# Airbus A320-200, G-MONY, 13 April 1996

## AAIB Bulletin No: 8/96 Ref: EW/C96/4/14 Category: 1.1

#### INCIDENT

Aircraft Type and Registration: Airbus A320-200, G-MONY

No & Type of Engines: 2 CFM-56 turbofan engines

Year of Manufacture: 1992

Date & Time (UTC): 13 April 1996 at 1730 hrs

Location: Stand 42, Birmingham Airport

Type of Flight: Public Transport

Persons on Board: Crew - 7 Passengers - 180

Injuries: Crew - None Passengers - None

Nature of Damage: Slight skin damage to forward passengerdoor

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 43 years

Commander's Flying Experience: 11,652 hours (of which 1,215were on type)

Last 90 days - 153 hours

Last 28 days - 48 hours

#### Information Source: AAIB Field Investigation

The aircraft was parked on stand 42 at Birmingham InternationalAirport with the airbridge aligned against the aircraft for passengerdisembarkation through the forward passenger door.

During disembarkation the commander heard a 'thump' which wasfollowed by an ECAM (Electronic Central Aircraft Monitoring) systemwarning of a flight control computer fault followed by an indicationthat the 'blue' system hydraulic pump was running. Approximatelyone minute later the ECAM gave a further warning of a 'FlightWarning Computer' (FWC) 1 and 2 fault. At this point the oncomingcommander for the next sector, who had been observing the passengersleave the aircraft from the ramp, pushed past them to inform theflight crew that the nose oleo was at full extension (this hadactivated the air/ground logic switch which operates with lessthan 500 kg of weight applied to the nose oleo). The commanderimmediately stopped the disembarkation with 70

of the passengersstill remaining on board. They later left the aircraft via mobilesteps positioned at the rear door. During the passenger disembarkation baggage handlers, contrary to company instructions, had been unloading baggage from the forward hold first instead of from the rear hold.

Stand 42 is equipped with a controllable 'Rail Drive Bridge' (Safegate). Suitably qualified personnel from the Handling Agency can control the movement of this 'bridge' horizontally; by extension or retraction of the sliding tunnel; vertically by raising and lowering of thebridge floor level and radially by rotating the cab end of thetunnel. An auto levelling device positioned and held against side of the aircraft, adjacent to the passenger door, automatically adjusts the height of the bridge floor to cater for vertical movements of the aircraft during loading and unloading. A further safety'shoe', positioned on the airbridge floor under the open aircraft sort senses any door contact and signals the bridge to move downautomatically. This safety shoe is automatically activated whenin the auto level mode.

The Airport Authority provide training for all airbridge operators and issue them with an appropriate licence. They also publishan Airport Operational Instruction (AOI 01/95) entitled 'AIRCRAFTSTANDS - AIR BRIDGES AND PARKING GUIDANCE'. Paragraph7.1 under the heading 'USE OF AIRBRIDGES' states:

'No airbridge must be left unattended whilst in the "Auto-Levelcondition" when docked to

an aircraft. A qualified operator must remain in attendanceto respond to any audible alarm which may occur. During the periodbetween completing disembarkation and boarding passengers for he next flights, if the airbridge is to be left unattended, theaircraft door should be closed, the jetty withdrawn clear of theaircraft side and shut down.'

On the day of the incident the handling agent had activated theauto levelling device attached to the jetty but the safety 'shoe'was not installed and available for use. Furthermore the operatorappears not to have been present in the bridge 'cab' at the timeof the incident.

#### Summary of unloading sequence

During passenger disembarkation the baggage handlers were incorrectlyunloading the baggage from the forward hold first. This, exacerbatedby the disembarkation of passengers from the front of the cabin, caused the aircraft to become tail heavy. The height of the forwarddoor increased progressively but this was compensated for by theauto levelling of the jetty floor which operated correctly. Asbaggage unloading progressed, now from the rear hold, and as passengersfrom the rear of the aircraft started to move forward to disembark, the height of the forward door began to decrease. Unfortunately this stage the auto levelling device failed and automaticallyremoved all power from the jetty controls. The aircraft continuedto settle with the door contacting the floor of the jetty allowing a significant proportion of the aircraft weight to be supported by the door itself. In this case, although the mismanagedunloading of the baggage increased the upward movement of theforward door, it also helped to minimise the damage to the aircraftstructure. The aircraft was delayed approximately 4 hours after incident whilst company engineers inspected the door in accordance with maintenance manual procedures.

