 30 s (optionally 10 s)
 - Low Flow Buzzer: when the air conditioning isolation valve closes, the low airflow buzzer will sound for 30 s.
 - Attendant Indication Panel (AIP): The smoke location message comes on, and the red indicator light flashes (or comes on steady according to CAM assignment).
 - LEAVE LDCRC: Signs will come on
 - LDCRC lighting: Will come on to 100 % intensity.
- In the staircase housing, on the FES indication panel:
 - The SMOKE indication comes on steady red.
 - The CLOSE HATCHES indication comes on steady red if the main hatch or the emergency hatch is opened.
- In the cabin:
 - Flight Attendant Panel (FAP) and Mini-FAP (MFAP) the hard key SMOKE RESET button comes on.
 - The FAP smoke page will appear automatically indicating the affected area.

- A triple chime will be repeated every 30 s (optionally 10 s).
- On the respective Area Call Panel (ACP) the amber lights will flash.
- On the AIPs the smoke location message comes on, and the red indicator light flashes (or comes on steady according to CAM assignment).
- The amber smoke indicator next to the LDCRC door flashes.

CAPT

ECAM ALERT SMOKE AFT (FWD) LWR CAB REST SMOKE. CREW AWARENESS

CABIN CREW

SMOKE RESET pb ON THE FAP OR THE RESPECTIVE AAP.PRESS TO RESET

This will :

- Silence the chimes in the cabin
- Reset the visual warnings on the respective ACPs and AIPs

Note: The amber smoke indicator, the SMOKE RESET pb and the SMOKE RESET hard key on the FAP smoke page remains ON until the smoke has dissipated.

CABIN CREW

LDCRC.CHECK FOR THE PRESENCE OF SMOKE AND FIRE

Search all the bunks, closets, stowage compartments and lavatory (if installed).

- **If smoke or fire is visible:**

BASIC FIRE FIGHTING PROCEDURE. APPLY

Use a portable fire extinguisher.

- **If unable to extinguish the fire using the portable fire extinguisher:**

CABIN CREW. EVACUATE THE LDCRC

EXIT HATCH AND EMERGENCY EXIT HATCH. CLOSE AND LOCK

FES SWITCH.SET TO DISCHARGE POSITION

Break the seal, and lift the plastic cover to access the FES switch.

Note: In the staircase housing, on the FES indication panel, the DO NOT OPEN HATCHES sign comes on steady red.

WARNING The main exit hatch and the emergency exit hatch must remain closed until arrival.

LDCRC.MONITOR FOR THE REMAINDER OF THE FLIGHT.

A350

- **When smoke is detected in the CCRC.**

In the CCRC

- **Visual alerts:**

- The AIP indicates the affected area in a red flashing alert info box
- The lighting is automatically set to 100 % intensity.

■ Aural alerts:

- After a single triple low chime sounds (smoke alert), a sequence of 4 low chimes (wake up chime) sounds for 30 s then, a triple low chime (smoke alert) sounds every 30 s (or CAM assigned value).

In the cabin:

■ Visual alerts:

- On the Flight Attendant Panel (FAP):

- the SMOKE DETECTION page automatically appears and displays the location of the affected area, the SMOKE RESET key comes on steady red
- the SMOKE RESET hard key comes on red steady.

- All AIPs indicate the affected area in a red flashing alert info box
- The related ACP flashes amber
- The related CCRC smoke indicator flashes amber
- The SMOKE RESET key on the related AAP comes on steady red.

■ Aural alert:

- a triple low chime sounds every 30 seconds in the cabin (or CAM assignment value).

CABIN CREW / COCKPIT CREW COMMUNICATION. ESTABLISH

The cabin crew must update the flight crew on the progress of the event.

On either the FAP or related AAP :

SMOKE RESET keyPRESS

To silence the chime in all cabin zones, and reset all visual warnings on local ACPs and AIPs.

Note: *The amber smoke indicator next to the CCRC door, the Smoke reset on the FAP and the AAPs, and the indications on the FAP SMOKE DETECTION page remain on as long as smoke is detected.*

CCRC DOORCHECK FOR HEAT

WARNING Do not open the door before checking for heat. Move the back of the hand along the door to evaluate the presence/severity of the fire.

• **If the door is not hot:**

CCRC DOOR.OPEN WITH CAUTION

SOURCE OF SMOKE/FIRE.LOCATE

Search all bunks, closets, and stowage compartments.

• **If smoke or fire is visible:**

BASIC FIREFIGHTING PROCEDURE. APPLY

• **If smoke or fire is not visible:**

CABIN SMOKE/FIRE IN HIDDEN AREA OR UNKNOWN SOURCE PROCEDURE.

. APPLY

• **If the door is hot:**

Note: If the door panel is hot, the fire is at a critical stage. Have extra fire fighting equipment available and ready to use.

PBE.....DON
FIREFIGHTER.....SELF PROTECT
Stay low and crouch down, using the door panel as protection against smoke and heat.

(*)CCRC DOOR.....OPEN SLIGHTLY
The door must be opened just enough to pass the nozzle of the extinguisher

(*)FIRE EXTINGUISHER.....DISCHARGE
(*)CCRC DOOR.....CLOSE
(*)Repeat last three steps of the procedure, as necessary.

• **when safe:**

CCRC DOOR.....OPEN WITH CAUTION
SOURCE OF SMOKE/FIRE.....LOCATE
Search all bunks, closets, and stowage compartments.

• **If smoke or fire is visible:**

BASIC FIREFIGHTING PROCEDURE.....APPLY

• **If smoke or fire is not visible:**

CABIN SMOKE/FIRE IN HIDDEN AREA OR UNKNOWN SOURCE
PROCEDURE.....APPLY

• **When situation is cleared:**

CCRC.....MONITOR FOR THE REMAINDER OF THE FLIGHT
To ensure that the CCRC remains clear of smoke.

4.32. LDCRC AIR CONDITIONING LOW FLOW

• If the air flow into the Lower Deck Crew Rest Compartments is faulty, a buzzer sounds through the loudspeakers for approximately 30 seconds. If fitted the "LOW AIR FLOW" sign on the heating control panel comes on.

The "LEAVE LDMCR/LDCRC" or "RETURN TO CABIN" signs come on at each bunk. The crew rest compartment occupants must proceed as follows.

OCCUPANTS.....LEAVE THE CREW REST COMPARTMENT
CREW REST COMPARTMENT CLEAR.....CHECK
EXIT AND EMERGENCY EXIT HATCHES.....CLOSED

CABIN CREW INFORM THE FLIGHT CREW

4.33. LDCRC HEATING SYSTEM FAULT

- If the heating system fails, the fault light on the heating control panel in the LDMCRC comes on.

Crew rest occupants should proceed as follows:

HEATING CONTROL PANELRESET

The reset button is located on the heating control panel. The ON/OFF button should be cycled OFF then back to ON.

- If the fault light remains on, the heating system is faulty

CABIN CREW INFORM THE FLIGHT CREW

The cabin crew should report the heating system failure to the flight crew, and apply airline procedure.

4.34. FLIGHT CREW REST COMPARTMENT (FCRC) SMOKE/FIRE PROCEDURE

A330 / A340 / A340-500 / 600

SMOKE WARNING PRINCIPLE

- When smoke is detected in the FCRC :

- In the FCRC :

On loudspeakers a low 30 s repetitive chime sounds, after a repetitive triple chime sounds every 30 s (optionally : every 10 s).

The air conditioning isolation valve closes, the Low Flow buzzer sounds for 30 s.

On the AIP, the "SMOKE <location>" message appears, and red indicator flashes.

The light intensity switches to 100 %.

- In the cabin :

On the FAP and respective AAP, the SMOKE RESET button comes on, the FAP Smoke page shows the location and a low, repetitive, triple chime sounds every 30 s (optionally : every 10 s).

On the respective ACP's, the amber light flashes.

On all AIP's, the "smoke <location>" message appears, and red indicator flashes. The amber smoke indicator at the FCRC entry flashes.

FLIGHT CREW

SMOKE f1t REST SMOKE. CREW AWARENESS

Maintain contact with the cabin crew to follow up on the status of the fire.

CABIN CREW PROCEDURE

FCRC door FEEL FOR HEAT AND OPEN THE DOOR VERY SLOWLY

FCRC SEARCH FOR PRESENCE OF SMOKE AND OF FIRE

- If smoke or fire is not visible in FCRC, the smoke warning is unjustified :

SMOKE PUSHBUTTON (on FAP, or respective AAP)RESET

To silence the chime in all the cabin and FCRC, and to reset the visual warning on the respective ACPs, AIPs.

Note: The amber Smoke indicator, the Smoke reset pushbutton on the FAP and respective AAP and the indication on the FAP Smoke page remain ON until all smoke has dissipated.

- If smoke or fire is visible :

FCRC EMPTY.CHECK

BASIC FIREFIGHTING PROCEDURE..... APPLY

Use a portable fire extinguisher.

SMOKE RESET PUSHBUTTON (ON FAP OR RESPECTIVE AAP) RESET

To silence the chime in all the cabin and FCRC, and to reset the visual warning on the respective ACP, AIP.

Note: The amber Smoke indicator, the Smoke reset pushbutton on the FAP and respective AAP and the indication on the FAP Smoke page remain ON until all smoke has dissipated.

FCRC. MONITOR FOR THE REMAINDER OF THE FLIGHT

A380

SMOKE WARNING PRINCIPLE

- When smoke is detected in the FCRC.

In the FCRC:

- Loudspeaker. A single low chime will sound repeatedly for 30 seconds. Following the single low chime, a repetitive triple chime will sound every 30 seconds
- Attendant Indication Panel (AIP): The smoke location message comes on and the red indicator comes on flashing (or comes on steady according to CAM assignment).
- FCRC lighting will come on to 100 % intensity
- The Amber light outside the FCRC will come on flashing
- The SMOKE RESET button on the MiniFAP will come on.

In the cabin:

- On the Flight Attendant Panel (FAP) and Additional Attendant Panel (AAP):
- The SMOKE RESET button comes on.
- The FAP smoke page will show the affected area.
- A triple chime will be repeated every 30 s (optionally every 10 s).
- On the respective Area Call Panel (ACP) the amber light will flash.

- On the AIPs the smoke location message comes on, and the red indicator comes on flashing (or comes on steady according to CAM assignment).

FLIGHT CREW

ECAM ALERT SMOKE FLT REST SMOKE CREW AWARENESS
Maintain contact with the cabin crew and follow up on the status in the FCRC

CABIN CREW

FCRC. SEARCH FOR PRESENCE OF SMOKE AND OF FIRE
Search all bunks, closets, and stowage compartments.

• If no smoke or fire is present in the FCRC:

SMOKE RESET pb ON THE FAP OR THE RESPECTIVE FAP PRESS TO RESET

This will :

- Silence the chimes in the cabin
- Reset the visual warnings on the respective ACPs and AIPs.

Note : The amber smoke indicator, the smoke reset pb on the FAP smoke page remain ON until the smoke has dissipated.

• If smoke or fire is visible.

BASIC FIREFIGHTING PROCEDURE APPLY
Use a portable fire extinguisher. Consider the use of a PBE.

FCRC MONITOR FOR THE REMAINDER OF THE FLIGHT

A350

• When smoke is detected in the FCRC.

In the FCRC

■ Visual alerts:

- All AIPs indicate the affected area in a red flashing alert info box
- The lighting is automatically set to 100 % intensity.

■ Aural alerts:

- After a single triple low chime sounds (smoke alert), a sequence of 4 low chimes (wake up chime) sounds for 30 s then, a triple low chime (smoke alert) sounds every 30 s (or CAM assigned value).

In the cabin:

■ Visual alerts:

- On the Flight Attendant Panel (FAP):
 - the SMOKE DETECTION page automatically appears and displays the location of the affected area, the SMOKE RESET key comes on steady red
 - The SMOKE RESET hard key comes on red steady.
- All AIPs indicate the affected area in a red flashing alert info box

- The related ACP flashes amber
- The related CCRC smoke indicator flashes amber
- The SMOKE RESET key on the related AAP comes on steady red.

■ Aural alert:

- a triple low chime sounds every 30 seconds in the cabin (or CAM assignment value).

CABIN CREW / COCKPIT CREW COMMUNICATION. ESTABLISH

The cabin crew must update the flight crew on the progress of the event.

On either the FAP or related AAP :

SMOKE RESET key. PRESS

To silence the chime in all cabin zones, and reset all visual warnings on local ACPs and AIPs.,

Note: *The amber Smoke indicator next to the FCRC door, the Smoke reset on the FAP and the AAPs, and the indication on the FAP Smoke page remain on as long as smoke is detected.*

FCRC DOOR. CHECK FOR HEAT

WARNING Do not open the door before checking for heat. Move the back of the hand along the door to evaluate the presence/severity of the fire.

• If the door is not hot:

FCRC DOOR. OPEN WITH CAUTION

SOURCE OF SMOKE/FIRE. LOCATE

Search all bunks, closets, and stowage compartments.

• If smoke or fire is visible:

BASIC FIREFIGHTING PROCEDURE. APPLY

• If smoke or fire is not visible:

CABIN SMOKE/FIRE IN HIDDEN AREA OR UNKNOWN SOURCE PROCEDURE.

. APPLY

• If the door is hot:

Note: *If the door panel is hot, the fire is at a critical stage. Have extra fire fighting equipment available and ready to use.*

PBE DON

FIREFIGHTER. SELF PROTECT

Stay low and crouch down, using the door panel as protection against smoke and heat.

(*)FCRC DOOR. OPEN SLIGHTLY

The door must be opened just enough to pass the nozzle of the extinguisher

(*)FIRE EXTINGUISHER. DISCHARGE

(*)FCRC DOOR CLOSE

()Repeat last three steps of the procedure, as necessary.*

• when safe:

FCRC DOOR. OPEN WITH CAUTION

SOURCE OF SMOKE/FIRELOCATE

Search all bunks, closets, and stowage compartments.

- If smoke or fire is visible:

BASIC FIREFIGHTING PROCEDURE APPLY

- If smoke or fire is not visible:

CABIN SMOKE/FIRE IN HIDDEN AREA OR UNKNOWN SOURCE PROCEDURE

..... APPLY

- When situation is cleared:

FCRC MONITOR FOR THE REMAINDER OF THE FLIGHT

To ensure that the FCRC remains clear of smoke.

4.35. BULK CREW REST COMPARTMENT (BCRC) FIRE PROTECTION

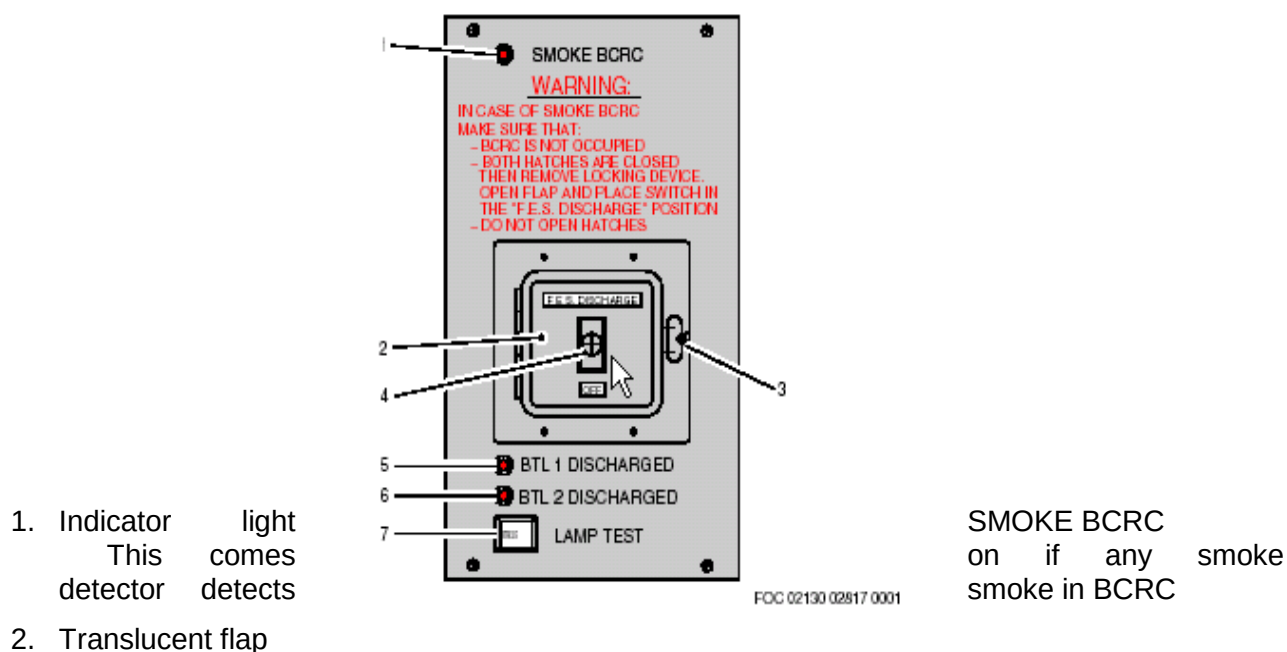
A330 / A340 / A340-500 / A340-600

A fixed under floor crew rest room installed in the bulk cargo compartment. Additional zone(s) is possible. This type of crew rest room is called Full Bulk Crew Rest Compartment (FBCRC).

SMOKE DETECTOR

The smoke detector is installed on the ceiling and it detects smoke in the zone where it is installed.

4.36. BCRC FIRE EXTINGUISHING SYSTEM (FES)



Cover the toggle switch FES DISCHARGE to avoid inadvertent activation

3. Lead seal to keep the translucent flap closed
4. Toggle switch FES DISCHARGE
Starts the discharge of the fire extinguishing bottle 1. When bottle 1 is empty, the FES automatically switches over and discharges bottle 2.
5. Indicator light BTL 1 DISCHARGED
6. Indicator light BTL 2 DISCHARGED
7. Pushbutton LAMP TEST
Starts a functional test of the indicator lights SMOKE BCRC, BTL 1 DISCHARGED and BTL 2 DISCHARGED

STARTING THE FES DISCHARGE

WARNING Before starting the FES discharge make sure that:

- All cabin crew have left the BCRC
- The emergency exit hatch and the entrance hatch are closed and locked

1. Remove the lead seal on the cover flap of the toggle switch FES DISCHARGE.
2. Open the cover flap.
3. Move the toggle switch FES DISCHARGE to the DISCHARGE position.

4.37. BCRC/FBCRC SMOKE/FIRE PROCEDURE

A330 / A340 / A340-500 / A340-600

SMOKE WARNING PRINCIPLE

- **When smoke is detected in the BCRC/FBCRC:**

- **In the BCRC/FBCRC:**

On loudspeakers a low 30 s repetitive chime sounds, after a repetitive triple chime sounds every 30 s (optionally : every 10 s).

The air conditioning isolation valve closes, the Low Flow buzzer sounds for 30 s.

On the AIP, the "SMOKE <location>" message appears, and red indicator flashes.

All "RETURN TO CABIN" signs illuminate.

The light intensity switches to 100 %.

- **In the staircase housing:**

The visual "DO NOT OPEN HATCH" warning appears in the staircase housing (when both the emergency exit and exit hatches are closed).

In the cabin:

On the FAP and respective AAP, the SMOKE RESET button comes on, the FAP Smoke page shows the location and a low, repetitive, triple chime sounds every 30 s (optionally : every 10 s).

On the respective ACP's, the amber light flashes.

On all AIP's, the "SMOKE <location>" message appears, and red indicator flashes.

On the staircase housing, the amber SMOKE indicator flashes.

FLIGHT CREW

SMOKE BULK REST SMOKE CREW AWARENESS

Maintain contact with the cabin crew to follow up on the status of the fire.

CABIN CREW PROCEDURE

**STAIRCASE HOUSING DOOR. . FEEL FOR HEAT AND OPEN THE DOOR VERY SLOWLY
BCRC/FBCRC.....SEARCH FOR PRESENCE OF SMOKE AND OF FIRE**

- **If smoke or fire is not visible in BCRC/FBCRC, the smoke warning is unjustified :
SMOKE RESET PUSHBUTTON (on FAP or respective AAP).....RESET**

To silence the chimes in all the cabin and BCRC / FBCRC, and to reset the visual warning on the respective ACPs, AIPs.

Note: The amber Smoke indicator, the Smoke reset pushbutton on the FAP and respective AAP and the indication on the FAP Smoke page remain ON until all smoke has dissipated.

• If smoke or fire is visible:

BCRC/FBCRC EMPTYCHECK

BASIC FIREFIGHTING PROCEDURE..... APPLY
Use a portable fire extinguisher.

• If unable to extinguish the fire using the portable fire extinguisher:

EXIT HATCH AND EMERGENCY EXIT HATCHCLOSE AND LOCK

FES SWITCH SET TO ACTIVE POSITION

To manually activate the Fire Extinguishing System. The FES switch is located in the staircase housing. Break the seal, and lift the plastic cover to access the FES switch.

SMOKE RESET PUSHBUTTON (ON FAP OR RESPECTIVE AAP) RESET

To silence the chime in all the cabin and BCRC/FBCRC, and to reset the visual warning on the respective ACPs/AIPs.

Note: The amber Smoke indicator, the Smoke reset pushbutton on the FAP and respective AAP and the indication on the FAP Smoke page remain ON until all smoke has dissipated.

WARNING The main exit hatch and the emergency exit hatch must remain closed until arrival.

BCRC/FBCRC MONITOR FOR THE REMAINDER OF THE FLIGHT

4.38. FBCRC EVACUATION PROCEDURE

A330 / A340 / A340-500 / A340-600 / A380

- If the main exit hatch, or the staircase door is blocked, the cabin crew must evacuate through the emergency exit hatch.

- Opening the emergency exit hatch from inside the FBCRC.

DECORATIVE HATCH COVER REMOVE
Place a finger in the hole of the hatch cover and firmly pull down on the hatch cover to remove it.

EMERGENCY EXIT HATCH HANDLE PULL DOWN VERTICALLY
This releases the hatch handle.

EMERGENCY EXIT HATCH PUSH UPWARD AND OUTWARD
To exit the FBCRC, step up onto the support, and reach up into the cabin.

- Opening the emergency exit hatch from inside the cabin.

CARPET COVERING REMOVE

EMERGENCY EXIT HATCH HANDLELIFT AND TURN COUNTERCLOCKWISE
This unlocks the hatch handle.

EMERGENCY EXIT HATCH LIFT AND PULL TOWARDS CABIN

CABIN CREW IN CABININFORM FBCRC OCCUPANTS
FBCRC occupants should be informed to move away from the hatch opening, because the hatch will drop down when it is opened.

DECORATIVE HATCH COVER PUSH DOWN FIRMLY TO REMOVE

- If the main exit hatch, or the staircase door, AND the separation door are blocked, the cabin crew must evacuate through the Kick-Out-Panel. This panel is on the wall of the lower bed of Unit 3 and permits evacuation into the flight crew portion of the FBCRC. The cabin/flight crew evacuate via the emergency exit hatch.
- Opening the Kick-Out-Panel from inside cabin crew side to the flight crew portion.

EMERGENCY HATCH PANEL PUSH TO OPEN
Opens the Kick-Out-Panel.

- If the emergency exit hatch, and the separation door are blocked, the flight crew must evacuate through the Kick-Out-Panel. This panel is on the wall and permits evacuation into the cabin crew portion of the FBCRC. The cabin/flight crew evacuate via the main exit hatch.
- Opening the Kick-Out-Panel from inside the flight crew portion to the cabin crew side.

EMERGENCY HATCH PANEL PULL TO OPEN
Opens the Kick-Out-Panel.

LDMCR/BCRC EVACUATION THROUGH THE EMERGENCY HATCH

A330 / A340 / A340-500/A340-600

- If the main exit hatch or the staircase door is blocked, the cabin crew must evacuate through the emergency exit hatch.

Emergency exit hatch opening from inside.

EMERGENCY EXIT HATCH HANDLEPULL DOWN TO VERTICAL POSITION
To unlock the hatch.

EMERGENCY EXIT HATCHPUSH UPWARD AND OUTWARDS
To exit, step up on the support and reach up into the cabin.

Emergency exit hatch opening from the cabin.

Remove the piece of carpet

EMERGENCY EXIT HATCH HANDLE LIFT AND TURN COUNTERCLOCKWISE
To unlock the hatch.

EMERGENCY EXIT HATCH LIFT AND PULL TOWARDS CABIN

4.39. FBCRC/LDMCR/BCRC EVACUATION OF AN INCAPACITATED PERSON

A330 / A340 / A340-500 / A340-600 / A380

If a person becomes incapacitated in the FBCRC/LDMCR/BCRC, and if their condition permits, they should be taken to the main deck before landing. This is due to the fact that the FBCRC/LDMCR/BCRC should not be occupied during takeoff and landing. However, the Captain may adopt a different procedure, if such a non-critical landing situation is encountered.

In such cases, cabin crew should be requested to help clear access to the main deck (i.e. by opening doors, removing obstacles from the evacuation path, etc.), or to provide general support (i.e. by ensuring adequate lighting conditions, etc.).

The number of people required to safely transport an incapacitated person depends on a number of variables (e.g. the occupant's size, weight, general medical condition, physical strength of the assistants, etc.) However, two to three persons within the FBCRC/LDMCR/BCRC/LDCCRC should be enough to safely lift an incapacitated person. Two other persons should be at the upper end of the ladder to take over.

EVACUATION THROUGH THE MAIN HATCH

CREWMEMBER.....CARRY INCAPACITATED PERSON

One crewmember should place their back to the ladder, and then use their left hand to support the incapacitated person under the arms. The crewmember should then use their right hand to slide up the ladder, while supporting the incapacitated person and pulling them up the ladder.

OTHER CREWMEMBER(S)..... ASSIST

The other crewmember helps by holding up the incapacitated person's legs and feet.

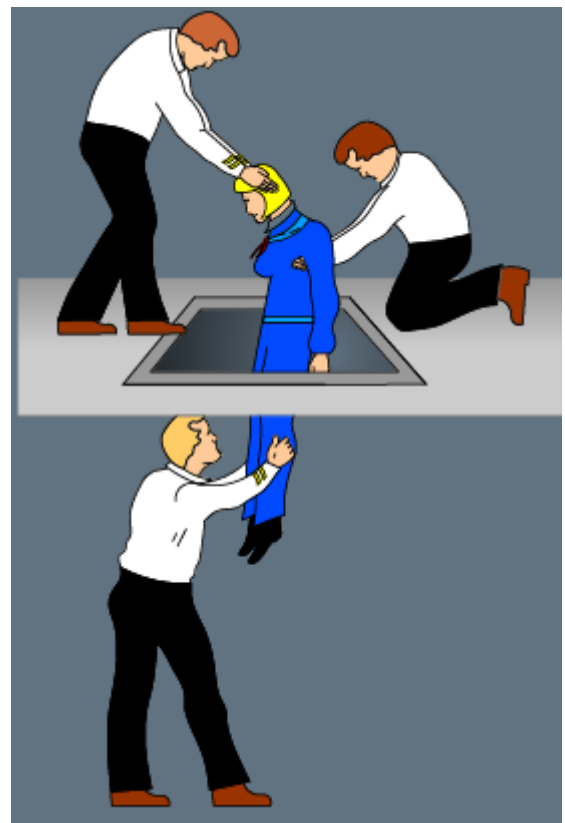
TWO CABIN CREW AT THE TOP OF THE LADDER..... GUIDE

Two cabin crew wait at the top of the ladder, grab hold of the incapacitated person, and help guide the evacuation by supporting the incapacitated person's head and neck through the hatch.

Evacuation through the Main Hatch



Evacuation through the Emergency Exit Hatch



EVACUATION THROUGH THE EMERGENCY EXIT HATCH

CREWMEMBER.....CARRY INCAPACITATED PERSON

One crewmember should grasp the incapacitated person by holding them up under the arms, and keeping them upright.

OTHER CREWMEMBER(S)..... ASSIST

The other crewmember holds the incapacitated person by the waist and guides the incapacitated person through the hatch

ONE CREWMEMBER OUTSIDE THE HATCHGUIDE

One crewmember waits outside the hatch to help support the incapacitated person's head through the hatch. When the incapacitated person's shoulders reach the opening, the crewmember should then pull the person up through the hatch by holding them up under their arms.

OTHER CREWMEMBER OUTSIDE THE HATCHASSIST

The other crewmember helps by holding up the incapacitated person's legs



5. EMERGENCY EVACUATION

5.1. INTRODUCTION

There are many factors that contribute to the successful evacuation of an aircraft.

