

AVIATION OCCURRENCE REPORT

FIRE IN BAGGAGE COMPARTMENT

**INTER CANADIEN
FOKKER F-28 MK 1000 C-FCRI
JEAN LESAGE INTERNATIONAL AIRPORT, QUEBEC
05 DECEMBER 1995**

REPORT NUMBER A95Q0232

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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Summary

Inter Canadien flight 668 from Montreal, a Fokker F-28 MK 1000, parked at boarding gate 3 of Jean Lesage International Airport, Quebec City. The attendant opened the forward baggage compartment and saw thick white smoke and reddish flames coming out of the compartment. He immediately closed the door and alerted the crew. The pilot-in-command immediately ordered the evacuation of the aircraft and told the co-pilot to notify emergency services.

The passengers were evacuated rapidly via the airstair at the left forward door and the evacuation slide at the right forward door. The airport fire-fighters arrived at the scene. They checked the baggage compartment and saw the flames. Fire-fighters equipped with respirators fought the fire inside the baggage compartment using extinguishers. One fire-fighter discharged a dry chemical extinguisher in the baggage compartment then closed the door to suffocate the fire. When the fire was extinguished, the fire-fighter entered the baggage compartment and removed the fire-damaged baggage. The aircraft was inspected, and was ferried that evening to the company maintenance base at Montreal.

The occurrence happened around 1827 eastern standard time (EST) in clear night conditions. There were no injuries.

Ce rapport est également disponible en français.

Other Factual Information

The flight crew was certified and qualified for the flight. The cabin crew consisted of two flight attendants who were also qualified for the flight. The evacuation of the aircraft ordered by the pilot-in-command was conducted rapidly and without incident.

The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. In accordance with airworthiness standards, the baggage compartment of the F-28 is fitted with a fire-resistant inner wall to delay the spread of fire. This aircraft was equipped with two doors to the main baggage compartment. Most Fokker 28 aircraft do not have the aft door. A floodlight is located at each access door to the baggage compartment. The light is recessed into the ceiling and protected by a grille. The floodlights are located about 11 inches above the edge of the door. Nets are provided at each door to restrain the cargo in the compartment when the door is opened. The anchor hooks for the nets are about seven inches from the door edge. The restraint nets were installed in this aircraft. The baggage compartment was about three-quarters full. Baggage for this destination had been stowed in the forward part of the compartment, and the other baggage had been stowed aft.

Communications between ground control, the aircraft, and rescue units were normal during the occurrence. When the alarm was sounded, airport emergency response personnel arrived promptly at the scene in two emergency vehicles. The first fire-fighter arrived at the front of the aircraft with a dry chemical extinguisher. He asked the pilot-in-command whether the extinguishers in the baggage compartment had been activated. The pilot told him the aircraft was not equipped with extinguishers for the baggage compartment. The fire-fighter then opened the baggage compartment door, saw the flames, and discharged his extinguisher, then closed the door to suffocate the fire. He then donned a respirator and re-entered the baggage compartment to remove the baggage. First he unloaded the forward section, then the aft section. As he moved further aft, the pieces of baggage caught fire as soon as they were exposed to the open air. The burning articles were sprayed with a mixture of dry chemical and water from the fire hose. All items of baggage were then laid out on the loading ramp.

Heat damage was observed in the baggage compartment. Soot was found on the upper panels enclosing the baggage compartment. The area most affected by heat was in front of the aft compartment door, under the ceiling light and towards the centre of the compartment.

Two black folding travel bags, three hand bags, and one plastic box for carrying mail were damaged by the fire. Examination of the baggage established that the fire had initiated between the travel bags and two of the hand bags. The plastic container that was under the travel bags had been melted by the heat of the fire. The fire had started to spread towards the hand baggage and the cardboard boxes above the centre of the fire. The origin of the fire could not be determined. Dangerous goods that are permitted to be carried on board aircraft in the baggage compartment under existing regulations were found in the baggage, including an aerosol can of hair spray and a container of shaving cream.

