AAIU Report No. 2000/015
AAIU File No. 19990030
Published.:12/09/2000

Aircraft Type and Registration:	BAe 146-200 EI-CMS
No. and Type of Engines:	Four, ALF 502-R5 Turbofans
Aircraft Serial Number:	E2044
Year of Manufacture:	1985
Date and Time (UTC):	24th May 1999, 06.44 hours
Location:	Dublin Airport, Stand 42A
Type of Flight:	Public Transport
Persons on Board:	Crew 4 Pax 40
Injuries:	Crew - nil Pax - nil
Nature of Damage:	Score 22" in length, (incld 4.24" of skin pierced) at rear fuselage.
Information Source:	Operator's Flight Safety Officer. AAIU Field Investigation.

SYNOPSIS

Flight AF5003, with passengers on board, was about to depart Stand 42A at Dublin Airport when an equipment tug engaged in loading baggage on to the aircraft, slid and struck the aircraft rear fuselage. The skin of the aircraft was punctured in the process.

1. FACTUAL INFORMATION

1.1 History

The BAe 146 aircraft arrived on Stand 42A at 20.44 hrs on Sunday 23rd May'99 and was parked at this stand overnight. It was designated Flight No. AF5003 and was due to depart for Paris at 06.50 hrs on Monday 24th May'99. The Operator's staff carried out a pre-departure inspection and the aircraft was cleared for flight. At approx 06.44 hours, with passengers on board and during loading of baggage, the equipment tow tractor came into contact with the starboard rear fuselage resulting in a rupturing of the aircraft's skin.

At 06.45 hours approx. a member of the Airport Police & Fire Service was called to the scene. He arrived, took photographs of the scene, withdrew the driver's permit and made out his report.

The AAIU investigator arrived at 07.30 hours. At that time the aircraft had been removed from Stand 42A with the permission of the Chief Inspector of Accidents and repositioned on Stand 48. The Investigator then received a copy of the police report.

1.2 Witness Recollections

The shift supervisor, who was a fully qualified licensed engineer, was engaged in a pre-departure inspection (PDI) of the aircraft, refuelling and removal of ground operation pins.

He was on the flight deck discussing fuel figures with the Captain of the aircraft when they both felt the aircraft shudder. The supervisor then left the aircraft and went around to the rear of the aircraft where he met some of the Handling Agent employees. They informed him that they had a problem with the "aircraft and the baggage truck". On inspecting the aircraft, the supervisor found a score mark along the rear of the fuselage skin, with the roof of the equipment tug some inches away form the aircraft. He informed the Captain of the aircraft and they both inspected the damage. The aircraft was then declared unserviceable and unfit for flight.

The supervisor then spoke to the tug driver who said that, as he was driving the equipment tow tractor, with loaded trolley attached, up to the rear of the aircraft, the tug slid and went into the side of the aircraft. The driver said that the ground was wet at the time with a lot of water at that loading point, so he drove accordingly. The supervisor said that the driver appeared to be the only witness to the incident.

Another employee of the Handling Agent who was helping the tug driver to unload the trolleys said that they had completed loading the forward baggage hold and that he went to the rear of the aircraft, to the rear baggage hold, in preparation for loading the rest of the baggage. He climbed into the hold. He was opening the cargo nets when he felt the aircraft shudder. As he had his back to the door he did not witness the tug striking the aircraft. He contacted his superior, the Ramp Controller and he arrived with the Ground Equipment Maintenance Manager within minutes.

1.3 Injuries to Persons

There were no injuries to persons.

1.4 Damage to Aircraft

The damage was confined to an area in the vicinity of the rear cargo bay door on the starboard side of the aircraft. This area was bounded by frames 38 and 39 in the vertical, and stringers 19 and 20 along the horizontal.

The score mark ran for 22 inches along the fuselage skin and terminated with a puncture to the skin where it was pierced for 4.25 inches. The depth of puncture was almost 0.4 inches and was evident when viewed internally from the pressurised area of the aircraft.

1.4.1 Other damage

There was very slight damage to the left hand corner of the equipment tug roof where some paint was removed on impact with the aircraft fuselage.

