

## INCIDENT

<b>Aircraft Type and Registration:</b>	Boeing 737-800, EI-DLJ
<b>No &amp; Type of Engines:</b>	2 CFM 56-7B26 turbofan engines
<b>Year of Manufacture:</b>	2005
<b>Date &amp; Time (UTC):</b>	17 July 2009 at 1225 hrs
<b>Location:</b>	London Stansted Airport, Essex
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)
<b>Persons on Board:</b>	Crew - 6                      Passengers - 164
<b>Injuries:</b>	Crew - None                      Passengers - 1 (Minor)
<b>Nature of Damage:</b>	None
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence
<b>Commander's Age:</b>	40 years
<b>Commander's Flying Experience:</b>	8,500 hours (of which 4,755 were on type) Last 90 days - 259 hours Last 28 days - 91 hours
<b>Information Source:</b>	AAIB Field Investigation

## Synopsis

Whilst boarding the aircraft using the forward airstairs, a small child fell through the gap between the handrail and the top platform, on to the ground. The child was airlifted to hospital for further treatment and was released 24 hours later. Three Safety Recommendations have been made as a result of this investigation.

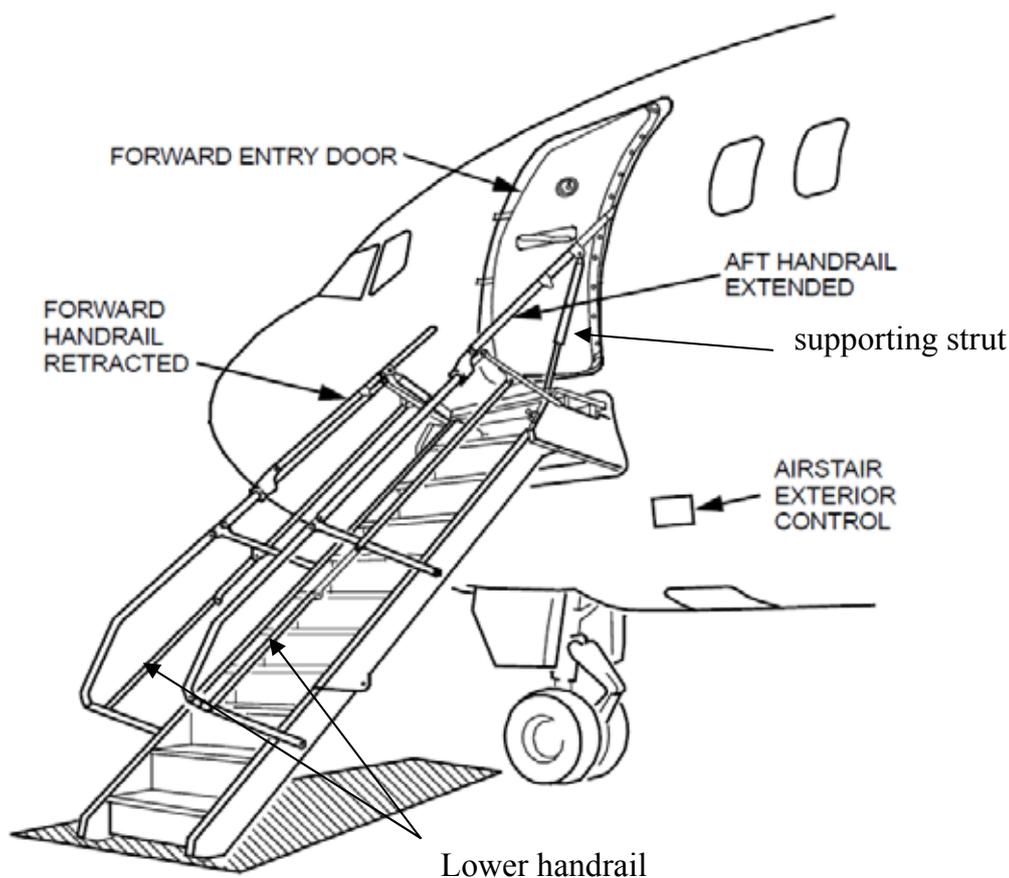
### Boeing 737 forward airstairs description

Some Boeing 737 series aircraft are fitted with a set of retractable airstairs at the forward left cabin door, to allow the boarding and disembarkation of passengers without the need for additional ground support equipment. These airstairs include an integral two-rung handrail on either side. These 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 airstairs, these are extended and secured to points in the entry door frame, Figure 1. Each extendable rail is supported by a strut extending from the side rail of the airstairs.

### History of the incident

The child, aged three years at the time of the incident, was accompanied to the aircraft by her mother, who was carrying a younger sibling together with a carry-on bag. They had opted for priority boarding and were



**Figure 1**

Boeing 737 forward airstairs  
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embarking via the aircraft's forward integral airstairs. The child, accompanied by her mother and sibling, climbed the airstairs with other passengers. Due to her mother's lack of a free hand, the child climbed the airstairs unassisted, but she held onto the lower handrail. When she 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 airstairs, onto the hardstanding below. After receiving initial medical assistance on site, the child was airlifted to hospital where she received additional treatment for her injuries, she was released from hospital 24 hours later.

