



Air Accident Investigation Unit Ireland

**FACTUAL REPORT
INCIDENT TO
BOMBARDIER DHC-8-402, G-JEDR
Waterford Airport (EIWT), Ireland
05 June 2012**



**An Roinn Iompair
Turasóireachta agus Spóirt**

Department of Transport,
Tourism and Sport

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In accordance with Regulation (EU) No. 996/2010 and the provisions of SI 460 of 2009, the Chief Inspector of Air Accidents, on 05/06/2012, appointed Mr. Paddy Judge as the Investigator-in-Charge to carry out an Investigation into this Incident and prepare a Report. The sole purpose of this Investigation is the prevention of aviation Accidents and Incidents. It is not the purpose of the Investigation to apportion blame or liability.

Aircraft Type and Registration:	Bombardier DHC-8-402, G-JEDR
No. and Type of Engines:	2 x Pratt & Whitney Canada PW150A
Aircraft Serial Number:	4087
Year of Manufacture:	2003
Date and Time (UTC):	05/06/2012 @ 15.38 hrs
Location:	Waterford Airport (EIWT), Ireland
Type of Operation:	Public Transport - Scheduled
Persons on Board:	Crew - 4 Passengers - 59
Injuries:	Crew - None
Nature of Damage:	Aircraft - None
Commander's Licence:	UK ATPL
Commander's Details:	Male, aged 43 years
Commander's Flying Experience:	3,968 hours, of which 777 were on type
Notification Source:	Station Manager, Dublin ATC
Information Source:	AAIU Pilot Report Form submitted by both Pilots. AAIU Field Investigation.



SYNOPSIS

G-JEDR was cleared by Air Traffic Control (ATC) to back-track on Runway (RWY) 21 before turning around and lining up for take-off. A runway turn pad is located before the threshold of RWY 21 that facilitates a 180-degree turn by aeroplanes. The aircraft taxied onto the pad and turned right in order to make a left hand 180 degree turn. While doing so at a slow speed the right main wheel went off the pavement into an adjacent gravel strip. There were no injuries to crew or passengers and no apparent damage to the aircraft.

1. FACTUAL INFORMATION

1.1 History of Flight

G-JEDR had earlier arrived in EIWF from Birmingham to which it was returning. As this was a recently established route, the Bombardier DHC-8-402 aircraft was larger than the normal aircraft that served EIWF. For the return flight to Birmingham, G-JEDR was routinely cleared by ATC to back track on the runway, as the only taxiway is located close to the mid-point of the runway.

The Pilot, who was also the Commander and the Pilot Flying (PF), reported that the runway was wet from recent rain and winds were light at 5 knots or less. This was his first flight to EIWF. He stated that they back-tracked slowly up RWY 21, during which the flight crew completed their taxi and line-up checks. Nearing the runway threshold the crew did not observe any yellow guidance/lead-in lines to or on the turn pad. He said that after the event they noticed a faint dashed line and red dots on the pad which, he commented, could be for future markings. He continued "*mindful of the tight nature of the airport's apron, taxiways and runway, the crew had the belief that the turning pad was also tight in nature*".

At the runway threshold, he made a right-hand turn with the intention of taxiing as close as possible to the edge of the turning pad. This strategy would also have allowed him easier alignment with the runway centre line when the 180° turn was completed and thus maximise the distance available for take-off. The Pilot stated that the taxi speed at the time was approximately 5 kts. He recalled the First Officer (F/O), who had a closer view of the pad's edge from his right hand seat, commenting that "*we are getting close to the edge*" and so no further right turn was made. The Pilot added that they felt no movement or vibration suggesting that they may have left the hard surface of the pad. Following the F/O's comment the Pilot initiated a left turn, at which point the aircraft came to a steady halt. The crew realised that the aircraft was stuck. The Pilot applied a small amount of power to see if the aircraft would move, but it did not.

He then asked the F/O to call ATC and request assistance. He also advised the cabin crew and passengers of their predicament. Airfield Operations requested the Pilot to shut down the No. 2 engine so that the right-hand main landing gear could be inspected (**Photo No. 1**). The Pilot did so, shutting both engines down. Shortly afterwards the passengers disembarked and were taken to the Terminal. The Pilot and F/O stayed with the aircraft until permission was given by the AAIU to move it from the soft ground to the apron.

Afterwards he awaited the arrival of company engineers from Belfast later that night. The aircraft, which was undamaged, was returned to service the next day.

In assessing the cause of the turning pad excursion, the flight crew gave the following reasons in their Report to the Investigation:

- The lack of prominent turning pad guidance markings.
- They had no information regarding the dimensions of the turn pad and, because the dimensions of the runway, taxiways and apron were tight, they therefore believed all of the available space on the turn pad would be needed to manoeuvre the aircraft.
- Finally, by making a left hand (anti-clockwise) turn on the pad, it was more difficult for the Pilot (on the left hand side of the cockpit) to judge the position of the wheels on the far right hand side of the aircraft and their relative position on the pavement.



