SERIOUS INCIDENT

Aircraft Type and Registration:	Boeing 757-28A, G-OOBE	
No & Type of Engines:	2 Rolls-Royce RB211-535E4-37 turbofan engines	
Year of Manufacture:	2003 (Serial no: 33100)	
Date & Time (UTC):	1 February 2016 at 1842 hrs	
Location:	Bristol Airport	
Type of Flight:	Commercial Air Transport (Passenger)	
Persons on Board:	Crew - 8	Passengers - 162
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	57 years	
Commander's Flying Experience:	17,956 hours (of which 6,730 were on type) Last 90 days - 40 hours Last 28 days - 31 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, and safety report by the operator	

Synopsis

On the return sector from Las Palmas Airport to Bristol Airport on a windy day the approach to Runway 27 become de-stabilised and during the subsequent go-around a significant speed decay occurred. The aircraft landed safely from the subsequent approach.

History of the flight

The flight was a chartered holiday flight, taking passengers from Las Palmas Airport, Gran Canaria to Bristol Airport. For the co-pilot, it was the second of four planned sectors of supervised line flying following his return to flying after a five and a half month period of sick leave, and consequently the commander was qualified as a Type Rating Examiner. Prior to this flight, the co-pilot had successfully completed a three hour refresher flight in a simulator, and he had operated as the PF for the outbound sector from Bristol to Gran Canaria, which was uneventful.

The flight from Gran Canaria proceeded normally and the aircraft was positioned for an approach to Runway 27 at Bristol Airport. The weather conditions included strong winds, which strengthened with altitude. The Bristol METAR and ATIS reported gusty conditions, but gusts were not indicated in the last surface wind report passed by the tower to the aircraft on its final approach, so the crew set V_{APP}[1] to 142 kt, adding 10 kt to the V_{REF} for

Footnote

[1] V_{APP} (Velocity for approach) is V_{REF} with a correction added to account for the wind conditions of the day.

the steady wind component, without any additional gust factor. The co-pilot was the PF, and the approach was stable[2] until approximately 300 ft agl.

Thereafter, the airspeed started to increase in the gusty conditions. The PF was advised by the commander of the speed trend, however, shortly afterwards, the aircraft started to drift high and to the left of the correct approach path, so the commander called for a go-around.

The initial go-around actions were carried out by the PF, whilst the commander selected the flaps to the two-engined go-around position and raised the landing gear. The PF then engaged the autopilot, with the aircraft climbing and in trim, using the company mnemonic 'TAGL[3]' but he did not verbalise this action, and the commander was unaware that the autopilot had been engaged. The commander then noticed that a high pitch attitude was developing, and the speed was reducing, so he began to coach the PF to lower the nose, but as the autopilot was engaged, the PF did not immediately correct the aircraft's attitude. The situation evolved rapidly as the aircraft approached the missed approach altitude of 3,000 ft with the power reducing as the Automatic Flight Control System (AFCS) tried to level-off the aircraft. The lowest airspeed the commander could recall seeing was 121 kt.

ATC then cleared the aircraft to climb to 5,000 ft. The aircraft was accelerated, and the flaps were fully retracted as the aircraft climbed. ATC were now reporting increased gusts of wind, so the commander elected to become the PF and he took control of the aircraft downwind. The second approach was uneventful, and the aircraft landed safely.

Recorded data

Approach phase

The approach commenced at approximately 1840 hrs with the autopilot and autothrottle engaged, and the V_{REF} was set to 142 kt. The relevant stabilised approach criteria were met at 1,400 ft aal, for landing with flap 25 set. The autopilot was disengaged at 600 ft aal, and the go-around was commenced at 119 ft aal, with the aircraft left of the centreline at an indicated airspeed of 172 kt. The lowest recorded height on the radio altimeter during the go-around was 94 ft.

