

FINAL REPORT

AAIU Synoptic Report No: 2008-010

AAIU File No: 2007/0061

Published: 26/06/2008

In accordance with the provisions of SI 205 of 1997, the Chief Inspector of Air Accidents, on 13 August 2007, appointed Mr. Paddy Judge as the Investigator-in-Charge to carry out a Field Investigation into this Accident and prepare a Synoptic Report.

Aircraft Types and Registrations:	(1) Bombardier BD-700-1A10, N20EG (2) Bombardier BD-700-1A10, N6VB
No. and Type of Engines:	(1) 2 x Rolls Royce - BR 700 (2) 2 x Rolls Royce - BR 700
Aircraft Serial Numbers:	(1) 9038 (2) 9144
Years of Manufacture:	(1) 1999 (2) 2004
Date and Time (UTC):	04 July 2007 @ 14.54 hrs
Location:	Dublin Airport (EIDW)
Type of Flight:	Not Applicable
Persons on Board:	Crew - Nil Passengers - Nil
Injuries:	Crew - Nil Passengers - Nil
Nature of Damage:	(1) Radome and radome bulkhead (2) Wing tip and winglet
Information Source:	AAIU Investigation
Notification Source:	Duty Manager, Dublin Airport Authority

SYNOPSIS

N6VB was being towed along a runway that had been withdrawn from service at Dublin Airport (EIDW) when it collided with a parked aircraft, N20EG. This caused significant structural damage to the nose of N20EG and to a crew van parked alongside. The wingtip of N6VB was also damaged. The Driver of the tug had not maintained adequate separation from the parked aircraft. There was no wing marker in position as required by aerodrome procedures in force at the time and the markings on the taxiway did not conform to the published Aerodrome Directive. There was no fire or injury.

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1 FACTUAL INFORMATION

1.1 History

The Dublin Airport Authority (DAA) had temporarily withdrawn Runway (RWY) 11/29 from service for use as an aircraft parking area. The northern side of the runway was then designated as an aircraft parking area. A red line marked the outer limits of the parking area.

N6VB was being towed along the disused RWY 11/29 at EIDW when its starboard wing collided with a similar model aircraft, N20EG, which was parked on the northern side of the runway.

1.2 Site Inspection

The parked aircraft, N20EG, was correctly positioned behind the red boundary line. Its nose was substantially damaged. It had slewed to starboard and mounted the roof of a crew van that had been parked close by. The nose oleo strut was fully extended with the nose wheel 5 cm off the ground.



Photo No. 1: Damage to N20EG and Marshaller's van

The towed aircraft, N6VB, was a little further up the runway still attached to the tug. Its right hand wing projected over the red boundary line into the parking area. The wingtip, winglet and navigation light assembly were damaged (**Photo No. 2**).

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In addition, the Investigation observed a significant number of lines or markings on the disused runway. These included old runway markings, roadway markings on the southern edge, old taxiway lines and new taxi lines associated with a new Aerodrome directive (**Photo Nos. 2 & 3**).