- The procedural knowledge of the cabin crew. This includes training, experience and behavior
- The aircraft configuration, the layout of the cabin
- The environment inside and outside the aircraft (e.g., the presence of smoke, fire, the cabin lighting, and outside conditions)
- The behavior of the passengers, their age, level of fitness and motivation

During an emergency evacuation, it is essential for the cabin crew to be able to apply their knowledge of procedures and rapidly adapt to the situation.

In the case of a life threatening situation onboard the aircraft, it is essential that the aircraft is evacuated quickly and efficiently to increase the occupants chances of survival.

The role of the cabin crewmember will change from being customer service-oriented, to being.

- A cabin safety specialist
- An assertive leader
- Ready to act
- In control of any given emergency situation.

The ICAO Training Manual states – Any in-flight emergency will require cabin crew to immediately transform themselves from amiable and ready-to-please airline public relations employees into assertive leaders responsible for the safety of every person on board the aircraft

Passengers very rarely see this aspect of the cabin crew's role. During an emergency situation the passengers will look to the cabin crew for guidance and assistance.

The majority of emergencies that result in evacuation occur during the takeoff, and landing phases of flight. They are frequently sudden and unexpected, and can occur with very little warning.

These types of emergencies leave cabin crew with little time to react.

5.2. USING SILENT REVIEW

The use of the Silent Review, or the 30 second review, is an excellent tool to prepare for the unexpected. The Silent Review helps the cabin crew to focus attention on safety during the critical states of flight (take-off and landing) therefore cabin crew will be ready to act, in the event of an unexpected emergency.

The constant use of the Silent Review is a key element in identifying emergency duties and responsibilities, and increases environmental awareness during the takeoff and landing phases of flight. It enables cabin crew to respond, adapt and react quickly in the event of an emergency.

Silent Review can take any form, and there are no hard and fast rules. It should contain all the elements needed to review evacuation duties and responsibilities. It may include, but is not limited to, the following subjects:

- How to brace for impact
- Commands
- Cabin environment (identify under what circumstances cabin crew would initiate evacuation, fire, smoke, life-threatening situation, ditching, no response from flight crew)
- How to initiate evacuation, if necessary
- Operation of exits
- Alternate exits
- How to assess outside conditions
- Self-protection
- Location of manual inflation handle
- Evacuation commands
- Location of able bodied passengers
- Location of passengers who require assistance, for example, disabled passengers, or unaccompanied minors.

Below, is an example of a silent review used by some operators, it is easy to memorize. At the same time, this puts the order of the evacuation duties and responsibilities into prospective. This example is known as “**OLDABC**”.

- **O**PERATION OF EXITS
- **L**OCATION OF EMERGENCY EQUIPMENT
- **D**RILLS (Brace for impact)
- **A**BLE-BODIED PASSENGERS AND DISABLED PASSENGERS
- **B**RACE POSITION
- **C**OMMANDS

Something that can easily be committed to memory can easily be recalled during a stressful situation.

It is easy to get caught up in the everyday onboard tasks, and all the different duties required of cabin crew, such as boarding, catering issues, passenger-queries, delays, and it is easy to get distracted. When cabin crew take their positions for takeoff or landing, the use of the Silent Review will help to focus on the emergency responsibilities, in the event of an unplanned emergency. The ability to anticipate a situation before it happens will enable cabin crew to respond rapidly.

The cabin crew should be alert to any indication that a possible emergency situation exists, when preparing for takeoff and landing. Such indications may be fire, smoke, scraping metal, unusual noises, the force of impact, or an unusual aircraft attitude.

5.3. FACTORS AFFECTING CABIN EVACUATION

5.3.1. CABIN CONFIGURATION

The cabin configuration can have an impact on the efficiency of the evacuation.

To enhance the situational awareness skills of the cabin crew, they should be familiar with the cabin layout, and the areas where congestion may occur due to:

- The passenger seating density
- The location of galleys, lavatories, bars etc.
- Restricted visibility
- Passengers arriving from different directions to the exits.

Some exits, for example the forward and aft exits, may be under-utilized because the majority of passengers are seated in the mid section of the aircraft and will be drawn towards their nearest exits.

It may be necessary for the cabin crew to redirect passengers to other usable exits to avoid congestion and to maximize the use of all the usable exits, in order to evacuate the aircraft as rapidly as possible.

To achieve this, the cabin crew must be aware of what is happening in the cabin.

5.3.2.CROWD CONTROL

One of the key elements to an efficient evacuation is effective crowd control and cabin management by the cabin crew. The actions and commands of the cabin crew will influence the performance of the passengers during the evacuation.

The objectives for the cabin crew are:

- To quickly establish the passenger flow at each usable exit
- To evacuate the aircraft as quickly and as safely as possible

Cabin crew must have control of the situation, and be assertive in the way commands and instructions are given to passengers. Not all passengers react in the same manner. Some evacuations have been quite efficient because passengers have co-operated with the crewmember instructions. Other evacuations, especially where a life-threatening situation has been perceived, have created a varying range of reactions.

- Panic (screaming, crying, hysteria)
- Negative panic (no reaction, frozen)
- No perception that danger exists
- Will insist on leaving by the door they entered
- Exiting with carry-on baggage
- Returning to seat to re-stow carry-on baggage
- Want to take control of evacuation
- Pushing
- Jumping over seatbacks to get ahead, disregarding others.

Specialists, who have been involved in analyzing evacuations, documented the above types of behavior. There is an absolute need for cabin crew to assert their authority, in order to avoid delays in getting passengers down the slide and away from danger. It may be necessary to use a certain amount of physical force, in order to get some passengers to leave the aircraft.

5.3.3. EVACUATION COMMANDS TO PASSENGERS

The cabin crew must use positive verbal commands and physical gestures, in order to direct passengers towards the exits and assist them down the slides.

The commands used by the cabin crew should be.

- Assertive
- Positive
- Short
- Loud
- Clear

5.4. CABIN CREW INITIATED EVACUATION

Many evacuations are not planned, and occur with no warning. In most cases, the decision to evacuate is made by the flight crew.

There may be occasions when the cabin crew have to initiate the evacuation, if there is a life-threatening situation in the cabin, such as:

- Uncontrollable fire
- Dense smoke
- Severe structural damage
- Ditching

When making the decision to initiate an evacuation, the cabin crew must evaluate the level of danger, and the consequences that a delay in decision-making may have. Smoke or fire that is out of control would definitely require a rapid decision. Smoke can impair judgment and restrict vision very quickly. Therefore it presents an extreme danger to the occupants of the aircraft and may make the evacuation process very difficult.

If the cabin crew consider that an evacuation may be required, they must attempt to contact the flight crew in order to inform them of the situation, and await instructions. If contact with the flight crew is not possible, cabin crew should initiate the evacuation.

COMMUNICATION DURING CABIN CREW INITIATED EVACUATION

Any evacuation requires crew co-ordination, because not all cabin crew may be aware that a life-threatening situation exists. Therefore, all cabin crew need to be informed. There are many possible methods, depending on their availability.

- Public Address
- Interphone

- Megaphone
- Evacuation alarm.

5.5. UNPLANNED GROUND EVACUATION

In the event of an unprepared emergency, cabin crew may only have enough time to give very short commands to prepare passengers for an imminent crash. In an unprepared emergency, the brace command may come from the flight crew, or may be initiated by the cabin crew.

The command to instruct passengers to assume the brace position, in any unplanned emergency will be **"Heads down"**, **"Grab ankles"**, and **"Stay down"**. The commands should be given until the aircraft has come to a complete stop.

The instruction to take up the brace position will be the most important piece of information that crew will give to passengers in an unplanned emergency.

These commands must be repeated continuously, until the aircraft has come to a complete stop. This is to ensure that the passengers remain in the brace position, to maximize protection from injury.

Shout as loud as possible to be heard in the cabin. If possible try to synchronize calling commands, so that they come across loud and clear. Repeating the commands, even over a short period of time, is tiring for the voice. For this reason, it is important to try to alternate with another crewmember seated in the same area.

5.6. THE EVACUATION PROCESS

When the aircraft has come to a complete stop, the cabin crew must release their harness, hold the frame assist handle, check that the slide is armed, check outside conditions and at the same time **shout** the commands to the passengers:

Open seatbelts, Come this way to bring the passenger to the exits. Using strong voice commands and open gestures will act as a beacon for passengers, especially if visibility is limited, due to smoke in the cabin.

Leave everything is important, as baggage carried to the door of the aircraft has delayed evacuations, and has caused pile-ups at the bottom of the slide in previous evacuations.

Cabin crew must assess outside conditions. Is it safe to open the door, is the area below free of smoke, fire, obstacles and debris?

Cabin crew should protect themselves by holding the frame assist handle and staying in the assist space located on either side of the door. This prevents them from being pushed overboard in the event of a rush of passengers, and will not interfere with passengers exiting from the aircraft.

If it is safe to do so, open the aircraft door in the armed mode.

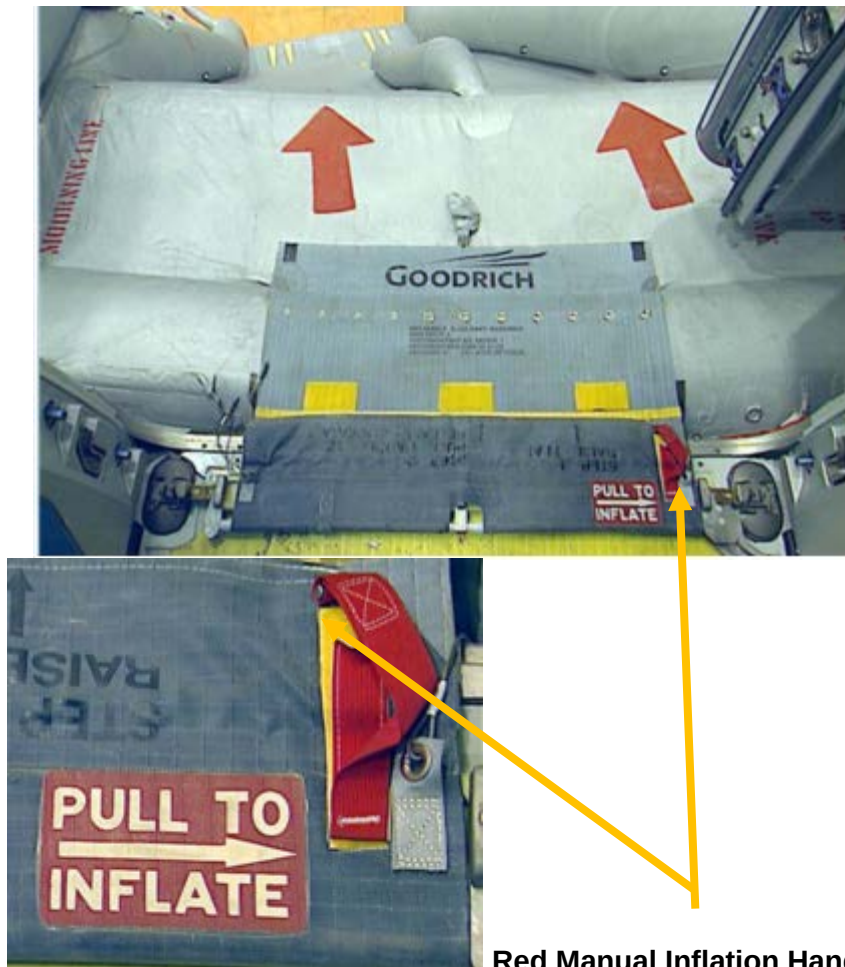
In the event of power assist failure, the cabin crew should push the door out until it engages in the gust lock. If the door is too difficult for the cabin crew to operate without power assist, they should engage the help of passengers. Instruct the passenger to hold the frame assist handle and assist to push on the door.

Ask one or two passengers to hold other passengers back until the slide is fully inflated. Alternatively use the command **Stand back** or **Wait**.

If the slide does not inflate and the Manual Inflation Handle has to be pulled, extra time may be required. Cabin crew must hold the frame assist handle and pull the manual inflation handle which will detach itself from the slide. Time in an emergency may seem like an eternity, even though it may only be a few extra seconds. The passengers' urgency to get out will increase with every passing second. The passengers must be held back until the slide is fully inflated and ready for use.

Check that the slide is correctly inflated, before sending passengers down the slide.

- If two cabin crew are assigned to one exit, one should manage the passengers while the other checks the conditions (i.e. correct slide inflation, and the outside conditions).



Red Manual Inflation Handle

5.7. THE EFFECT OF SMOKE AND FIRE DURING EVACUATION

It has been well documented in accident reports, that smoke and fire in the cabin has presented frequent obstacles during evacuation. Smoke or fire in the cabin can also cause a tremendous amount of anxiety and panic amongst the passengers.

Inhalation of smoke and toxic fumes has incapacitated people, and limited their physical and mental ability to the extent that they have not been able to reach, or operate the exits.

Smoke has the ability to obscure light therefore making visibility difficult. A study by CAMI (Civil Aero Medical Institute) found that smoke inhalation and burns were the primary cause of death in 95% of fatalities during evacuation.

In the presence of smoke and/or fire, an evacuation must be done as quickly as possible to increase the chances of survival.

Advise passengers to cover their nose and mouth, stay close to the floor (there is more breathable air at floor level, as smoke rises), and crawl on hands and knees if necessary, in order to exit the aircraft before being hindered by the effects of smoke inhalation. The floor lighting and exit locators at floor level will help to guide them to an exit.

5.8. EXIT MANAGEMENT

Monitor the progress of the evacuation, and ensure that the slide remains safe to use. Frequently check the toe-end of the slide to ensure that there are no pile-ups.

It is useful to ask two or three passengers to assist at the toe-end of the slide. The cabin crew should use commands such as:

- **Stay at the bottom**
- **Help people**
- **Send them away**

Passenger help at the bottom of the slide significantly reduces the risk of congestion and injury.

Maintain the flow of the evacuation using commands, such as:

- **Jump and slide**
- **Two by two (Dual lane slide)**
- **Jump and slide (Single lane slide)**
- **Keep moving**

- **Hurry**

Cabin crew also need to be aware of any development during the evacuation. For example, if the slide becomes damaged, or a fire develops in the area, or anything that makes the exit unusable. The crewmember must stop the evacuation at that door, block the exit, and re-direct passengers to the nearest usable exit.

When redirecting passengers, cabin crew need to be aware to which location/exit they should be directed. **Listen for another crewmember giving the command to COME THIS WAY or JUMP indicating that the exit is usable.**

Redirect passengers to the usable exit. Use positive commands:

- **Exit Blocked**
- **Go across**
- **Go forward**
- **Go back**

When the flow of passengers to the exit begins to slow down, the cabin crew should check the cabin and call all remaining passengers to the exits.

When the flow of passengers has stopped, the cabin crew should check their assigned area for any other passengers.

If the cabin is in darkness, use a flashlight to check the cabin. Check the following areas:

- Aisles
- Seats (including the floor area between the seats)
- Galleys
- Lavatories
- Crew rest areas
- Cockpit

When the assigned area is empty, or it is no longer safe to remain onboard the aircraft, the cabin crew should evacuate through the nearest usable exit. The nearest cabin crew to the cockpit should check the flight crew.

If an evacuation occurs away from an airfield, the cabin crew should take any available emergency equipment from the aircraft, if the situation permits.

5.9. POST EVACUATION

The cabin crew will be responsible for a large number of passengers until the rescue and emergency services assist them.

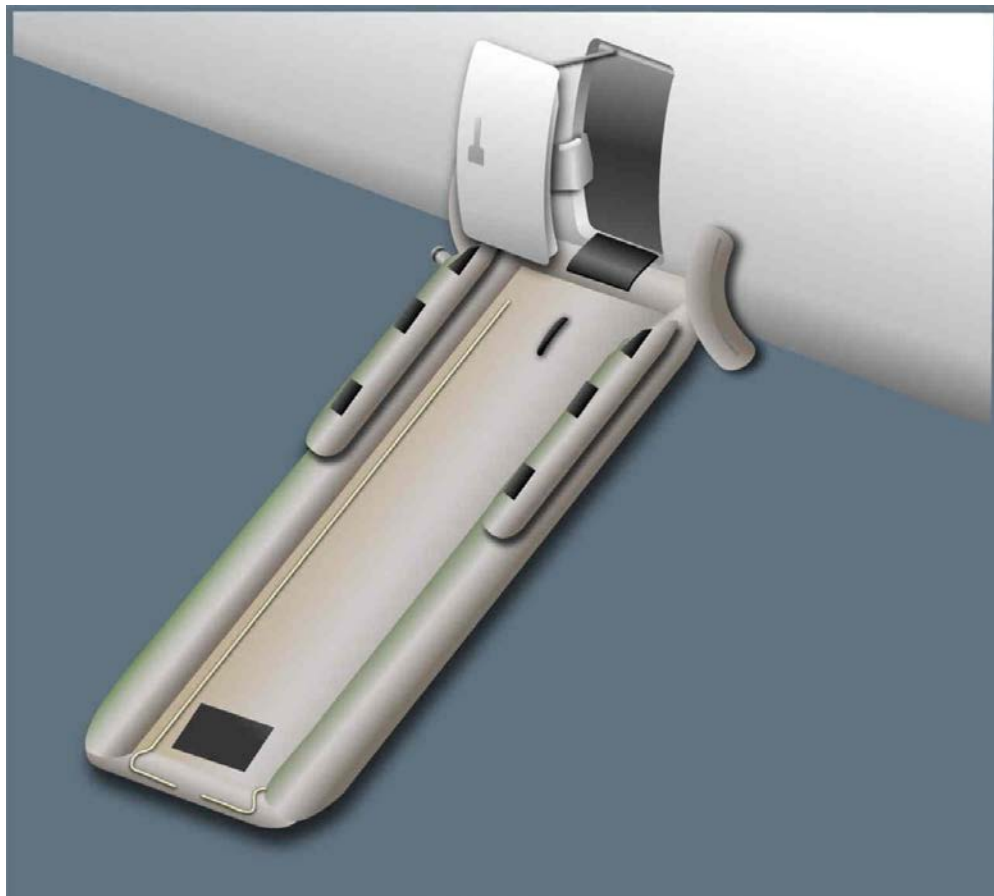
When the cabin crew have evacuated the aircraft they must manage the passengers on the ground by:

- Assisting passengers away from the slides
- Directing passengers upwind and away from the aircraft
- Keeping passengers away from fuel, fire and vehicles
- Assembling the passengers and keeping them together
- Enforcing no smoking and prohibiting the use of mobile phones
- Assisting passengers and giving first aid, when necessary
- Making a passenger headcount, if possible.

Note: Cabin crew seated near a megaphone should consider taking it from the aircraft to assist with crowd management post evacuation

Figure 5-1

A340 Escape Slide





6. PLANNED GROUND EVACUATION

6.1. INTRODUCTION

A planned ground evacuation can be defined as an evacuation that enables the cabin crew to review procedures, and to inform and prepare passengers for an emergency landing. Cabin crew provide passengers with instructions on the brace position, guidance on exit usage, and information on how and when exits should be operated. Effective communication between the cabin crew and the passengers is necessary for a timely, successful and orderly response.

A safety study by the NTSB (National Transportation Safety Board) entitled “Emergency Evacuation of Commercial Airplanes”, cites examples of planned evacuations where the cabin crew were able to provide passengers with a detailed briefing. The cabin preparation and briefing resulted in an orderly, timely evacuation with little or no injuries.

6.2. CABIN CREW ALERT PHASE

It is important for Operators to establish procedures in order to ensure that adequate guidance is provided to both flight crew and cabin crew on how to conduct abnormal and emergency briefings.

For example, if the flight crew need to inform the cabin crew of an emergency, there may be a specific signal to alert the cabin, such as.

- A series of chimes
- A specific phrase, i.e. Purser to cockpit.

When other cabin crew hear the signal, this indicates that an emergency situation exists, and that they must secure all equipment. Cabin crew should be ready, at their stations, to be briefed by the Purser via the interphone.

6.3. EMERGENCY CHECKLISTS

Emergency checklists are useful tools that enable cabin crew to prepare the cabin for a planned emergency. It contains all the steps required to prepare the cabin for an emergency, and lists the steps to be completed in order of priority.

Many Operators have developed checklists in the form of laminated cards that are distributed to each crewmember, or are stowed near the cabin crew' seat in the cabin. These types of checklists should be readily accessible to cabin crew.

Emergency checklists are designed to provide support to cabin crew in a planned emergency, and to help them complete all the necessary actions. However cabin crew should be able to act spontaneously in an emergency evacuation and should not rely on reading a checklist. Emergency checklists should be short and consistent.

6.4. THE FLIGHT CREW TO PURSER BRIEFING

The flight crew should brief the Purser in a clear, and concise manner. The briefing should provide the Purser with the following information:

- Nature of emergency, and intentions of the flight crew, for example landing away from an airfield or at an airfield
- Time available to prepare the cabin (the cabin and flight crew should synchronize watches to assist with time management)
- The signal to brace
- The signal to remain seated (if no evacuation is required)
- Special instructions/other information (who should inform the passengers and when they should be informed)

The Purser should repeat the information to the Captain to confirm understanding.

6.5. TIME MANAGEMENT

Time permitting, a full passenger briefing may be possible, however cabin crew must be prepared to adapt the briefing according to the time available. The Purser will need to closely monitor the time in order to accomplish as many tasks on the checklist, as time permits.

The extent of the cabin preparation will depend on the time available. The steps of the cabin preparation should be completed in the order of their importance.

Time management is an essential element of good cabin preparation

6.6. THE PURSER TO CABIN CREW BRIEFING

The Purser will relay the information provided by the flight crew to all of the cabin crew. The Purser will then instruct the cabin crew to:

- Take their emergency checklists
- Take their emergency briefing position
- Be prepared for the emergency announcement and demonstration

6.7. THE CABIN CREW TO PASSENGER BRIEFING

It is better for the flight crew to inform the passengers of an emergency. However, this may not always be possible, due to the workload of the flight crew during an emergency situation. Therefore, the Purser may be required to make the initial announcement. The following is a guideline on what the Purser should explain:

- The nature of the emergency
- Necessity to prepare the cabin
- Passengers must follow the instructions of the cabin crew.

Before the emergency demonstration begins ensure that:

- The cabin dividers are open
- The cabin lighting is turned up to 100% bright lighting
- The entertainment system is switched off.
- The cabin crew are ready to demonstrate the emergency briefing in their assigned areas

6.8. GOLDEN RULES OF PASSENGER BRIEFING

The aim of the briefing is to give passengers as much information as possible.

The amount of time available will determine the extent of the briefing. Both passengers and cabin crew will need to give their undivided attention to the announcements. Therefore, there should be no elements of unnecessary distraction. This is the only opportunity that cabin crew will get to relate this information. To avoid distraction cabin crew should:

- Stay in the assigned area
- Do not talk during the announcements
- Coordinate the demonstration with the announcement.

When reading the safety briefing announcement, it is important to pause at key points, in order to give the cabin crew time to demonstrate and check passenger compliance.



6.9. THE CONTENT OF THE PASSENGER BRIEFING

6.9.1. THE BRACE POSITION

The brace position is essential when preparing passengers for an emergency landing. Reviewing the brace position during a passenger briefing will help to ensure that passengers are in the correct brace position for landing.

The brace position has a dual function. First of all, it reduces body flailing, as passengers must lean or bend over their legs. Secondly, it protects passengers from hitting their head on a hard surface.

The brace position must be adopted by all passengers and cabin crew and it can vary according to seating layout and passenger conditions. Examples are shown below:

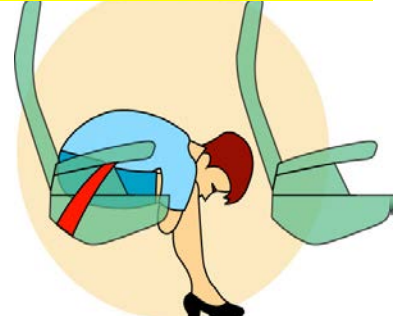
Normal seating position



Against a bulkhead



Greater distance between seats



Adult with infant



No bulkhead or seat in front



Pregnant lady





It must be emphasized to passengers that they should expect more than one impact, and they must remain in the brace position until the aircraft comes to a complete stop.

When the instructions for the brace position are being broadcast, the other cabin crew should demonstrate the following to the passengers:

- Point out the brace position on the safety information card
- Demonstrate brace position, move along the aisle so that all passengers can see
- Check brace position and alternative brace positions.

It is important to ensure that the passengers understand how to brace for impact correctly in order to minimize injury.

- Passengers should press their lower backs into the seat
- Seat belts should be worn as low and as tight on the torso as possible. The tighter the safety belt, the better the restraint
- Upper body should be bent forward as far as possible, with the chest close to the thighs and knees
- Head should be down as low as possible. The head should be face down in the lap. The head should not be turned to the side.
- Arms should be around or behind legs, tucked in against the body or hands should be placed on the head, one on top of the other
- Lower legs should be angled slightly behind the knee joints
- Feet should be placed flat on the floor.

The passengers must be advised when to take up the brace position, e.g. when hearing BRACE, BRACE and remain in this position until the aircraft comes to a complete stop.

CABIN CREW BRACE POSITIONS

Aft facing seat



Forward facing seat



6.9.2. EMERGENCY EXIT LOCATION

The cabin crew must indicate the location of the nearest emergency exits and the floor proximity exit path lighting to the passengers.

6.9.3. SECURING LOOSE ITEMS

Passengers should remove and stow all loose sharp items from their person, and secure them in an overhead bin, closet or under a seat. These objects include:

- Carry-on baggage
- High heeled shoes
- Handbags
- Laptops
- Briefcases

High-heeled shoes and sharp objects must also be removed, because these objects can cause damage to the slide during an evacuation. In addition, these objects must not be stowed in seat pockets as they may injure passengers when they take the brace position.

Seat pockets should only be used to stow small objects, such as pens and eyeglasses. Cabin crews should also remove items such as pens, badges and wing pins from their uniforms.

6.9.4. ABLE BODIED PASSENGERS

The International Civil Aviation Organization (ICAO) defines able-bodied passengers (ABPs) as *“passengers selected by cabin crew to assist in managing emergency situations if and as required”*.

The selection of ABPs is based on their ability to understand instructions, their physical ability, and their ability to stay calm. The ideal candidates are people such as:

- Cabin crew on board as passengers
- Military personnel
- Police
- Fire personnel
- Anyone who is used to dealing with a trauma, i.e. doctors, nurses, etc.

Cabin crew should avoid selecting family members traveling together to be ABPs, because they will naturally prefer to assist their family members before the other

passengers. Instead, cabin crew should select passengers who are traveling alone to be ABPs.

Crew as passengers, military, police, and/or fire service are good choices, because they are used to following instructions, and have the required manual dexterity.

Ideally, cabin crew should select three ABPs for each exit. One of the ABPs should be briefed on the following.

- How to replace cabin crew in case they become incapacitated. However, cabin crew must emphasize that ABPs will replace cabin crew **only** if they are not able to perform their function due to incapacitation
- How to assess conditions outside the aircraft, for example, how to identify that an exit is usable/no longer usable
- How to open the exit
- How to protect oneself from being pushed outside, to remain in the assist space and to hold onto the frame assist handle
- Commands to be used during evacuation. i.e. "Jump and slide"
- How to open the cabin crew seatbelt. The crew harness buckle is different from a passenger seatbelt, and a crewmember that is incapacitated in a crew seat may block a usable exit.

The two other ABPs should be briefed on how to assist the cabin crew during the evacuation, for example.

- Holding passengers back during door opening and slide inflation
- Remaining at the bottom of the slide during the evacuation to assist other passengers.

The cabin crew should brief the ABPs seated at overwing exits on the following.

- How to assess the outside conditions
- When to open the exit
- How to open the exit
- Commands to be used. i.e. "Come this way", "Step out", "Follow the arrows", "Run and slide"
- How to redirect passengers if an exit is no longer usable or blocked.

ABPs should also be assigned to assist special needs passengers for example:

- Passengers with reduced mobility
- The elderly
- Unaccompanied minors
- An adult-traveling alone with more than one child

6.10. SECURING THE CABIN

When the passenger briefing has been completed, the final cabin secure is required, as follows:

- Seat belts fastened
- Seat backs in the up-right position
- Tray tables closed and latched
- Armrests down
- Carry-on baggage stowed and secure
- Overhead bins closed and latched
- Aisles clear of all obstruction
- Service items cleared
- Cabin dividers open.

When the passengers and the cabin have been secured, areas such as lavatories and galleys need to be correctly secured.

All lavatories should be vacated and locked.

All galley equipment should be stowed and secured.

- Close and lock all containers
- Ensure that carts are correctly stowed and secured
- Switch off all galley power and pull all galley circuit breakers.

When the cabin has been secured, and the cabin preparation is complete, the Purser will notify the flight crew.

The Purser should also ask the flight crew for an update of the situation, and the amount of time remaining.

