

ACCIDENT

Aircraft Type and Registration:	Airbus Industries A321-211, OE-LBF
No & Type of Engines:	2 CFM56-5B3/P turbofan engines
Year of Manufacture:	2001
Date & Time (UTC):	23 December 2011 at 1748 hrs
Location:	Manchester Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 6 Passengers - 182
Injuries:	Crew - None Passengers - None
Nature of Damage:	Skin damage to aft lower fuselage
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	42 years
Commander's Flying Experience:	13,182 hours (of which 5,534 were on type) Last 90 days - 123 hours Last 28 days - 52 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot, Occurance Reports and recorded flight data

Synopsis

The tail of the aircraft struck the runway during an approach and go-around in gusty conditions.

History of the flight

The accident occurred during a scheduled flight from Innsbruck in Austria to Manchester. The 1707 hrs ATIS report for Manchester gave a surface wind from 320° at 16 to 27 kt with scattered cloud and light rain showers. Reported visibility was 10 km and the temperature was 6°C. As neither of the flight crew had operated to Manchester before, they checked their company's briefing information regarding the airport. The only significant point gleaned concerned the runway profile.

The co-pilot was pilot flying. The aircraft was vectored for an approach to Runway 23R, with speed being reduced early in the approach for separation from preceding traffic. As the aircraft intercepted the localiser, the crew noticed a crosswind of about 40 kt, although the ATC reported surface wind was given as 320° at 12 kt. Initially, the approach was in smooth conditions, but the aircraft encountered turbulence as it descended through approximately 1,500 ft aal.

The co-pilot disengaged the autothrust system as briefed and, with turbulence increasing as the aircraft descended, the commander increased the approach speed target by 5 kt. Slightly below 1,000 ft, the

co-pilot disengaged the autopilot. Below 400 ft, he experienced increasing difficulty controlling the aircraft, having to apply full sidestick control on occasions. By about 100 ft the situation had become worse and shortly afterwards he initiated a go-around. TOGA¹ thrust was set and the co-pilot rotated the aircraft to an initial pitch attitude of 10° nose-up. Almost simultaneously, the crew sensed a severe downdraft which caused the aircraft to sink and the main gear to make contact with the runway.

A standard missed approach was flown and preparation made for a further approach, the co-pilot remaining as pilot flying. A 10 kt increment was applied to the target approach speed. The crew encountered similar conditions to those on the first attempt and noted a sudden negative windshear late in the final approach, giving a 10 to 15 kt speed loss. However, the aircraft continued to a normal landing.

During the Commander's external inspection after arriving on stand, he discovered damage to the lower rear fuselage skin and suspected that the aircraft had suffered a tail strike during the go-around manoeuvre. An engineering inspection confirmed that the aircraft would be unable to operate the return sector pending further maintenance action.

Occurrence reports

Reports were received from Manchester ATC and the Airport Authority. Manchester ATC reported that the incident occurred on a dark and windy night. At 1450 hrs that afternoon a 'weather standby' had been initiated due to the crosswind. This was a procedure for use when the weather conditions deteriorated to such an extent as to render the landing of aircraft more

difficult. Under the weather standby procedure, the airport's Rescue and Fire Fighting service deployed to designated standby areas on the aerodrome. After the aircraft damage had been discovered, runway operations were suspended pending an inspection. This revealed ground marks typical of a tail strike in the area of runway abeam taxiway JA.

Recorded information

The Flight Data Recorder (FDR) showed that the autothrottle system was disengaged at about 2,000 ft radio altitude, and the co-pilot's sidestick commands began at 920 ft, which is consistent with the commander's recollection of when the autopilot was disengaged. From that point until established in the go-around, almost continual roll inputs were made, the largest of which were distributed equally about the zero input position. Below 170 ft the amplitude of 'roll right' inputs increased, with full roll command, both right and left, occurring shortly before the aircraft touched down.

At about the 70 ft the thrust levers were moved rearwards towards the idle position and both engine rpm reduced towards idle, followed by a large nose-down pitch demand. Very shortly afterwards, the thrust levers were advanced fully but the lag in engine acceleration meant that the engines were still accelerating towards full power when the aircraft touched the runway. Rate of reduction of radio altitude in the last 200 ft of the approach remained nearly constant. On touchdown the aircraft's pitch attitude was 9.8° (very close to that commanded by side stick input), with 0.7° roll to the right.

Data showed that the aircraft had been subject to an average 4 kt tailwind component during most of the approach, but that this became a 8 kt headwind component at approximately 100 ft.

Footnote

¹ Takeoff/Go-Around thrust.

Manufacturer's comments

The aircraft manufacturer confirmed that damage to the aircraft was consistent with the tail striking the ground. The damage occurred in an area which would be expected to be affected for an A321 at a high pitch attitude with the main landing gear struts compressed. The recorded pitch and acceleration values were consistent with this scenario. The manufacturer noted that, at the time an upwards trajectory was recorded, the aircraft pitch was about 9° , below the tail contact attitude of 11.2° with landing gear struts fully extended. Thus, it was concluded that the tail strike occurred at touchdown.

The manufacturer carried out a wind reconstruction. It was determined that most of the approach was conducted with an average tailwind of 4 kt, but that this changed at about 200 ft to an 8 kt headwind component. The wind changed again to a tailwind of about 8 kt,

just as the go-around manoeuvre was initiated. The manufacturer considered that the combination of loss of energy due to the changing environmental conditions and slow acceleration of the engines from their near idle condition made runway contact unavoidable.

Discussion

The final sequence of events which lead to the tail strike appears to have been started with the change of relative wind experienced just before landing. This enhanced the aircraft's performance and was probably the reason the co-pilot reduced thrust and applied a nose-down pitch input, at the same time as applying up to full lateral control inputs. The aircraft's engines had quickly reduced to near idle rpm so the aircraft continued to sink despite the subsequently increasing pitch attitude, which may have accounted for the pilots' impression that the aircraft had been subject to a sudden downdraft.