### Previous events and safety actions

As a result of four previously reported similar incidents involving small children, the FAA published a Special Airworthiness Information Bulletin (SAIB) NM-07-47 in September 2007. This was distributed to all current Boeing 737 operators and recommended that owners and operators of the Boeing 737 series of airplanes incorporate Boeing Service Bulletin (SB) 737-52-1157 and Monogram Systems (manufacturer of the airstairs) SB 870700-52-2130. These bulletins required warning placards to be added to the risers of the airstairs steps and the aircraft door apertures, together with the addition of anti-skid material to the top platform and the side rails. The SAIB 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 with small children or with special needs.

Page 7.10.34 of the revised Boeing Flight Attendant Manual (29 October 2008) states:

*'WARNING: As passengers are boarding or deplaning, pay particular attention to persons with small children or those with special needs. Small children on airstairs should be attended by an adult or responsible person.'*

This manual is provided to operators on delivery of an aircraft and is intended to provide a guide to assist in the development of a Cabin Crew / Safety Equipment and Procedures (SEP) manual to satisfy regulatory requirements. In the event that the manual is amended, there is no revision service to ensure that current operators of the type receive the amended information. The Flight Attendant Manual received by the operator with its first Boeing 737-800 was issued on 28 September 1998.

### **Investigation**

The Boeing 737 series of aircraft is one of a number of types that use integral airstairs to facilitate boarding and disembarkation without relying on the presence of ground based steps or an airbridge. When deployed, the left and right extendable handrails are intended to provide protection against people falling sideways off the upper section of the airstairs. Whilst these handrails appear to provide adequate protection for adults, a gap exists between the handrail and the airstairs platform which is large enough to allow a small child to pass through it and fall onto the hardstanding below. At the

time of the accident, the airstairs installed on EI-DLJ had the warning placards on the risers and anti-slip material installed in accordance with Monogram Systems SB 870700-52-2130, but the door aperture placards, detailed in Boeing SB 737-52-1157, had not yet been applied.

As part of the investigation, the boarding and disembarkation process used by various operators of the Boeing 737, when using the forward airstairs, was observed. It was noted that in 95% of cases, during disembarkation, passengers travelling with several small children and hand baggage received no assistance from either cabin crew or ground staff. However, ground and cabin crew provided assistance in 78 % of cases when single passengers accompanied by small children were allowed to pre-board the aircraft. The operator does allow pre-boarding of passengers if they opt for priority boarding; however, in this incident, although the passenger accompanied by her small child had opted for priority boarding, neither the cabin crew nor ground crew gave them assistance during boarding.

It was observed that when portable ground based steps, or the aircraft's integral airstairs 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.

### **Boarding and disembarking procedures**

The procedures laid down in the operator's SEP manual require that three of the four cabin crew members

remain in position by the forward and rear doors, and near over-wing exits, for the duration of boarding. The fourth cabin crew member would normally be providing passenger assistance or completing other duties within the cabin. However, during boarding, the ability of the cabin crew member at the forward doors to identify those passengers requiring assistance, whilst they are ascending or descending the airstairs, is limited.

Section 2.4.13.5 of the operator's SEP manual regarding passenger disembarkation states:

*'Passengers accompanying young children should be instructed to hold their hands when descending the stairs and on the ramp.'*

#### **Immediate safety action taken by the operator**

After this incident, the operator initiated a review of the measures that could be taken to minimise the possibility of a similar event recurring. 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. After approval by the relevant airworthiness authorities, this modification will be embodied on the operator's fleet as a matter of priority.

#### **Safety Recommendations**

The lack of an amendment service for the Boeing 737 Flight Attendant Manual means that current operators of the type do not receive updates to the manual. It is understood that this situation applies to all of the Boeing commercial aircraft product line. In this case, the warning regarding the provision of assistance to passengers boarding with small children and those with special needs, had not been passed to the operator from the manufacturer; however, the operator would have been aware that some changes had been made

to the manual upon receipt of FAA SAIB NM-07-47. The following Safety Recommendations are therefore made:

#### **Safety Recommendation 2010-017**

It is recommended that Boeing establish a process to inform the operators of all Boeing commercial aircraft of changes to the relevant Flight Attendants Manual.

#### **Safety Recommendation 2010-018**

It is recommended that 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.

The gap between the extendable handrail and the upper platform of the Boeing 737 airstairs, represents a hazard to small children boarding or disembarking the aircraft. Four previous events resulted in the publication of FAA SAIB NM-07-47 in September 2007, the amendment of the Boeing 737 Flight Attendant Manual and the release of two SBs. Whilst these SBs provide increased protection against slipping on the airstairs upper platform, and visual cues to a potential personal injury risk, they 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. Therefore, the following Safety Recommendation is made:

#### **Safety Recommendation 2010-019**

It is recommended that Boeing review the design of the Boeing 737 forward airstairs with the intention of adding a removable barrier to minimise the possibility of a child falling through the gap between the extendable handrail and its upper platform.