The cabin lighting should be adjusted according to the expected outside conditions.

If time permits, the Purser should repeat the instructions on the PA and the cabin crew should point out exits again.

Cabin crew should take their seats, adjust the harness, begin a silent review, and be prepared to brace when the command comes from the flight crew.

6.11. SUMMARY

- There may be more than one impact. Therefore, remain in the brace position until the aircraft stops.
- The aircraft must be at a complete stop before initiating an evacuation.
- Evacuation should begin immediately upon receiving the Evacuation Signal.
- Assertive action from the cabin crew will directly impact the rate of flow and accelerate passenger movement to the exits and down the slides.
- Monitor the flow of the evacuation, and be aware of congestion in the aisles and at the toe-end of the escape slide.
- Be alert to a change in situation, for example, fire, damage to the slide or congestion at the bottom of the slide.
- Be ready to redirect passengers to another exit.

6.12. EMERGENCY PASSENGER DOOR OPERATION

This procedure applies to the following aircraft: A320 Family/A330/A340/A350/A380

FRAME ASSIST HANDLE GRASP

SLIDE ARMED CHECK

OUTSIDE CONDITIONS CHECK SAFE

Use the door window or the fresnel lens in the door window to ensure that the slide deployment area is clear of:

- Fire
- Smoke
- Obstruction

• If outside conditions are safe:

DOOR CONTROL HANDLE RAPIDLY LIFT FULLY UP AND RELEASE

WARNING

When the door is in the ARMED mode, the residual Cabin Pressure visual and aural warnings (when installed) will not trigger in order to indicate the cabin differential pressure.

Indications of cabin differential pressure may be:

- Resistance in the door control handle when it is being lifted to the open position, using normal force, and/or
- A hissing noise around the immediate area.

If circumstances permit, fully lower the door control handle to the closed position. Notify the flight crew immediately.

WARNING

Do not attempt to hold the door closed when the automatic door opening has been initiated.

• If the door power assist fails, the door will not open automatically, therefore there will be resistance when the cabin crew try to open the door manually, and it may be necessary to seek the help of a passenger to assist in pushing the door open.

DOOR PUSH TO OPEN

GUST LOCK CHECK ENGAGED

SLIDE DEPLOYED AND INFLATED VISUAL CHECK

• If the slide does not inflate.

RED MANUAL INFLATION HANDLE PULL

The Cabin Crew must only pull the red manual inflation handle if the slide has not inflated but is fully deployed.

The red manual inflation handle is located on the right side of the girt bar.

Note: 1-On A380, the red manual inflation handle is replaced by a Manual Inflation Pushbutton (MIP) located on the right side of the door frame.

2- On A321 doors 2 and 3, the red manual inflation handle is located at the upper right side of the door frame.

SLIDE DEPLOYED AND INFLATED.CHECK

6.13. CABIN CREW ACTIONS AT UNUSABLE EXITS

An exit may be unusable at the beginning of an evacuation or may become unusable during the evacuation.

1. An exit may be unusable at the beginning of the evacuation, for one of the following reasons:

- The exit is jammed, and will not open
- The slide does not deploy correctly or the slide is damaged
- There are external hazards.

The cabin crewmember who is responsible for the unusable exit must inform the passengers that the exit is blocked, and redirect the passengers to the nearest usable exit.

Note: *The cabin crewmember must guard the exit to prevent the exit from being used.*

When redirecting passengers, the cabin crewmember should listen for the other crewmembers giving the command to "Come this way" or "Jump" for confirmation that another exit is usable.

Redirect passengers to the nearest usable exit with the appropriate positive commands and gestures, such as:

- "Go ahead, go straight"
- "Go that way" with the appropriate gesture
- "Go across"
- "Quick, quick"
- "Hurry up, hurry up"

2. An exit becomes unusable during the evacuation:

The cabin crew must be aware of the environment inside and outside the cabin. If the situation changes during the evacuation, for example:

- The slide becomes damaged
- A fire develops in the area
- There are other external hazards.

Then the cabin crewmember at the unusable exit must perform the following actions:

- Stop the evacuation

- Block the exit and redirect passengers to the nearest usable exit
- Guard the exit.

6.14. GROUND EVACUATION PROCEDURE

EVACUATION ORDER RECEIVED

Note : The order to evacuate is usually given by the flight crew, however, in a catastrophic situation any cabin crewmember may initiate an evacuation.

“EVACUATE, EVACUATE, SEAT BELTS OFF” SHOUT

“LEAVE EVERYTHING, HIGH HEELS OFF, COME THIS WAY” SHOUT

FRAME ASSIST HANDLE GRASP

SLIDE/SLIDERAFT ARMEDCHECK

OUTSIDE CONDITIONS CHECK SAFE

Check through the observation window to ensure that the slide/slideraft deployment area is clear of:

- Fire
- Smoke
- Obstacles

- If outside conditions are unsafe:

PASSENGERS TO NEAREST USABLE EXIT REDIRECT

EXIT PROTECT

- If outside conditions are safe:

FRAME ASSIST HANDLE GRASP

DOOR OPEN

- If the door power assist fails, the door will not open automatically:

DOOR PUSH TO OPEN MANUALLY

Note: Manual opening will require a physical effort.

GUST LOCK CHECK ENGAGED

SLIDE/SLIDERAFT DEPLOYED AND INFLATED VISUAL CHECK

Ensure that the slide/slideraft deployment area is clear of all obstructions.

- If the slide/slideraft does not inflate automatically:

RED MANUAL INFLATION HANDLE PULL

The red manual inflation handle is located on the right-hand side of the girt bar extension.

Note: On A380, the red manual inflation handle is replaced by a Manual Inflation Pushbutton (MIP) located on the right side of the door frame

ASSIST SPACE OCCUPY
 “COME THIS WAY, HURRY, JUMP AND SLIDE”..... SHOUT

Note: Dependant to the slide/slideraft configuration, cabin crewmembers should instruct passengers to jump 1 by 1 or 2 by 2.

PASSENGER EVACUATION EXPEDITE

- If the slide/slideraft becomes not usable:

PASSENGER EVACUATION STOP
 PASSENGERS TO ANOTHER USABLE EXIT REDIRECT
 ASSIGNED AREA CHECK FULLY EVACUATED
 EMERGENCY EQUIPMENT TAKE

Time permitting, each cabin crewmember takes their designated safety and survival equipment before leaving the aircraft.

CABIN CREW EVACUATE
 PASSENGERS AWAY FROM THE AIRCRAFTDIRECT
 ON GROUND CONDUCT POST EVACUATION DUTIES

CABIN PREPARATION - PLANNED GROUND EVACUATION

<p>1. Alert Phase</p> <p>“Purser to Cockpit” or a series of rings</p>
<p>2. Captain to Purser Briefing</p> <ul style="list-style-type: none"> • Nature of the emergency (why it is necessary to make an emergency landing) • Time available to prepare the cabin • Signal to BRACE • Signal to remain seated • Special instructions / other information • Who will inform the passengers and when
<p>Purser to cabin crew briefing</p> <ul style="list-style-type: none"> • Nature of the emergency • Time available to prepare the cabin • Take demonstration positions • Await announcement.
<p>4. Captain’s announcement (time permitting)</p>
<p>5. Purser’s Announcement</p> <p>If an announcement from the Captain is not possible.</p> <ul style="list-style-type: none"> • The Nature of the Emergency • Necessity to prepare the cabin • Follow the instructions of the crew <p>The emergency announcement and demonstration should include.</p> <ul style="list-style-type: none"> • Brace positions • Location of exits • Loose items • Passenger assistance (ABPs) • Assistance with children and infants • Safety Card Review (Including seat belts, tray tables, seat backs, armrests)
<p>6. Final cabin secure check</p> <ul style="list-style-type: none"> • Seat belts fastened • Seatbacks upright • Tray tables stowed and latched • Carry-on baggage stowed and secure • Overhead bins closed and latched • Aisles clear of all obstruction • Service items cleared • Cabin dividers open

<p>7. Secure Galleys</p> <ul style="list-style-type: none"> • Close and secure all containers • Trolleys stowed and secured • Switch off all galley power • Pull all circuit breakers
<p>8. Check all doors</p> <p>ARMED</p>
<p>9. Cabin crew to Purser</p> <ul style="list-style-type: none"> • Cabin preparation complete
<p>10. Purser to Captain</p> <ul style="list-style-type: none"> • “Cabin Ready” cabin preparation complete • Obtain updated information
<p>11. Repeat Emergency Announcement If time permits, the Purser will repeat the announcement and the cabin crew will ensure passengers understand the brace position and the location of the exits.</p>
<p>12. All Cabin Crew at Stations</p> <ul style="list-style-type: none"> • Secure seat harness • Silent Review
<p>13. Command from Captain via PA (Approximately 1 minute before landing) BRACE, BRACE</p>
<p>14. Cabin Crew continue to shout</p> <p>BRACE, BRACE Until the aircraft comes to a complete stop</p>



7. DITCHING

7.1. INTRODUCTION

The definition of ditching is “A *deliberate emergency landing on water, where the aircraft touches down under control*”. However, in commercial aviation this is a rare occurrence.

On January 15, 2009, about 15.27 eastern standard time (EST), US Airways flight 1549, an Airbus Industrie A320-214, N106US, experienced an almost total loss of thrust in both engines after encountering a flock of birds and was subsequently ditched on the Hudson River about 8.5 miles from LaGuardia Airport (LGA), New York City, New York. The flight was en route to Charlotte Douglas International Airport (CLT), Charlotte, North Carolina, and had departed LGA about 2 minutes before the in-flight event occurred. The 150 passengers, including a lap-held child, and 5 crewmembers evacuated the airplane via the forward and overwing exits.

A ditching, when executed correctly, is survivable. During a planned ditching the cabin crew have notice, and therefore, sufficient time to prepare the cabin, or to advise passengers to put on their life vests. (Extract from the NTSB report)

However, an NTSB study of Air Carrier water contact accidents indicates that these accidents are usually inadvertent, with no time to prepare. Most accidents occur during the takeoff and landing phases of flight, and usually within proximity of the airport. Many water contact accidents occur during the hours of darkness.

There is usually a lot of damage to the aircraft. In some cases, the cabin has flooded quickly, and the aircraft has sunk within minutes.

The NTSB report of the Hudson River incident states:

Contributing to the survivability of the accident was (1) the decision-making of the flight crewmembers and their crew resource management during the accident sequence; (2) the fortuitous use of an airplane that was equipped for an extended overwater flight, including the availability of the forward slide/rafts, even though it was not required to be so equipped; (3) ***the performance of the cabin crewmembers while expediting the evacuation of the airplane;*** and (4) the proximity of the emergency responders to the accident site and their immediate and appropriate response to the accident.

The actions and response of the cabin crew, during a “ditching” or inadvertent water landing, will have a direct effect on the chances of survival. Wet drills and ditching exercises, that form part of the cabin crew’s initial training and further emergency training, provide the cabin crew with invaluable information, that helps them to react effectively, and improves their situational awareness skills in emergencies.

7.2. UNPLANNED DITCHING

Many inadvertent landings on water (referred to as an Unplanned Ditching) have been documented. During an unplanned ditching, there is no time for the cabin crew to advise the passengers to don life vests or adopt the brace position

An unplanned ditching occurred in 1989, on a night flight during the take-off roll. The aircraft drifted to the left, the take-off was aborted, and the aircraft overran the runway, and then dropped onto the wooden approach light pier. The aircraft broke into three pieces and came to rest in the water.

During takeoff, the cabin crew knew that something was abnormal, and that the take-off was deteriorating. They immediately reacted by shouting the brace commands to the passengers.

When the aircraft came to a complete stop, the crew assessed the outside conditions. They opened the exits, according to the outside conditions, and immediately gave the commands for the passengers to evacuate.

The flotation devices onboard this aircraft were seat cushions. The water depth was between 7-12 meters deep with a 1-knot current.

Due to the strong current it was difficult for some people to stay afloat. The cabin crew threw seat cushions to passengers who were in the water. Two of the passengers could not swim, two of the cabin crew linked their arms together to support these passengers, and prevent them from going under the water.

The cabin crew remained in control of the situation, and they instructed the passengers in the water to stay in groups and to help each other.

Approximately 20 passengers exited by the left wing, which was not in the water, and the ditching line was attached. These passengers held on to the ditching line, until they were rescued. Amongst the passengers on the wing was a woman with an 8-month old infant, and a 5-year-old child.

The NTSB commended the actions of the four cabin crew, as they performed “in an outstanding manner”.

Amongst the total of 63 people onboard, there were two fatalities.

This is just a brief synopsis of the accident, however, the actions of the cabin crew resulted in making the accident survivable (NTSB/AAR-90/03).

7.3. SITUATIONAL AWARENESS

In any unprepared emergency the reaction of the cabin crew will depend largely on their situational awareness skills.

When preparing for take-off and landing, the use of the Silent Review will heighten cabin crew situational awareness skills, and prepare them for the unexpected. When departing or arriving at a destination that involves flying over water, some ditching information should become part of the Silent Review. Cabin crew should concentrate on the additional information to be given to passengers, for example:

- What commands should be used?
- What should be looked for when assessing conditions?
- What would determine the exits usable/unusable?
- What equipment should be used?
- How to use the slideraft?
- What equipment to take?
- How to manage passengers in the water?
- How to manage passengers in the raft?

During unplanned ditching, anything can happen and anything is possible including rising water, damaged equipment, communication problems, as well as evacuating children, elderly and handicapped.

No two incidents/accidents are the same and an unplanned ditching poses a formidable challenge to cabin crew.

The outcome will depend on many factors:

- Immediate actions of the cabin crew
- The condition of the aircraft
- Ability to evacuate into slide/sliderafts.

The leadership of the cabin crew plays a very important role in any emergency, even more so, in the event of a ditching. Cabin crew will have to use their knowledge of equipment, survival procedures, and rescue techniques. Cabin crew need to be efficient and maintain control of the situation.

Time is of the essence in an emergency, in order to evacuate the aircraft and get people to safety as quickly as possible, without endangering lives. The level of danger to both passengers and cabin crew increases as time passes, and puts emphasis on the urgency to evacuate the aircraft rapidly.

Landing on water can be divided into three phases:

- The impact phase
- The evacuation phase
- The survival phase.

7.4. THE IMPACT PHASE

As with any unplanned impact, one of the first actions cabin crew will need to take is to shout the commands for the brace position. This will reduce the amount of injury to the passengers, and give them a better chance of being able to evacuate the aircraft and survive. Remember, there may be more than one impact, everyone will need to remain in the brace position until the aircraft finally comes to a complete stop.

If the cabin is flooding, or water is visible, start evacuating the aircraft immediately. Cabin crew should immediately don their life vests, and simultaneously shout commands to passengers to **"Open seat belts", "Get Life vests", or "Seat cushions", "Come this way"**.

Not all cabin crew, in unplanned ditching situations, were aware that they were actually in water until they assessed the outside conditions. It may be possible that only one part of the aircraft is in the water.

Cabin crew must assess all exits and operate and use all available exits.

If possible, the cabin crew must communicate to establish the status of the exits. Cabin crew must use whatever means available to communicate.

7.5. THE EVACUATION PHASE

When assessing the conditions before exiting the aircraft, it will be necessary to determine if the water level is present at exits. This information will determine the actions that the cabin crew will take.

7.6. PASSENGER REACTION

When there is a need to evacuate the aircraft rapidly, the expertise, instructions and assertiveness of the cabin crew will have a direct impact on the outcome.

Passenger reaction is likely to be different than in a ground evacuation, because other elements, such as water are involved, and the use of equipment, such as lifejackets, will be unfamiliar.

- It is possible that passengers may be injured, particularly if the aircraft has been subjected to severe structural damage
- The level of panic may be higher, particularly if water is present, or rising in the cabin
- Passengers may find it difficult to find life vests
- Passengers may have difficulty donning life vests.

7.7. AIRCRAFT SINKING RAPIDLY

- Direct passengers out of the nearest usable opening
- Instruct passengers to support themselves, by holding anything that will keep them afloat
- Find as much flotation equipment as time permits, distribute to passengers
- Leave the aircraft.

7.8. AIRCRAFT FLOATING

The level of the water will determine whether the exit is usable or not. Exits that are below water, or seeping water at the sides, are not considered usable.

Use all exits above the water line. If the level of water is at the doorsill, evacuate passengers directly onto the sliderafts, and leave the slideraft attached to the floor of the aircraft.

It is possible that aircraft fuel, hydraulic fluid and oil have contaminated the water. Swallowing or being in contact with these fluids can cause temporary loss of hearing, vision and produce nausea. Boarding a raft from the water can be a difficult task, someone who is covered in fuel and oil will be slippery and difficult to grasp from the water.

Low water temperatures may also pose the threat of hypothermia. The symptoms of hypothermia may start within 10 minutes.

If the water is cold it may cause panic and shock. Shock can place severe strain on the body and lead to cardiac arrest.

Those who are non-swimmers are very susceptible to incapacitation and drowning.

Be prepared to shout instructions regarding how to board the slideraft. **“Shoes off”, “Board on hands and knees,” “Go to the end”, and “Sit down”.**

7.9. OVERWING EXITS

If the overwing exits are usable passengers should be instructed to face forward, step onto the wing and inflate their life vests.

If life lines are installed, they should be removed from the stowage and one end hooked into the overwing exit frame and the other end hooked onto the wing.

If circumstances permit, keep the passengers together on the wing until rescue arrives. Alternatively passengers should enter the water via the leading edge of the wing and swim to the slides/sliderafts.

7.10. LIFE VESTS

Donning a life vest takes time and dexterity. Imagine what it would be like to have to use a life vest for the first time under these circumstances. The passenger must use the life vest, as follows:

- Locate it
- Remove it from the stowage
- Unpack it from the plastic pouch
- Don it
- Fasten or tie it
- Inflate it

Several accident reports have reflected the difficulties that passengers have experienced in locating, and removing their life vests. One report states that *“passengers had been told 5 to 7 minutes before impact of a possible ditching, some passengers had to get on their hands and knees to retrieve the life vests from the stowage and put them on.”*

Another report states “rising water in the cabin compounded the problems of locating and removing the vests from the under seat compartments. Cabin crew and able-bodied passengers had to swim under water to retrieve as many life vests as possible and distribute them to passengers who were already outside the aircraft”. Life vests may also be dislodged from stowage during impact.

Cabin crew may find themselves having to shout instructions to passengers regarding the use of the flotation devices.

Research carried out by Civil Aero Medical Institute (CAMI) in the United States has confirmed that people have difficulty in donning life vests. Adjustable waist straps appear to pose the biggest problems. Either they are not tightened, or the passengers cannot fasten them correctly, or do not fasten them at all, or the straps become twisted and caught in the strap length adjuster. The numerous straps, and the various attachment mechanisms confused many of the research participants. The research was conducted in a test environment. It is important to remember that the level of stress will be greater in reality, and is an important element.

The cabin crew should know how to give instructions for the use of equipment carried onboard the aircraft. Expect to shout instructions in order to help passengers don their life vests correctly.

- **Life vest under your seat**
- **Open the package**
- **Remove the vest**
- **Place the vest over your head**
- **Fasten straps tight around waist**
- **Inflate when leaving the aircraft**

The cabin crew should think about the commands that may be used in order to assist passengers in donning their life vests correctly. The voice of the crewmember giving instructions is a very effective tool, and can make a difference.

Life vests should be inflated as the passengers are exiting the aircraft. Life vests should not be inflated in the cabin to avoid damage and congestion.

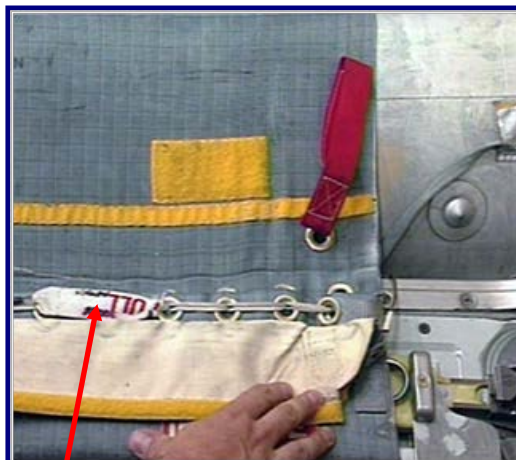
7.11. DISCONNECTING THE SLIDERAFT

When all passengers have boarded the slideraft, the crewmember will be the last person to board. If the slideraft is still attached to the floor;

- Lift the Flap
- Pull the Disconnect Handle.



FLAP

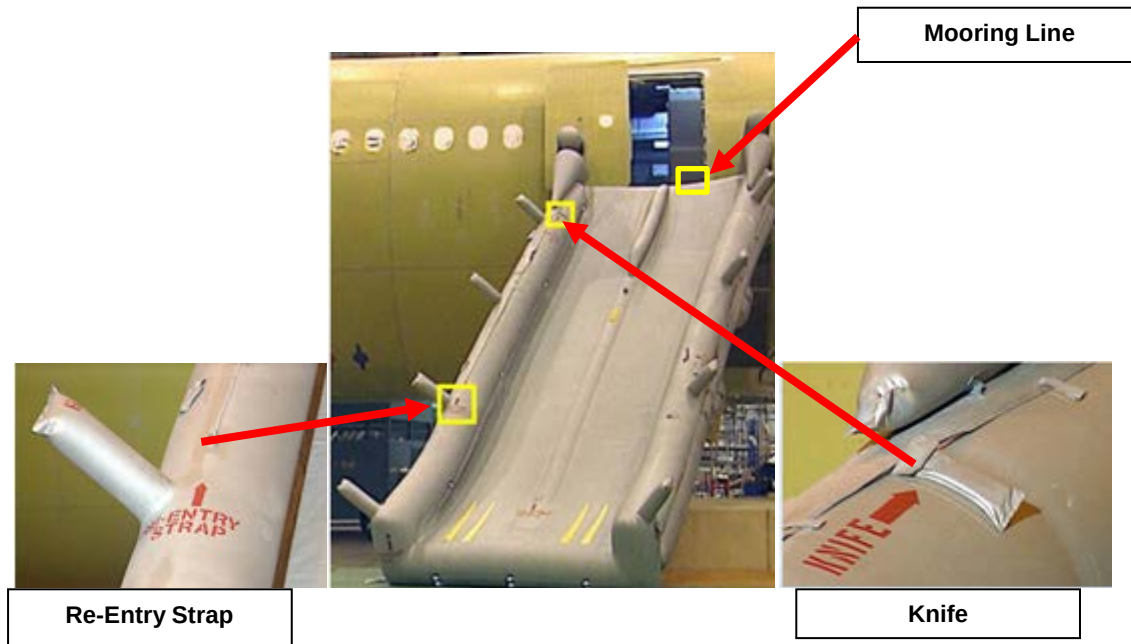


DISCONNECT HANDLE

The slide/slideraft will still be attached to the aircraft by the mooring line. Before removing the slideraft from the aircraft, the cabin crew should position it to the wings and assist any passengers on the wing or in the water to board the slideraft.

To separate the slide/slideraft from the aircraft:

- Cut the mooring line.



7.12. SURVIVAL PHASE

If the aircraft is near an airport, assistance and rescue will not be far away. However, cabin crew must remain in control of the situation, and keep passengers together.

If passengers are in the water waiting for rescue, the cabin crew should instruct them to stay in groups, by forming a circle, linking arms if possible and facing towards the center. The crew should encourage passengers to help each other until assistance arrives. For example, an injured person may be placed in the center of the circle, this will help them to stay afloat and maintain body heat.

Staying together in groups has a dual purpose. Firstly, it is easier to locate survivors if they are all together or in groups. Secondly, close together in a circle provides body heat, and slows down the effects of hypothermia.

If sliderafts have been used, get as many people as possible out of the water.

If the escape slides are used, passengers should be advised to hold onto the lifelines along the sides of the escape slides. As they are not designed to carry people they must not be used as such, however it may be possible to place a small child on the escape slide, or the escape slides can also be used to accommodate any emergency equipment that has been removed from the aircraft.

In order to enable search and rescue services to identify the survivors in the water, the canopy must be installed on the sliderafts and, where possible, all the sliderafts and escape slides should be kept together in the same area.

The most important factor in surviving an unplanned ditching is the quick response from the crew to take immediate action, have a sound knowledge of ditching procedures, and above all, the ability to remain in control of the situation.

The most appropriate way to prepare cabin crew for the unexpected is to provide training, that encourages cabin crew to “think on their feet”, and to use and adapt their skills to the situation.

7.13. PLANNED DITCHING

Planned ditching in commercial aviation is a rare occurrence. However, in other sectors of aviation, ditching does occur and is survivable.

In commercial aviation, probably the most successful ditching of a commercial transport aircraft was in Sitka Sound, near Biorka Island, Alaska, in October 1962. Due to an engine failure, during cruise at 20 000 feet, the engine seized and began to lose parts. The Captain decided to ditch the aircraft.

There are many factors that contributed to the successful outcome of the Sitka Sound ditching.

The communication between the flight crew, and the cabin crew, was an open two-way communication. This enabled the cabin crew to carry out detailed cabin preparations. The cabin crew had approximately 45 minutes to prepare the cabin.

The cabin crew rehearsed the brace position with the passengers, gave instructions for donning life vests, and distributed life vests for children.

The cabin crew explained to the passengers seated at exits, how to open the exits, and launch the life rafts. The rafts were moved to the corresponding exits, and the static lines secured. These passengers were advised by the cabin crew not to take any action, until advised.

When the cabin was prepared, the cabin crew informed the flight crew that the cabin was ready.

The cabin crewmember used the public address system to tell passengers to take the brace position, and remain in that position until the aircraft came to a complete stop.

When the aircraft stopped, the cabin crew immediately began to deploy the life rafts, and assist the passengers to board. The water level in the cabin rose to approximately 2 feet (75cm), however the aircraft took 24 minutes to sink.

Within 5 minutes of ditching, all the passengers and crew were in the rafts. Only one raft did not have a crewmember onboard. Within 20 minutes all passengers and crew had been transferred to a launch, and boarded the coast guard vessel.

This was a civilian aircraft operating as a military passenger charter. All the occupants survived, and none of the passengers or crew was seriously injured.

The report of the “Civil Aeronautics Board” (now called the NTSB) described this ditching as “an outstanding feat”. The successful outcome was attributed to the following factors.

- Ideal conditions of wind and sea
- Crew familiarity with ditching procedures
- Sufficient time to prepare the cabin
- The military passengers’ receptiveness and responsiveness to orders.

This example highlights the fact that ditching can happen, but it can also be survived.

7.14. CABIN PREPARATION – DITCHING

Preparing the cabin for a ditching is similar to preparing the cabin for a land evacuation. However, there are a few differences.

1. Alert Phase

In this situation, it will be necessary for everyone to evacuate the aircraft, therefore cabin crew will not wait for a command from the flight crew.

- **N**ature of the emergency and intentions of the flight crew, for example landing away from an airfield or at an airfield
- **T**ime available (check watch)
- **S**pecial Instructions
- **B**race signal.

2. Passenger Briefing

The passenger briefing will take the same form as the planned ground evacuation briefing, however, the passengers will need more information due to the nature of the emergency, and the equipment required to survive.

- Donning and the use of the life vest
- ABP Assistance briefing will be more detailed

The amount of time available will determine the level of preparation. The most important survival information should take priority, and other tasks should be accomplished as time permits.

- Life vests
- Brace position
- Exits
- ABP Briefings
- Safety Checks
- Final Cabin preparation

Cabin crew must collect their own life vest before commencing the briefing.

The cabin crew should be in their designated brief and secure area, equipped and ready to commence the passenger briefing.

Cabin crew should listen carefully to the announcement, and coordinate the demonstration with the instructions.

When reading the safety briefing announcement, it will be important to pause at key points, in order to give the cabin crew time to don their life vests, demonstrate and check passenger compliance.

7.15. LIFE VEST DEMONSTRATION

Cabin crew should simultaneously don their life vest and demonstrate to the passengers in conjunction with the emergency PA.

- Remove the crew life vest from the pouch
- Unfold the life vest and hold it up in front [crewmember]
- Don the life vest
- Secure straps
- Identify light (if applicable)
- Identify whistle (if applicable).

Cabin crew should then check the passenger life vests in their assigned area.

Assist passengers with their children's life vest. If an adult life vest is to be used for a child, adapt it accordingly. If available, distribute and explain to passengers how to use other flotation equipment, such as baby survival cots. Assist any passenger that may need help in donning their life vest.

7.16. EXITS

Cabin crew should identify all the exits to the passengers.

7.17. ABLE BODIED PASSENGER BRIEFINGS

The criteria used for selecting Able Bodied Passengers (ABPs) for a ground evacuation applies to ditching. Ideally, select three APBs per exit, and seat them at the exit.

