



A small child's fall reminds adults of the need for close supervision and reveals inadequate updates to operators.

Airstair Vigilance

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A 3-year-old girl's fall from the forward integral airstair of a Ryanair Boeing 737-800 — an approximate height of 8.5 to 9.0 ft (2.6 to 2.7 m) — has prompted the U.K. Air Accidents Investigation Branch (AAIB) to issue several safety recommendations, including one for airstair modification. She was released from a hospital after a 24-hour assessment and treatment of minor injuries.

The child had climbed the airstair to the upper platform followed by her mother, who was carrying a younger sibling and a carry-on bag. “Due to her mother’s lack of a free hand, the child climbed the airstair unassisted, but

she held onto the lower handrail,” the report said. “When [the girl] reached the top of the stairs, she turned towards her mother, leaned backwards and fell through the gap between the extendable handrail and the top of the airstair, onto the hardstanding [ramp pavement] below.” Other passengers also were on the airstair at the time.

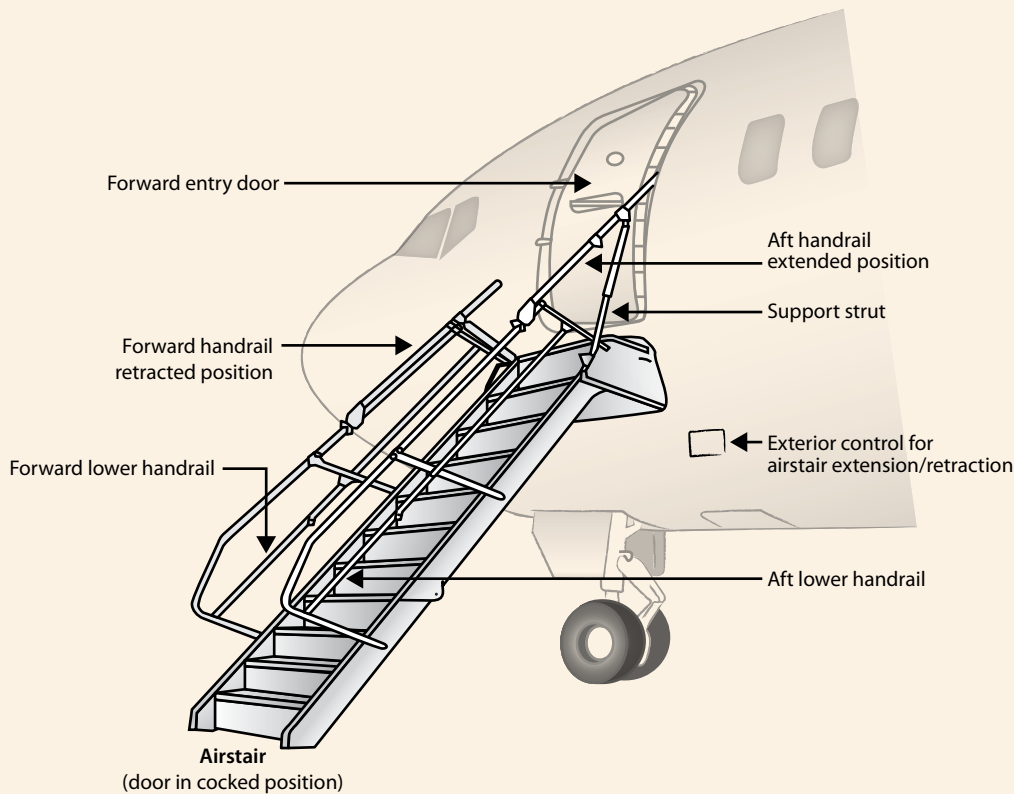
The incident occurred at 1225 local time on July 17, 2009, at London Stansted Airport, the AAIB report said. The airplane was manufactured in 2005 and certificated to applicable European standards.

This integral airstair (Figure 1, p. 38) primarily was used to facilitate routine

boarding and disembarkation in place of portable ground-based steps or an airbridge, and safe operation depended on a combination of barriers, procedures and warnings on placards. “These airstairs include an integral two-rung handrail on either side,” the report said. “These [handrails] rise into position during deployment of the stairs, but due to the geometric restrictions imposed by the retraction mechanism design, they do not extend to the fuselage side.

“In order to bridge the gap between the top of the handrails and the fuselage, a manually extendable handrail is fitted to each of the integral rails. After deployment of the airstair, these are

Forward Integral Airstair on Boeing 737s



FAA = U.S. Federal Aviation Administration

Notes: The upper handrail extensions, when secured to the inside of the door opening, are designed to provide a continuous support from the ground to the airplane cabin. However, an FAA special airworthiness information bulletin (SAIB NM-07-47) in September 2006 advised 737-series owners and operators of four occurrences in which, during the process of disembarking or entering the airplane, unattended small children fell through or over the handrails or lost their balance and fell from the airstair.

Source: U.K. Air Accidents Investigation Branch; FAA

Figure 1

extended and secured to points in the entry door frame. Each extendable rail is supported by a strut extending from the side rail of the airstair.”