Photo No. 2: Starboard wing of towed N6VB, facing west on RWY 11/29

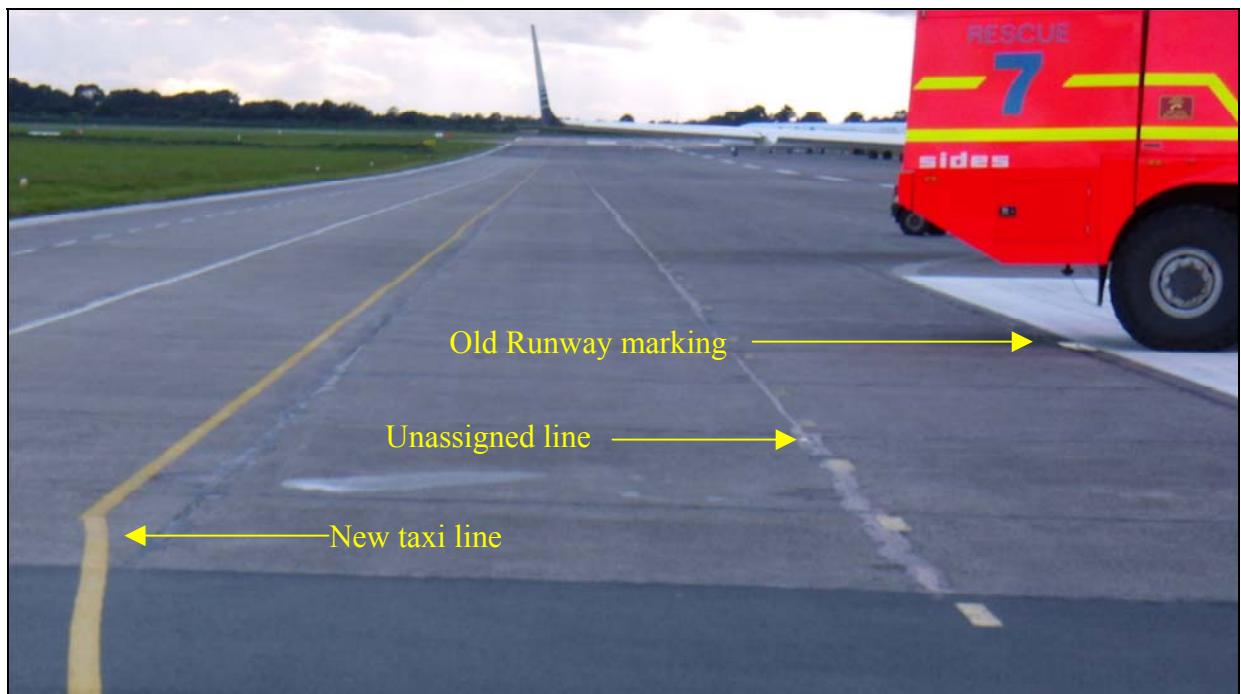


Photo No. 3: Port wing of the towed N6VB, facing west on RWY 11/29

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The Investigation also observed two crossing taxi lines leading towards the temporary parking area. The new taxi line was narrower and irregular compared to the older. It was also discontinuous to the east in the vicinity of taxiway intersection T1 (**Photo No. 4**).