One ABP should be briefed to replace the cabin crewmember in case the crewmember becomes incapacitated. The crewmember should brief the passengers on:

- How to assess conditions outside the aircraft, and identify if the exit is usable/unusable (determined by water level)
- How to open the exit
- How to locate the manual inflation handle
- How to protect themselves from going overboard, and remain in the assist space.
- The commands to be used during evacuation
- How to board the slide/raft
- How to disconnect the slide/raft
- How to cut the mooring line to release the raft from the aircraft.
- How to remove the overwing exits and attach lifelines (if applicable)

ABPs Two and Three. Slideraft assistance.

ABPs two and three should be instructed to board the raft to assist passengers. One ABP should be instructed to go to the end of the raft. The other ABP should be instructed to stay in the middle of the raft to assist passengers to the far end.

On some aircraft types, where the rated capacity of the slideraft is lower than the number of people onboard, a liferaft (dinghy) is located in a stowage in the cabin. ABPs two and three are responsible for the liferaft. These ABPs will be briefed how to:

- Take the raft to the exit
- Use the mooring line to attach the raft to a fixed part of the aircraft, for example, a passenger seat
- Launch the raft (the raft must be thrown outside the aircraft)
- Manually-inflate the raft, in case it does not inflate. Pull the mooring line
- Board the raft and distribute passengers evenly.

When the ABP briefing has been completed, the cabin crew should perform a final safety check to ensure that all loose or sharp objects have been removed, the passengers have fitted the life vest and that the cabin is secure.

For the A320 Family, during the final cabin preparation, the survival kit should be attached to the slideraft (if fitted) by attaching the hook on the survival kit to the lanyard on the slideraft.

When the cabin is secure, the Purser should inform the flight crew that the cabin is ready. The Purser should ask the flight crew for updated information, and communicate any new information with the rest of the cabin crew. The flight crew may be able to inform the Purser about:

- The nearest landfall
- Shipping in the area.

When the cabin preparation is complete, the cabin crew should then prepare themselves. Ensure that the doors are in the armed position, and concentrate on the Silent Review, including the location of suitable emergency equipment

The flight crew will give the brace command at the appropriate time.

Cabin crew should keep repeating the brace command until the aircraft has come to a complete stop.

7.18. POST DITCHING

When the aircraft has come to a complete stop, cabin crew will release their seat belt, and begin to shout their commands. If the noise level is high, use a megaphone or the PA if operative.

The ability to evacuate passengers from the aircraft to the rafts will depend on the state of the sea and the condition of the aircraft. When an aircraft is intact, it should be able to float on calm seas for several minutes.

Being aware of the situation in the cabin, and the condition of the aircraft, will determine how passengers will leave the aircraft and where.

In the worst possible case, if the aircraft is sinking, passengers and crew should leave the aircraft through any possible opening. Instruct passengers to inflate their life vest, and hold on to anything that is floating.

Structures, such as engine pylons or flaps may detach from the aircraft and possibly damage the rafts as the aircraft starts to sink. Therefore, cabin crew should stress the urgency to evacuate the aircraft and get away from immediate danger.

Assess outside conditions

The level of water at the exit will determine whether or not the exit is usable. Exits that are below water, partially submerged or seeping water around the edges, must be considered unusable. Priority should be given to exits that are above the water level.

When the exits have been opened, cabin crew will be able to determine how to evacuate passengers to the rafts. **If the water is at doorsill level**, the passengers may board the slideraft directly from the aircraft. The slideraft should be left attached to the floor of the aircraft.

Passengers must inflate their life vest, when exiting the aircraft.

Distribute passengers evenly on the sliderafts to prevent capsizing.

If the water level is too far below the doorsill, detach the raft from the doorsill using the disconnect handle. The raft will still be attached to the aircraft by the mooring line. Cabin crew should pull the mooring line in to keep the slideraft close to the door to evacuate passengers.

Cabin crew will need to continue shouting commands to speed up the evacuation.

When boarding passengers into the rafts, ensure that the passenger count does not exceed the raft capacity.

Monitor the flow of passengers at each exit and be prepared to re-direct to other rafts in case there is congestion or if the cabin conditions change for example, unusable exits, rising water, aircraft sinking.

Before the cabin crew leave the aircraft, check the cabin to ensure that all passengers and crew have evacuated. Remove any emergency equipment (including flotation seat cushions) from the aircraft.

- Inflate life vest and evacuate the aircraft into the assigned slideraft
- If the slideraft is still connected to the doorsill pull the disconnect handle.
- The slideraft is still connected to the aircraft by the mooring line.
- Maneuver the slideraft to the overwing exits and assist passengers to board.
- Using the knife cut the mooring line to separate the slideraft from the aircraft or use the quick release handle if fitted
- Retrieve the survival kit attached to the lanyard.

Once separated from the aircraft:

- Maneuver the slideraft upwind of the aircraft, but stay in the vicinity of the aircraft
- Stay clear of fuel contaminated water in case the fuel ignites
- Stay clear of any debris which may damage the rafts
- Locate other survivors.

If possible, there should be at least one crewmember per slide/slideraft. The crewmember should take the leadership role. The survival of the passengers depends on the cabin crew knowledge, the ability to use the available survival equipment and the ability to cope with the hazards and hardship.

As soon as the raft is clear of the wreckage, the cabin crew should deploy the sea anchor. The sea anchor must be deployed in order to prevent the raft from drifting with the current. It is possible to drift over 160 Kilometers in one day, therefore making it difficult to locate survivors.

When survivors have been found in the water, immediate action should be taken to get them onboard the slideraft. Throw the heaving ring located on the raft, to the survivor and pull them towards the raft.

When bringing survivors into the raft, it is important to ensure that the weight is evenly distributed to prevent the raft from capsizing. Boarding handles or boarding steps are usually located on the slideraft to assist survivors.

Some survivors may be injured or too weak to board the raft, and may require assistance. This can be quite difficult, however, there are techniques that may make it easier. Below is an example of one such technique.

- Two people should hold the person under the armpits (not the arms)
- Push the person down into the water, and then pull as the buoyancy from the life vest pushes the person up again.

However, keep the person informed every step of the rescue, so that they can cooperate.

Once onboard the raft, all persons should keep their life vests on until rescued.

Remember that keeping the raft close to the ditching site will make location easier.

7.19. SURVIVAL

The four basic principles to survival are.

- Protection
- Location
- Water
- Food

7.19.1. PROTECTION

Erect the canopy to prevent wind-chill hypothermia from affecting wet bodies. When the canopy is erected, all occupants will be protected from the elements. In addition, the canopy will assist the air rescue services to locate the sliderafts.

Check the physical condition of all passengers and other cabin crew onboard, and administer first aid as necessary.

Seasickness can be expected. The smell inside the life raft and loss of visual reference increases the risk of seasickness. Vomiting causes a serious loss of fluid. If available, seasickness pills should be distributed. However, if they are not available, occupants should be instructed to look at the horizon to have a visual reference.

Use the bailing bucket and the sponge from the survival kit to remove water from the raft. The floor of the raft should be kept as dry as possible.

Try to keep the raft clean and dry to prevent illness and infection.

The condition of the raft should be frequently monitored. If necessary, inflate the buoyancy chambers using the hand pump that is in the survival kit. The buoyancy chambers should be firm, but not too hard. Inflation should be checked regularly.

7.19.2. LOCATION

The second element of survival is location. The Emergency Locator Transmitters (ELTs) should be activated, to send out a signal to identify your location. This is where a mobile phone may be an asset. If there is one available and it works, use it.

Other signaling equipment in the survival kit includes:

- Signaling mirror
- Day/night flares
- Sea dye marker.

If there is more than one slideraft, they should be tied together. A distance of approximately 8 meters (25 feet) should be respected, to allow for wave action. Keeping the rafts together makes location and rescue easier.

If transceivers are available, they should be used to check the beacon signal on 121.5 MHz. The beeping noise will confirm that the beacon is correctly deployed.

Transceivers may also be used to communicate with other rafts.

Rescue at sea requires a cooperative effort. Therefore, raft occupants should actively participate in the rescue effort and assist with raft maintenance. Not only will this help to use time constructively, but will also mentally occupy passengers and cabin crew and keep the morale up during a very difficult situation. The cabin crew should assign tasks to occupants, for example:

- Look-out – to spot for passing aircraft or ships
- Use the signaling mirror, as mirror flashes can be seen for many kilometers, even in hazy weather

- Keep the floor of the raft dry – using the bailing bucket and sponge
- Recover moisture or rainwater to drink
- Check the buoyancy of the slideraft

These duties should be rotated every few hours to give people a sense of responsibility. Passengers should be reminded that cooperation is necessary to survive.

Conditions in the raft will be far from ideal. Even during a short space of time occupants may feel cramped, tired and anxious.

Mental attitude is a very important aspect of survival. In emergency situations, try to keep the morale up to prevent people from falling in to hopelessness and despair. Do not give up hope because the will to live is a key element of survival.

7.19.3. WATER

Cabin crew will need to assess how much food and water is available and ration them accordingly.

Water is the most important element. It is possible to live on just water for 10 days or more. When the water supply is limited and cannot be replaced, it should be used efficiently.

Freshwater supplies should be protected from being contaminated from seawater.

At night, if water is in short supply, the canopy can be rolled up at the side to collect dew, by using a sponge or cloth.

The amount of water available, and the amount of people and their physical condition, should be considered when rationing water.

7.19.4. FOOD

The general rule is if you don't have water, don't eat. Only eat if water is available as it is necessary to aid digestion.

7.20. RESCUE

When an aircraft or a ship has been sighted, all the signaling equipment available should be used to attract attention. Insert the sea-dye marker (if available) in the water to highlight the area of the slideraft. Only use the sea-dye marker in daylight conditions if an aircraft is sighted or heard in the area. The sea-dye marker will stay active for about 3 hours, except in very rough seas. A sea-dye marker produces a trail of about 30 meters (100 feet) and is visible at a distance of more than 11 kilometers (7 miles) from an aircraft at 2,000 feet.

Occupants should stop using the signaling equipment as the craft approaches. It will be necessary to prepare for a rescue. Take the canopy down; secure all loose items in the raft. The crewmember should instruct the passengers to ensure their life vests are fully inflated by blowing into the tubes to restore the buoyancy chambers.

Never take a life vest off during rescue.

Passengers and cabin crew will have to be patient during the rescue operation and understand that the procedure takes time, depending on the type of rescue craft. It may not be possible to rescue all raft occupants at once.

The crewmember may have to decide who should be rescued first, such as injured persons, or women with children. The cabin crew will need to manage the passengers calmly, and maintain order until the last person has been rescued.

The cabin crew and passengers must follow the instructions of the rescue personnel and remain in the raft until instructed.

Helicopter rescue requires particular attention and it is imperative that the instructions given by the rescue crew are obeyed.

- Do not attempt to stand up - all raft occupants should remain seated with arms and legs inside the raft
- Rotor wash from the helicopter may be quite severe. Keep people low in the raft and ensure that the weight is evenly distributed.
- Do not do anything using your own initiative
- Do not reach out to grab the cable (to avoid the possibility of an electric shock), wait until it reaches the raft or makes contact with the water
- Wait for instructions from the winch man
- On reaching the door sill of the helicopter, wait for assistance from the crew on board
- A rescue swimmer may not always drop from the helicopter to aid with rescue. The cabin crew may have to help with instruction
- The crewmember must stay in the raft until all passengers have been rescued.

With modern satellite technology, location and rescue may not be far away.

However, it is always best to prepare for the most extreme circumstances.

Cabin crew should feel confident that their knowledge of ditching procedures and survival techniques would get them through the worst possible circumstances.

During this chapter, examples of unplanned and planned ditching situations were used to highlight the positive effects that cabin crew can have during emergencies.

Cabin crew are always the leaders in any emergency situation. An effective leader has knowledge and skills, plus the ability to apply those skills as necessary.

7.20.1. EVACUATION ON WATER PROCEDURE- SLIDERAFT

STAND UP AND SHOUT **OPEN SEATBELTS, LIFE VESTS ON**
Inflate the life vest, only when outside the aircraft.

ORDER **REMOVE SHOES**

• **If the exit is usable.**

DOOR IN ARMED POSITION **OPEN**
RED MANUAL INFLATION HANDLE **PULL**

Do not wait for automatic inflation of the slideraft.

Note: On A380, the red manual inflation handle is replaced by a Manual Inflation Pushbutton (MIP) located on the right side of the door frame

• **If the water level is close to the door sill:**

The slideraft inflates on the water.

SLIDERAFT **LEAVE ATTACHED TO CABIN FLOOR**
ASSIST SPACE **OCCUPY**

• **If the water level is too far below the door sill:**

SLIDERAFT/ESCAPE SLIDE **DISCONNECT FROM DOOR SILL**
The slideraft remains tied to the aircraft by a 6 M (20 feet) mooring line.

MOORING LINE **HOLD**
To keep the slideraft close to the exit, hold the mooring line.

PASSENGER EVACUATION **EXPEDITE**
COME THIS WAY, HURRY **SHOUT**
PASSENGER LIFE VESTS. . . INSTRUCT TO INFLATE WHEN LEAVING THE AIRCRAFT
NUMBER OF PASSENGERS BOARDING THE SLIDERAFT **MONITOR**
ASSIGNED AREA **CHECK FULLY EVACUATED**
LAST CREWMEMBER **BOARD SLIDERAFT**
DISCONNECT HANDLE. **PULL**
SLIDERAFT **MANEUVER TO OVERWING EXITS**
PASSENGERS ON THE WING/IN THE WATER. ASSIST TO BOARD SLIDERAFT
MOORING LINE **CUT**
SURVIVAL KIT **RETRIEVE**
The survival kit is attached to the slideraft via a lanyard.

7.20.2. EVACUATION ON WATER PROCEDURE - DOOR ESCAPE SLIDE

The escape slide is used as a passenger flotation device only. It is not equipped with a canopy or a survival kit.

STAND UP AND SHOUT **OPEN SEATBELTS, LIFE VESTS ON**
Inflate the life vest, only when outside the aircraft.

ORDER **REMOVE SHOES**

- If the exit is usable.

DOOR IN ARMED POSITION **OPEN**

RED MANUAL INFLATION HANDLE **PULL**

Do not wait for automatic inflation of the slide.

SLIDE **DISCONNECT FROM DOOR SILL**

The slide remains attached to the aircraft by a 6 M (20 feet) mooring line.

ASSIST SPACE **OCCUPY**

PASSENGER EVACUATION **EXPEDITE**

COME THIS WAY, HURRY **SHOUT**

PASSENGER LIFE VESTS. . . . INSTRUCT TO INFLATE WHEN ENTERING THE WATER

ASSIGNED AREA **CHECK FULLY EVACUATED**

LAST CREWMEMBER **INFLATE LIFE VEST, ENTER WATER**

ESCAPE SLIDE **INSTRUCT PASSENGERS TO HOLD THE LIFELINE**

MOORING LINE **DISCONNECT**

7.20.3. PLANNED DITCHING CABIN PREPARATION

<p>1. Alert Phase</p> <p>Purser to Cockpit or series of rings</p>
<p>2. Captain to Purser Briefing</p> <ul style="list-style-type: none"> • Nature of the emergency (why it is necessary to make a ditching) • Time available to prepare the cabin • Signal to brace • Signal to remain seated • Special instructions/other information • Who will inform the passengers and when
<p>3. Purser to cabin crew briefing</p> <ul style="list-style-type: none"> • Nature of the Ditching • Ditching preparation/Life vests for briefing • Take demonstration positions • Await announcement
<p>4. Captain's Announcement (situation permitting)</p>
<p>5. Purser's Announcement (If the captain's announcement is not possible)</p> <ul style="list-style-type: none"> • The Nature of the emergency • Necessity to prepare the cabin • Follow the instructions of the cabin crew <p>The emergency demonstration announcement should include:</p> <ul style="list-style-type: none"> • Life vests (only to be inflated when exiting the aircraft) • Brace positions • Location of exits • Loose items • Passenger assistance (ABPs) • Assistance with life vests, children and infants • Safety Card Review (including seat belts, tray tables, seat backs, armrests)

<p>6. Final Cabin Secure</p> <ul style="list-style-type: none"> • Seat belts fastened • Seatbacks upright • Tray tables stowed and latched • Carry-on baggage stowed and secure • Overhead bins closed and latched • Aisles clear of all obstruction • Service items cleared • Cabin dividers open
<p>7. Secure Galleys</p> <ul style="list-style-type: none"> • Close and secure all containers • Trolleys stowed and secured • Switch off all galley power • Pull all circuit breakers
<p>8. Check All Doors</p> <p style="text-align: center;">ARMED</p>
<p>9. Cabin Crew to Purser</p> <ul style="list-style-type: none"> • Cabin preparation complete
<p>10. Purser to Captain</p> <ul style="list-style-type: none"> • Cabin Ready – cabin preparation complete • Obtain updated information
<p>11. Repeat Emergency Announcement If time permits, the Purser will repeat the announcement and the cabin crew will ensure passengers understand the brace position, the fitting of the life vests and location of the emergency exits.</p>
<p>12. All Cabin crew at stations</p> <ul style="list-style-type: none"> • Secure seat harness • Silent Review
<p>13. Command from captain to cabin crew via PA (approx. 1 minute before landing)</p> <p style="text-align: center;">BRACE, BRACE</p>
<p>14. Cabin Crew continue to shout</p> <p style="text-align: center;">BRACE, BRACE Until the aircraft comes to a complete stop</p>



8. CABIN DEPRESSURIZATION

8.1. INTRODUCTION

Aircraft have cabin air systems that control pressurization, airflow, air filtration, and temperature. The purpose of these systems is to provide a safe and comfortable cabin environment, and to protect all cabin occupants from the physiological risks of high altitudes. Modern aircraft are now operating at increasingly high altitudes. This increases the physiological risks that are associated with depressurization.

In the case of depressurization, there is a risk that not enough oxygen will be supplied to the body. This condition, hypoxia, is the greatest threat to both cabin crew and passengers.

8.2. CABIN PRESSURIZATION

Pressurization of the aircraft cabin begins before, or shortly after, takeoff. The air from outside the aircraft is compressed through the engines, cooled and humidified by the air conditioning unit, and then distributed into the cabin. The pressurization system is maintained by a series of valves that control the flow of the air into, and out of the cabin. The aim is to pump more air into the cabin than is allowed to escape. As the aircraft climbs, the “outflow” valves close and the pressure builds up inside the cabin to an altitude of between 6 000ft and 8 000ft. The pressurized cabin protects the occupants from the physiological risks of high altitude.

The external altitude may be 41 000 feet, therefore the difference between the cabin altitude and the external altitude, creates a pressure differential.

During depressurization, the cabin pressure decreases, and the cabin altitude increases to equalize with the flight altitude.

The risk of a pressurized cabin is the potential for cabin depressurization. This can occur due to a pressurization system malfunction, or damage to the aircraft that causes a breach in the aircraft structure, enabling cabin air to escape outside the aircraft, for example loss of a window, or a hole in the aircraft fuselage due to an explosion.

The loss of pressurization can be slow - in case of a small air leak - while a rapid or explosive depressurization occurs suddenly, usually within a few seconds.

Other factors influence the rate and duration of depressurization:

- The larger the cabin, the longer the depressurization time
- The larger the opening, the faster the depressurization
- The greater the pressure differential between the cabin pressure and the external environmental pressure, the more forceful the depressurization.

When cabin pressure decreases, the occupants are no longer protected from the dangers of high altitude, therefore increasing the risk of hypoxia, depressurization illness and hypothermia. It is, therefore, important that cabin crew recognize the different types of depressurization and react effectively to overcome the difficulties associated with a loss in cabin pressure.

CABIN PRESSURE INDICATOR

Operational experience shows that several events of residual cabin pressure differential have been reported and led to violent door opening, resulting in serious injuries.

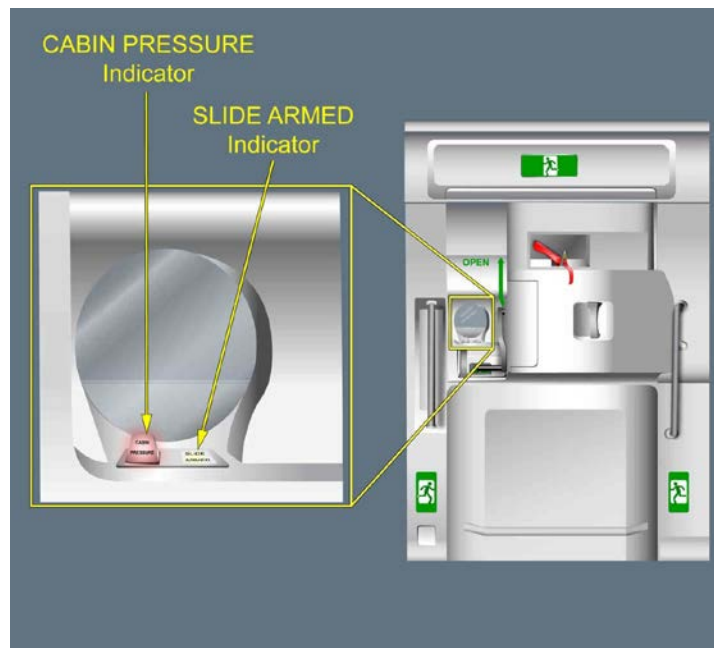
Cabin crew should therefore be aware of the risk existing when opening the passenger doors, as he/she may be ejected out of the aircraft if there is any residual pressure.

In case of cabin residual pressure differential, the cabin pressure indicator flashes red at each passenger door when:

- The door is in the disarmed mode,
- Pressure differential exists between the cabin (high) and outside conditions (low) (2.5 mbar difference (0.0362 PSI)).
- Aircraft is on the ground and (at least one or all) engine(s) is (are) OFF.



Example of Cabin Pressure Indicator



Cabin Pressure Indicator location

Nevertheless, the cabin pressure indicator remains inhibited if the slides are still armed (emergency evacuation) or engines are running.

The cabin pressure indicator is only a passive protection, it also relies on cabin crew compliance to procedures. The training for cabin crew highlights that before opening any passenger door, the cabin crew has to check the cabin pressure indicator. He/she must inform the cockpit crew if the red light flashes. Before any opening of the door, he/she must hold the frame assist handle.

In any case, several procedures are in place in order to allow the release of the residual cabin pressure, if any. In addition, for aircraft not equipped with a cabin pressure indicator, it is clearly requested to crosscheck with flight crew that pressure differential is zero before opening doors.

The cabin pressure indicator is fitted on A318/A319/A320/A321, A330/A340, A350, A380. It can be optionally installed on the A300-600 and A310.

8.3. TYPES OF DEPRESSURIZATION

Depressurization can be separated into two categories:

- Rapid/Explosive
- Slow/insidious

8.3.1. RAPID/EXPLOSIVE DEPRESSURIZATION

Structural damage or malfunction in the pressurization system may cause rapid depressurization. Rapid depressurization may be explosive, especially where there is a hole in the fuselage. Listed below are some of the signs of a rapid depressurization:

- Loud bang, thump or clap. When the two masses of air make contact
- Cloud of fog or misting in the cabin. Due to the drop in temperature, and the change of humidity
- Rush of air – as the air exits the cabin
- Drop in temperature as the cabin temperature will equalize with the outside temperature
- Release of cabin oxygen masks, when the cabin altitude reaches 14,000ft.

If a hole in the structure is the cause of the depressurization, the rush of air that leaves the aircraft through the hole will take with it anything unsecured items from the surrounding area.

Debris may fly around the cabin, and loose items may become projectiles. Dust particles may also restrict vision.

Occupants will also feel some of the physiological effects such as:

- Hypoxia
- Hypothermia
- Gas expansion
- Exposure to windblast.

8.3.2. SLOW DEPRESSURIZATION

Slow depressurization is a very gradual decrease in cabin pressure. Slow depressurization may be the result of a faulty door seal, a malfunction in the pressurization system, or a cracked window.

Slow depressurization may not be obvious. There will be no fog or sound of air rushing through the cabin, or any visible indication of depressurization. Therefore, cabin crew must be alert to any clues that may indicate slow depressurization.

One of the first physiological indications may be ear discomfort, joint pain or stomach pain as the gas expands.

Cabin crew should be aware of the signs and symptoms of hypoxia, not only for passengers, but also for other cabin crew. Due to the insidious nature of hypoxia, the symptoms may not be identified until it is too late.

Anyone who has symptoms of hypoxia should be given oxygen and the flight crew should be immediately notified.

If the origin of the slow depressurization is a faulty door or window seal, there may be a slight hissing sound in the immediate area. In this case, notify the flight crew. Any passengers who

are seated in the area should be moved, and resealed if possible. All other cabin crew should be informed. As a precautionary measure all seatbelts should be fastened, and equipment stowed and secured, in the event of a rapid depressurization.

8.4. HYPOXIA

The greatest danger during depressurization is hypoxia (lack of oxygen). The most common type of hypoxia in aviation is "hypoxic hypoxia", which occurs due to low partial pressure of oxygen in the arterial blood. If oxygen is not used immediately in hypoxia cases, it is possible that occupants become incapacitated and lose consciousness in a very short time.

The effects of hypoxia cannot be over emphasized. It is important for cabin crew to realize that even mild hypoxia, though not fatal, can have fatal results. This is because hypoxia can significantly reduce the performance of the cabin crew and consequently lead to errors that may be fatal.

As the insidious nature of hypoxia can cause a gradual decrease in individual performance, followed by incapacitation, the symptoms may not be identified until it is too late.

It is necessary to remember that each person may not react in the same way, and that the symptoms of hypoxia may manifest themselves differently in each individual.

Hypoxia can cause a false sense of well being. It is possible for a person to be hypoxic and not be aware of their condition. Therefore, it is important that the cabin crew recognize the signs of hypoxia and provide oxygen as soon as possible in order to prevent a loss of consciousness. The affected passenger or crewmember usually recovers a few minutes after receiving oxygen. However, they may not be aware of having lost consciousness.

8.5. THE TIME OF USEFUL CONSCIOUSNESS (TUC)

The Time of Useful Consciousness (TUC) refers to the time available to individuals to perform their tasks, after they have been deprived of oxygen, but are still aware of their environment and capable of controlling their actions.

It is important for the cabin crew to realize that the time of useful consciousness is different for each individual, and depends on the:

- Altitude
- Individual's state of health
- Amount of activity.

The TUC table is used as a guideline for the expected performance time at different altitudes. The TUC is a relative term, and will vary according to each individual's state of health and level of activity.

The primary factor that will affect cabin crew, and reduce their TUC is the level of activity. Activity increases the need for oxygen. The more cabin crew move around the cabin the

higher their oxygen requirement. During depressurization, and particularly post depressurization, cabin crew should consider their own oxygen requirements. The TUC does not imply that a person will be able to perform their duties to their full capacity. As the time increases the ability to perform duties will diminish and even the simplest of tasks may become difficult, as hypoxia sets in.

The cabin crew must remember that, in cases of continued physical activity, TUC is significantly reduced.

Table 1

Carlyle, 1963

Time of Useful Consciousness Table at Various Altitudes

TIME OF USEFUL CONSCIOUSNESS		
Altitude	Moderate Activity	Sitting Quietly
22 000 feet	5 minutes	10 minutes
25 000 feet	2 minutes	3 minutes
28 000 feet	1 minute	1.5 minutes
30 000 feet	45 seconds	1.25 minutes
35 000 feet	30 seconds	45 seconds
40 000 feet	18 seconds	30 seconds

Note: It is important to emphasize that this table is only a guideline, and provides average values that can increase or decrease depending on the skills needed to accomplish a task, on the individual's health and on the amount of activity. For example, the TUC for a cabin crewmember involved in moderate activity is significantly less, compared to a passenger that is sitting quietly.

The following are some other factors that can contribute to reducing the TUC

- **Fatigue.** A person who is physically or mentally fatigued will have an increased risk of hypoxia
- **Physical effort.** During physical activity, there is an increased need for oxygen, an increased risk of hypoxia and, as a result, a decrease in the amount of useful consciousness time
- **Alcohol.** Alcohol can significantly affect behavior, and can increase the risk of hypoxia, in addition to aggravating some of the behavioral changes resulting from hypoxia.

8.6. THE PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS OF HYPOXIA

Physical activity, during the initial descent and post depressurization, when the aircraft has leveled out, will increase the need for oxygen. If supplemental oxygen is not used, cabin crew may become hypoxic and incapacitated. Cabin crew performance is vital during in-flight

emergencies. The symptoms of hypoxia are various, and may manifest themselves differently in each individual. Initial signs of hypoxia include:

- Increased rate of breathing
- Headache
- Nausea
- Light-headedness
- Dizziness
- Tingling sensation in hands and feet
- Sweating
- Irritability
- Euphoria
- Cyanosis (blueness of the lips and the fingernails)
- Ear discomfort
- Stomach pain due to gas expansion.

