AAIB Bulletin No: 10/94 **Ref: EW/G94/07/24** **Category: 1.1**

Aircraft Type and Registration:	Boeing 737-400, G-GBTA
No & Type of Engines:	2 CFM 56-3C1 turbofan engines
Year of Manufacture:	1993
Date & Time (UTC):	18 July 1994 at 1515 hrs
Location:	Aberdeen Airport
Type of Flight:	Scheduled Passenger
Persons on Board:	Crew - N/K Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Fuselage skin pierced and dented near the forward service door
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	49 years
Commander's Flying Experience:	9,648 hours (of which 1,048 were on type) Last 90 days - 83 hours Last 28 days - 13 hours
Information Source:	AAIB Field Investigation

Background

The aircraft was being 'turned round' for the return flight to its main operating base. The commander was seated on the flight deck where he was preparing for the forthcoming flight; the co-pilot was carrying out an external inspection of the aircraft and the cabin crew were preparing for the arrival of passengers. At that time one of several other concurrent activities was the supply of stores from a contractor's catering truck.

The catering vehicle was a Road Runner 8·12 four-wheeled vehicle as shown in the photograph below. It had a hydraulically operated 'hi-lift' body which could be raised to service the aircraft and lowered for driving. The chassis was equipped with two hydraulically extended jacks at the rearmost corners to stabilise the vehicle. Transfer of catering trolleys from the vehicle body to the aircraft was achieved via a loading platform above the vehicle cab which was raised and lowered in line with the body floor. There was no mechanism for horizontally extending the loading platform and its forward edge was vertically above the vehicle's front bumper. A small manually operated 'flip-over' bridge

was attached to the forward section of the loading platform to span the gap between the platform and the aircraft's cabin floor. This bridge and its safety rails were attached to the platform by vertical steel brackets supporting pivots. The bridge was capable of spanning a gap of at least two feet.

The accident sequence

The catering vehicle was manned by two persons: a driver and a guideman. On approaching the aircraft, its forward service door was closed and so the guideman left the vehicle on foot, entered the aircraft and made his way to the forward service door to open it. Meanwhile the driver positioned the vehicle. He was unable to drive it squarely onto the fuselage because a set of steps and a baggage vehicle servicing the forward hold were obstructing his desired path. Without waiting for the guideman to return, he approached the aircraft at an angle slightly less than 30° and stopped clear of it with the front left corner of the loading platform closest to the fuselage. He later stated that he had left 'a small gap' between the rubber buffer of the platform and the sill of the aircraft. The vehicle body and the loading platform were then raised without incident and then the flip-over bridge was extended. The driver and the guideman then catered the aircraft without difficulty.

After the aircraft had been catered, the flip-over bridge was withdrawn and secured in position. The driver then returned to the vehicle cab whilst the guideman remained by the open forward service door to obtain a signature from the cabin crew. The guideman stated that as the driver lowered the vehicle body and loading platform, he heard a bang. He signalled to the driver that something was wrong and then left the aircraft to see what had happened. On the ground he saw a tear in the fuselage skin just

aft of the service door and slightly below the sill height. The aircraft crew and the catering contractor's management staff were then informed of the accident. Photographs of the damage and the catering vehicle were taken by the airport duty manager and the local police interviewed the vehicle crew.

Examination of the aircraft

The fuselage skin had been dented inwards in a triangular shape with the apex of the triangle pointing towards the aircraft's nose. The sides of the triangle were approximately eight inches long and the base was approximately five inches long. The fuselage skin at the base of the triangle had been penetrated resulting in a tear approximately one inch wide. The damage was assessed by the operator's engineering staff at Aberdeen and the aircraft was withdrawn from service. Later that day it was ferried unpressurised to its main base where it was repaired.

The region of the skin damage was below the maximum width of the fuselage yet photographs showed that the tear had undoubtedly been caused by a narrow object moving upwards. This evidence appeared at first to be inconsistent with the guideman's statement that the damage had been inflicted when the body of the vehicle was lowered.

Examination of the catering vehicle

There was no damage to the catering vehicle which was examined by the AAIB. It was several years old and of an uncommon type no longer in production. It had no stabiliser jacks at the front of the chassis and no proximity sensors to alert the driver if he positioned it too close to the aircraft. When the jacks at the rear were extended, the back of the vehicle was raised by several inches. This transferred some of the vehicle's weight to the front wheels and tended to rotate the chassis around the front axles. The combined effect lowered the leading edge of the loading platform at the front of the vehicle by about four inches.

The loading ramp was positioned too close to the aircraft before transferring the stores. The weight of the vehicle then decreased as the stores were transferred and the platform rose due to offloading of the front wheel suspension. Also, the aircraft may have settled slightly with the increased weight of fuel and stores. These changes in weight reduced the gap between the platform and the aircraft such that as the stabiliser jacks were retracted, the front left corner of the platform rose sufficiently to close the gap and strike the fuselage. There were abrasions and paint marks on a vertically mounted metal bracket just above the leading edge of the platform which were consistent with the damage to the aircraft. Although the leading edge of the loading platform was fitted with a tubular rubber buffer, the rubber did not wrap around the corners of the platform and its diameter was smaller than that usually fitted to catering vehicles. Also, there was no padding or protection around the brackets which supported the safety rails and the flip-over bridge.

Drivers' operating procedures

The catering contractor provides a 'Drivers Handbook for Airport Operations'. In this book there were no orders specific to named vehicle types but the orders did discriminate between vehicles with or without extendible loading platforms.

In the operating procedures for 'MANOEUVRING AT AIRCRAFT/OPERATING THE HI-LIFT (TWO MAN OPERATION)' the handbook stated that 'The driver must stop 10 feet from the aircraft to test brakes and allow the guideman to position himself by the aircraft door.' There was no statement in this section regarding the maximum or minimum clearance between vehicle and aircraft for safe transfer of stores but it was stated that 'The vehicle must be driven as squarely as possible onto the aircraft, with the driver obeying the guideman's signals '. The contractor's management staff stated that standard practice for this type of vehicle was to position the loading platform approximately 18 inches from the aircraft door yet the book of procedures stated that for platforms without an extending section 'The gap at floor level must not be greater than 18 inches'.

Another section of the book covering 'MANOEUVRING AT AIRCRAFT/OPERATING THE HI-LIFT (ONE-MAN OPERATION)' stated that 'If clear and safe, the vehicle may be driven towards the loading door, with the driver continually concentrating on hazards. The vehicle must stop at least one foot away from the aircraft door'. There were no instructions in the handbook which prohibited the driver of a two man crew reverting to single man operating procedures if the guideman was temporarily absent.

Preventative action

The catering contractor's staff were given additional training. The two vehicles of this type in the contractor's fleet were to be modified at the contractor's behest with larger radius rubber buffers which would extend across the full width of the loading platform and along either side for a distance of 6 inches. Moreover, the angle bracket joining the flip-over bridge to the platform (which penetrated the aircraft's skin) was to be cut back flush with the guard rails.