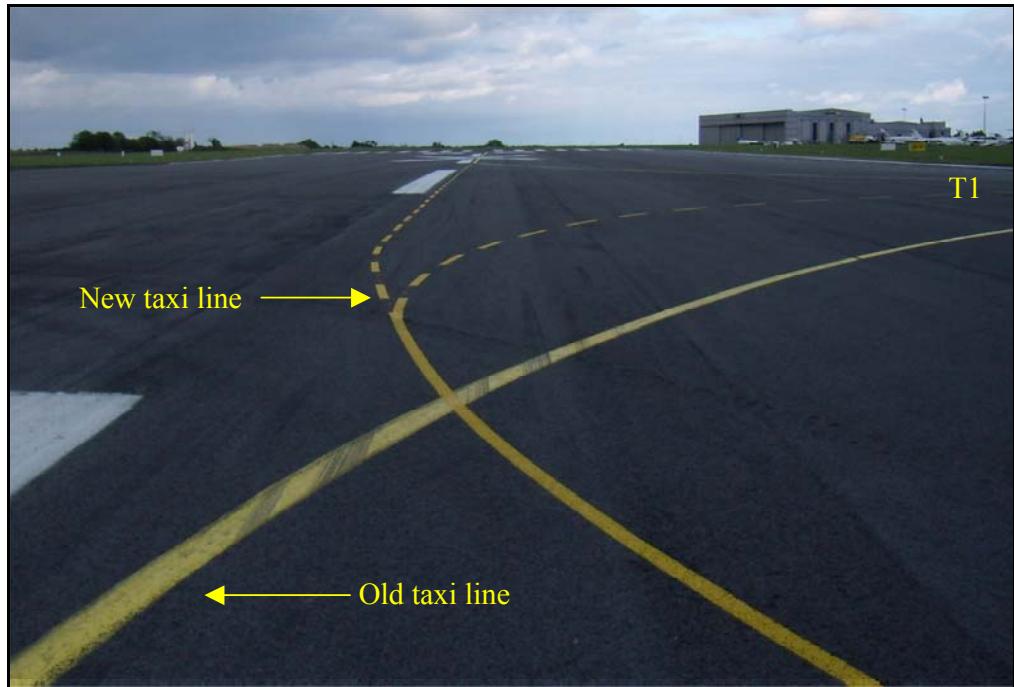


Photo No. 4: Facing east along RWY 11/29
The direction from which the tow would have come.

1.3 Damage

The radome of N20EG had detached and was lying on the ground. The radar antenna was damaged. The bulkhead on which the antenna was mounted had opened on the port side and pulled away from the stringers, some of which were visible. The nose of N20EG was resting on the roof of the van, which was carrying the weight of the front of the aircraft. The nose gear was fully extended with the tyres about 5 cm off the ground and nose steering link was disconnected. That area of the aircraft nose in contact with the roof of the van appeared indented (**Photo No. 1**).

The roof of the van was depressed with the rear windows broken. Though damage was significant the van was subsequently repaired.

The damage to N6VB appeared relatively minor being confined to the wingtip and winglet base with the starboard light assembly destroyed.

The windscreen of the tug was shattered and was located inside the driver's cab.

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1.5 Tug Driver Interview

The tug Driver was asked to tow N6VB to RWY 11/29. Before he hitched up the windscreen cracked and fell into the cab. He secured the windscreen alongside himself in the cab and decided to undertake the tow. There was no radio on the tug so ATC clearance was co-ordinated by a Marshaller who was driving a crew van equipped with a VHF radio. The Driver towed N6VB down J1 and the Marshaller went ahead. He stated that he saw her removing some chocks from the far side of a parked aircraft so he knew she wanted him to go past the aircraft and reverse in. He slowed down. The Driver said that he saw the Marshaller standing on the red line but that she did not signal any warning. He then felt a bump and initially thought that the shear pin had broken or the coupling had disconnected. He discovered that the coupling was intact and decided to check for a puncture. He stopped and then saw the damage. The tug Driver stated candidly that he had misjudged the width of the tow. He had towed aircraft up RWY 11/29 previously and used the old runway marks as guidance. During those tows, he had tried to keep the wing tip in line with the old runway centreline and had had no problems.

He subsequently said that the taxi lines were confusing. He stated that one was very thin and looked more like the road edge markings for a car.

1.6 Marshaller Interview

The Marshaller received clearance from ATC to tow the N6VB to the disused RWY, as the tug was not equipped with a VHF radio. She escorted the tow from its stand to taxiway J1. Then she went ahead to the parking position and parked the crew van 2-3 metres from the nose of N20EG, while the tug proceeded up the RWY. She then removed a chock that was obstructing the proposed parking position and moved back to wing-mark N6VB into place. She stated that she had not reached the van when the impact occurred. She did not directly see the impact but saw glass shattering as the aircraft moved some distance to its right on top of the van. The tow was still moving but stopped shortly afterwards.

1.7 Aircraft Information

The Bombardier BD-700-1A10 aircraft type is also known as the Global Express. It has the following relevant dimensions:

Wingspan over winglet: 28.65 m
Length: 30.30 m

1.8 Weather

This incident happened in good visibility during daylight hours.

1.9 Airport Published Information

RWY 11/29 at EIDW was withdrawn from service for use as an aircraft parking area. Initially Aerodrome Notice (AN) No. 21/2007 was issued in May 2007 followed by AD 21A/2007 and 21B/2007 on the 1st June 2007.