Previous Child Falls

Four similar incidents involving small children had prompted the U.S. Federal Aviation Administration (FAA) in September 2007 to issue advisory information to all current owners and operators of 737s. This comprised a special airworthiness information bulletin,¹ calling for the incorporation of the latest safety advice and advances from

a service bulletin developed by Boeing Commercial Airplanes,² and another developed by Monogram Systems, the manufacturer of the airstair.³

“These bulletins required warning placards to be added to the risers of the airstair steps and the aircraft door apertures, together with the addition of anti-skid material to the top platform and the side rails,” the report said. “The [Boeing bulletin] also highlighted the fact that Boeing had revised the flight attendant manual for the 737 series of aircraft, to include a warning regarding the need for operators to pay particular

attention to passengers boarding [or deplaning] with small children or [passengers] with special needs.” The AAIB report cited a paragraph from this template for operators, which says, in part, “Small children on airstairs should be attended by an adult or responsible person.”⁴

Investigation of the 2009 incident, however, found no process in place for operators to receive amendments to these type-specific cabin safety recommendations. “The flight attendant manual received by the operator with its first Boeing 737-800 was issued on 28 September 1998,” the report said.

Investigators noted that, at the time of the incident, imple-

mentation of the most current airstair safety improvements recommended by Boeing and the airstair manufacturer was incomplete. “The airstair ... had the warning placards on the risers and anti-slip material installed in accordance with [the] Monogram Systems [service bulletin], but the door aperture placards, detailed in [the] Boeing [service bulletin], had not yet been applied,” the report said.

Small children require close supervision because of limitations of the geometry of the rails. “When deployed, the left and right extendable handrails

are intended to provide protection against people falling sideways off the upper section of the airstair,” the report said. “While these handrails appear to provide adequate protection for adults, a gap exists between the handrail and the airstair platform which is large enough to allow a small child to pass through it and fall onto the [ramp pavement] below.”

According to procedures in Ryanair’s safety equipment and procedures manual (SEP), three of four flight attendants are assigned to maintain positions by the forward and rear doors, and near overwing exits for the duration of boarding. “However, during boarding, the ability of the cabin crewmember at the forward doors to identify those passengers requiring assistance, while they are ascending or descending the airstair, is limited,” the report noted, citing a provision from the SEP, which says, “Passengers accompanying young children should be instructed to hold their hands when descending the stairs and on the ramp.”⁵ The report did not mention the positioning of the flight attendants in the 2009 incident.

Other Airlines

AAIB observers also looked beyond the airline involved to assess supervision of small children on the 737 forward integral airstair. “In 95 percent of cases, during disembarkation, passengers traveling with several small children and hand baggage received no assistance from either cabin crew or ground staff,” the report said. “However, ground [staff] and cabin crew provided assistance in 78 percent of cases when single passengers accompanied by small children were allowed to pre-board the aircraft.” The 2009 pre-boarding incident was an exception: Neither the cabin crew nor the

ground staff provided assistance, according to the AAIB.

“When portable ground-based steps or the aircraft’s integral airstair were used, an adult boarding or disembarking with ‘carry-on’ baggage, which could not easily be placed over the shoulder, and a small child, found themselves, in certain situations, in a position where neither hand was available to provide support during the ascent or descent. This situation was further complicated when an adult was accompanied by more than one small child and ‘carry-on’ baggage, as some of the children had to negotiate the steps with little assistance from the adult.”

Mitigation Measures

The AAIB said that Ryanair also analyzed this incident and instituted measures to reduce the risk. “As a result, the operator raised a modification which introduces a roller-tensioned, high-visibility tape between the door aperture and the extendable handrail strut,” the report said. “After approval by the relevant airworthiness authorities, this modification will be embodied on the operator’s fleet as a matter of priority.”

The AAIB recommended that:

- “Boeing establish a process to inform the operators of all Boeing commercial aircraft of changes to the relevant flight attendant manual;
- “Ryanair review their current passenger boarding and disembarking procedures so that assistance is made available to passengers accompanied by children, and those with special needs; [and,]
- “Boeing review the design of the Boeing 737 forward airstair with the intention of adding a removable barrier to minimize

the possibility of a child falling through the gap between the extendable handrail and its upper platform.”

The report explained the analytical basis of each safety recommendation. “The lack of an amendment service for the Boeing 737 flight attendant manual ... applies to all of the Boeing commercial aircraft product line,” the AAIB noted. “In this case ... the operator would have been aware that some changes had been made to the manual upon receipt of [the FAA special airworthiness information bulletin].”

Investigators concluded that the absence of a barrier that specifically protects small children also should be addressed. “The gap between the extendable handrail and the upper platform of the Boeing 737 airstair represents a hazard to small children boarding or disembarking the aircraft,” the report said. “Four previous events resulted in [amended guidance or safety bulletins that] do not provide physical protection against a child falling through the gap. The modification proposed by the operator provides a significant visual cue to the lack of a rigid barrier in this area, but provides only a limited physical protection against falling.”

This article is based on AAIB Bulletin 8/2010, EIDLJ, EW/C2009/07/08, published in August 2010.

Notes

1. FAA. Special Airworthiness Information Bulletin NM-07-47. September 2007.
2. Boeing. Service Bulletin 737-52-1157.
3. Monogram Systems. Service Bulletin 870700-52-2130.
4. Boeing Commercial Airplanes. *Boeing Flight Attendant Manual*, page 7.10.34. October 29, 2008.
5. Ryanair. *SEP Manual*, Section 2.4.13.5.