

**INCIDENT**

<b>Aircraft Type and Registration:</b>	ATR72-202, G-BWDA	
<b>No &amp; Type of Engines:</b>	2 Pratt & Whitney Canada PW124B turboprop engines	
<b>Year of Manufacture:</b>	1995	
<b>Date &amp; Time (UTC):</b>	23 May 2006 at 0829 hrs	
<b>Location:</b>	Runway 27, Guernsey Airport	
<b>Type of Flight:</b>	Public Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 4	Passengers - 40
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Wear to the tail bumper skid-shoe	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	43 years	
<b>Commander's Flying Experience:</b>	8,510 hours (of which 1,430 were on type) Last 90 days - 143 hours Last 28 days - 72 hours	
<b>Information Source:</b>	AAIB Field Investigation	

**Synopsis**

The aircraft bounced on touchdown due to insufficient landing flare being applied. In an attempt to cushion the second touchdown the co-pilot, who was the handling pilot, over-pitched the aircraft resulting in the tail bumper making contact with the runway surface. The co-pilot was relatively inexperienced, this being his first airline aircraft type, and he could not recall ever having received formal instruction in recovery techniques for bounced landings. One safety recommendation was made.

**History of the flight**

The aircraft departed Gatwick Airport at 0733 hrs for the short flight to Guernsey with the co-pilot acting as

handling pilot. This was his first airline aircraft type; he had a total flying experience of 561 hours and 312 hours experience of flying the ATR72.

The ILS glideslope for Runway 27 at Guernsey was not in service at the planned time of their approach so during the cruise the pilots briefed for a visual approach to Runway 27. The weather reported by Guernsey ATIS for the period of their approach and landing was as follows: surface wind 240° at 13 kt, visibility 10 km or more, FEW cloud at 2,000 ft, air temperature 10°C and QNH 1018 mb.

The reference speed ( $V_{REF}$ ) for the aircraft's predicted landing weight of 18.4 tonnes was 106 kt to which

the crew added 5 kt, in accordance with their standard operating procedures (SOPs) and the prevailing wind conditions, to give an approach speed of 111 kt.

The co-pilot flew the approach using the runway PAPIs for glideslope guidance. Both pilots stated that these indicated two red and two white lights throughout the approach and that the aircraft was maintained at the correct approach speed. Indeed the commander, a line training captain, stated that the co-pilot had flown a particularly good approach. At about 10 ft agl the co-pilot closed the power levers and flared the aircraft. It touched down but then bounced back into the air.

The co-pilot instinctively tried to control the aircraft and was aware of it sinking back towards the runway. He stated that in an attempt to arrest the rate of descent, he pulled back on the control column. The aircraft touched down again and bounced once more, although this time to a lesser extent. The commander then immediately took control of the aircraft, landing from this second bounce before slowing the aircraft to taxiing speed and vacating the runway.

As the aircraft taxied to the parking apron ATC informed the crew that they believed the aircraft had struck its tail on landing. The crew continued to their stand, parking the aircraft and carrying out a normal shutdown. An engineering inspection then confirmed they had indeed struck the runway with the tail bumper.

### Examination of the aircraft

Evidence of the tail strike was confined to the replaceable steel skid-shoe on the base of the tail bumper which was worn in two areas by approximately 3 mm. The skid-shoe is painted red to allow a tail strike to be identified by the erosion of paint.

The tail bumper is attached to a nitrogen-charged oleo allowing the bumper to be deflected upwards by a heavy contact. If deflected sufficiently, an angle indicator positioned either side of the bumper contacts the ground. If this occurs, further structural inspection is required. No contact was made with the angle indicators during this incident and repair necessitated simply re-painting the skid-shoe.

### Runway inspection

Inspection of the runway revealed a scrape mark approximately 6 m in length and of a width consistent with that of the skid-shoe. It was positioned on the centreline approximately 650 m from the Runway 27 threshold.

### Landing flare

Section 4.9.1 of the company Operations Manual describes the correct landing flare technique and states that the associated pitch attitude is:

*'normally +2 to +3 degrees'.*

Page 43 of Section 3 of the same manual states:

*'Tail strike may occur is (sic) the pitch attitude exceed (sic) 8° during the flare, depending upon vertical speed at touch down.'*

### Bounced landing technique

The co-pilot cannot recall having being formally taught a bounced landing recovery technique during his flying training, either with this operator or earlier during his training on light aircraft. However, he had discussed it with instructors during his earlier training flights on light aircraft, normally as a result of having just bounced on touchdown.

When asked what he considered was the correct technique he stated that should the bounce be sufficiently severe, he would carry out a go-around. Where the bounce was less severe he would attempt to control it by applying slight forward pressure on the control wheel to limit the extent of the bounce, followed by once again, increasing the pitch attitude to cushion the landing whilst applying some power to arrest the rate of descent.

The company operating manuals contained no information on bounced landings.

#### **National Transportation Safety Board (NTSB) Aircraft Accident Report NTSB/AAR-05/02**

An accident in 2004 to an ATR72 resulting from a bounced landing was investigated by the NTSB. The report revealed that the operator involved did not, at that time, provide training or standardised guidance to its pilots on bounced landing recovery techniques. The NTSB considered that

*'written company guidance on bounced landing techniques would have increased the possibility that the captain could have recovered from the bounced landings or handled the airplane more appropriately by executing a go-around'.*

An informal survey conducted as part of their investigation revealed that from a sample of six airlines, one aircraft manufacturer and one pilot training facility, only some (it did not state how many) included relevant information on the matter in their flight manuals, or discussed techniques during training. The NTSB was concerned that this lack of guidance could contribute to similar landing accidents in the future.

As a result the NTSB made the following recommendation to the Federal Aviation Administration:

*'Require all 14 Code of Federal Regulations Part 121 and 135 air carriers to incorporate bounced landing recovery techniques in their flight manuals and to teach these techniques during initial and recurrent training'*

#### **Analysis**

The commander believes the bounce occurred due to insufficient flare being applied prior to touchdown. Neither pilot considered the initial bounce sufficiently severe to necessitate a go-around but the impression of an excessive sink rate back towards the runway led the co-pilot to instinctively apply nose-up pitch, in an attempt to reduce the heaviness of the second touchdown. The limited nature of the damage to the skid-shoe suggests that the pitch achieved at touchdown was only slightly in excess of 8°.

The investigation revealed that there is no formal requirement in the UK for pilots to receive training in bounced landing recovery techniques at any stage in their training. Rather, there is an assumption that this will be covered during basic pilot training with additional advice being given as appropriate by operators. Training for bounced landings on any type is problematic because it is inappropriate to bounce an aircraft simply in order to practise the recovery technique. Pilots, however, should already have sufficient knowledge to deal with a bounced landing should it occur, rather than gain such knowledge after the event. To ensure this knowledge is acquired, bounced landing techniques should form part of the formal training syllabus. This should apply not only to basic training but also to commercial and other operations, where different types of aircraft might require different recovery techniques.

In common with the investigation carried out by the NTSB, it is considered that the lack of formal guidance and training available to the pilot contributed to the accident. Therefore, the following safety recommendation was made:

**Safety Recommendation 2006-124**

The UK Civil Aviation Authority should require UK aircraft manufacturers, operators and training providers to issue appropriate guidance to pilots in the techniques for recovering from bounced landings.