The aircraft sustained minor damage to the door skin in the formof a 12 inch long crease 2 inches above the lower edge at thelower aft corner. Visual inspection revealed that there was nocracking and no damage to the door and fuselage mountings and surrounding structure. Door and slide operation, indication and ground pressurisation checks were also satisfactory. The companyalso

contacted the manufacturers asking them to provide details of any Non Destructive Testing (NDT) inspections that may have been required.

### **Other Incidents**

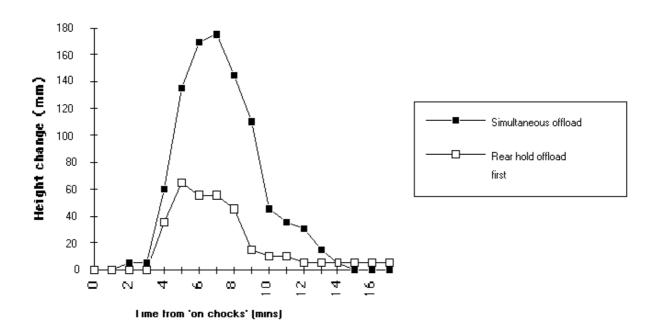
A similar incident occurred on 18 April 1996 to the same aircrafton stand 53 at Birmingham. The 'Safegate' airbridge had beenpositioned normally with the normal gap below the forward passengerdoor. As passengers disembarked the bottom of the door contacted the floor of the airbridge. The pilot reported that the autolevelling device appeared not to be working.

### Follow-up action

As a result of these incidents the AAIB, together with the AirportAuthority, examined the operation of the 'Safegate' airbridgeson stands 42 and 53 and carried out trials to measure the amountof vertical movement of the forward door sill height of an A320-200aircraft during normal passenger disembarkation.

Two trials were conducted to measure the changes in height of the aircraft fuselage adjacent to the nose landing gear (directlyin-line with the forward passenger door). Measurements were takenat one minute intervals. In trial No 1 the front and rear holdsof the aircraft were unloaded simultaneously whilst the passengerswere disembarking through the forward door only. The conditions for trial No 2 were the same except that the rear hold was unloaded first (the procedure specified by the company). The results from these trials were compared with tabulated information supplied Airbus in their operations manual (Chapter 2.3 page 1) under the title 'AIRPLANE CHARACTERISTICS'. The table gives details of heights above ground for various points along the aircraft's length under empty operating weight conditions with a C of G at 22%; at maximum ramp weight with a C of G at 18.6% and at maximum ramp weight with a C of G at 41%. The results of the trials and the relevant manufacturers figures are included below:

#### A320-200 MOVEMENT OF NOSE GEAR DATUM



Simultaneous offload: Aircraftlanding weight = 60,473 kg; ZFW CG=35.5%; (pax=174, bags=205)

Rear hold offload: Aircraft landing weight = 60,043kg; ZFW CG=32.2%; (pax=169, bags=187)

	OPERATING WEIGHT EMPTY CG 22%		MAXIMUM RAMP WEIGHT CG 18.6%		MAXIMUM RAMP WEIGHT CG 41%	
	Metres	Feet	Metres	Feet	Metres	Feet
Front door sill height	3.45	11.31	3.39	11.12	3.46	11.36

AIRPLANE CHARACTERISTICS - A320 Model 100 & 200

The manufacturers data above gives details of the forward doorsill height at the three conditions stated. It does not howevergive an indication as to the total range of movement of the doorheight during weight changes. The manufacturers data implies that, at worst, the maximum amount of height change is 7 cm. On the other hand measurements taken from the trials shows that the maximum amount of total movement that can be expected, during a routine disembarkation, is at least 17.5 cm.

#### Safety Recommendation 96-63

It is therefore recommended that Airbus provide A320 operators with information on the maximum amount of door (both front andrear) sill height movement that can be expected, during aircraftweight changes, in order that airbridges, without auto levellingdevices, and fixed height mobile steps can be positioned accordinglyso as to avoid aircraft structural damage.