

## **FIRE ON BOARD**



### ***SPEAK ON "FIRE ON BOARD". FOLLOW THE CHECKLIST***

- factors that lead to fire on board an aircraft
- situation development in case of fire
- dangers posed by fire on board
- pilots' requests and actions in case of a fire emergency
- effect of a fire emergency on ATC operations
- effect of a fire emergency on aerodrome operations
- services alerted in case of a fire emergency
- controller's actions in case of a fire report
- difference between an emergency evacuation and a normal disembarkation
- effective ways of preventing fire on board an aircraft in the future
- situation connected with fire on board you have had / heard about

*(from "Steps to Proficiency" Test Preparation)*

### **KEY WORDS & PHRASES**

- produce smoke, fumes, heat, flames, fire
- rapidly spread
- catch fire, ignite (start to burn)
- blow up (explode)
- lead to the total loss of the aircraft
- fully destroy the aircraft
- disable the crew
- cause severe burns, injuries and asphyxiation
- identify the source of fire (origin of fire) and its location
- fight fire, contain fire (stop spread of fire), isolate fire
- don oxygen masks
- use fire extinguishers
- put out (extinguish) fire
- alert fire brigade (fire guard, fire fighters, firemen)
- evacuate via emergency slides (chutes)

## ***DANGERS OF SMOKE & FIRE***

In-flight fire is one of the most frightening situations. Fire of any size is treated as an extreme emergency. Fire may spread rapidly and can lead to the total loss of the aircraft within a very short period. Fires can start in inaccessible locations, difficult to extinguish, so the aircraft can burn to ashes. The crew have very little time to put out fire before the situation gets out of control. Time is critical in this situation.

Fire may affect aircraft systems: transponders, radios and other equipment may stop to function correctly or may be switched off. Some systems may be damaged leading to a loss of control. Apart from that, powerful engines and large quantities of fuel increase the risk of explosion. If there are dangerous goods on board, the situation can be more hazardous as they can blow up and fully destroy the aircraft.

Fire in aircraft is a severe threat to life due to flammable fuel and limited possibilities of escape. Panic among passengers, rushing to either end of the plane may create disbalance, making the aircraft difficult to control. Open fire is extremely dangerous as people on board can receive severe burns and injuries. The visual signs of fire are flame and smoke. Hidden fires also present a danger as they are difficult to determine. Sometimes there is no evidence. Dense smoke in the cockpit may reduce pilots' vision. In some cases smoke is a more significant issue because heat and toxic fumes can disable the crew and passengers and aircraft occupants can die from asphyxiation by poisonous gas.

Fire can occur when the airplane is on the ground. The situation is not less dangerous.

## ***NATURE OF SMOKE & FIRE***

Fire may originate from any source. A running aircraft has plenty of hot components that can overheat and ignite. Electrical system, including wiring, lighting, de-icing, radios, is a major source of ignition. Short circuit can make wiring smoke and result in fire. Every element of aircraft systems, as well as leaking avgas or dropping fluid from brakes, can start to burn from a single spark. The engine can catch fire due to bird or debris ingestion. Occasionally lightning strike can produce fire on board. Dangerous goods may also contribute to fire.

## ***CREW ACTIONS***

In the event of in-flight fire pilots will follow emergency procedures. They will initiate an immediate descent to land the aircraft as soon as possible. They declare an emergency and request priority for handling. The crew can start an emergency descent even without a report to ATC.

At the first indication or suspicion of smoke or fire on aircraft, the flight crew will don oxygen masks to prevent incapacitation. It can make the voice messages more difficult to understand. Also they will try to identify the origin and location of fire or smoke and isolate it. If smoke is detected or suspected, an unscheduled or precautionary landing will follow.

In case of open fire pilots activate emergency equipment to contain spread of fire and put it out. They will fight fire using manual extinguishers and airborne anti-fire systems. Even when

fire is extinguished, the crew are forced to land as soon as possible so that the fire cannot break out again. In case of wrong fire or smoke indication, pilots still have to land as a precaution to avoid potential risks.

An uncontrolled fire can become a catastrophic event. In case of uncontrolled fire the crew can make out-of-the-field landing or ditching. After an emergency landing of a burning plane the passengers and crew are evacuated via emergency exits and emergency slides (chutes) without any delay.

### ***SMOKE & FIRE DETECTION***

- Smoke and fire detectors are installed all over the aircraft to alert pilots.
- Fire detection equipment is available on aircraft to immediately warn the crew.
- Fire can be identified visually, though smell is the first indication of fire.

### ***ATC ACTIONS***

Air traffic controllers should consider stress, strain and time pressure which the pilots experience under the circumstances. Controllers should follow ASSIST code: ACKNOWLEDGE – acknowledge emergency status, nature of the problem and intentions; SEPARATE - separate the aircraft from other traffic, clear the airspace to give it room to maneuver; SILENCE - impose radio silence if the frequency is congested; INFORM - notify authorities and units, agencies concerned such as adjacent sectors, emergency and airport services; SUPPORT - provide maximum assistance to the pilots, arrange and facilitate rerouting and diversion by coordinating a direct path; TIME – give the pilots time to resolve, or improve the situation.

<b><i>Causes of fire</i></b>	<b><i>Possible consequences</i></b>	<b><i>ATCO's actions</i></b>
<ul style="list-style-type: none"> <li>• electrical malfunction</li> <li>• short circuit</li> <li>• damaged wiring</li> <li>• lightning strike</li> <li>• bird or debris ingestion into the engine</li> <li>• dangerous goods</li> <li>• fuel leak</li> <li>• smoking on board</li> </ul>	<ul style="list-style-type: none"> <li>• high stress level in the cockpit</li> <li>• emergency descent</li> <li>• landing at the nearest airfield</li> <li>• poor radio communication due to oxygen masks or radio failure</li> <li>• passenger evacuation straight after landing</li> <li>• blocked runway by the aircraft in distress</li> <li>• suspended runway operations and thus, delays</li> </ul>	<ul style="list-style-type: none"> <li>• provide pilots with navigational and informational assistance</li> <li>• inform all concerned: adjacent units, authorities, appropriate services</li> <li>• clear the airspace for the emergency traffic</li> <li>• ensure priority descent and landing at the nearest available aerodrome</li> </ul>