

## AIRCRAFT ACCIDENT REPORT No 3/2009

*This report was published on 21 May 2009 and is available on the AAIB Website [www.aaib.gov.uk](http://www.aaib.gov.uk)*

### REPORT ON THE SERIOUS INCIDENT TO BOEING 737-3Q8, G-THOF ON APPROACH TO RUNWAY 26 BOURNEMOUTH AIRPORT, HAMPSHIRE ON 23 SEPTEMBER 2007

<b>Registered Owner and Operator</b>	Thomsonfly Ltd
<b>Aircraft Type</b>	Boeing 737-3Q8
<b>Nationality</b>	British
<b>Registration</b>	G-THOF
<b>Place of Incident</b>	On approach to Runway 26 at Bournemouth Airport, Hampshire
<b>Date and Time</b>	23 September 2007 at 2250 hrs (All times in this report are UTC)

#### Synopsis

The Air Accidents Investigation Branch was notified by the operator on the 5 October 2007 of an unstable approach and stall during a go-around by a Boeing 737-300 aircraft, G-THOF, at Bournemouth Airport. The event had occurred 12 days previously on the 23 September 2007.

The following Inspectors participated in the investigation:

Mr K Conradi	Investigator-in-charge
Mr A Blackie	Operations
Ms A Evans	Engineering
Mr P Wivell	Flight Data Recorders

The Boeing 737-300 was on approach to Bournemouth Airport following a routine passenger flight from Faro,

Portugal. Early in the ILS approach the auto-throttle disengaged with the thrust levers in the idle thrust position. The disengagement was neither commanded nor recognised by the crew and the thrust levers remained at idle throughout the approach. Because the aircraft was fully configured for landing, the air speed decayed rapidly to a value below that appropriate for the approach. The commander took control and initiated a go-around. During the go-around the aircraft pitched up excessively; flight crew attempts to reduce the aircraft's pitch were largely ineffective. The aircraft reached a maximum pitch of 44° nose-up and the indicated airspeed reduced to 82 kt. The flight crew, however, were able to recover control of the aircraft and complete a subsequent approach and landing at Bournemouth without further incident.

Although the commander reported the event to the operator the following morning, his initial Air Safety Report (ASR) contained limited information and the seriousness of the event was not appreciated until the Quick Access Recorder (QAR) data was inspected on 4 October 2007.

G-THOF was not subjected to an engineering examination to ensure its continued airworthiness and remained in service throughout this period.

The investigation identified the following causal factors:

1. The aircraft decelerated during an instrument approach, to an airspeed significantly below the commanded speed, with the engines at idle thrust. Despite the application of full thrust, the aircraft stalled, after which the appropriate recovery actions were not followed.
2. The trimmed position of the stabiliser, combined with the selection of maximum thrust, overwhelmed the available elevator authority.

The investigation identified the following contributory factors:

1. The autothrottle warning system on the Boeing 737-300, although working as designed, did not alert the crew to the disengagement of the autothrottle system.
2. The flight crew did not recognise the disengagement of the autothrottle system and allowed the airspeed to decrease 20 kt below  $V_{REF}$  before recovery was initiated.

Three Safety Recommendations have been made.

## Findings

### *Flight operations*

1. The flight crew were properly licensed and qualified to conduct the flight. They were medically fit and there was no evidence of fatigue. Their training was in accordance with national regulations and the operator's requirements.
2. The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures. At the time of the incident there were no recorded defects that might have contributed to the event.
3. The mass and centre of gravity of the aircraft were within the prescribed limits.
4. The flight had been routine until the approach at Bournemouth.
5. The autothrottle retarded the thrust to idle in response to crew inputs.
6. The autothrottle disengaged for undetermined reasons.
7. No significant fault could be found with the autothrottle warning or associated systems.
8. The disengagement of the autothrottle was not recognised by the crew.
9. The aircraft's Indicated Airspeed (IAS) decayed in line with crew expectations for an idle thrust approach and this constant deceleration approach masked the disengagement of the autothrottle.

10. No external factors degraded the flight crew's ability to monitor the aircraft.
11. The pilots were distracted at a critical phase of flight and did not properly monitor the airspeed.
12. The aircraft stalled and descended in a nose-up attitude and slowed to a minimum airspeed of 82 kt.
13. The thrust levers remained at full thrust for 26 seconds and  $N_1$  exceeded the target  $N_1$  for 31 seconds.
14. The flaps retraction did not materially affect the event.
15. The stall recovery techniques recommended in the manufacturer's Flight Crew Training Manual (FCTM) were not fully applied.
16. Forward trim was not used during the stall recovery.
17. A reduction in thrust lever position to a go-around (GA) thrust setting occurred 40 seconds after the go-around was initiated, which allowed sufficient nose-down elevator authority to control the pitch-up couple.
18. The speeds and pitch angles were outside the flight test envelope and outside the validated flight modelling envelope.
2. The 'go-around' drill and 'approach to stall' drill in the QRH do not mention trimming the aircraft.
3. The upset recovery techniques outlined in the QRH, FCTM and the manufacturer's training aid are effective and would have resulted in earlier recovery of the aircraft.

#### *Safety management*

1. The Air Safety Report (ASR) as filed by the commander did not depict the event accurately.
2. The ASR was received at the operator's offices the morning after the event but was not initially filed as an Mandatory Occurrence Report (MOR).
3. The ASR was passed to the Operational Flight Data Monitoring (OFDM) analyst on the day after the event and was reviewed that day when the OFDM analyst flagged the event for a pilot representative.
4. The flight data was not viewed by a pilot representative until 11 days after the event. This delay in reviewing the data resulted in the loss of information of value to the investigation.
5. The delay in reviewing the data allowed both the aircraft and the crew to continue operating without the incident being reviewed.
6. There was no requirement in the company OFDM agreement to de-identify the data and the data could have been reviewed on the day after the event.

#### Flight procedures

1. The wording of the go-around drill in the Quick Reference Handbook (QRH) has the potential to prejudice pilots away from reducing thrust to match the required go-around thrust.

7. The operator has undertaken significant changes in their OFDM and safety management system following this event.

### Causal factors

The investigation identified the following causal factors:

1. The aircraft decelerated during an instrument approach, to an airspeed significantly below the commanded speed, with the engines at idle thrust. Despite the application of full thrust, the aircraft stalled, after which the appropriate recovery actions were not followed.
2. The trimmed position of the stabiliser, combined with the selection of maximum thrust, overwhelmed the available elevator authority.

### Contributory factors

The investigation identified the following contributory factors:

1. The autothrottle warning system on the Boeing 737-300, although working as designed, did not alert the crew to the disengagement of the autothrottle system.
2. The flight crew did not recognise the disengagement of the autothrottle system and allowed the airspeed to decrease 20 kt below  $V_{REF}$  before recovery was initiated.

### Safety Recommendations

#### Safety Recommendation 2009-043

It is recommended that Boeing, in conjunction with the Federal Aviation Administration, conduct a study of the efficacy of the Boeing 737-300/400/500 autothrottle warning and if necessary take steps to improve crew alerting.

#### Safety Recommendation 2009-044

It is recommended that The European Aviation Safety Agency review the requirements of Certification Standard 25 to ensure that the disengagement of autoflight controls including autothrottle is suitably alerted to flightcrews.

#### Safety Recommendation 2009-045

It is recommended that Boeing clarify the wording of the approach to stall recovery Quick Reference Handbook Non-normal Manoeuvres to ensure that pilots are aware that trimming forward may be required to enhance pitch control authority.