Photo No. 1: Embedded right hand wheels with RWY 21 threshold in background.



1.2 Runway 21

RWY 21 is 1,290 metres in length, 30 metres wide and has a 50 metre turning circle at its threshold. There is a single taxi-way from near the mid-point of the runway to the Terminal and its facilities. Following the incident, the Investigation examined the turn pad, which was located before the threshold of the runway. The diameter of the turn pad measured 50.1 metres with a minimum radius of 25 metres. EIWF Operations had photographed and marked the wheel positions with yellow paint before removing the aircraft, having received permission from the Investigation to do so. These showed that the right hand wheels had gradually embedded alongside the paved area while creating a track 9.6 metres long. The Investigation noted a faint dashed line and red dots on the asphalt surface of the pad but turn pad guidance markings, as required by Annex 14 to the Convention on International Civil Aviation Organization (ICAO), were absent.

The Investigation was informed by the Operator that after this incident, the measurements of the turn pad area were provided to flight crew as part of briefing documentation for EIWF.

1.3 ICAO Annex 14

Annex 14 to the Convention on International Civil Aviation Organization (ICAO), Volume I, contains the Standards and Recommended Practices in regard to Aerodrome Design and Operations.

Annex 14 states in Section 5.2.9. Runway turn pad marking:

5.2.9.1 Where a runway turn pad is provided, a runway turn pad marking shall be provided for continuous guidance to enable an aeroplane to complete a 180-degree turn and align with the runway centre line.

1.4 Waterford Airport

The Investigation queried why EIWF did not have turn pad guidance lines. In reply, EIWF stated that recent safety capital works had been completed on the runway to improve the surface; this included a newly designed grooved pavement. Following re-surfacing the runway, new pavement markings were required and those were designed for the ATR 72, the then most critical aircraft operating into EIWF. The airport then established temporary test threshold guidance lines based on the ATR 72. However when the test lines were reviewed in the context of a Dash 8-Q400 operation, they were found not suitable. Due to adverse weather conditions the airport had experienced significant delays in completing the pavement markings, leaving the runway with only the centreline and runway designator markings. In order to address this issue, the decision was made to proceed with the main pavement markings and for safety reasons not to go ahead with (ATR 72) threshold guidance lines that could lead to misguidance being provided for the Dash 8-Q400.

It was the airport's intention to redesign the threshold turning circle guidance lines using the Dash 8-Q400 as the critical aircraft and put in place temporary guidelines and monitor them for suitability prior to permanent markings being applied.

However, due to commitments to other safety related projects, there had been a delay in completing the pavement marking project.

While management indicated to the Investigation that temporary redesigned Dash 8-Q400 compatible threshold guidance test lines would be in place later in June 2012, this was not achieved. Management cited further delays incurred with differences arising between 2008 survey data and more recent data which necessitated a new survey in the autumn of 2012. The red dots observed on the turn pad were survey marks.

1.5 Bombardier DHC-8-402

Bombardier Aerospace in the Q400 Airport Planning Manual, Figure 4-3, under Minimum Turning Centre on Main-Axle Projection, Turning Radius at Minimum Power gives a minimum pavement width for a 180° turn as 25.7 metres (without backing up).

The Investigation examined the pilot's view from the cockpit. From the left-hand seat there were no obvious markings by which the position of the right-hand wheels on the pavement could be judged accurately. In addition, even from the right-hand seat this judgement would not be easy.

2. AAIU COMMENT

This was the first time the Pilot had operated into EIWF. The lack of guidance lines on the threshold turning circle of RWY 21 and the fact that the Pilot was unaware that the diameter of the turning pad was more than adequate for a 180 degree turn, led him to being over cautious while entering the turn. As the Pilot was steering from the left hand side of the cockpit his ability to judge the position of the right hand wheels was impaired. This led to the aircraft being positioned too close to the edge of the pavement area and an inadvertent excursion from the hard surface on to soft gravel, thus becoming stuck. The slow speed at which this happened and the gentle nature of the retardation resulted in no damage to the aircraft.

The Investigation notes turn pad guidance lines were not provided at EIWF in accordance with the requirements of Annex 14 and accordingly a Safety Recommendation is issued in this regard.

3. SAFETY RECOMMENDATIONS

It is recommended that:

1. Waterford Airport should provide turn pad guidance lines in accordance with the provisions of Annex 14. [IRLD2012007](#)

[View Safety Recommendations](#) for Report 2012-019

- END -

In accordance with Annex 13 to the International Civil Aviation Organisation Convention, Regulation (EU) No 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of these investigations is to prevent aviation accidents and serious incidents. It is not the purpose of any such accident investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

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