



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 28, 2003

In reply refer to: A-03-04

Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On August 11, 2002, about 1920 eastern daylight time, a Boeing 747-256, Spanish registration EC-DNP, operated by Iberia Airlines as flight 6250, sustained a fire in the number 2 engine during the initial climb after takeoff. The flightcrew performed an emergency landing at John F. Kennedy International Airport, Jamaica, New York, and an emergency evacuation was performed. Preliminary injury information indicates that, of the 369 passengers and 17 crewmembers on board, 44 passengers and one flight attendant sustained minor injuries and 2 passengers sustained serious injuries¹ during the emergency evacuation. Visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the flight, which was destined for Madrid, Spain. The scheduled international passenger flight was conducted under 14 CFR Part 129.

During the emergency evacuation, the five left-side exit doors were not used because of the engine fire on that side of the airplane. Flight attendants opened the five right-side exit doors, but the 4R and 5R slide/rafts did not fully inflate. The 4R slide/raft [part number (P/N) 7A1238-58] partially inflated but failed to break most of its shear-pin restraints and remained in a semi-inflated configuration just below the 4R doorsill. The 5R slide/raft (P/N 7A1239-30) broke most of its restraints and inflated sufficiently to touch the ground. However, due to underinflation, the 5R slide/raft hung almost vertically from the doorsill. Neither slide/raft was used during the evacuation. Passengers and crew evacuated through doors 1R, 2R, and 3R, for which the slide/rafts deployed and inflated correctly.

¹ One passenger sustained a fractured ankle during the evacuation, and one passenger was admitted to Jamaica Hospital Medical Center for more than 48 hours. In accordance with 49 *Code of Federal Regulations* (CFR) 830.2, these passengers' injuries were classified as serious.

Although the cause of the 5R slide/raft underinflation has not been identified, the investigation revealed that the 4R slide/raft underinflated because one of its two inflation hoses had fractured at the hose fitting's connection to the inflation bottle's regulator. The area of the fracture is known as the swivel (lock) wire groove.

Slide/Raft Design and Operation

Goodrich Corporation dual-lane slide/rafts (P/Ns 7A1238 and 7A1239) are standard equipment at doors 1, 2, 4, and 5 on some late-model Boeing 747-100 airplanes, 747-200 airplanes, and some early-model 747-300 airplanes.² Similar dual-lane slide/rafts (P/Ns 7A1261, 7A1255, 7A1256, and 7A1257) are used on 747-SP airplanes. The slide/raft is mounted on the door of the airplane. When the door is armed, the slide/raft becomes fastened to the airplane by means of a girt bar, which is inserted into the floor fittings at each doorsill. The girt bar is connected to the slide/raft by a fabric girt.

Deployment and inflation of the slide/raft is automatically initiated when the door is opened in the armed mode. A lanyard attached to the fabric girt releases the slide/raft from the packed position, allowing it to drop from the door-mounted packboard. As the slide/raft drops below the doorsill, a firing lanyard attached to the fabric girt extends and is pulled free from the slide/raft inflation bottle's regulator, releasing a compressed gas mixture into two inflation hoses (see Figure 1). Two turbofans attached to the hoses draw ambient air into the slide/raft chambers and, along with the compressed gas mixture from the inflation bottle, inflate the slide/raft to its normal operating pressure of approximately 2.0 psig. During the inflation sequence, the slide/raft is restrained by shear-pin devices that control the speed and sequence of the slide/raft's deployment. When the pressure within the chambers becomes greater than the pressure of the incoming air through the turbofans, two flapper valves close to seal the chambers.

² The upper deck of some late-model Boeing 747-100 airplanes, 747-200 airplanes, some early-model 747-300 airplanes, and 747-SP airplanes contains a manually deployed slide (P/N 7A1248) that deploys similarly to the main deck slide/rafts.