As the lack of oxygen increases, the symptoms become more pronounced and include:

- Impaired vision
- Impaired judgment
- Motor control (unable to coordinate)
- Drowsiness
- Slurred Speech
- Memory loss
- Difficult to concentrate

Hypoxia can cause a false sense of well-being. It is possible for a person to be hypoxic and not be aware of their condition. It is important that cabin crew recognize the signs of hypoxia, and administer supplemental oxygen as soon as possible in order to prevent unconsciousness.

When oxygen has been administered, recovery will usually be within minutes. However, the person may not be aware of having a period of reduced consciousness.

8.7. CABIN DEPRESSURIZATION GENERAL GUIDELINES

A study conducted by the Civil Aero Medical Institute (CAMI) in the United States, entitled "Flight Attendant Procedures in a Depressurization", revealed that accident investigators, and safety inspectors reported that cabin crew did not follow the recommended procedures during depressurization. This study resulted in a Flight Standards Information Bulletin (FSIB released by the FAA) that provides the recommended procedures in a cabin depressurization event.

In the case of depressurization the immediate use of oxygen is critical. Therefore, the first actions to be performed by the cabin crew are.

- **Immediately don the nearest oxygen mask**
- **Sit down, fasten seat belt or grasp a fixed object**
- **Hold on**

If the cabin crew are not able to sit down or grasp a fixed object, they should wedge themselves between passengers and ask passengers for assistance. For example, in one cabin depressurization event, a cabin crewmember was saved from ejection out of the aircraft, because a passenger was holding onto the cabin crewmember's ankle.

The priority of the cabin crew is to consider their personal safety.

Incapacitated or injured cabin crew will not be able to assist other cabin crew or passengers during the post-depressurization phase.

8.8. CREW COMMUNICATION AND COORDINATION

During any emergency, effective crew communication is critical to a successful outcome. Effective Crew Resource Management (CRM) involves cooperation and communication between the flight and cabin crew. In many abnormal and emergency situations, the cabin crew play an important role in helping the flight crew to identify and resolve developing problems.

Many incident and accident reports have revealed that effective crew communication, between flight and cabin crew, can make the difference between an accident and an incident. It has also been revealed that ineffective communication between the flight and cabin crew has contributed to the severity of an accident.

8.9. COMMUNICATING IN A NOISY ENVIRONMENT

Communication between the flight crew and the cabin crew may be difficult. Equally, communication between the cabin crew and the passengers may cause problems, depending on the type of depressurization, particularly if it is rapid/explosive as the noise level may be quite high.

Some rapid/explosive depressurizations have been severe, and presented the cabin crew with diverse challenges to overcome. One such depressurization happened over the Pacific. Not only were the cabin crew faced with an explosive depressurization, but they also had to try to prepare the cabin for a ditching, and then a land evacuation with 337 passengers onboard.

“Communication between the flight attendants and passengers was very difficult because of the high ambient noise level in the cabin after the depressurization, even though the public address (PA) system was operational. Flight attendants were located at each of the 10 doors,

yet there were only two megaphones required to be on the airplane; one located at door 1- left and the other at 4-left.

The flight attendants, who were responsible for each of these two doors, used the megaphones to broadcast commands to passengers in their immediate areas and to other flight attendants in preparation for the landing and subsequent evacuation. The other 13 flight attendants (including one deadheading flight attendant) had to shout, use hand signals, and show passengers how to prepare for the evacuation by holding up passenger safety cards."

"Because of the intense cabin noise she [the flight attendant] had to communicate with passengers by holding up a safety card and a life preserver. Passengers sitting in the front rows, in turn, showed safety cards and life preservers to other passengers seated behind". (Source Accident Report NTSB/AAR-90/01)

During any emergency, effective communication is critical to the outcome. Cabin crew should use any possible means to communicate with other cabin crew and passengers.

8.10. POST DEPRESSURIZATION

After a depressurization, when the aircraft reaches a safe altitude, the cabin crew can move around the cabin, and should use the portable oxygen cylinders until they are confident that they can breathe without support.

When the emergency descent is completed, and a safe altitude is reached, the cabin crew should consider their oxygen requirements. Due to the physical activity at an increased altitude, the cabin crew may still be exposed to hypoxia. Oxygen deprivation can be insidious and the cabin crew may not be the best judges of their own oxygen intake after depressurization.

After cabin depressurization, the cabin crew should.

- Check on the flight crew, and be prepared to assist in the case of pilot incapacitation.
- Check passengers for any injuries
- Check the cabin for any damage
- Provide first-aid and oxygen, as necessary
- Report the cabin status to the flight crew.

8.11. OXYGEN SYSTEMS

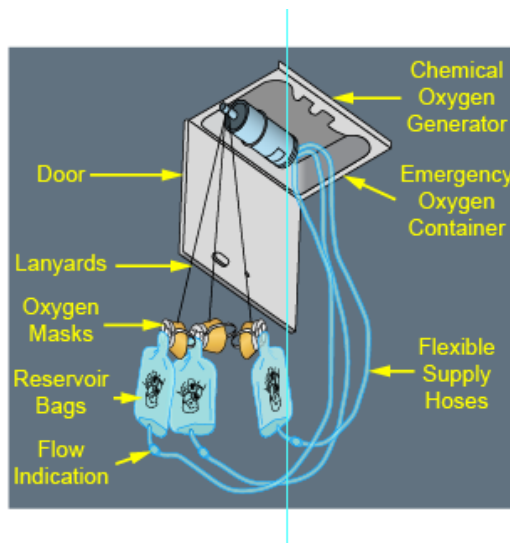
When the cabin altitude increases up to 14 000 feet, the oxygen masks that are housed above the passenger seats, in the lavatories galleys, and crew stations will deploy automatically. The flight crew may also manually deploy the oxygen mask system.

When the compartments are open, the masks drop down, and are suspended by a lanyard. The oxygen masks are normally in groups, depending on the seat row configuration of the aircraft. Each group of masks has a release pin that is connected to a lanyard. It is sufficient to pull one mask to activate the oxygen for that entire row of seats.

There are two different passenger oxygen systems that are currently used on aircraft, chemical and gaseous. However, there are some differences between the two systems.

Figure 8-1

Cabin Fixed Oxygen System



8.11.1. CHEMICAL OXYGEN

The chemical system generates a chemical reaction, when the mask has been pulled down and the release pin has been removed. When the oxygen begins to flow to the mask, it will continue for either **15 or 22** minutes depending on the duration chosen by the airline.

It is not possible to stop the flow of oxygen when it has started. The chemical generator creates heat and becomes hot, therefore a smell of burning, where dust has gathered, is not unusual. Passengers may become concerned with the smell of burning associated with the oxygen generators.

In a Notice to AOC holders (NTAOCH) No. 5/96, the CAA recommended that:

“As soon as practicable after emergency oxygen masks have been deployed, passengers should be advised that there is a possibility of a smell of burning associated with the normal operation of chemical oxygen generator systems”

A passenger announcement should be made, when it is considered safe to do so.

8.11.2. GASEOUS OXYGEN

A number of high-pressure oxygen bottles, contained within the aircraft, supply gaseous oxygen to the cabin. Unlike the chemically generated oxygen that works independently from the aircraft altitude, the gaseous system is activated depending on the cabin altitude.

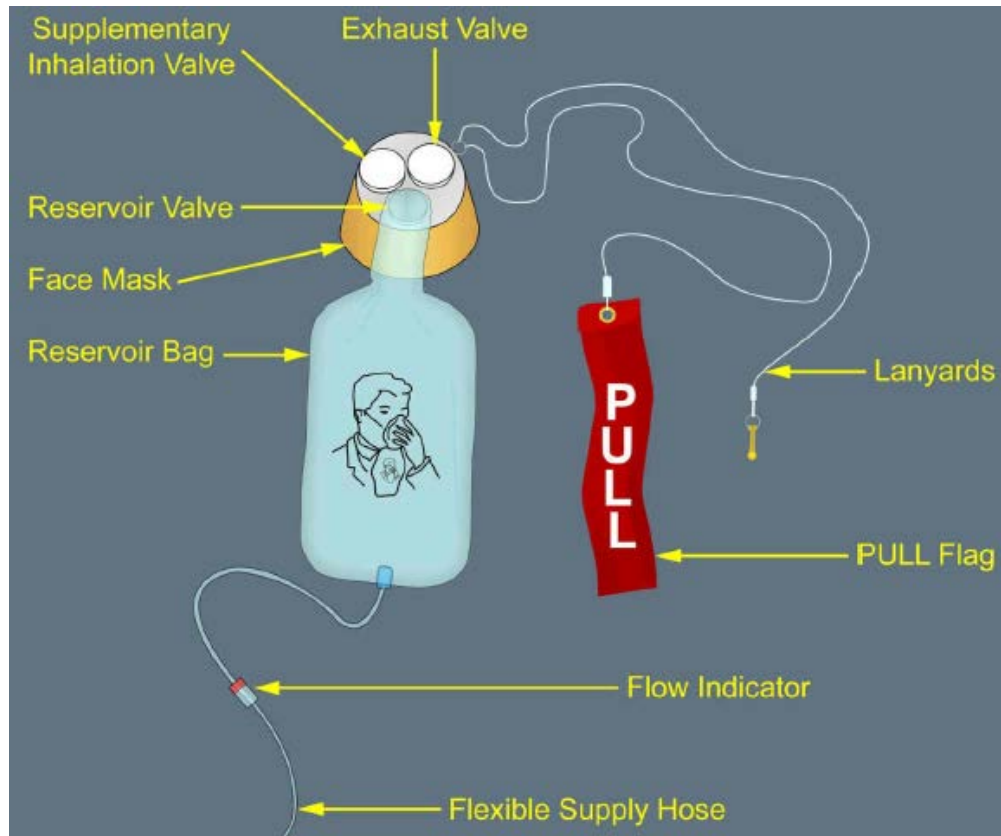
The mask receives pure oxygen under positive pressure, at a rate governed by the cabin altitude pressure.

The lower the altitude, the less oxygen will flow to the masks. When the cabin altitude reaches 10 000 feet, the oxygen supply will stop.

Unlike the chemically generated oxygen, there is no burning odor, because no heat is generated.

Figure 8-2

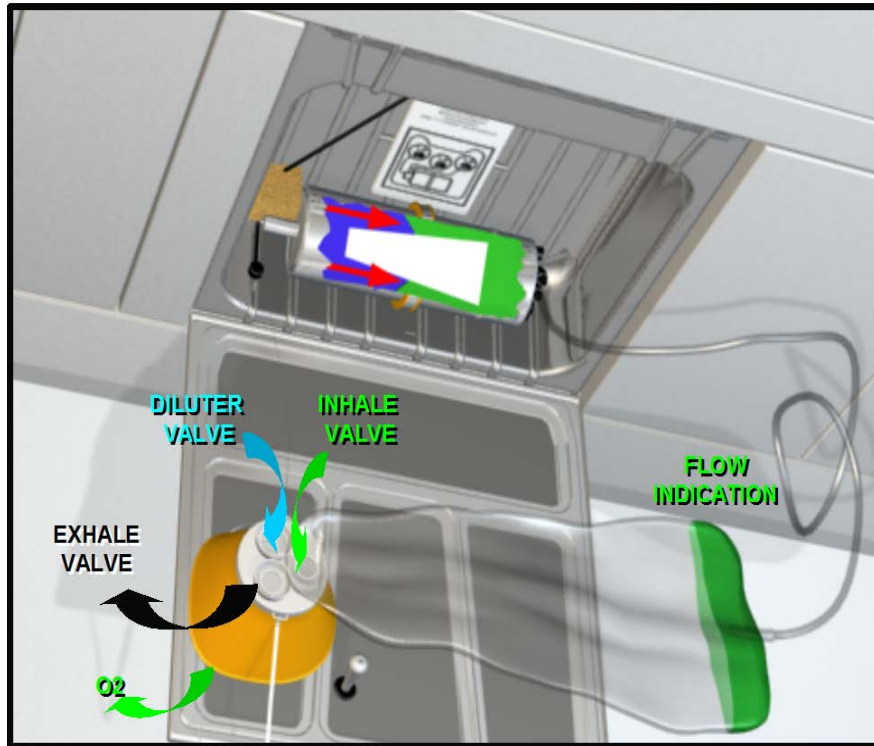
Oxygen Mask 1



The flow indicator, a green bead, is visible through the transparent tubing, when oxygen is flowing to the mask.

Figure 8-3

Oxygen Mask 2



The oxygen flow indication on this oxygen mask is the green strip on the reservoir bag.

8.11.3. COCKPIT OXYGEN

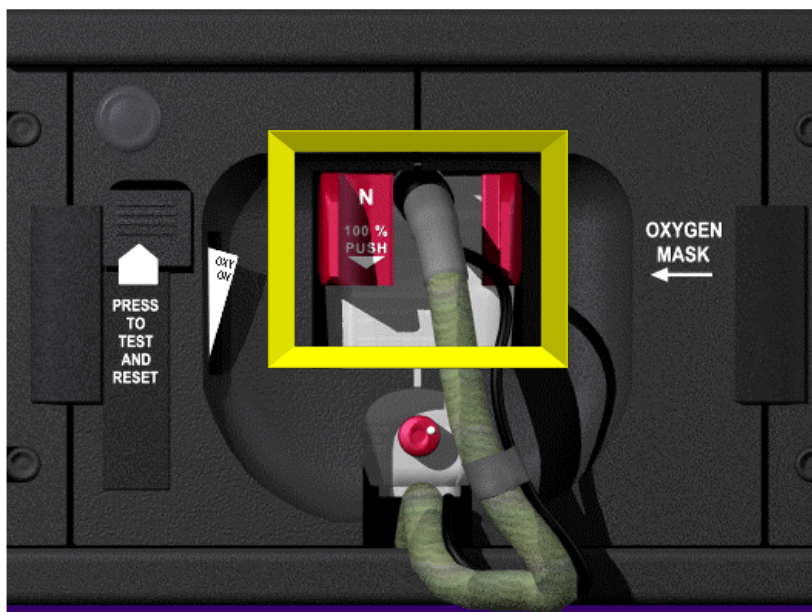
In the event of depressurization, or emissions of smoke or noxious gases, a fixed oxygen system in the cockpit supplies adequate oxygen to the flight crew.

Full face quick donning masks are stowed in boxes that are easy to access, adjacent to the pilot seats (one per seat).

A mask-mounted regulator supplies a mixture of air and oxygen, or pure oxygen, and performs emergency pressure control. With the regulator set to “NORMAL”, the user breathes a mixture of cabin air and oxygen up to the cabin altitude at which point the regulator supplies 100% oxygen. The user can select the regulator to 100%, in this case the regulator supplies pure oxygen at all cabin altitudes.

Cockpit Oxygen System

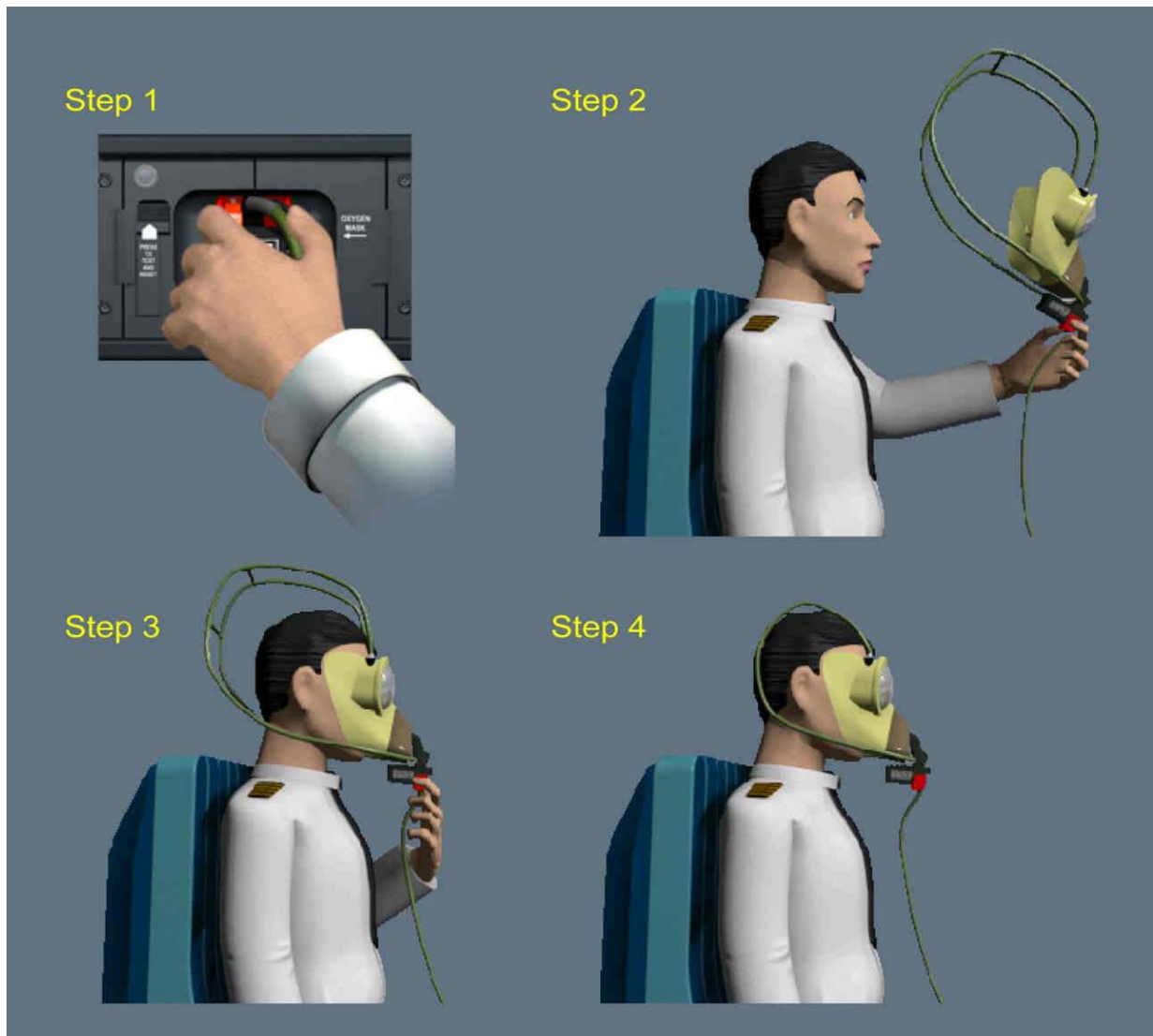
Figure 8-4



How to use the cockpit oxygen:

1. Remove the mask from the storage box by squeezing and pulling the two red grips upwards.
2. Continue to squeeze the red grips, as this causes the oxygen flow to inflate the head harness.
3. When the mask is in place, release the grips (so that the oxygen flows out of the harness), and then adjust the mask to fit the face.
4. The mask can be donned with one hand. The microphone is automatically transferred to the mask.

Figure 8-5
Donning the cockpit oxygen mask



8.11.4. PORTABLE OXYGEN CYLINDERS

Oxygen cylinders are located throughout the cabin. The number and location of the oxygen cylinders varies, depending on the aircraft cabin configuration.



*Zodiac AVOX Systems
Portable Oxygen Cylinder Assembly*

8.12. CABIN DEPRESSURIZATION PROCEDURE

8.12.1. CABIN DEPRESSURIZATION PROCEDURE – A300 / A300-600 / A310 / A320 / A330/340 / A350XWB / A380

CABIN INDICATIONS

When the cabin altitude reaches the value mentioned below:

Aircraft type	Altitude (ft)
A300-600, A310	>11300 ft
A320	>11300 ft (or the Landing Field Elevation + 1000 ft)
A330/340, A350 XWB, A380	> 9550 ft

the following will occur:

- The cabin lighting comes on to 100 % (or CAM assigned value)
- The EXIT signs will come on
- The FASTEN SEAT BELT and NO SMOKING signs come on

Note: In the case of depressurization, the lavatory RETURN TO SEAT signs do not come on.

- Passengers are advised to return to their seats and fasten their seat belts. A verbal announcement or a pre-recorded announcement (if installed) may be used.

When the cabin altitude reaches the value mentioned below:

Aircraft type	Altitude (ft)
A300, A300-600, A310, A330/340	>14000 ft
A320	>14000 ft (or 16000 ft for the operation on high altitude airfields)
A350 XWB, A380	> 13800 ft

the following will occur:

- The oxygen masks will drop down
- The volume of the pre-recorded announcement is increased, and if installed, a message is broadcast to the cabin crew and passengers to pull the oxygen mask and place it over their face.

• If oxygen masks drop:

NEAREST OXYGEN MASK. DON
 NEAREST SEAT. SIT DOWN
 SEAT BELT. FASTEN

WARNING Do not remove your oxygen mask until it is safe to do so. Removing your oxygen mask during a depressurization may lead to total incapacitation caused by hypoxia.

- **If no seat is available:**
FIXED OBJECT. GRASP AND HOLD ON
When no seat is available, the cabin crew should wedge themselves between passengers and hold on.
 - **If the flight crew does not communicate with the cabin crew:**
CABIN/COCKPIT COMMUNICATION. ESTABLISH
The cabin crew should, as soon as possible, inform the flight crew of the situation by appropriate means and confirm that the flight crew wear their oxygen masks.
 - **If no reply from the cockpit:**
CABIN CREW. EQUIP YOURSELF WITH OXYGEN
CABIN CREW. ENTER COCKPIT
CABIN CREW. PROVIDE ASSISTANCE TO THE FLIGHT CREW
 - **If the flight crew communicates with the cabin crew:**
"DON OXYGEN MASKS - FASTEN SEAT BELTS". INSTRUCT PASSENGERS
From your location, speak through your mask, or use gestures to demonstrate the donning of masks.
ANNOUNCEMENT. MAKE IF POSSIBLE
Although the bag does not inflate, oxygen is flowing to the mask.
Note: *In the case of a cabin depressurization, the lavatory "return to seat" signs do not come on. For passengers located in the lavatories, 2 masks will immediately drop down from the lavatory ceiling. Passengers should apply the mask over their nose and mouth.*
 - **When notified by the flight crew (PA) that a safe flight level has been reached:**
CABIN CREW. TRANSFER TO PORTABLE OXYGEN
Note: *To prevent crew incapacitation due to hypoxia, the cabin crew must transfer to portable oxygen, and consider their post decompression oxygen needs. When deciding to remove oxygen masks, the cabin crew must use good judgment and must be aware of any signs of hypoxia.*
- FLIGHT CREW. CHECK**
The cabin crewmember nearest to the cockpit should check on the flight crew in case assistance is needed.
- PASSENGERS AND CABIN. CHECK**
The cabin crew should check for passenger injuries and damage in the cabin.
- FIRST AID AND OXYGEN. GIVE AS REQUIRED**

CABIN STATUS. REPORT TO FLIGHT CREW

Report the nature of injuries and the cabin damage to the flight crew.

8.12.2. ABNORMAL CABIN ALTITUDE

ABNORMAL CABIN ALTITUDE

Immediately after the flight crew informs the cabin crew of possible abnormal cabin pressure the cabin crew must apply the following abnormal cabin altitude procedure:

CABIN CREW STOP ACTIVITIES
CABIN CREW TAKE DESIGNATED CABIN CREW SEAT & SECURE HARNESS
CABIN TO COCKPIT COMMUNICATION MAINTAIN

- **If cabin depressurization occurs:**

CABIN DEPRESSURIZATION PROCEDURE APPLY

Note: *The cabin crew must apply the CABIN DEPRESSURIZATION procedure upon any indication of CABIN DEPRESSURIZATION.*

8.12.3. CREW REST COMPARTMENT DEPRESSURIZATION PROCEDURE

- **If a depressurization occurs:**

- A chime sounds through the Crew Rest Compartments loudspeakers.
- The oxygen masks drop down automatically from the oxygen container, when the cabin altitude reaches :
 14000 feet for the A330/A340/A340-500/A340-600
 13800 feet for the A350XWB/A380.

The crew rest occupants must proceed as follows.

OXYGEN MASKS DON IMMEDIATELY

SEATBELT FASTEN

CREW REST OCCUPANTS STAY INSIDE

- **When the flight crew notifies (via PA) that a safe flight level has been reached.**

CABIN CREW RETURN TO THE CABIN

CABIN CREW TRANSFER TO PORTABLE OXYGEN

Note: *To prevent crew incapacitation due to hypoxia, the cabin crew must transfer to portable oxygen, and consider their post decompression oxygen needs. When deciding to remove oxygen masks, the cabin crew must use good judgment, and must be alert to any signs of hypoxia.*

8.13. SUMMARY

During any in-flight emergency, including depressurization, the first action of the cabin crew must always address the greatest threat to safety.

The greatest danger is the risk of hypoxia, and the possibility of being ejected from the aircraft. Therefore, the immediate action for cabin crew will always be:

- **Immediately, don the nearest oxygen mask, sit down or grasp a fixed object, and hold on, until given clearance by the flight crew to move around the cabin.**
- To consider their own oxygen requirements post depressurization. The cabin crew should transfer to portable oxygen during the post depressurization walkaround to prevent the symptoms of hypoxia. Remember, physical activity requires more oxygen than sitting down. An incapacitated crewmember is no longer able to perform safety duties and aid passengers.

Communication is a lifeline during any emergency. The information that cabin crew can give passengers will save lives. The sharing of information is vital during any emergency, whether it is between cabin crew or passengers. Aircraft safety and survival is a team effort.



9. TURBULENCE MANAGEMENT

9.1. INTRODUCTION

Turbulence is air movement that normally cannot be seen and often occurs unexpectedly. It can be created by many different conditions, including atmospheric pressure, jet streams, air around mountains, cold or warm weather fronts or thunderstorms. Turbulence can even occur when the sky appears to be clear.

Turbulence is the leading cause of injury to passengers and cabin crew in non-fatal accidents. Initiatives can be taken to reduce turbulence-related injuries, with little or no financial cost to the operator.

The aim of this Chapter is to:

- Increase cabin crew awareness of the hazards of turbulence
- Provide strategies to enable the cabin crew to effectively manage the cabin during turbulence
- Help cabin crew to ensure safety in the cabin and prevent turbulence-related injuries.

9.2. STATISTICAL DATA

Turbulence-related injuries to cabin crew occur much more frequently than turbulence-related injuries to passengers, because cabin crew are constantly working in the cabin.

IATA, Safety Trend Evaluation, Analysis and Data Exchange System (STEADES) performed a study of turbulence-related injuries to cabin crew.

Analysis revealed that from January 1st 2004 to December 31st 2004 there were 232 reported cases of turbulence-related injuries to cabin crew, and that

- **64%** of the injuries were due to cabin crew not being secured during turbulence
- **44%** of the injuries occurred in the galley
- **9%** of these incidents resulted in serious injury to cabin crew.

In the majority of these cases, cabin crew were lifted off the floor, or lost their balance, resulting in foot, ankle and back/spinal injuries.

Other cabin crew injuries were due to loose items in the cabin, such as trolleys.



Figure 1

Damage to cabin ceiling panel during turbulence

9.3. TURBULENCE DEFINITIONS

The following levels of turbulence can be encountered during a flight:

- **Light Turbulence.**
- **Moderate Turbulence.**
- **Severe Turbulence.**

The cabin crew should always use these terms when communicating turbulent conditions to the flight crew or other crew members.

The following table provides the definition and the cabin conditions associated with each of the three levels of turbulence.

LIGHT TURBULENCE	MODERATE TURBULENCE	SEVERE TURBULENCE
Light turbulence momentarily causes slight, rapid and rhythmic bumpiness without noticeable changes in the aircraft altitude or attitude.	Moderate turbulence causes rapid bumps or jolts.	Severe turbulence causes large abrupt changes in the aircraft altitude and attitude.
CABIN CONDITIONS	CABIN CONDITIONS	CABIN CONDITIONS
Liquids are shaking but are not splashing out of cups Trolleys can be maneuvered with little difficulty Passengers may feel a slight strain against their seat belts.	Liquids are splashing out of cups Trolleys are difficult to manoeuvre It is difficult to walk in the cabin It is difficult to stand without holding onto something Passengers feel definite strain against their seat belts	Items fall or are lifted off the fall Loose items are tossed about the cabin It is impossible to walk Passengers are forced violently against their seat belts

9.4. TURBULENCE MANAGEMENT

9.4.1. CREW COMMUNICATION AND COORDINATION

Two-way communication between the cabin crew and the flight crew is necessary in order to manage turbulence and prevent turbulence-related injuries. There are Standard Operating Procedures (SOPs) that can be implemented to enable the flight crew and the cabin crew to improve communication and effectively manage the aircraft and the cabin during turbulence.