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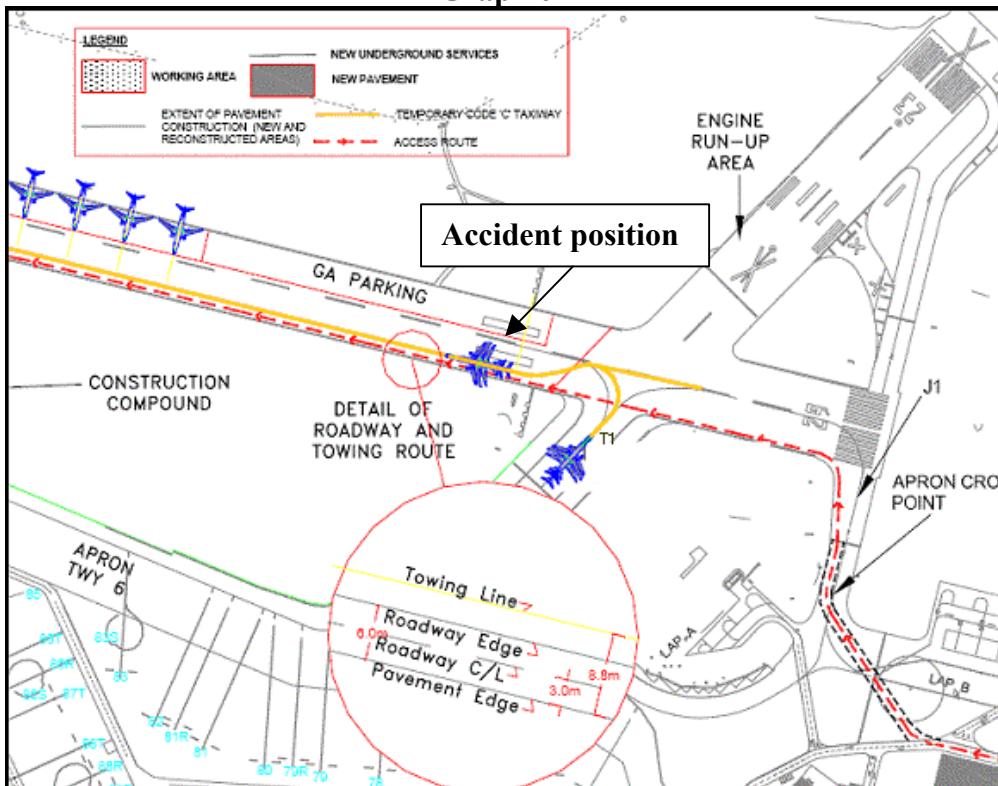
AN 21A/2007, item 3 states: Towing vehicles may enter closed Runway 11/29, via the apron crossing at the North Apron and Taxiway J1, to prepare for towing operations, however tow off/on must proceed under escort.

This latter AN was in force on the date of the accident and included the following instructions:

6. All aircraft shall be positioned with sufficient number of wing-markers to ensure safe operation.
7. All aircraft must be towed on and towed off the runway under escort. Under no circumstances shall an aircraft proceed under power to/from this temporary parking area.
8. All aircraft shall park within the red clearance area.

This AN included a graphic, an extract of which is shown below:

Graphic 1



Extract from Aerodrome Directive 21B/2007

1.10 Annex 14

Aerodrome taxiway marking is required to conform to ICAO Annex 14 Aerodromes, of which Volume 1 covers Aerodrome Design and Operations. Annex 14 states in Section 7.1.5 that, “*When a runway or taxiway or portion thereof is permanently closed, all normal runway and taxiway markings shall be obliterated*”.

The Annex also states that taxiway lines should be smooth and continuous.

There are no provisions for temporary markings, either in Irish or international regulations, for a runway that is withdrawn from service.

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1.11 Later Site Inspection

Some weeks later the AAIU, having visited the airport, observed that the old taxi lines had been removed and that the markings on RWY 11/29 now conformed to that depicted on Aerodrome Directive 21B/2007.