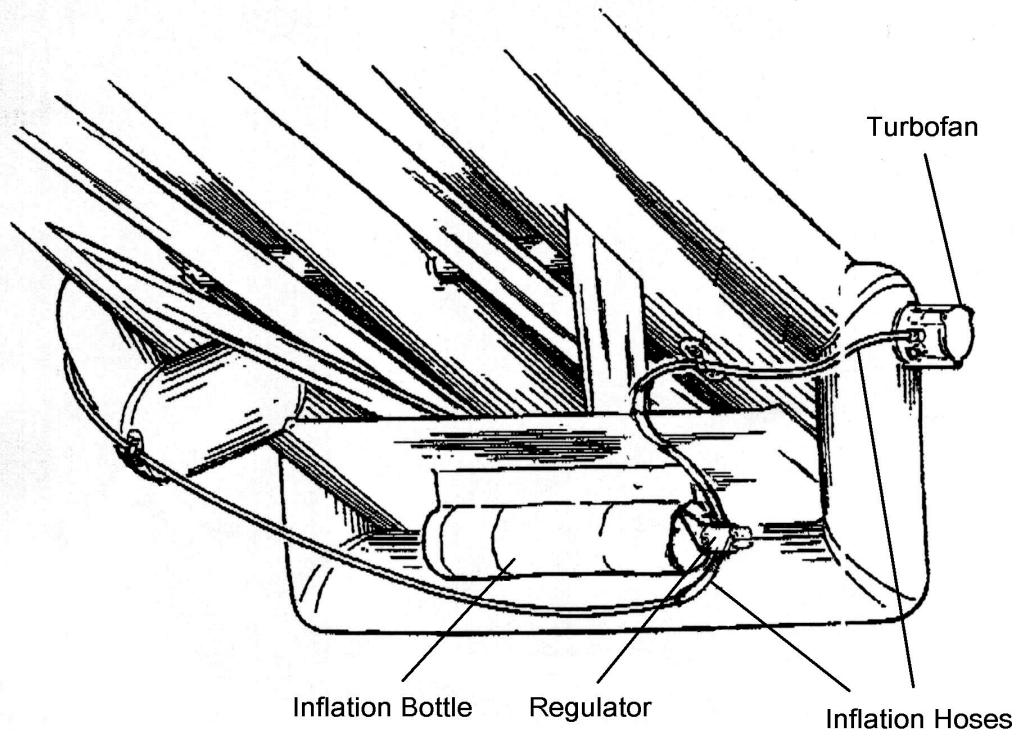


Figure 1. The underside of Goodrich dual-lane slide/raft P/N 7A1238 or 7A1239

Past Actions

Goodrich reported that before this accident, it had received reports of fractures in the slide/raft inflation hoses at the swivel (lock) wire groove in-hose fitting that connects to the inflation bottle's regulator. In 1983, at least one operator reported to Goodrich that a hose assembly (P/N 3A2620) had fractured at the hose fitting's swivel (lock) wire groove. As a result, the hose assembly's manufacturer, Preece, Inc., modified the hose fitting to strengthen its side loading capabilities. In a June 20, 1984, report, Preece stated,

by subjecting new unmodified hose fittings to a 90-degree side loading...it was found that the hose [fitting] began to yield at 260 pounds and broke off at 290 pounds.³ A comparison between the unmodified fitting and a fitting that had broken during [the 1983] slide deployment revealed the same type of break had occurred.

When the modified hose fitting was subjected to 90-degree side loading, it fractured at 640 pounds, demonstrating that the modification had improved the fitting's side loading capabilities by a factor of more than two.

³ The Safety Board notes that it is possible that such side loads could be imposed on the hose fitting during the repacking process after a slide/raft has been overhauled.

Goodrich reported that, at the time, it considered this modification a “minor product improvement” and therefore did not change the part number of the hose assembly or issue a service newsletter or service bulletin (SB). Preece began manufacturing the modified hose assemblies on May 30, 1983, and from that date on, new slides and slide/rafts were shipped with the modified hoses. According to Goodrich, they received no additional reports of hose fitting fractures until the early 1990s. Although Goodrich personnel could not locate documentation of the reported incidents, they stated that all of the incidents in the early 1990s involved hose fittings manufactured before May 30, 1983, and that none of the fractures occurred during an emergency evacuation. As a result of these reported incidents, Goodrich issued Service Bulletin [SB] 25-241⁴ on September 30, 1991. The SB recommended that operators “replace any hoses with Manufacturing/Test dates prior to May 30, 1983...at the next scheduled maintenance action.”

Iberia Airlines personnel reported that, because service bulletin compliance is not mandatory and because their fleet had not experienced any problems with the hoses, Iberia chose not to implement Goodrich SB 25-241.⁵ On November 5, 2002, the Boeing Company issued a *Fleet Team Digest* article recommending that “operators accomplish Goodrich SB 25-241 at the next maintenance opportunity, if not already accomplished on all applicable escape slides.” Additionally, Boeing issued a November 7, 2002, service letter to operators recommending removal of the older hoses affected by SB 25-241. The Safety Board agrees that such actions are necessary and should be required of all operators.

Because no airworthiness directive was issued requiring operators to replace the older hoses, the Safety Board is concerned that, like Iberia, other operators may not have implemented SB 25-241 on their Boeing 747-100, -200, -300, and -SP airplanes and that an unsafe condition may exist on those airplanes. The Board notes that issuance of an airworthiness directive, which would directly require only U.S. operators to comply with SB 25-241, would likely also result in a requirement for foreign operators to implement the SB because Annex 8, Chapter 4, to the International Civil Aviation Organization, requires States of Registry to adopt mandatory information or “assess the information received and take appropriate action.”⁶ Therefore, the issuance of an airworthiness directive will help verify that the worldwide fleet has implemented SB 25-241.

⁴ SB 25-241 was effective for hose assemblies 3A2617, 3A2618, 3A2619, 3A2620, 3A2621, and 3A2622. Those hose assemblies were installed on slides and slide/rafts with the following P/Ns: 7A1238, 7A1239, 7A1248, 7A1255, 7A1256, and 7A1257.

⁵ Within 48 hours after the accident, Iberia “tested all inflation hoses installed in the whole B747 fleet of the same P/N or equivalent to the broken hose.” Iberia plans to implement SB 25-241 “ASAP in the whole fleet” with a target completion date of July 2003.

⁶ See Annex 8 to the International Civil Aviation Organization: Chapter 4, section 4.3.3.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an airworthiness directive to require operators of Boeing 747-100, -200, -300, and -SP airplanes to implement Goodrich Service Bulletin 25-241 if they have not already done so. (A-03-04)

Acting Chairman HAMMERSCHMIDT and Members GOGLIA, BLACK and CARMODY concurred in this recommendation.

original signed

By: John A. Hammerschmidt
Acting Chairman