For example, use common terminology when communicating the severity of turbulence.

- Light turbulence
- Moderate turbulence
- Severe turbulence.

Using common terminology ensures that the flight crew and the cabin crew share a common understanding of the level of turbulence expected. This enables the cabin crew to perform the appropriate actions and duties, to effectively manage the cabin during turbulence.

Note

On large aircraft, it is possible that the forward section of the aircraft will experience less turbulence than the aft section of the aircraft. Therefore, the flight crew may not be aware of the level of turbulence experienced in the aft section of the cabin.

It is important that the cabin crew inform the flight crew of turbulent conditions in the cabin during the flight.

9.4.2. EXPECTED TURBULENCE

As part of the preparation for the flight, the flight crew receive information on the weather en route, they will therefore be aware of possible areas of turbulence that are forecast for the flight.

The preflight briefing between the flight crew and the cabin crew should include information about the areas of turbulence expected during the flight, and the procedures to be applied in the case of turbulence, for example.

- If areas of turbulence are forecast during the flight
- Estimated time until reaching the area of turbulence
- The severity of the expected turbulence (i.e. light, moderate or severe turbulence)
- The actions that the Captain wants the cabin crew to perform when turbulence is expected
- The signal the flight crew will give to the cabin crew to indicate that the aircraft is no longer going through turbulence (for example, by calling the cabin crew via the cabin interphone, or Passenger Address (PA)).

9.4.3. SUDDEN TURBULENCE

During the flight, the aircraft may encounter areas of turbulence that were not forecast.

For example, Clear Air Turbulence (CAT), which usually occurs at high altitudes, may result in the aircraft suddenly entering an area of turbulence during cruise. Clear Air Turbulence can be forecast but cannot be detected by the aircraft radar, so there is often no warning.

When an aircraft encounters, or is about to encounter, moderate or severe turbulence, there may be little or no time for preparation.

If the flight crew turn on the FASTEN SEAT BELT sign and make an announcement for “all passengers and crew to fasten seat belts immediately”, the cabin crew should:

- Immediately sit down and secure themselves (if a crew seat is not nearby, the cabin crewmember should use a passenger seat)
- Instruct passengers to fasten their seatbelts
- Stay seated until advised by the flight crew or until the FASTEN SEAT BELT sign is switched off.

If time permits before the turbulence encounter, the flight crew should advise the cabin crew:

- How much time there is available to secure the cabin
- The level and expected duration of the turbulence
- How the flight crew will inform the cabin crew that the aircraft is no longer going through turbulence (for example, by calling the cabin crew via the cabin interphone, or Passenger Address).

9.4.4. CABIN CREW PERSONAL SAFETY

Turbulence-related injuries to cabin crew are more frequent than turbulence-related injuries to passengers. Cabin crew should be aware of the types of hazards in the cabin that can cause harm during a turbulence encounter. If a cabin crewmember loses balance, they may injure themselves by striking armrests, ceiling video screens or in-flight entertainment equipment connected to passenger seats.

Federal Aviation Authority (FAA) Advisory Circular 120-88A recommends that training courseware should be used to increase cabin crew awareness of their vulnerability during moderate and severe turbulence encounters. During cabin crew initial and recurrent training, it is recommended to use real scenarios and interviews with cabin crew that have experienced moderate to severe turbulence, in order to demonstrate that “turbulence can be stronger than you are”.

9.4.5. BALANCING SAFETY AND SERVICE

The role of cabin crew requires that both safety and service duties are performed during the flight.

It is important that operators develop strategies that can enable the cabin crew to effectively manage both safety and service duties.

For example, if turbulence is anticipated to occur after takeoff or during approach, the cabin service can be adapted according to the flight conditions. If turbulence is expected near the destination, starting the cabin service earlier will give the cabin crew sufficient time to correctly secure the cabin before approach.

Cabin crew should not risk injury by continuing cabin service during moderate or severe turbulence. If the turbulence is too intense, the cabin crew should:

- Inform the Purser and the flight crew
- Stop the cabin service
- The cabin crew should be seated without delay, whether or not they have been instructed to do so by the flight crew.

9.4.6. CABIN MANAGEMENT

It is possible that loose objects, such as passenger baggage, or service equipment, such as trays, trolleys, etc. become projectiles, and cause injury to cabin crew and passengers during turbulence.

Operators should develop and implement strategies to enable the cabin crew to efficiently manage the cabin, in order to ensure safety and prevent turbulence-related injuries. Some practices can be applied to assist the cabin crew, for example:

- Ensuring that trolleys do not remain unattended in the cabin and stowing trolleys when not in use.
- Frequently checking the cabin during the flight to ensure that.
 - The cabin is kept tidy in order to limit the amount of loose objects such as glasses and trays
 - Passenger baggage is not left in the aisles
 - All the overhead stowage compartments are closed during the flight.

If the cabin crew follow the above-mentioned strategies, they will need less time to secure the cabin in the case of turbulence.

9.4.7. GALLEY MANAGEMENT

Many cabin crew injuries occur in the galley areas. These injuries are mostly due to galley equipment or objects that are not secured, for example.

- Trolleys that remain in the galleys without the brakes being applied
- Galley compartments that are not correctly latched and closed, falling from their stowage and spilling their contents
- Bottles, coffee pots and service items falling off the galley countertops.

After each service, the cabin crew should:

- **Stow** trolleys in the correct stowage
- **Set** the trolley brake to on, when the trolley is not being moved
- **Close and lock** the doors of trolleys and stowage compartments immediately after each use
- **Stow** service equipment that is not in use
- **Place** service equipment that is in use in a drawer or cupboard so that it can be easily stowed in the event of turbulence
- **Use** the latches provided on coffee/beverage makers to keep coffee pots secured in order to prevent hot contents from spilling.



Cabin crew should never use the galley standard units as a seat or a step. The galley standard units should be in their correct location, closed and latched when not in use.

Securing the galley after each service and restraining all equipment after each use, means that less time is needed to secure the galley in the event of turbulence. Therefore, this enables the cabin crew to secure themselves rapidly and prevent injuries.

GALLEY PROCEDURES DURING TURBULENCE

LIGHT TURBULENCE	MODERATE TURBULENCE	SEVERE TURBULENCE
<p>Ensure that trolleys and galley equipment not in use are correctly stowed and secured.</p> <p>Empty hot beverages not in use.</p>	<p>Ensure that trolleys and galley equipment not in use are correctly stowed and secured.</p> <p>If the turbulence is expected for a longer duration, stow and secure all galley items.</p> <p>Empty hot beverages and liquid containers and stow.</p> <p>Crew members working in the galley areas must take their seats when the galley is secure.</p>	<p>Set the brakes on all trolleys that are in use in their current location.</p> <p>Place pots and hot beverages on the floor.</p> <p>Cabin crew must immediately sit down and fasten seatbelt and harness</p> <p><u>WARNING</u> Cabin crew must not risk personal injury by returning to the galley to stow items during severe turbulent conditions. The personal safety of the cabin crew is the priority.</p>

9.4.8. PASSENGER MANAGEMENT

The most effective way to prevent passenger and cabin crew injuries during turbulence is to **sit down and keep seatbelts fastened**.

The best way to help prevent turbulence-related injury is to use seat belts. The flight crew and cabin crew should encourage the use of seat belts and the importance of passenger compliance with the FASTEN SEAT BELT signs.

Flight safety organizations recommend that during the after takeoff announcement, the flight crew and cabin crew should advise passengers to always keep their seat belts fastened while seated.

When the FASTEN SEAT BELT sign comes on in-flight due to turbulence, the cabin crew must:

- Make an announcement to advise passengers to return to their seats and fasten their seat belts
- Walk through the cabin and check that all passengers are seated with their seat belts fastened
- Make periodic announcements when the FASTEN SEAT BELT signs are on for a long time, or when passengers do not comply with the FASTEN SEAT BELT signs.

Note: When the FASTEN SEAT BELT signs remain on for reasons other than turbulence, the effectiveness of the FASTEN SEAT BELT sign is reduced for passengers and cabin crew.

9.5. POST TURBULENCE

When the turbulence is over, the flight crew will advise the cabin crew that they can resume their cabin duties.

After moderate to severe turbulence, the cabin crew must check the cabin for damage and passenger injuries. The cabin crew should provide first aid treatment to injured passengers or cabin crew and reassure passengers if necessary.

In addition, the Purser must report the cabin status to the flight crew.

9.6. SUMMARY

- Cabin crew must be aware of their own safety during turbulence
- The flight crew and cabin crew preflight briefing, should include the following subjects:
 - Anticipated areas of turbulence during the flight
 - The importance of keeping the flight crew informed of the conditions in the cabin.
- Use standard terminology when referring to the severity of a turbulence encounter, to ensure that all cabin crew and flight crew understand the meaning and the required actions
- Encourage the use of seat belts. Passengers should be advised during the after takeoff announcement to keep their seat belts fastened at all times when seated.
- Effectively use the Passenger Address (PA) system and other types of communication with passengers during turbulence to ensure safety.

9.7. TURBULENCE MANAGEMENT PROCEDURES

The following levels of turbulence can be encountered during a flight.

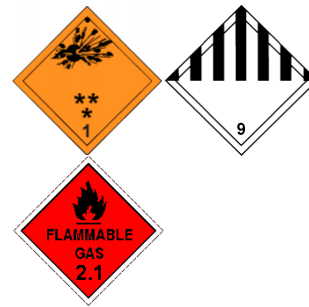
- Light turbulence
- Moderate turbulence
- Severe turbulence.

The cabin crew should always use these terms when communicating turbulent conditions to the flight crew or other cabin crew.

The table below describes the turbulence procedures for cabin crew.

CABIN CREW PROCEDURES DURING TURBULENCE

LIGHT TURBULENCE	MODERATE TURBULENCE	SEVERE TURBULENCE
<ul style="list-style-type: none"> - Visually check that all passengers are seated with their seat belts fastened and hand baggage is stowed - Infants must be removed from bassinets and secured with an infant seat belt (if applicable) on the guardians lap, or secured in an approved car seat. - Give the "cabin secure" to the Chief Purser - Chief Purser informs the flight crew that the cabin is secure. - Check if it is safe to continue with the service especially the serving of hot liquids 	<ul style="list-style-type: none"> -When the cabin crew are returning to their crew seats, check that all passengers are seated with their seat belts securely fastened and hand baggage is stowed - Infants must be removed from bassinets and secured with an infant seat belt (if applicable) on the guardians lap, or secured in an approved car seat. - Give the "cabin secure" to the Chief Purser - Chief Purser informs the flight crew that the cabin is secure. 	<ul style="list-style-type: none"> - The cabin crew must not attempt to visually check passenger compliance - If trolleys are in the cabin, set the brakes on all trolleys that are in use in the current location - Place jugs/pots of hot beverages on the floor - The cabin crew must immediately sit down. Take the nearest seat (including a passenger seat) and fasten seat belt/harness. <p><u>WARNING</u> Cabin crew must not risk personal injury by continuing with the service during turbulent conditions. The personal safety of the cabin crew is the priority.</p>



10. DANGEROUS GOODS AWARENESS

10.1. INTRODUCTION

Many everyday items and substances can be dangerous when transported by air. Due to the variations in temperature and pressure during a flight, some of these items may leak or break, generating toxic fumes or possibly starting a fire.

Employees who may come into contact with dangerous goods need to be aware of the nature of such goods, their potential for causing incidents and accidents and how to deal with them.

10.2. DEFINITION OF DANGEROUS GOODS

The International Civil Aviation Organization (ICAO) defines dangerous goods as: “Articles or substances which are capable of posing a risk to health, safety, property or the environment and which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions.”

(ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air)

The International Civil Aviation Organization (ICAO) “Technical Instructions for the Safe Transport of Dangerous Goods by Air”, provides Operators with the basic legal requirements for transporting dangerous goods by air.

The International Civil Aviation Organization (ICAO) and the International Air Travel Association (IATA) provide guidance material for Operators who wish to develop their dangerous goods training programs. The ICAO and IATA guidance material is updated annually and provides Operators with an excellent source of information on dangerous goods.

EASA, the FAA and many Aviation authorities require that Operators provide dangerous goods training for cabin crew during initial and recurrent training.

This training should include:

- The risks involved in carrying dangerous goods by air
- **How** to deal with a dangerous goods incident onboard the aircraft.

10.3. REPORTED DANGEROUS GOODS INCIDENTS

Prohibited dangerous goods may inadvertently be carried onboard an aircraft by passengers who are not aware of, or who deliberately ignore, the regulations. Items that passengers are entitled to carry onboard an aircraft may also cause an incident.

The following are some examples of cases where baggage contained dangerous goods onboard the aircraft.

- “Upon arrival, customs officers found a passenger's baggage contained 48 long fireworks (roman candle type), 32 packets of friction ignition (match style) fireworks and 2 cigarette lighters, all packed in the same bag. The passenger had started his journey with another operator and had made two transit stops prior to connecting with the flight in question.” (Source. Civil Aviation Authority, United Kingdom Safety Regulation Group, *Dangerous Goods Monthly Report*, April 2007).
- The picture below shows damage to passenger baggage due to bottles of 35-percent hydrogen peroxide solution in water, an oxidizer with corrosive properties that leaked in a cargo compartment.

The bottles were in an ice chest that was checked in by a passenger on the flight.

The suitcase was found smoldering in the cargo compartment by the baggage handlers.



Photo Credit. National Transportation Safety Board, (NTSB) DCA-99-MZ-001

Damage to Passenger Baggage

10.4. DANGEROUS GOODS CLASSIFICATIONS

The main document of reference used by operators is the International Air Transport Association (IATA) Dangerous Goods Regulations (DGR) guide. The IATA DGR provides operators with information regarding the marking, packaging, labelling and the documents required for dangerous shipments, based on international and national air regulations.

The IATA Dangerous Goods Regulations are developed in accordance with the ICAO Technical Instructions.

Dangerous goods are classified into hazard classes. Each hazard class is divided into several sections and specific labels are applied to each one of these classes and/or sections.

A system of diamond-shaped placards and labels are used to identify dangerous goods. Different colors and symbols, such as a flame for flammables or skull and crossbones for poisons, identify the dangers associated with the product.

Note. These symbols are as Known at the time of the publication and are subject to revision. Operators should refer to the IATA Dangerous Goods Regulations.

Class 1. Explosives – Explosive substances, explosive articles, and pyrotechnic devices, for example, ammunition and fireworks.



Class 2. Gases

- **Class 2.1 Flammable Gases.** Gases, which ignite on contact with an ignition source, such as acetylene and hydrogen
- **Class 2.2 Non-Flammable Gases.** Gases, which are neither flammable nor poisonous.
- **Class 2.3 Poisonous Gases.** Gases liable to cause death or serious injury to humans if inhaled for example hydrogen cyanide



Class 3. Flammable liquids – Examples are petrol, alcohol, and perfume.



Class 4. Flammable solids – Examples are matches, flammable metal powder

- **Class 4.1. Spontaneous Combustibles**
- **Class 4.2. Dangerous When Wet** - Solid substances that emit a flammable gas when wet or react with water when wet, such as sodium and potassium.



Class 5. Oxidizing Agents and Organic peroxides

- **5.1 Oxidizing Agent** - oxidizing agents, which are not organic such as ammonium nitrate and chemical oxygen generators.
- **5.2 Organic Peroxides** – are thermally unstable substances that may undergo heat generating, self-accelerating decomposition. These substances are sensitive to impact or friction, or may create a dangerous reaction when in contact with other substances. These substances may be explosive and burn rapidly. Some examples are, fertilizers, and pool chemicals.



Class 6. Toxic (poisonous) and infectious substances

- **Class 6.1 Toxic substances** - those substances that are liable to cause death or injury if swallowed, inhaled or absorbed through the skin. Examples are pesticides, poisons and mercury.
- **Class 6.2 Infectious substances** - those known to contain, or reasonably expected to contain, pathogens, such as Bacteria, Viruses and medical waste (used needles).



Class 7. Radioactive materials – Radioactive substances - I-White



Class 8 Corrosives –Corrosive substances can dissolve organic tissue or severely corrode certain metals for example, hydrochloric acid or sulfuric acid contained in batteries.



Class 9 Miscellaneous - Hazardous substances such as dry ice and magnets.



10.5. DANGEROUS GOODS ACCEPTED IN THE CABIN

Passengers and cabin crew are permitted to carry a limited amount of classified dangerous goods for personal use in their carry-on baggage, such as:

- Toiletry articles. e.g. perfume, nail polish, nail polish remover
- Small lithium and lithium-ion batteries, such as those found in portable electronic devices
- Alcoholic beverages, with an alcohol content of less than 70%
- Dry ice.

Note: The types of items that are authorized onboard the aircraft may vary in each country, depending on the local aviation authority and security regulations.

Other classified dangerous goods that are permitted in the cabin include required emergency equipment, in accordance with airworthiness regulations, such as:

- Oxygen
- Fire extinguishers
- CO2 gas cylinders to inflate the life vests.

10.6. PROHIBITED DANGEROUS GOODS

The discovery of the following items in the cabin must be considered as a dangerous goods incident as the items below are strictly prohibited for transport in the cabin.

- Explosives – fireworks, flares, toy gun caps
- Compressed gases - filled or partly filled aqualung cylinders (including camping gas cylinders)
- Flammable liquids and solids - lighter fuel, non-safety matches, paints, thinners, fire lighters

- Oxidizers - some bleaching powders
- Organic peroxides - some types of solid hydrogen peroxide
- Poisons - arsenic, cyanide, and weed-killer
- Irritating materials - Tear gas devices
- Infectious substances - live virus materials
- Radioactive materials - medical or research samples which contain radioactive sources
- Corrosives - acids, alkalis, wet cell type car batteries, caustic soda
- Magnetized materials - instruments containing magnets.

10.7. DANGEROUS GOODS HANDLING

Operators should provide dangerous goods response kits onboard the aircraft to enable the cabin crew to deal with a dangerous goods incident. A dangerous goods response kit usually contains the following minimum equipment:

- Large, heavy quality polythene bags
- Bag ties to seal the bags correctly after use
- Long rubber gloves.

If a dangerous goods response kit is not provided onboard the aircraft, the cabin crew must improvise using the equipment that is available. There are many pieces of equipment in the cabin that the cabin crew may use in this case, such as:

- Oven gloves/fire gloves that can be covered with plastic bags to protect the hands
- Large and small polythene bags, e.g. waste bin bags, duty free bags or airsickness bags
- Absorbent materials, e.g. paper towels, newspapers, headrest covers, etc.
- Catering boxes
- Towels
- Blankets

10.8. DISCOVERY OF DANGEROUS GOODS IN THE CABIN

The first alert to a dangerous goods spillage or leak may be from a passenger who notices an unusual odor or fumes, or who simply identifies an item that is leaking from cabin baggage. When a dangerous good is discovered in the cabin, the cabin crew must **notify the flight crew immediately**.

The cabin crew should ask the passenger concerned to **identify the item**. The passenger may be able to provide the cabin crew with some guidance on the hazard involved.

The cabin crew should try to collect as much information as possible, e.g. check for:

- A dangerous goods label
- Numbers on the packaging
- Written information on the packaging
- Odors
- Fumes
- Smoke
- An effect on passengers

In the case of a spill of known or suspected dangerous goods in powder form:

- ***Leave everything undisturbed***
- ***Do not use a fire extinguisher or water***
- ***Cover the area with polythene, plastic bags and blankets***
- ***Isolate the area until after landing.***

10.9. CREW COMMUNICATION AND COORDINATION

The cabin crew should provide the flight crew with an accurate description of the item, and the effects in the cabin, in order to help the flight crew to apply the appropriate procedure. It is essential that the cabin crew and flight crew coordinate their actions and that they keep each other fully informed of their actions and intentions.

10.10. PROTECTION

The cabin crew should put on gloves before they touch leaking, suspicious packages or items in order to protect their hands. If rubber gloves are not provided, fire-resistant gloves or oven gloves covered by polythene bags are a suitable alternative.

The cabin crew should also use Portable Breathing Equipment (PBE) to protect themselves from fumes or smoke.

If there are fumes or smoke, the cabin crew should take prompt action and move passengers away from the affected area, provide wet towels or cloths and instruct passengers to breathe through them.

If the item or substance is emitting fumes or smoke, or if there is a fire, the cabin crew must apply the procedures for smoke and fire.

Water should not be used on a spillage or when fumes are present as it may spread the spillage or increase the fumes. Consideration should also be given to the possible presence of electrical components when using water extinguishers.

10.11. DANGEROUS GOODS REMOVAL

The dangerous good and the associated contaminated materials should be removed from the cabin.

The dangerous good should be placed in a dangerous goods bag or a polythene bag, with the damaged/leaking part or opening facing upwards. Put all materials that became contaminated when removing the dangerous good in the same bag.

Close the bag and expel excess air, twist the open end of the bag, and seal it by tying a knot or using a bag tie.

Note. The cabin crew must not make the bag airtight. It must be tight enough to be secure, but not so tight that pressure equalization cannot take place.

Take off the gloves, and avoid skin contact with any contaminants. Put the gloves in the second bag. Place the first bag into the second dangerous goods bag using the same procedure.

All contaminated materials, such as seat covers and sections of carpet should be treated in the same manner as a dangerous good.

10.12. STOWING DANGEROUS GOODS ITEMS

After the cabin crew clean up the dangerous goods spill, they must ensure that the polythene bags containing the dangerous goods are safely stowed and secured.

If a catering box is available, the cabin crew can use it to store the bags containing the dangerous goods.

Dangerous goods should be stored in a location that is as far away from the cockpit and passengers as possible. The cabin crew may use an aft galley or aft lavatory, if possible. However, boxes or plastic bag(s) must not be stored against the pressure bulkhead or fuselage wall.

If the cabin crew use a lavatory to store dangerous goods, boxes should be put on the floor, bag(s) should be stowed in an empty waste container, and the lavatory door should be locked from the outside. Using the lavatory to store the dangerous goods will prevent fumes from entering the cabin.

Note: In a pressurized aircraft, if a lavatory is used, any fumes will be vented away from passengers.

When moving a box that contains dangerous goods, the cabin crew must ensure that the opening remains upward. When moving a bag, the cabin crew must ensure that the receptacle containing the dangerous goods remains upright.

Regardless of the location of the catering box or bag, the cabin crew must secure them firmly to prevent them from moving.

10.13. REPORTING A DANGEROUS GOODS INCIDENT

The cabin crew and flight crew should coordinate to complete an Air Safety Report following a dangerous goods incident. In many countries this report is mandatory. This report should include:

- The date of the incident or accident, or the discovery of undeclared or incorrectly declared dangerous goods
- The flight number and flight date
- A description of the goods and the location found in the cabin
- The type of packaging and the packaging specification marking on it
- Passenger details, e.g. seat number, name, address
- Crew actions
- Any other relevant information.

The cabin crew must enter the details of the incident in the aircraft maintenance logbook, so that the maintenance personnel can replace the dangerous goods kit (if installed) and repair any damage to the cabin caused by the incident.

After landing, notify the ground personnel of all the known facts about the Dangerous Goods item and where it is stowed.

10.14. PREVENTION STRATEGIES

Dangerous goods are regularly and routinely carried on passenger and all cargo aircraft, and present little hazard in transport provided they are correctly identified, packaged and handled. But, dangerous goods can be potentially harmful to passengers and crew if they release smoke or fumes in the cabin or develop into an on-board fire.

Therefore, both the Operator and the cabin crew should take the following preventive actions:

- Display notices for passengers at check-in areas, ticket sales desks, etc.
- Ensure that the regulations regarding the transportation of dangerous goods are strictly adhered to by ground personnel, passengers and the cabin crew and flight crew.
- Provide detailed and precise procedures for dangerous goods handling and emergencies to all employees who may come into contact with dangerous goods.

10.15. DANGEROUS GOODS INCIDENT CHECKLIST

INITIAL ACTION

The cabin crew must notify the flight crew of:

- The nature and location of the dangerous goods
- The type of dangerous goods, if possible (passenger may be able to assist)
- Whether or not passengers are affected, e.g. if there is smoke or fumes in the cabin.

IN THE CASE OF FIRE

The cabin crew must apply the basic firefighting procedure.

Note: The cabin crew must use the firefighting procedure to control any fire. In general, the cabin crew must not use water on a spillage or when there are fumes. This is because water may cause the spillage to spread or may increase the fumes. The cabin crew should also consider whether or not there are electrical components in the area when using water extinguishers.

IN THE CASE OF SPILLAGE OR A LEAK

The cabin crew must:

- Collect the emergency response kit (if equipped) or other useful items
- Put on rubber gloves and Portable Breathing Equipment (PBE)
- Move passengers away from the area, distribute wet towels or cloths, and instruct passengers to place the wet cloths over their nose and mouth and breathe through them.

REMOVAL OF DANGEROUS GOODS

The cabin crew must remove a dangerous good as follows:

1. Put the dangerous good in a dangerous goods bag or a polythene bag, with the broken part or opening facing upwards.
2. Put all materials that become contaminated when removing the dangerous good in the same bag.
3. Close the first bag and expel excess air, twist the open end of the bag, and seal it using one bag tie.

Note: The cabin crew must not make the bag airtight. It must be tight enough to be secure, but not so tight that pressure equalization cannot take place.

4. Take off the gloves, and avoid skin contact with any contaminants. Put the gloves in the second bag.
5. Place the first bag into the second dangerous goods bag using the same procedure.
6. Tag and stow the bag in the lavatory. Tag and lock the lavatory door with a dangerous goods tag.
7. Treat all contaminated materials, such as seat covers and sections of carpet in the same manner as a dangerous good.
8. Cover the carpet/floor area where the dangerous good has leaked/spilled.
9. Regularly inspect the lavatory used for dangerous goods stowage and the contaminated areas in the cabin.
10. Make an entry in the cabin/aircraft maintenance logbook.
11. Complete an Air Safety Report of the incident.

AFTER LANDING

The cabin crew must provide the ground/maintenance personnel with all necessary information regarding the dangerous good and where it is located.



11. BOMB ON BOARD

11.1. INTRODUCTION

There are many different forms of bomb threats, the majority of which are hoaxes. However, a bomb threat, no matter which form it takes, should be regarded as a legitimate threat to flight safety.

Types of bomb threats.

- **Specific.** The operator, flight number, aircraft type, departure time, and destination are positively identified. The location of the bomb on board the aircraft may also be given
- **Non-specific.** May identify a flight by destination, origin or departure time.

These types of threats usually take the form of a telephone call. The bomb threat will be treated according to the operator's policy and security procedures.

However, there are other threats that may occur onboard the aircraft:

- Passenger made bomb threat
- An anonymous written message found onboard the aircraft, such as a message on the mirror in the lavatory, on an airsickness bag, or on a piece of paper left visible to passengers or crew

In the event of a threat made in-flight, **notify the flight crew immediately.**

The captain will decide the course of action to take. The cabin crew should wait for further instructions.

11.2. SUSPECT ITEM

How would cabin crew determine a suspect item onboard?

The three following questions may help to determine a suspect object:

- **Is the item characteristic “normal” to the location?**
- **Has the item been hidden?**
- **Does the object look obviously suspicious?**

The cabin crew should report any doubts regarding any unusual item. The crewmember who finds the item should:

- **Notify the flight crew immediately**
- **Notify all other cabin crew.**

DO NOT

- **Leave the suspect object unattended, ask another crewmember to stay and guard over the area, to prevent any inadvertent movement or handling**
- **Touch or disturb the object**
- **Move it until the Captain has made the decision to move the item to the Least Risk Bomb Location (LRBL)**
- **Cut or disconnect any wires or strings**
- **Use electronic devices in the vicinity of the suspect object.**

Provide the flight crew with as much information as possible.