Go-Around

After pressing the go-around (GA) switches, the autothrottle and AFDS (autopilot flight director system) GA mode activated in the normal manner, and this was annunciated on the Flight Mode Annunciator (FMA). The aircraft pitch then increased from 2˚ to 12˚ nose-up, recording a vertical acceleration of +1.72g. The aircraft continued to pitch up, following the Flight Director (FD) pitch commands, to 21˚ nose up. Shortly after the landing gear was selected up there was a slight reduction in the pitch attitude, which was followed by the aircraft pitch attitude increasing to 22°, above the 19° commanded by the FD. The annunciation

Footnote

[2] Operators specify speed, flightpath and configuration criteria for the continuation of an approach to land. If these criteria are met the approach is considered to be 'stable'.

[3] TAGL is the Mnemonic for Trim, Autopilot, Go Around, and Lateral Mode.

ALT CAP illuminated on the FMA at 1,460 ft, indicating that the autopilot was starting to level the aircraft at the missed approach altitude of 3,000 ft[4]. The airspeed decreased rapidly through 160kt, with thrust reducing. Immediately after activation of the ALT CAP mode the centre autopilot was engaged, with the corresponding indication illuminating on the FMA.

The pitch attitude continued to increase through 27° with airspeed reducing through 151 kt. The GA mode of the autopilot was activated again. The selected airspeed remained 142 kt and a nose-up pitch exceeding the FD command persisted, reaching a maximum pitch of 30.76° with a climb rate in excess of 6,000 ft/min. The airspeed then reduced below V_{APP}. The pitch attitude remained high for a further 4 seconds before reducing steadily, while the airspeed continued to decrease, reaching 119 kt.

Pitch attitude then decreased rapidly from 26° as the aircraft reached the missed approach altitude of 3,000 ft and the ALTITUDE HOLD mode of the AFCS was activated. The airspeed reduced further, to a minimum of 110 kt before it began increasing again. The stick-shaker[5] was not activated. The nose-up pitch continued to reduce further to 8° and the autopilot was disconnected. The airspeed began to recover through 120 kt, however, thrust was then reduced which slowed acceleration until the aeroplane descended back towards 3,000 ft having peaked at an altitude of 3,100 ft.

Flap 5 was selected at an airspeed of 150 kt. However, an acceleration was not commanded until 10 seconds later when the selected speed was increased to 196 kt. The aeroplane then accelerated normally from this point to 220 kt. A right hand circuit was flown to a further ILS approach followed by a normal landing.

Analysis

This was the first line training flight for the co-pilot after approximately five and a half months away from flying on medical grounds, and the wind conditions were challenging.

The approach flown by the co-pilot became de-stabilised and a go-around was initiated. During the go-around a low-level ALT CAP occurred. The speed at which the go-around was initiated meant the flight directors commanded a high nose-up attitude. The rapidly increasing wind speed with altitude, turbulence and full go-around thrust combined to create a high rate of climb with an ever increasing nose-up attitude. The ALT CAP annunciation occurred a short time before the autopilot was engaged and initially went unnoticed by the crew, and the AFCS was unable to recover the nose-high upset[6]. The commander was unaware that the autopilot had been engaged so his coaching of the co-pilot to reduce the aircraft's pitch attitude was ineffective and, with autothrottle and autopilot engaged, the airspeed reduced to a minimum of 110 kt.

The operator's safety investigation considered that, during the high workload period of a go-around, there was a degradation in the situational awareness of the crew. The crew

Footnote

[4] The Altitude Capture activated at this altitude because of the high rate of climb.
[5] Stick-shaker is a device fitted to most large aircraft, to warn the crew that the aircraft is approaching a stall.
[6] The Boeing 757 QRH definition of *'upset'* includes unintentionally exceeding a pitch attitude of 25°nose-up.

were “startled” and their performance was affected, as confirmed by their subsequent selection of FLAP 5 whilst the aircraft was not accelerating. This was eventually corrected and the aircraft landed safely.

The commander commented that the incident highlighted the importance of FMA monitoring by the PM. With hindsight, he also considered that he should have intervened earlier, and taken control of the aircraft for the go-around.

Safety Action

As a result of the operator’s safety investigation both pilots received additional training before returning to flying duties. The operator’s annual refresher training was modified to include a module to refresh all its Boeing 757 pilots on procedures for go-arounds with both engines operating. The operator’s training department will also be reviewing how it develops the intervention skills of its training pilots.