

## ACCIDENT

<b>Aircraft Type and Registration:</b>	DHC-8-402 Dash 8, G-JEDM	
<b>No &amp; type of Engines:</b>	2 Pratt & Whitney Canada PW150A turboprop engines	
<b>Year of Manufacture:</b>	2003	
<b>Date &amp; Time (UTC):</b>	8 June 2006 at 1157 hrs	
<b>Location:</b>	30 miles north of Exeter Airport, Devon	
<b>Type of Flight:</b>	Public Transport	
<b>Persons on Board:</b>	Crew - 5	Passengers - 45
<b>Injuries:</b>	Crew - 1 (Serious)	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Air Transport Pilot's Licence	
<b>Commander's Age:</b>	50 years	
<b>Commander's Flying Experience:</b>	8,000 hours (of which 471 were on type) Last 90 days - 101 hours Last 28 days - 16 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by AAIB	

## Synopsis

The aircraft encountered severe turbulence whilst descending through cloud: the turbulence had not been forecast. The passengers were strapped into their seats in preparation for landing; however, the two cabin crew were still on their feet. During the turbulence, one of the cabin crew was lifted off his feet and landed heavily, breaking his right ankle.

## History of the flight

The aircraft was inbound to Exeter Airport on a passenger service from Newcastle. About ten minutes prior to landing the aircraft was descending close to a small area of cumulus cloud when it experienced sudden and severe turbulence: the weather radar was selected

to OFF. Recorded data indicates that the event occurred at 9,338 ft when the aircraft's speed was 260 kt. The autopilot disconnected automatically due to the severity of the turbulence. The commander, who was the handling pilot, ensured that the wings remained level and reduced power, he then re-engaged the autopilot once the aircraft was clear of the turbulence. The event lasted 15 seconds during which the aircraft's speed reduced to 240 kt. The maximum recorded vertical acceleration was 2.285g.

The cabin crew had just completed preparing the cabin for landing, which included ensuring that the passengers were correctly strapped into their seats. At the onset of the turbulence one of the cabin crew was walking along the

cabin aisle and managed to seat herself in a spare passenger seat. The other cabin crew member was standing in the galley at the rear of the cabin and was unable to get to a seat. He was twice lifted off his feet, and on the second occasion fell very heavily on his right ankle; he came to rest lying across the aircraft between the rear passenger exit and a service door on the other side.

Once clear of the turbulence other members of the crew rendered first aid to their injured colleague. Because the injured crew member could not be moved to a seat, he was immobilised as much as possible. The aircraft landed without further incident and the emergency services attended to the injured crew member before transporting him to hospital. The cabin crew member's right ankle was later diagnosed as broken.

Subsequent engineering checks revealed no damage to the aircraft.

### **Meteorology**

The Low Level forecast below 10,000 ft for the period 0800 hrs to 1700 hrs, in an area that included the location of the severe turbulence experienced by G-JEDM, predicted isolated scattered cumulus and strato-cumulus cloud, with moderate turbulence, between 3,000 and 4,000 ft.

The actual weather reports (METARs) at Exeter Airport close to the time of the accident were:

At 1150 hrs - surface wind from 160° at 9 kt, visibility in excess of 10 km, few clouds at 2,800 ft, temperature 22°C, dew point 15°C.

At 1220 hrs - surface wind from 160° at 7 kt, visibility in excess of 10 km, few clouds at 3,000 ft, temperature 23°C, dew point 14°C.

### **Procedures**

The operator's procedures reflect those provided by the manufacturer. The standard operating procedure (SOP) for flight in severe turbulence, as stipulated in their operations manual, states:

*On entering severe turbulence disengage the autopilot, maintain the desired pitch attitude and maintain wings level if possible.... If severe turbulence is encountered unexpectedly, a slow acceleration/deceleration should be made to achieve the rough air speed.*

The aircraft's maximum permitted operating speed ( $V_{MO}$ ) below 10,000 ft, as detailed in the Operation's Manual, is 282 kt; below 8,000 ft the  $V_{MO}$  is 245 kt. The recommended speed for flight in turbulence is  $V_{MO} - 10$  kt, and 210 kt if the turbulence is severe. The SOPs also required that the seat belt sign should be switched on, and the passengers strapped into their seats, ten minutes prior to landing.

### **Discussion**

The aircraft encountered severe turbulence, which had not been forecast. In the prevailing conditions the commander had decided not to use the weather radar. When the aircraft first encountered the turbulence its airspeed was 50 kt faster than that recommended for flight in severe turbulence, but the encounter was entirely unexpected. The autopilot disengaged automatically due to the severity of the turbulence and, as recommended, the airspeed was reduced during the period of turbulence.

In accordance with the SOPs, the passenger seat belt signs had already been switched on, and the passengers were strapped into their seats in preparation for landing.

The only people in the cabin who were not strapped into a seat when the turbulence was encountered were the two cabin crew. One of them managed to locate a seat immediately, but the other did not and broke his right ankle when he was lifted off his feet and fell heavily.

It is likely that the aircraft would have been subjected to significant movement in the severe turbulence, even at the rough air speed. However, the increased speed would have exacerbated the effects of the turbulence in the cabin.