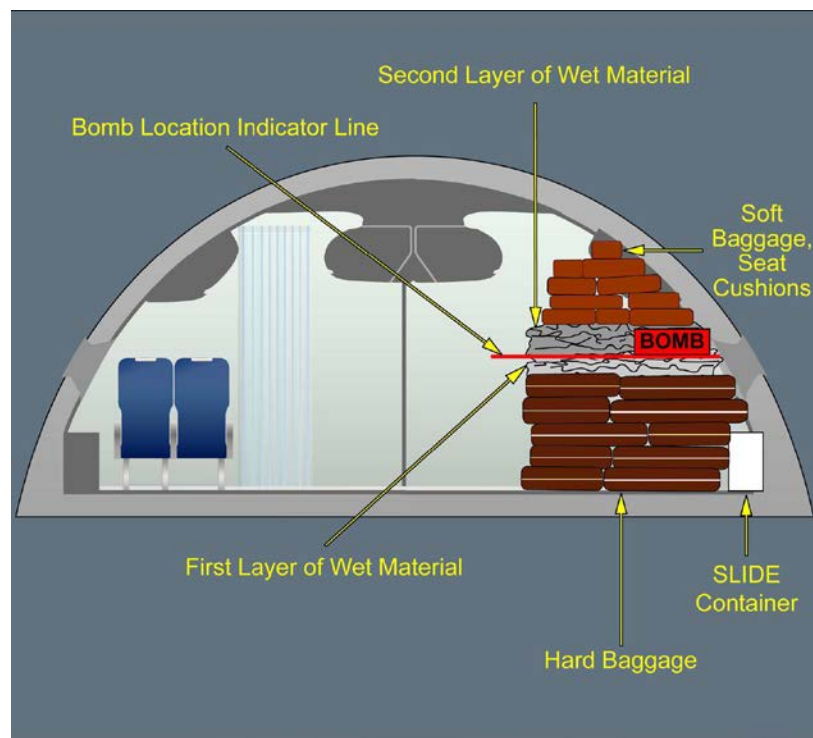
- **Exact location**
- **Description of the object - give as much detail as possible**
- **Size**
- **Color**
- **Any particular odor.**

The cabin crew should wait for further instructions from the flight crew. The Captain will decide whether to implement the ‘Bomb on Board’ procedure.

11.3. LEAST RISK BOMB LOCATION (LRBL) PREPARATION

- Move passengers away from the site of the LRBL
- Remove all safety equipment from the area as well as any flammable objects
- Protect the floor area with meal trolleys laid on their side – at least two, one on top of the other
- Use seat cushions to build a platform up to window height
- Prepare damp materials (blankets, curtains, coats, etc) by soaking them in the washbasins or using any appropriate liquid except alcohol
- Place the suspect item onto the LRBL (in the same position and angle as it was found) as close to the door as possible
- Cover with plastic to keep it dry and continue building the LRBL above and around the suspect item. Carry-on baggage may be used provided it contains soft items
- The completed LRBL should be at least 2 metres wide and if possible should reach the ceiling.

Example of LRBL Stack



11.4. BOMB ON BOARD CABIN CREW PROCEDURE

When a suspect device is found in the cabin.

WARNING

Do not cut or disconnect any wires. Do not attempt to gain entry to internal components of a closed or sealed suspect device. Any attempt may result in an explosion. Booby-trapped closed devices have been used on aircraft in the past.

WARNING

Alternative Least Risk Bomb Locations LRBL must not be used without consulting with an aviation explosives security specialist. Never take a suspect device to the cockpit.

The LRBL location for each aircraft is documented in the Aircraft Flight Manual.

EOD PERSONNEL ON BOARD CHECK
Announce. "Are there any EOD personnel on board?" By using the initials, only persons familiar with EOD (Explosive Ordnance Disposal) will be made aware of the problem.

BOMB DO NOT OPEN, DO NOT CUT WIRES, SECURE AGAINST SLIPPING, AVOID SHOCKS
Secure in the attitude found and do not lift before having checked for an anti-lift ignition device.

PASSENGERS. LEAD AWAY FROM BOMB
Move passengers at least 4 seat rows away the bomb location. On full flights, it may be necessary to double up passengers to achieve standoff from the suspect device.
Passengers near the bomb should protect their heads with pillows, blankets.
All passengers must remain seated with seat belts on and, if possible, head below the top of the head rest. Seat backs and tray tables must be in their full upright position.
Service items may need to be collected in order to secure tray tables.
Distance from an explosion is one of the best protective measures for passenger safety.
Placing seat backs and tray tables in their full, upright positions will provide additional protection

CREW REST AREAS EVACUATE
For aircraft equipped with crew rest areas

PORTABLE ELECTRONIC DEVICES SWITCH OFF

BOMB. CHECK NO ANTI-LIFT DEVICE
If possible, place a thin card (safety instruction card) in place underneath it and move it in the position found to the prepared LRBL base.
Stabilize it on top of the plastic sheet above the 10 inches (25 cm) of wetted materials and center it against the inside surface of the door.
Position the bomb in the attitude found, as close to the center of the LRBL door.

CAUTION

Ensure that the suspect device, when placed in the stack against the door, is above the slide pack but NOT against the door handle, and if possible, avoid placement in the view port.

LEAST RISK BOMB LOCATION COMPLETE
Place an additional sheet of thin plastic over the bomb.

CAUTION

Do not omit the plastic sheets, as the suspect device could get wet and possibly short circuit electronic components causing inadvertent device activation.

Carefully pack at least 10 inches (25 cm) of the prepared damp materials around and on top of the bomb.
Arrange the soft carry-on baggage in a manner that prevents excessive weight from being applied directly in the bomb, and fill the entire remaining area above the bomb with soft blast-attenuating materials, for example, seat cushions up to the cabin ceiling and out to the aisle.

LRBL SECURE
Secure the LRBL stack in place using seat belts, headset cords, ties, or other appropriate materials.



12. CREW RESOURCE MANAGEMENT (CRM)

12.1. INTRODUCTION

“Crew Resource Management is the effective use of available resources (e.g. cabin crew, aircraft systems and supporting facilities), to achieve safe and efficient operations” (EU-OPS and ICAO).

Aviation has reached a very high level of safety with very low accident rates in recent years. This can be attributed to the efforts of the many people involved in the design, manufacture, and training, and the aviation authorities who take time and effort to ensure the highest possible levels of flight safety. The ultimate goal is to obtain zero accidents.

Accident analysis indicates that there are many factors that contribute to an accident. Accidents rarely occur due to one particular cause, but are in fact attributed to a chain of events. Some accidents have been attributed to the failings of both flight crew and cabin crew to communicate.

Therefore, to improve performance and help cabin crew realize the factors that influence the way cabin crew communicate, make decisions, manage stress and increase situational awareness skills, Crew Resource Management (CRM) was born.

The everyday operation of an aircraft requires very complex planning and coordination. In addition to the numerous tasks to be completed by the flight crew and cabin crew once onboard the aircraft, there are many teams of people involved in getting an aircraft off the ground. Sometimes it can be overwhelming, every day does not always run smoothly, and just to complicate matters further, we are all **HUMAN**. The Human Factor is a big part of the equation.

Since 1940, three out of four accidents have had at least one contributory factor relating to human performance.

CRM addresses the human factors elements of flying, such as interpersonal relationships, stress, fatigue and how they can affect performance. The correct application of CRM skills helps to create an effective crew, and is a valuable tool that helps cabin crew to assess

situations and react accordingly. CRM promotes vigilance in order to prevent errors that may occur due to human error.

Initially, CRM was for pilots only. Today, it is a mandatory part of initial and recurrent cabin crew training in EASA and FAA operating regions, and many countries throughout the world.

CRM should be seen as a means to help cabin crew to be objective, effective and cope with what can sometimes be a very hectic working environment. CRM helps cabin crew to develop knowledge, skills and attitudes that will reduce the risk of error.

12.2. COMMUNICATION AND COOPERATION

■ JAR-OPS 1.989 Terminology –Definition of Cabin Crew

“Cabin Crew Member; A crew member, other than a Flight Crew Member, who performs, in the interests of safety of passengers, duties assigned by the operator or the commander of the aircraft”.

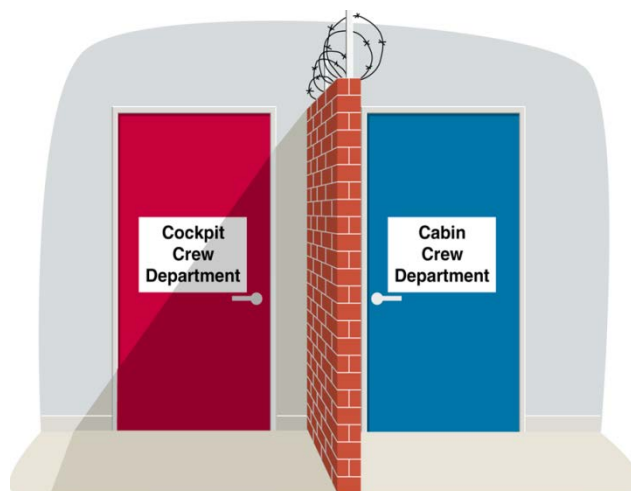
The cabin crew should function as an extension of the flight crew, to ensure safety in the cabin. Flight crew and cabin crew should function as one team with a common goal - flight safety.

Any situation, feeling, word, behavior or observation that alerts cabin crew to a possible threat to flight safety, must immediately be reported to the Purser and the flight crew.

In order to better understand why there is sometimes a lack of communication between the flight crew and the cabin crew, it is necessary to go back in time to see how the two different cultures began.

“In the 70 -year history of commercial airlines, traditions and roles have evolved which influence the crew of today. The original aviators were intrepid pilots who risked life and limb to deliver the mail for the U.S post office. Despite the primitive aircraft and the lack of radio guidance, those independent, self-reliant fliers persevered. In contrast, the original flight attendants were nurses and were selected to be compliant and subservient. Therefore, two very different types of people were called upon to work together in close proximity to one another. A rigid chain of command was adopted from the military and maritime traditions and the pilots and stewardesses were relegated in to separate departments. Moreover, the early flight manuals instructed crews not to converse. Remnants of those guidelines are still in evidence today”

(Source, Mahler, 1991; Chute and Weiner, 1994; 1995.)



There are many factors that can affect crew communication, such as:

- The flight crew report to the operations department/cabin crew to the commercial department
- Separate scheduling, different duty time regulations
- Flight crew are mostly male/cabin crew are mostly female
- Technical for pilots versus social orientation for cabin crew
- Bad or poor perception of each other's duties
- Two very different areas of the aircraft separated by a reinforced door
- Sterile cockpit rule

Communication is essential for the safe operation of an aircraft. However, poor communication continues to contribute to many safety issues within the industry. The incident and accident reports highlight the fact that there is a need for improvement in this area, particularly concerning flight and cabin crew communication.

Flight and cabin crew have the same goals - the safety of the flight being the highest priority. Most crew work well together, and communication is open between the flight crew and the cabin crew. However, it is important to realize how flight safety can be compromised, when a barrier to communication exists or there is no communication at all.

Many accident analyses have indicated that communicating information between the cabin and the cockpit, and vice versa, is vital to flight safety. The following is an extract from the accident report of an accident that took place in the United Kingdom. This is one of a few major accidents that could have had a different outcome, if there had been sufficient communication.

"The three flight attendants in the rear of the cabin saw evidence of fire from the left engine, and two of them briefly saw light colored smoke in the cabin."

"The commander then broadcast to the passengers on the cabin address system that there was trouble in the right engine which had produced some smoke in the cabin, that the engine was now shutdown and they could expect to land at East Midlands Airport in about 10 minutes. The flight attendants who saw signs of fire in the left engine later stated that they had not heard the commander's reference to the right engine. However, many of the passengers who saw the fire were puzzled by the commanders reference to the right engine, but none brought the discrepancy to the attention of the cabin crew"

Following the accident, the AAIB (in Section 2.1.2.2 "Coordination between the flight deck and the cabin") made the following analysis.

"It was extremely unfortunate that the information evident to many of the passengers of the fire associated with the left engine did not find its way to the flight deck even though, when the commander made his cabin address broadcast, he stated that he had shut down the "right" engine. The factor of the role commonly adopted by passengers probably influenced this lack

of communication. Lay passengers generally accept that the pilot is provided with full information on the state of the aircraft and they will regard it as unlikely that they have much to contribute to his knowledge. Even those passengers who noticed the commander's reference to the right engine might well have assumed that the commander had made a slip of the tongue, or that the commander had dealt with it. It cannot be regarded as surprising that information from the passengers was not made available to the pilots.

The same information was available to the 3-cabin crew in the rear of the aircraft but they, like the passengers, would have had no reason to suppose that the evidence of the malfunction they saw on the left engine was not equally apparent to the flight crew from the engine instruments. In addition, it would appear that there was not the same awareness of the possible error, since these cabin crew heard the commander's reference to the right engine. This may have been because the cabin crew, engaged in their own duties, were not aware of any more than the general sense of the broadcast. In addition, cabin crew are generally aware that any intrusion into the flight deck during busy phases of flight may be distracting, and this is particularly true if the flight crew are known to be dealing with an emergency. There can thus be at these times a firm division between flight deck and cabin, and it is notable in this context that in this accident the flight service manager made no initial attempt to approach the flight deck until he was called.

However, it must be stated that had some initiative been taken by one or more of the cabin crew who had seen the distress of the left engine, this accident could have been prevented. It must be emphasized, nonetheless, that present patterns of airline training do not provide specifically for the exercise of coordination between cabin and flight crew in such circumstances" (Source AAIB UK Aircraft Accident Report No. 4/90 (EW/C1095).

This is an example of what can happen when people do not communicate, when we "Don't tell the pilot", and assume that "the pilots know". Pilots may not always be aware of a fault. Therefore, cabin crew can play a crucial role by giving critical information to the flight crew in a timely and accurate manner.

12.3. BRIEFING AND CABIN CREW COMMUNICATION

Effective communication between the cabin crew is vital to the every operation of the aircraft, and is conducive to:

- Establishing common objectives
- Exchanging information
- Monitoring activity
- Reporting situations.
- Setting a friendly and professional atmosphere.

At the beginning of each duty, a briefing is held for the cabin crew to meet and review together the details and requirements for the following duty period.

Briefing is probably the most important part of any flight preparation. Unlike many other types of work where co-workers know each other and have had time to build up a rapport, flight and cabin crew may be meeting for the first time at the briefing. Yet they have to work together in close proximity, and sometimes, for very long periods of time. The briefing is where the rapport building should start by encouraging openness, friendliness, mutual respect and professionalism. Briefing is the starting block for a high performance crew.

Briefing, as the word suggests, should be brief and can be as simple as A-B-C.

- **A= Appropriate**
- **B= Brief**
- **C=Clear and Concise.**

The briefing should be relevant, and appropriate. Focus on details that are specific to the flight.

The aim of the briefing is to organize the crew activities. It is important that every crewmember knows their allocated work position and their safety responsibilities. The briefing must be understood by all cabin crew and they should be given the opportunity to ask questions.

Briefings are the ideal moment for cabin and flight crew to set the tone and the expectations for a flight. It is also the opportunity to advocate open two-way communication between the cabin and the flight crew. Joint crew briefings assist in creating a working environment that is more conducive to a safe operation.

- Cabin crew should introduce themselves
- Use professional and friendly language
- Be respectful to each other
- Be safety conscious
- Cabin crew should be encouraged to report to the purser, or the flight crew, anything that they feel may pose a threat to the safety of the flight
- Discuss the Sterile Cockpit rule with the pilots, and the circumstances that are acceptable for contacting the flight crew during this time
- Understand each other's workload.

Joint cabin crew/flight crew briefings are important. If it is not possible to meet before boarding the aircraft, every effort should be made for the crew to meet together before departure. The flight crew and the Purser should encourage open communication from all cabin crew. All cabin crew should feel that they will be listened to, and that information and feedback are welcome and appreciated.

Maintaining a common picture of a situation is achieved through direct communication, briefings and the use of documented procedures.

Communication is a two-way transfer. Communication also means listening. Listening is an important skill. Active listening demands attention to be directed towards the speaker and the message. If you listen to the other person you will gain more information. There is also a chance that they will listen to what you say.

12.4. BARRIERS TO COMMUNICATION

Barriers to communication are highly undesirable onboard the aircraft. However it is important to be aware of these barriers, and manage them before they become a source of conflict that will result in a breakdown of communication.

- **Uncommunicative attitudes.** It is not easy to communicate with someone who does not want to communicate.
- **Hierarchy.** It is more difficult to be assertive with a senior colleague, than with a colleague of the same job level.
- **Non-verbal components can 'betray' you.** For example, during a PA announcement, additional signs such as breathing, voice, hesitations, and accent contribute to the message.
- **Workload can impair, or even prevent communication.** When there is a high workload, there is less time to communicate. Cabin crew can become so focused on what they are doing that they shut themselves off from what is happening around them and avoid all communication in order to complete the task. If removed from the task, it can be difficult to get back into the flow and they may find themselves repeating what they have already done or miss something that they should have done.
- **Cultural differences.** Cultural differences and language can seriously confuse communication. Cultural differences are not just limited to different countries of origin, but education, upbringing, and values. For example, English is spoken in England and in the United States, however, the meaning of a word in England may not have the same meaning in the United States. The same word may have two totally different meanings, depending on what side of the Atlantic you are on.
- **Difficulties due to the medium of transmission.** Distortion of the information due to background noise, excessive feedback (and volume level) on the PA system, or poor volume of interphone.
- **Assumptions.** When assumptions can be based on expectation and context. Problems associated with assumptions can be minimized, if the message is not ambiguous, and accurate feedback is given. Assumptions occur, when:
 - One of the parties 'assumes' that the other party knows or is aware of a situation, and there is no communication at all

- The sender of a message may assume that the person receiving the message understands the content and context
- The receiver of the message thinks they understand the context of the what the sender is trying to convey
- **Lack of confidence.** A lack of confidence in the abilities of oneself or other members of the crew.

The following is an extract from a National Transportation Safety Board incident report that addresses the importance of effective communication between cabin crew.

“Given the acknowledged seriousness of the in-flight fire and the obvious association of a report of smoke in the cabin with a strong possibility of a fire, the safety board is deeply concerned by the captain’s apparent reluctance to accept either the flight attendant’s or deadheading cabin crew report as valid or to seek additional information to resolve his uncertainty”.

“The captain’s skepticism about the report of smoke was also reflected in the first officer’s dialogue with the cabin crew”.

“In conclusion, the safety board believes that while it is unlikely that the captain could have taken any action to land the plane more quickly, the flight crew failed to use the cabin crew effectively to obtain an accurate understanding of the developing problem. Had communications between the flight crew and the cabin crew been more effective, the safety board believes that the captain would have called for the fire/rescue equipment to meet the airplane and ordered an emergency evacuation on the runway. The safety board believes that airlines should use this example in cockpit and cabin crew coordination training to illustrate the need for flight crews to more effectively use cabin crews in describing suspected in-flight safety problems and to emphasize the need for cabin crews to be assertive when communicating information about safety problems to the flight crew.

The lack of close coordination and timely exchange of accurate information among cabin crew were clearly problems during preparations for a possible emergency landing of a DC-8 at Portland, Oregon, in 1978. during an in-flight fire aboard an L-1011 at Riyadh, Saudi Arabia, in 1980. during preparations of a possible ditching of an L-1011 near Miami, Florida, in 1985; and during an in-flight fire onboard a DC-9 at Cincinnati, Ohio, in 1985. These instances, vividly support improved coordination and communications and joint cockpit and cabin crew training with respect to conducting emergency procedures and periodic emergency drills in which cockpit/cabin crew coordination and communication are practiced” NTSB/HZM-88/0.

12.5. INFORMATION SHARING

Effective communication is complex. The tone, expression and gestures all contribute to the way the message is received by others. The meaning of the message is driven by the receiver’s context.

The majority of communication between the flight crew and the cabin takes place via the interphone due to the locked cockpit door. This form of communication does not provide visual feedback. It is important to understand and to be understood using speech and tone only.

Shared information should be factual, and only important points should be included. The crewmember giving the information should speak clearly in order to be heard and understood. **Keep the message short and simple.** The person receiving the message should always have the opportunity to ask questions, to clarify the information. Answers should be clear, concise and factual.

When receiving information it is important to clarify the important points with the person that is giving the information, by paraphrasing the information to ensure that the message has been correctly understood. Feedback should always be encouraged.

12.6. SOURCES OF INFORMATION

One aspect of CRM is to consider all of the resources that are available. There are many sources of information available on the aircraft, which enable cabin crew to detect, assess and act effectively in various situations.

12.6.1. PASSENGERS

Passengers can be a great source of information, and may sometimes be the first to bring information regarding an unusual odor, for example, to the attention of the cabin crew.

Always take into account passengers' remarks regarding:

- The cabin (noise, fumes, smoke, fire, loose objects etc.)
- Other passengers' behavior
- Aircraft exterior (wings, fuselage etc.)
- Outside environment (runway, weather etc.).

Cabin crew should follow up any reports from passengers regarding anything unusual, and ensure that the purser and flight crew are informed.

Operators should encourage passengers to communicate with the cabin crew. One airline has included the following phrase in the passenger briefing.

"If you have any safety concern during the flight, please do not hesitate to bring it to the attention of a crewmember".

Something as simple as this will encourage passengers to address the crew and voice their concerns.

12.6.2. STANDARD OPERATING PROCEDURES

Standard operating procedures are a form of communication that is provided by the operators to cabin crew and detail the procedures to be followed. When the procedures are understood and adhered to, they provide a common ground and understanding amongst the entire crew.

Many operators have cabin crew of different cultures and nationalities who are sometimes based in various parts of the world. The common language of the Standard Operating Procedures enables cabin crew to work together and communicate. **When consistently applied, Standard Operating Procedures provide a guaranteed form of communication.**

12.6.3. CABIN INTERCOMMUNICATION DATA SYSTEM (CIDS)

CIDS is an automated information system for flight crew, cabin crew and ground personnel. CIDS operates, controls and monitors the main cabin systems such as, air conditioning, communications, fire protection, ice protection, lights, waste and water.

The CIDS system is also able to detect faults automatically and alert the cabin crew via the Flight Attendant Panel (FAP).

12.6.4. COMMUNICATION WITH MAINTENANCE

Maintenance personnel are a vital part of the daily operation of the aircraft. Like everyone involved in the operation of a departing or arriving aircraft, they also have a heavy workload with time constraints, particularly during short turnaround times.

It is important that the purser communicates with the maintenance personnel in order to understand the impact of any technical malfunction. For example, deferred items, inoperative items, tripped circuit breakers, or any items that may have an effect on the flight.

When reporting items to maintenance, particularly when entering items in the cabin maintenance logbook, the following points should be considered:

- Use clear terminology to report problems and actions taken
- Clearly identify the location, and the description of the problem

Ensure that the cabin maintenance logbook is prepared well in advance of arrival, and that all maintenance items have been listed.

Maintenance personnel should be extended the same courtesy and respect as any other member of the crew. They are part of the same team and play a vital role in daily operations.

- Verbal communication between the Purser and the maintenance personnel is important
- Ensure that they understand the impact of any technical malfunction and it's possible effects on cabin service
- Use clear terminology to report problems and the actions taken
- Report the problem to the appropriate person, if possible.

12.6.5. COMMUNICATION AND COOPERATION WITH CATERING PERSONNEL

When catering personnel are onboard the aircraft, a cabin crewmember should be present in the galley areas to monitor catering operations. Catering personnel may not understand the impact of their actions on safety. When monitoring catering, cabin crew should ensure that:

- Trolleys are operative and the brakes work
- Ovens are checked thoroughly for unusual objects, papers, towels
- Handles and latches on stowage bins are in working order.

12.6.6. COMMUNICATION AND COORDINATION WITH BOARDING STAFF

The boarding of the aircraft is a very coordinated task between the flight crew, cabin crew and ground personnel.

The priority of boarding staff is to board all the passengers to maintain an on time departure.

However, there are days when, due to the late arrival of an inbound aircraft, ground personnel have the responsibility for all the passengers, and the possibilities of missed connections.

In order to avoid the confusion of passengers boarding before the cabin preparation has been completed, cabin crew should liaise with the boarding staff and inform them when the aircraft will be ready for boarding.

Communication is the key element to the smooth and safe operation of a flight.

12.7. SUMMARY

To improve flight safety and promote efficient team work:

- Use briefings to encourage communication and teamwork, and to build a rapport with the crew. A good briefing will result in a high performing team.
- Follow Standard Operating Procedures to ensure that all cabin crew are familiar with the flight standards and expectations.
- Communicate and cooperate with all airline personnel with whom you come into contact.
- Communicate with passengers, and make them feel comfortable and able to communicate with the crew.

12.8. FACTORS AFFECTING PERFORMANCE

12.8.1. PASSENGER CONFLICT

"Conflicts arise from the perception of incompatible needs or goals, and from the impossibility or failure to render them compatible (Source 'Briefings' Dédale, Europe).

In recent years, reports of unruly passenger behavior have become more frequent, with a wide variety of anti-social behavior that ranges from verbal abuse to physical assault.

Many of these incidents have had an impact on flight operations, flights being diverted, delayed arrival and the knock-on effect on the rest of the operation, including missed passenger connections, inconvenience and the financial cost involved in diverting a flight.

Many passengers and cabin crew have been extremely upset and frightened by the behavior of some unruly passengers.

Conflict can take many forms. Some may be resolved through discussion and a satisfactory conclusion found without further consequences. However, when a conflict becomes confrontational and hostile, it must be addressed immediately. If the conflict occurs on the ground, it should be resolved before departing.

When a conflict becomes confrontational, it can generate emotional tension and stress.

As a conflict escalates, communication deteriorates, and the conflict becomes destructive. At this stage the people involved may develop acute stress. In turn, acute stress affects performance.

Dealing with any type of conflict requires tact, diplomacy, and most of all, the ability to remain calm.

Most importantly, does the behavior of the passenger pose a threat to the safety of the flight?

How can cabin crew resolve passenger conflict? Conflict management is related to attitude.

- Listen, to allow the passenger to express his/her concerns, this helps to reduce tension
- Be courteous, but firm
- Address the issue, **what is right, not who is right**
- Appeal to reason, before resorting to authority
- Ensure cabin safety
- Be assertive
- Involve the crew and the purser
- The purser should inform the flight crew
- Don't take it personally.

The following is one example of passenger behavior that was a source of conflict between a passenger onboard an aircraft, and the cabin crew that were fulfilling the safety requirement.

“Passenger would not get off her cell phone when advised by the crew. The Captain said, “Prepare for takeoff” and she wouldn’t get off the phone. Other passengers yelled at her to get off the phone. She ignored them also. Then she started screaming profanities to all the flight attendants and passengers”. (Source ASRS report)

The conflict was due to non-compliance with an aviation safety regulation, and interfered with the performance of cabin crew duties. The conflict arose due to incompatible goals.

The goal of the passenger was to continue using the mobile phone, knowing that it was prohibited. The goal of the crew was to ensure the safety of the flight, by asking for the passenger to comply with an aviation regulation.

One of the most frequent sources of passenger conflict onboard the aircraft is non-compliance with the ‘No Smoking’ rule.

Many aviation authorities throughout the world have very strict regulations regarding passenger behavior, and clearly define the type of behavior that is “unacceptable”. The regulations are also a resource for cabin crew that enables them to define the type of behavior that poses a threat to flight safety. The following is an extract of the Air Navigation Order (ANO) 2000, from the United Kingdom.

“63. A person shall not recklessly or negligently act in a manner likely to endanger an aircraft, or any person therein.

64. A person shall not recklessly or negligently cause or permit an aircraft to endanger any person or property.

65. A person shall not enter any aircraft when drunk, or to be drunk in any aircraft.

66 (2). A Person shall not smoke in any compartment of an aircraft registered in the United Kingdom at a time when smoking is prohibited in that compartment by a notice to that effect exhibited by or on behalf of the commander of the aircraft.

67. Every person in an aircraft shall obey all lawful commands which the commander of that aircraft may give for the purpose of securing the safety of the aircraft and of the persons or property carried therein, or the safety, efficiency or regularity of air navigation.

68. No person shall while in an aircraft.

(a) Use any threatening, abusive or insulting words towards a member of the crew of the aircraft;

(b) Behave in a threatening, abusive, insulting or disorderly manner towards a member of the crew of the aircraft; or

(c) Intentionally interfere with the performance by a member of the crew of the aircraft in his duties”.

IATA resolution RRP 1724 provides operators with a useful guideline for dealing with “difficult” passengers, this includes Article 7. “Refusal and Limitation of Carriage”, and Article 11 “Conduct aboard Aircraft”.

Signs of misconduct may sometimes be seen at the check-in area, security checkpoints or in the departure area. All employees who are involved with passenger contact have a responsibility to ensure that flight safety is not compromised due to passenger misconduct. Many operators have their own policy on passenger behavior, what is acceptable and not acceptable.

12.8.2. STRESS

- Stress is an automatic response to a disturbing situation
- Stress is a vital adaptation mechanism, as it mobilizes resources against any kind of aggression agent
- Stress is not only a physical reaction but also an emotional one
- A stressful situation can either be unexpected (for example, an emergency), or anticipated (for example, when you know in advance that you will have an overbooked flight, and therefore, difficult passengers).

Stress can be either good or bad. It is a question of intensity. Moderate stress improves performance, and enables people to adapt to situations. However, when the level of stress is beyond the individual's capacity, stress may then become a problem, and result in poor performance.

Have you ever felt like this?



The environment itself does not cause stress, it is caused by the way in which individuals interpret their environment and their perception of a situation. The response to stress is automatic and the human body and mind are normally able to adapt to the stresses of new situations. However this ability has definite limits beyond which continued stress may cause a breakdown, although this limit varies from person to person.