The back panels, baggage compartment light, fire-damaged baggage and baggage contents, and boxes were transported to the TSB Engineering Branch Laboratory for analysis.

Tests were conducted on the baggage compartment light to determine whether objects could ignite after prolonged contact with the light base. These tests were negative. The highest temperature produced was 400°C. When the canvas of one of the mail bags was placed in direct contact with the base of the bulb at this high temperature, the canvas melted but no flame was produced. Next, the aerosol can of hair spray was sprayed on the light at a temperature of 150°C. No flame was produced. The exact position of the switches for the baggage compartment lights could not be determined. None of the baggage handlers remembers having seen the baggage compartment lights illuminated either on departure or on arrival of the aircraft.

At the TSB Engineering Branch Laboratory, with the assistance of the handlers involved, the pieces of baggage were repositioned as they were when the aircraft departed. It was determined that the grey plastic box containing mail had been placed on the floor. The travel bags had been placed one against the other, and the cardboard boxes containing brochures had been placed on top, very close to the ceiling. Based on this reconstruction, the evidence indicated that the fire originated between the travel bags and spread upward. A small travel bag, a canvas bag containing mail, and a down coat were considerably burned. The cardboard boxes were also burned. The flames rose to the ceiling and spread in all directions, reaching the baggage closest to the ceiling, including the cardboard boxes.

A container of hair spray was found damaged by the fire. The plastic cap, button, and plastic stem had melted, but X-ray examination revealed that the valve spring was still in place. The container did not explode. A test conducted previously by the US Federal Aviation Administration (FAA) demonstrated that an aerosol can that explodes in flight can cause the pressure to increase inside the baggage compartment and damage the baggage compartment bulkheads. In that test, damage to the bulkheads allowed toxic gases to escape and spread throughout the cabin.

All indications are that the fire originated in flight, but the exact time at which it started could not be determined. The fire was extinguished as more carbon dioxide was released and the oxygen supply was depleted. Examination of the baggage and baggage contents did not establish the origin of the fire.

Following this occurrence, the company installed protective covers on all baggage compartment lights to avoid all contact with the bulbs and reduce the possibility of baggage compartment fires.

Analysis

After an aircraft fire, some items of evidence may be missing due to the necessarily rapid response of on-board personnel and fire-fighters. These persons are properly trained to combat the fire as quickly as possible and prevent it from spreading. In this case, despite the full cooperation of the fire-fighters, several items of evidence were damaged in the response and were not available. Although it was determined that a fire occurred in the baggage compartment, and very probably in flight, the origin of the fire could not be conclusively determined.

However, examination of the passenger baggage established that the baggage selected for analysis contained dangerous goods that are permitted to be carried on board aircraft in the baggage compartment under existing regulations, including a container of hair spray and a container of shaving cream. If these containers had exploded, there is a strong possibility that the consequences could have been more disastrous and that the fire could possibly have spread within the aircraft. However, due to its design, the baggage compartment was able to contain the fire as expected.

To further enhance baggage compartment safety, measures were immediately taken by the company to prevent the baggage compartment lights from coming into contact with baggage.

The following laboratory report was prepared:

LP 188/95 - Fire Examination Fokker F-28, C-FCRI.

Findings

1. The aircraft was evacuated rapidly and without incident.
2. The baggage contained dangerous goods that are permitted to be carried on board aircraft in the baggage compartment under existing regulations.
3. The fire probably originated in flight.
4. The origin of the fire could not be determined.
5. Due to its design, the baggage compartment was able to contain the fire as expected.

Causes and Contributing Factors

A fire occurred in the baggage compartment, probably during flight. The cause of the fire could not be determined.

Safety Action

As a result of this occurrence, the manufacturer is evaluating the possibility of modifying the lamp guard in the cargo compartment on all Fokker F-28 models to reduce the potential for heat accumulation.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail and W.A. Tadros, authorized the release of this report on 12 November 1996.