1.5 Personnel Information

The Investigator was given information on courses conducted by the Handling Agent. The tug driver attended the following courses:

Course	Date Conducted	Signed Off
Ramp Safety	18/3/99	Same date
Pre-Trip Procedure	18/3/99	Same date
Equipment Defect Reporting	18/3/99	Same date
Belt Loaders	22/3/99	Same date
Equipment Tug	23/3/99	Same date
Ground Power Unit	23/3/99	Same date
Aircraft Marshalling	23/3/99	Same date
Towable Passenger Steps	23/3/99	Same date
F.D.P. Power	23/3/99	Same date
Walk Round Checks	23/3/99	Same date
Wing Walking	23/3/99	Same date

1.6 Ramp Area

Stand 42A was inspected by the investigator more than an hour after the occurrence. At that time the concrete surface was quite dry. However there was evidence that it had been raining in the area some time previously. There were some old oil stains on the surface near where loading of the baggage would have taken place, but these appeared to be dry.

1.7 Impact Information

The tow tractor was withdrawn from service and a technical inspection carried out by the Handling Agent's Ground Maintenance Manager. No fault was found with the tractor.

1.7.1 This tow tractor had been inspected on 18/5/99 and previously serviced on 30/3/99. The front tyres had a depth of tread of 7mm and the rear 10.5 mm.

The electric tow tractor was inspected by the AAIU investigator at the handling agents' servicing depot. Front and rear tyres had threads of different cut. The rear tyres had a fine thread whilst the front tyres had a "block" thread and were described as "23X5 Super- Cushioned".

1.8 Additional Information

The following documents were provided by the Handling Agent:-

(a) Equipment Tug Driving - 6 pages.

(b) Safety Statement - Safe Working Practices No. 2 - Driving on the Ramp.

(c) Safety Statement - Safe Working Practices No. 5 - Towing Tractors

The above documents are included in the syllabus of driver training and require drivers to:

- Always drive with due care and attention to the prevailing weather conditions.
- Approach aircraft using a competent guide person.
- Not to drive within 6 feet of an aircraft.
- Not to park the vehicle too close to an aircraft.
- Never reverse a dolly to an aircraft - disconnect and position to aircraft.

1.9 Investigation of Tow Tractor

This type of electric tow tractor has three independent braking systems:

(a) Dual circuit hydraulic drum brakes on all four wheels
(b) Parking brake lever connected to rear wheels
(c) Regenerative electric braking

The manufacturer's specification issued for this tractor indicates that the tyres for front and rear should be of size 23 X 5 Pneumatic. The manufacturer stated that the vehicle would normally be supplied with these tyres fitted. However, they stated that they had no reason to believe that the solid rubber Super-Cushioned tyre would have any adverse effect on the handling and control of the tractor.

The tyre agent indicated that the pneumatic tyre might not always be available when requested.

2. ANALYSIS

The objective of the tug driving course, which the driver had received, was to provide the trainee with sufficient knowledge of the equipment tug to ensure a safe working practice at all times. The driver is instructed to always drive with due care and attention to the prevailing weather conditions.

The driver's helper was in the rear baggage hold at the time of the incident. With the tug manoeuvring so close to the aircraft it would have been safer if he had been outside the hold in order to guide the tug up to the rear of the aircraft.

The tug was being driven so close to the aircraft that there was no margin for error in the event of a skid taking place.

The brakes on the tug were found serviceable. However, the type of tyre used on the front of the vehicle which had a very course thread (block type) might not have had maximum grip, given the weather conditions prevailing at the time.

A pneumatic tyre, with a finer thread, as recommended by the tug manufacturer would have been more suitable.

3. CONCLUSIONS

3.1. The tug was being driven too near the aircraft for the weather conditions prevailing.

3.2. A pneumatic front tyre with a finer thread similar to that fitted to the rear axle would be more suitable for this type of vehicle.

4. RECOMMENDATIONS

4.1 When fitting tugs with tyres, the manufacturer's specified tyre size and type should be used when commercially available. **(SR 45 of 2000)**

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4.2 The Handling Agent should consider changing the regulation *"Approach aircraft using a competent guide person"* to a stronger- *"Do not approach an aircraft unless a competent guide person is present and available"*. **(SR 46 of 2000)**