This section aims to advise cabin crew how to recognize, prevent, reduce and cope with stress.

The following types of stress affect people:

- **Acute stress** comes from the pressure of managing a situation in the immediate past, present or near future. Acute stress can be exciting and thrilling in limited amounts, for a short period of time. However, too much acute stress can be exhausting. People are immediately aware of acute stress because it is new, a sudden surge.
- **Chronic stress** is an accumulation of pressure and demands that build up over a long period of time. The danger of chronic stress is that it is difficult to identify the symptoms, because it is old, familiar and easy to get used to. This may lead to a sense of hopelessness, and fatalistic helplessness. Over a period of time, chronic stress can deplete physical and mental resources, and can pose serious health risks (heart attack, stroke, cancer and suicide).
- **Anxiety or Anticipatory stress** is in anticipation of an event that may be viewed as dangerous or unpleasant, that the person has no control over. Anxiety may be real or imaginary. Reactions to anxiety may vary from mild discomfort, to intense anguish and the impression of immediate death. Intense anxiety can cause an intense stress reaction, with all the affects of stress.

The following are some of the symptoms and affects of stress.

- **Physiological symptoms.** Dryness of mouth, sweating
- **Cognitive effects.** Lack of concentration, forgetfulness, indecision
- **Health effects.** Insomnia, nausea, headaches diarrhea
- **Behavioral symptoms.** Restlessness, nervous laughter, change in appetite, excessive drinking
- **Subjective effects.** Depression, mood swings, irritability, anxiety.

Onboard the aircraft, the obvious source of stress would be dealing with any kind of emergency situation. However, there are many kinds of stressful situations or events, also called stressors.

- **Mental stressors.** Stress rises when you are under pressure, particularly time pressure. This type of stress can be increased when you feel you are lacking the knowledge or the skills required to cope with the situation
- **Physical Stressors.** Noise, light, vibration, pain, illness, fatigue
- **Professional stressors.** Adverse working conditions, bad working environment, airline mergers, strikes and salary problems are all professional stressors. Professional stressors may be intensified if the individual also has private life stressors
- **Social stressors.** Conflict with passengers, colleagues, or even management
- **Private life stressors.** Divorce, death, illness, change of life conditions or environment. Even positive events such as a birth or marriage can be stressors.

When stress has been recognized, the tendency is to respond in one of two ways -defensive or coping.

- A defensive reaction to stress would be to take alcohol or medication, denying that there is a problem, “when someone is in denial”, or quite simply blaming someone else. A defensive reaction is only alleviating the symptoms of stress, not the actual cause.
- Coping with stress is dealing directly with the source of the stress, as opposed to the symptoms. Strategies for coping with stress could be, facing a problem directly, delegating workload, and prioritizing tasks. Coping with stress requires assessing a situation, adjusting to a situation, or changing a situation.

However, there are ways to help manage stress. Stress is a part of life that cannot be avoided. Whether work related, personal or outside the control of the individual, stress can affect how a person thinks and performs. Therefore, it is important to effectively manage stress. A good healthy lifestyle, a positive outlook, support from family, friends and peers are all valuable tools that help build confidence and resistance to stress.

Performing the following may help to relieve stress:

- Sufficient sleep and a well balanced diet, particularly on stopovers, must be organized around the need for rest
- Regular physical exercise promotes good health and good self esteem, and battles anxiety and depression
- Talk to someone - a friend, or colleague
- Relaxation exercises, breathing exercises – Tai Chi, yoga or stretching is an excellent way to integrate physical and mental wellbeing
- Learn to say no, to avoid overloading yourself
- Do something that makes you feel good

12.8.3. COPING WITH EVERY DAY STRESS

The cabin environment can be somewhat hectic at times, particularly when things do not go according to plan. For example, if an oven is broken, and the service starts ‘falling apart’ and things seem to be going from bad to worse. Well, the good news is when you work as part of a crew you are not alone. However, you can do the following:

- Accept the situation
- Go back to basics, trust your skills and knowledge
- Stick to documented procedures
- Use all available resources, ask for help, and say that you are stressed
- You are not alone, trust and have confidence in your colleagues
- Keep your sense of humor.

Remain in control of yourself, and keep as cool as possible. This will help maintain a calm atmosphere, and good working conditions in the cabin. In the event of an abnormal/emergency situation, staying calm will help to prevent passengers from panicking. Panic is contagious, particularly onboard an aircraft.

It is important to remember your primary task, and focus your attention on executing it ‘step by step’.

If danger is present, do not attempt to conceal it. Face the problem using all available resources, and always ask for help.

Stress can also be managed at crew level. You are part of a crew, and as such you have fellow cabin crew, a Purser and a Captain that you can rely on. Cabin crew should remember that they are also a resource for the others.

12.8.4. STRESS DURING EMERGENCIES

During an emergency situation, it is normal for cabin crew to feel stressed. Reports have shown that cabin crew have not always remembered emergency procedures, or have not adhered to procedures due to stress. In some cases, the actions of the cabin crew have contributed to an increase in the number of passenger injuries.

The following is an extract from an accident report that gives a very clear example of the kind of actions that can happen under stress.

“A DC-10 with 186 passengers and a crew of 15 overran the departure end of the runway at Los Angeles, California, on March 1, 1978. When the airplane departed the runway, the left main gear failed, causing the fuel tank to rupture. There was a significant fire and an

evacuation was initiated. When the airplane stopped, two flight attendants who had 18 years and 4 years experience respectively, seated at the L-1 exit unsuccessfully attempted to open the exit. The door was eventually opened with the selector handle in the “disarmed” position, and the slide remained in the container on the door. The flight attendant at R-3, with 18 years experience, stated that she “automatically” disarmed the slide before opening the exit. She realized what she had done, rearmed the exit and opened the door. Another flight attendant with 21 years experience at L-4, stated that “My first reaction, I just zeroed in on the panel, and the thing I saw was the disarming handle. I disarmed the slide. I realized what I did. I jammed it back in.” The door opened and the slide inflated”.

As demonstrated in this extract, there is a risk that behavior reverts to automatic reactions, under conditions of stress. However, the cabin crew in the above extract, realized their error and rectified it.

One of the best tools to prevent stress in any emergency is **TRAINING**.

When cabin crew feel that they do not have the skills to handle an abnormal, or emergency situation, the rate of stress increases. This is also true when cabin crew feel that they do not have the required or insufficient knowledge.

Training develops the skills, and increases the knowledge to help cabin crew be effective during emergencies.

The ability of the cabin crew to perform their duties successfully, during an emergency, is directly linked to the quality of their emergency training. More efficient reactions to stress can be taught through training.

Good and frequent training produces:

- Good skills (that tend to be automatically activated)
- Control over the situation
- Efficient coping strategies
- Increases confidence.

Good training increases confidence, and gives cabin crew the ability to cope with stress in emergency situations. Cabin crew should be confident in knowing what the task requires, and knowing what they have to do.

12.8.5. SLEEP

Having discussed the effects of conflict and stress on performance, this section focuses on the effects of sleep deprivation on individual performances.

Sleep deprivation is lack of sleep, whilst fatigue is due to using up our mental or physical resources. Both alter vigilance in a complex way.

The need for sleep varies amongst individuals. Some people need more sleep than others.

- Each individual has their own sleeping pattern
- Sleeping patterns may change, or vary, according to health and age
- Identifying and respecting your sleep pattern are conditions for good performance.

Individuals know their own sleep requirement, and how much sleep they will need in order to be refreshed. However, if the amount of sleep has not been sufficient, particularly over a few days, the individual will build up a 'sleep deficit', that will need to be recovered, otherwise it will affect the level of performance.

Cabin crew sleeping patterns can easily be changed or disrupted depending on the nature of flight schedules – either long-haul or short-haul.

As long-haul flights cross many time zones they can easily disturb sleep patterns and short-haul flights can have a continuous block of very early morning reports, also disrupting sleep patterns.

Rest and sleep is vital for cabin crew. The amount of time for rest periods and stopovers should be allocated wisely, and cabin crew should rest sufficiently before going on a flight.

The nature of the work means that the crew do not always work every day of the week, or the same hours each day, nor do they eat at the same hour each day, or sleep at the same hour each night. Just when a block of days off means that cabin crew can start to get back to a "normal routine", it is time for them to start a new block of duties.

- Sleep is a necessity
- Sleep deprivation may lead to a serious health disorder
- It is essential that cabin crew are well rested before taking a flight, particularly on stopover
- Ensure that the proper rest period requirements are respected.

Ops 1.085.

"Although the controls on flight and duty periods are intended to ensure that adequate opportunities are provided for cabin crew to obtain rest and sleep, individuals should ensure that proper advantage is taken of such opportunities".

12.8.6. FATIGUE

Consuming too much physical or mental energy causes fatigue. It is the bodies' way of saying that there is a need for the individual to restore, and replenish their energy. Fatigue can be attributed to many of the following factors.

- Physical activity
- Mental activity
- Delayed sleep

- Sleep deprivation
- State of health
- Long hours
- Working during normal sleep hours
- Working on rotating shifts and schedules
- Monotonous/repetitive tasks.

Many of these factors apply to cabin crews professional lives, and can affect performance. The following is a list of some of the symptoms and effects of fatigue.

- Diminished perception (vision, hearing...) and lack of awareness
- Reduction in motor skills, causing slow reaction, reduced coordination
- Reduction in short term memory
- Mood changes - depressed, elated, energetic
- Channeled concentration - fixating on a single issue, and inability to maintain an overview
- Easily distracted
- Poor judgment and decision making, leading to increased mistakes
- Diminished standards.

Sleep and rest is essential to combat fatigue. There are also other factors that can reduce the effects of fatigue.

- Fatigue and physical activity - Regular physical activity of moderate intensity increases resistance to both stress and fatigue. However, too much physical activity before departure is tiring
- Balanced meals - Try to avoid meals that are high in sugar or fat, either before a flight or onboard the aircraft
- A healthy lifestyle – Limit the amount of alcohol intake. Refrain from smoking.

12.9. SUMMARY

Each individual can manage the factors that affect performance. To summarize factors that affect performance.

- Manage conflict. Listen and propose a safe solution. Involve the crew and refer to the captain
- Under stressful situations. Go back to basics, and use all available resources.



12.10. ERROR MANAGEMENT

“It is the nature of man to err”, according to the roman philosopher Cicero some two thousand years ago.

Error has been defined as follows.

“Error will be taken as a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to the intervention of some chance agency”,

(Source “Human error” by Professor James Reason.)

CRM addresses errors in two ways.

- Detecting an error in the early stages, and correcting or controlling it
- Reducing the possibility of error.

Part of the human condition is to make errors, no matter who the person is. Everyone has made an error at one time or another. Errors are made when the individual's actions deviate from their intentions, or if the intention is not appropriate. Therefore, an error by nature is never intentional.

The most common errors are slips, lapses and mistakes.

- Slips. When the intended action does not go as planned (for example, taking the wrong train or bus)
- Lapses. Occur due to forgetfulness, or a lack of attention (for example, forgetting to arm/disarm the aircraft doors)
- Mistakes. Occur when there is fault in the plan or the intention, and the individual believes that their action is correct, when in fact it is wrong (for example, seeing smoke coming from a coffeemaker, and turning the wrong coffeemaker off).

Part of cabin crewmember training is to learn from errors. Using mockups, to create realistic exercises for cabin crew, provides the cabin crew with the opportunity to learn from their errors, without suffering from the consequences of committing the same error onboard the aircraft.

Making an error during an evacuation exercise in a mock-up, is not as serious as making the same mistake in reality. For example, during an evacuation exercise the crewmember may not assess conditions properly and may open the aircraft door, only to realize that there is “fire” outside the exit. The same gesture in a real emergency situation could have disastrous results.

Cabin crew instructors should be aware that errors made during training exercises should be treated as a learning experience, as opposed to a criticism of individual performance.

The use of scenarios or accident analysis, where errors have occurred, is probably the most effective method to learn how to detect and prevent future errors.

Experienced personnel can occasionally make errors. The errors they make are different from the errors made by novices. Some errors made by experienced personnel stem from complacency. Experience is not a “cure all”. Experienced cabin crew still make mistakes, and even benefit from them. Life is a learning process, each person can learn a lot from their own mistakes, and the mistakes of others. The aim is to learn from errors, and adapt behavior to avoid repeating the same error.

The downside of making errors is that every action has a reaction.

Error and Consequence



The effects of an error depend on the situation, and the context in which it occurs.

For example, a cabin crewmember forgets to disarm the door for arrival that could provoke inadvertent slide deployment, which in turn (depending on the context), could cause:

- Flight delay/cancellation
- Offloading of passengers
- Serious injury to someone on the ground.

12.11. VIOLATION

Sometimes errors are intentional. Another source of error is **Violation**. Contrary to slips, lapses and mistakes, violations are intentional.

Violation is defined as “an intentional deviation from a regulation, procedure or rule”. For example, if cabin crew do not perform preflight checks in accordance with company policy, or if they cut corners on the in-flight service, “to save time”.

In the beginning, violations are intentional, but they can become routine. When a violation becomes routine, it becomes the “Norm”, and the individual no longer realizes that it is a violation and becomes complacent.

When violations become the “Norm”, they have a tendency to substitute the official rules. Standard Operating Procedures (SOPs) provide a common language, and provide the basis for communicating as a crew. If cabin crew regularly violate the SOPs, the basis of communication is lost, and can cause confusion and misunderstanding.

Group pressure and group conformity can produce a violation. For example, when cabin crew work for the same company, but are not based in the same city/country. The majority of the cabin crew are based in “A”, and a few joining cabin crew are based in “B”. Group pressure causes group “B” to conform to group A’s behavior, because “That’s the way we do it here”. The violation becomes the “norm”, and replaces the official regulation. The common ground for communication is then compromised, and results in confusion.

Standard Operating Procedures are particularly important for Operators that have personnel in various parts of the world, because they provide a common language, and a tool that enables crews to work together effectively.

WARNING

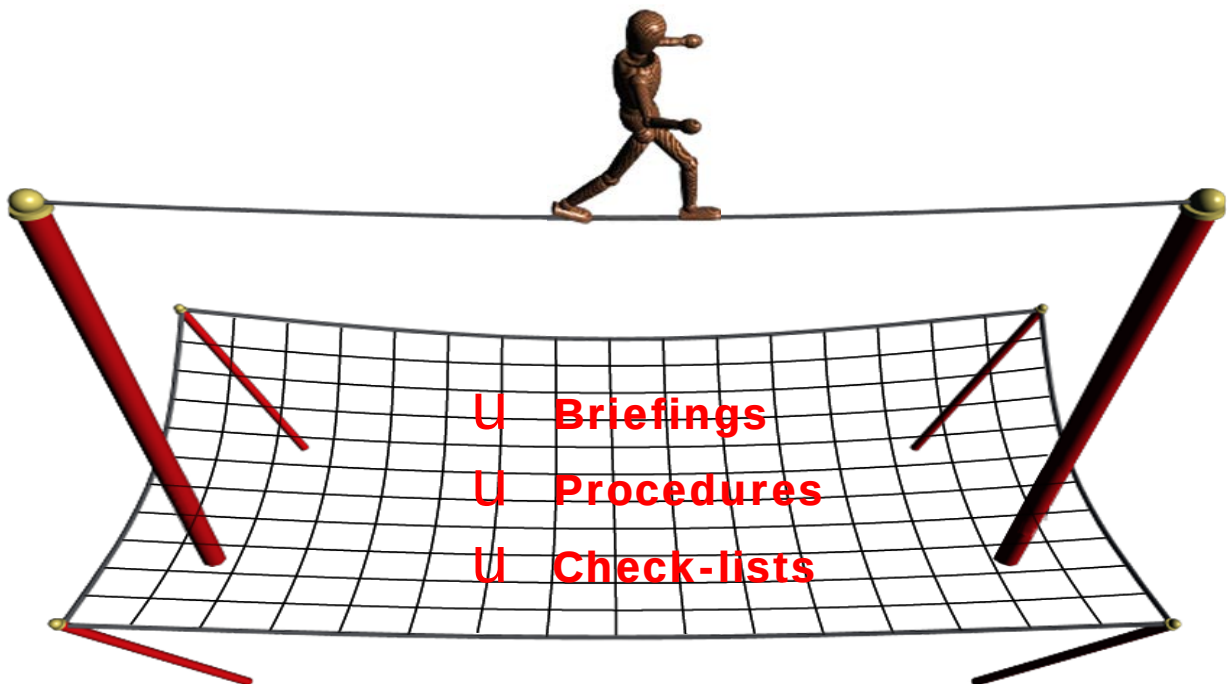
Most violations are a threat to safety

Violations are a threat to safety. By violation cabin crew remove a layer of defense against error and weaken their safety net.

Management of violations has to be performed both at the individual and the team level. Purser and experienced cabin crew should encourage colleagues to respect rules and regulations, and understand operating procedures.

The best way to avoid violation is to stick to the rules.

Standard Aviation Tools for Error Management



These provide the tools to work, but they also provide a safety net against error.

12.12. TEAM PERFORMANCE

A team is made up of players. Each crewmember is a team player with a specific role and task.

A good team does depend on individual performances; however, team performance takes precedence over individual performance.

Great team performance depends on '**synergy**'. 'Synergy' is a technical term from the world of medicine that means, "working together".

When in synergy, the performance of a team working together, is higher than the sum of the individual performances. **1+1>2!**

Conditions for synergy are:

- A shared goal
- A clear crew structure
- Clear task allocation
- Team spirit
- Good leadership.

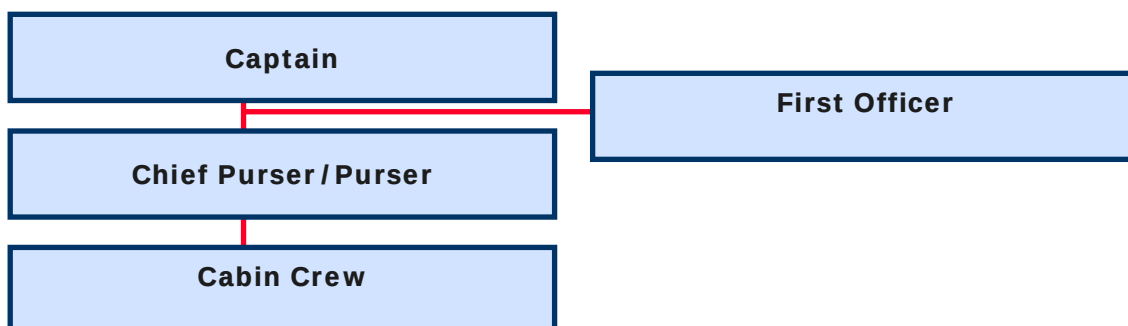
The role of cabin crew onboard the aircraft is complex, as there are two clearly defined aspects the safety role, and the service role. Sometimes, there is conflict between the two, which can have implications on performance.

The duality of the roles sometimes requires the cabin crew to be two different people, depending on the circumstances, one minute smiling and pleasant, the next minute assertive when dealing with a safety threat.

The structure of the cabin crew ensures that cabin crew have specific roles, and very specific duties. The application of good CRM within a crew creates the right balance for the crew to work as an effective team.

In order for a team to be effective, they must be able to talk to each other, share information, listen to each other and be assertive, when necessary.

In every effective team, there are leaders and followers. Followers should not be thought of as 'sheep following blindly'. Followers play a complimentary role to leadership. A follower is the supporting role. Every effective leader needs support.



The Captain is in charge of and responsible for the aircraft and occupants – and is ultimately responsible for the safety of the aircraft. The Captain's decision is final and all responsibility should be taken to ensure that the entire crew functions as a team.

An operator shall take all reasonable measures to ensure that all persons carried in the aeroplane obey all lawful commands given by the commander for the purpose of securing the safety of the aeroplane and of persons or property carried therein. EU-OPS 1.090

The First Officer

If for any reason the captain is unable to take responsibility, the first officer will assume command of the aircraft.

The Chief Purser/Purser

The Purser is responsible for all the cabin crew, and is identified as the leader and allocates the workload and tasks to the cabin crew. The Purser is the communication link between the cabin and the flight crew. The captain informs the purser of any technical, or operational problems and the Purser shares the information with the other cabin crew.

Cabin crew

The cabin crew play a supporting role to the Captain, First Officer and Purser. The cabin crew are the eyes and ears in the cabin for the flight crew. They provide the flight crew with any pertinent information regarding safety or unusual situations.

12.13. LEADERSHIP

The leadership onboard is established by the airline. Naturally, there will always be the Captain, First Officer and sometimes a relief pilot in the cockpit. In the cabin there is sometimes a Chief Purser, and pursers in different cabins, or just one Purser for the entire aircraft. The Purser is responsible for all the cabin crew and their activities.

A leader is someone who through word, action and example can influence the behavior and actions of others. A leader has the capacity to share the goals of the team, understand the needs of the team, and motivate the team to achieve their goals. Good leadership requires teamwork. The quality of the leader depends largely on the relationship with the other members of the team.

There is a difference between authority and leadership. Leadership is an acquired skill, whereas authority is assigned. A good leader has the correct balance of both.

The role of a leader is to:

- Build the team
- Manage the workload
- Manage time
- Coordinate and monitor activity
- Prevent and solve conflicts

- Listen to input from other members of the team
- Make decisions
- Provide and maintain standards
- Supervise and intervene in case of a deviation from standards.

A good leader has the acquired knowledge, skills, expertise and professionalism to motivate the rest of the team and inspire confidence. A good leader also:

- Establishes an atmosphere that encourages communication and team participation
- Listens to feedback and input from others.
- Motivates the team by appreciation, and the ability to praise when appropriate
- Takes the initiative and assists team members in completing tasks during difficult situations
- Remains calm in conflict, and is able to be objective and propose solutions
- Has the ability to differentiate between “what is right, not who is right”
- Has good problem solving skills that involve gathering information, identifying the problem, finding a solution, or another course of action
- Informs other team members when there is a change of plan

A good leader is always a pleasure to work with, and can make a difference to the work environment onboard the aircraft.

12.14. SUMMARY

Good team performance and synergy require:

- Crew structure
- Clear and balanced allocation of roles and tasks
- Good leadership
- Good teamwork and lots of team spirit
- Compliance with procedures
- Adherence to allocated tasks
- Effective communication
- Confidence to report any safety related items- even if in doubt.

As part of a crew, each person brings their knowledge, skill, experience, individualism and personality to the team. Every crewmember is important and contributes toward the team effort.

Exercising good CRM as part of work practice enhances team performance and more importantly reduces the risk of errors.

**13. ABBREVIATIONS****ABBREVIATIONS**

AA	Airworthiness Authorities
AAP	Additional Attendant Panel
ABP	Able-Bodied Passenger
AC	Alternating Current
A/C	Aircraft
ACARS	Aircraft Communication Addressing and Reporting System
ACP	Area Call Panel
ACU	Air Cooling Unit
ADB	Area Distribution Box
AFT	After, at the Back of the Aircraft
AIP	Attendant Indication Panel
ALT	Altitude
AMU	Audio Management Unit
APU	Auxiliary Power Unit
ASAP	As Soon As Possible
ASP	Audio Selector Panel
ATC	Air Traffic Control
B/C, BC	Business Class
BCRC	Bulk Crew Rest Compartment
BFE	Buyer Furnished Equipment
BGM	Boarding Music
BITE	Built-In Test Equipment
BRT	Bright
BTL	Bottle

C	Centigrade
C1	Coat Stowage 1
CAA	Civil Aviation Authority
CAB	Cabin
CAPT	Captain
CAM	Cabin Assignment Module
CAMI	Civil Aero Medical Institute
CAP	Civil Aviation Publication
CAT	Category
CAUT	Caution
C/B	Circuit Breaker
CC	Cabin Crew
CC1	Cabin Crew 1
CCB	Cabin Crew Bulletin
CCOM	Cabin Crew Operating Manual
CCRC	- Cabin Crew Rest Compartment
CDU	Control and Display Unit
CFDS	Centralized Fault Display System
CG	Center of Gravity
CHK	Check
CIDS	Cabin intercommunication Data System
CKPT	Cockpit
C/L	Check List
CMD	Command
CO	Company
COMMS	Communication
CONF	Configuration
CRC	Crew Rest Compartment
CRSD	Crew Rest Smoke Detection
CVR	Cockpit Voice Recorder
Db	Decibel
DCR	Dock on Crew Rest
DEU	Decoder/Encoder unit
DIM	Dimming
DSCS	Door Slide Control System
DU	Display Unit
DU	Documentary Unit
E	East

ECAM	Electronic Centralized Aircraft Monitoring
EEPMS	Emergency Escape Path Marking System
EIS	Entry into Service
EMER	Emergency
EMER EXIT R	Emergency Exit Right (overwing)
EOD	Explosive Ordnance Disposal
EPSU	Emergency Power Supply Unit
EVAC	Evacuation
F/A	First Aid
FAA	Federal Aviation Administration
FAP	Flight Attendant Panel
FAR	Federal Aviation Regulations
FBCRC	Full Bulk Crew Rest Compartment
F/C, FC	First Class
FCOM	Flight Crew Operating Manual
FCRC	Flight Crew Rest Compartment
FES	Fire Extinguishing System
FL	Flight Level
FLT	Flight
F/O	First Officer
FPEEPMS	Floor-Proximity Emergency Escape Path-Marking System
FREQ	Frequency
FSB	Fasten Seat Belt
FSIB	Flight Standards Information Bulletin
FT	Foot, Feet
FT/MN	Feet per Minute
FWC	Flight Warning Computer
FWD	Forward
G5	Galley 5
GEN	Generator
GND	Ground
GWDU	Galley Waste Disposal Unit
HI	High
HZ	Hertz
HS	Handset

ICAO	International Civil Aviation organization
IDENT	Identification
IFE	In Flight Entertainment
IFEC	In Flight Entertainment Center
INOP	Inoperative
INT	Interphone
IPCU	Ice Protection Control Unit

KG	Kilogramm
KT	Knot

L	Left
LAV	Lavatory
LAV34	Lavatory 34
LCD	Liquid Crystal Display
LD	Lower Deck
LDCRC	Lower Deck Crew Rest Compartment
LDG	Landing
LD LAV	Lower Deck Lavatory
LDMCR	Lower Deck Mobile Crew Rest
LED	Light Emitting Diode
L/G	Landing Gear
LH	Left Hand
LO	Low
LP	Low Pressure
LRBL	Least Risk Bomb Location
LS	Loudspeaker
LSU	Lavatory Service Unit
LT	Light

MAINT	Maintenance
MD	Main Deck
MECH	Mechanic
MED	Medium
MEL	Minimum Equipment List
MFAP	Mini-FAP
MIC	Microphone
MIN	Minimum
MMEL	Master Minimum Equipment List

MRT	Manual Release Tool
MTOW	Maximum Take-Off Weight
N/A	Not Applicable
NAV	Navigation
NORM	Normal
NS	No Smoking
NTSB	National Transportation Safety Board
O2	Oxygen
OBRM	On Board Replaceable Module
OCCPD	Occupied
OHSC	Overhead Stowage Compartment
OPS	Operations
OVBD	Overboard
OVHD	Overhead
OW	Overwing
OXY	Oxygen
PA	Passenger Address
PAX	Passenger
pb	Pushbutton
pb sw	Pushbutton Switch
PBE	Portable Breathing Equipment
PCB	Passenger Call Button
PCU	Passenger Control Unit
PDF	Portable Document Format
PED	Portable Electronic Devices
PERF	Performance
PES	Passenger Entertainment System
PIM	Programming and Indication Module
PISA	Passenger Interface and Supply Adapter
P/N	Part Number
POS	Position
PSIU	Passenger Service Information Unit
PSU	Passenger Service Unit
PTP	Programming and Test Panel
PTT	Push To Talk
PWR	Power

QT	Quart (US)
QTY	Quantity
REG	Regulation
RH	Right Hand
RTS	Return To Seat
RWY	Runway
SB	Service Bulletin
SDCU	Smoke Detection Control Unit
SDF	Smoke Detection Function
SERV INT	Service Interphone
SFE	Seller Furnished Equipment
STBY	Standby
STD	Standard
SW	Switch
SYS	System
TBC	To Be Confirmed
TBD	To Be Determined
T/C, TC	Tourist Class
TCAS	Traffic alert and Collision Avoidance System
TEMP	Temperature
T/O	Take Off
UD	Upper deck
VCC	Video Control Center
VCR	Video Cassette recorder
VCU	Video Control Unit
VENT	Ventilation
VHF	Very High Frequency
VOL	Volume
VOD	Video On Demand
WDO	Window
WT	Weight

YC Economy Class, Tourist Class