1.12 Additional Information

The AAIU previously, in Synoptic Report No. 2005-029, investigated an accident at EIDW where taxiway markings were also a factor. This Report stated, *inter alia* “*Ultimately, it was remiss of the DAA to allow a situation whereby, yellow taxi lines were present, but were no longer in use....*”

2. ANALYSIS

2.1 Operational

The tug Driver proceeded west along the disused RWY 11/29 from the J1 intersection unescorted. Abeam T1 he met two yellow lines coming from T1:

- (1) A thin broken yellow line (new taxiway line), leading to a solid line (**Photo No. 4**) that he was already on, and if followed would have led to the left hand side of RWY 11/29 (**Photo No. 3**).
- (2) A normal width solid taxiway line (old taxiway line) that lead straight ahead to the centreline of the old RWY 11/29 (**Photo No. 4**).

In fact, the Driver did not follow either but went to some extent between them. He kept to the right of the new, presumably provisionally marked, taxi line and to the left of the old taxi line, which lead directly up the white centre line of the runway.

Though there was disagreement between the statements of the Driver and the Marshaller regarding the location of the Marshaller at the time of the incident, both Driver and Marshaller stated that no wing-marker was in position. However, the Driver should have stopped and either waited until the Marshaller was in a position to act as wing-marker or otherwise communicated to the Marshaller that one was required in position in accordance with the aerodrome procedures in force at the time.

The Driver stated that neither weather nor the sun obstructed his vision. He did not feel that the broken windscreen had impeded him or contributed to the accident. Although this view is shared by the Investigation, nevertheless the tug should not have been operated in that condition.

Although misleading taxi line markings may have confused the Driver, the responsibility for safely conducting a towed aircraft to its parking position still rests with the driver of the tug. The driver always has the option of stopping to make sure the tow can proceed safely.

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2.2 Aerodrome Markings

Although the new taxi line marking was yellow, this was narrower than usual and discontinuous at the intersections. In addition, some changes in direction were angular and not the smooth curves associated with a taxi line. It is possible that these properties influenced the driver and caused him to feel that the line looked more like a roadway edge line than a taxi line. The Investigation notes that the old taxi line was later erased and that the new taxi line is regular and continuous. Thus, this possible cause of confusion has been removed.

The markings on the surface of the disused RWY did not conform to the drawing details in AN 21B/2007. The Investigation notes that a previous accident involving a taxiing aircraft the AAIU commented on disused taxiway lines, which had not been removed. Although in this case the AN specified the maximum size of aircraft, the old yellow taxi line had not been removed and thus the potential for confusion existed.

AN 21B/2007 states, “*All aircraft must be towed on and towed off the runway under escort*”. However, it is unclear if the above stipulates an escort requirement while on the runway and it can certainly be argued otherwise.

3. CONCLUSIONS

(a) Findings

1. N6VB collided with N20EG when it was being towed along RWY 11/29, which had been withdrawn from service.
2. As a result, the starboard wing of the towed aircraft collided with the nose of the parked aircraft.
3. Both aircraft were damaged during the collision, N20EG more substantially.
4. A crew van parked alongside was damaged when the nose of the parked aircraft came to rest on its roof.
5. The tug driver had not maintained adequate separation from the parked aircraft.
6. The taxiway markings on the disused runway were incorrect and inadequate.
7. There was no wing-markers in position, as was required by aerodrome procedures.
8. The tug should not have been operated with a broken windscreen.

(b) Cause

The driver of the tug did not maintain adequate separation from the parked aircraft.

(c) Contributory Cause

1. No wing-markers were in position at the time that the aircraft was being towed along the taxiway.
2. The markings on the taxiway were confusing and did not conform to the published Aerodrome Directive.

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4. SAFETY RECOMMENDATIONS

It is recommended that:

1. The Dublin Airport Authority should ensure that its taxiways are adequately marked before unescorted, towed aircraft uses them. [\(SR 06 of 2008\)](#)
2. That the handling agency makes its tug drivers aware that they should not operate equipment in an unserviceable condition. [\(SR 07 of 2008\)](#)

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