AIR ACCIDENTS INVESTIGATION
INSTITUTE
Beranových 130
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FINAL REPORT

Investigation into the incident of aircraft B 737-3Q8, registration G-THOF, at LKPR on 28 December 2005

Prague
Jun 2006

A) Introduction

Operator:	Thomsonfly Ltd. (UK)
Aircraft type:	Boeing, B 737-3Q8
Registration:	G-THOF
Place of Incident:	Prague / Ruzyně (LKPR)
Date and Time:	28. 12. 2005, 18:03 (All times in this report are UTC)

B) Synopsis

On 28 January 2006 Thomsonfly Ltd (UK) notified Air Accident Investigation Institute (AAII) of an B737 incident. The crew, which was to execute flight BY 444 from LKPR to Doncaster (EGCN), rejected the take-off from RWY 31 during the take-off run, because after increasing engine power to full T/O thrust and achieving a speed of 80 kts the captain could not maintain lateral control on the runway covered in sleet and slush. The crew braked the airplane to the taxi speed and vacated RWY 31 taking exit to TWY G. With regard to this event and a continuous slight snowfall, TWR EC suspended operation on RWY 31 and asked for a check of braking action (B/A). After the B/A had been measured and the situation of airplanes holding to land evaluated, clearing of RWY 31 got started.

The cause of the incident was investigated by an AAII commission comprising:

Investigator in charge:	Ing Stanislav Suchý
Member:	Ing. Jan Kadlec – Prague Airport

The Final report was released by:

AIR ACCIDENTS INVESTIGATION INSTITUTE
Beranových 130
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On the 13 Jun 2006.

C) The Final report includes the following main parts:

1) Factual information
2) Analysis
3) Conclusions
4) Safety recommendation
5) Annexes (to copy No.1 stored in AAII archive)

The present document is the translantion of the Czech Investigation Report. Although efforts are made to translate it as accurate as possible, discrepancies may occur. In this case the Czech version is authentic.

1 Factual information

1.1 History of the incident

On 28 December 2005 a Boeing 737-3Q8 with 5 crewmembers and 65 passengers on board was on the flight GB294 from LKPR Airport to EGCN Airport. At the time the crew was getting ready for the flight, lots of aircraft were arriving at or leaving LKPR because the previous weather conditions were poor and RWYs 24 and 31 were being cleared. At 17:10 ATIS "L" information was issued giving B/A values from the last 16:58 measurement by SFH. The following sequence of ATIS information "M, N, O, Q, R and K" gave the same B/A data 71/65/80 till 18:14.

At 17:15 the crew of the airplane, call sign TOM 444, established contact on the clearance delivery dispatcher Ruzyně DELIVERY frequency, acknowledged the ATIS "L" information and received a departure clearance. At 17:30 the TOM 444 crew requested on the Ruzyně Ground frequency to taxi to the stand for de-icing. At 17:44 the TOM 444 crew reported the end of de-icing and received the instruction to taxi to the holding possition of RWY 31. The TOM 444 crew commented that, prior departure and during de-icing, they regularly checked the current ATIS. At no time was the TOM 444 crew aware of an official braking action, received by ATIS, of less than was comparative to value "Good".

There was a snowfall all that time, RWY 31 being covered wholly by slush. On landing, TWR EC asked the CSA 917 crew to assess the RWY 31 braking action and got a "Medium" value. The TWR EC transmitted this assessment to the following arriving plane. At that time, the airport operations officer asked clearance for entering TWY L, C and RWY 06. At 17:43 TWR EC gave permission to use the demanded route, advised the operations officer of the B/A assessment reported by the crew, and asked for check and measurement of B/A on RWY 31.

At 17:49 after landing, the DLH 3286 airplane´s crew reported on the TWR EC frequency that it assessed the B/A as "Medium to Poor". The TWR EC passed this information to the landing airplane that followed next. Because of a great number of landing aircraft, the TWR EC discussed the situation with the airport operations officer at 17:50,with the result that the B/A measuring vehicle should be waiting on RWY 06 by THR 13 and he would find through APP a slot between the landing aircraft to get access to RWY 31 to measure the B/A effect.

At 17:51:28 the TOM 444 crew established contact on Ruzyně Tower frequency and got the instruction to taxi on TWY L to the RWY 31 holding bay.

At 17:53:13 TWR EC required the BAW 856 crew on landing to assess the B/A. The BAW 856 crew reported its B/A assessment as "Medium to poor". TWR EC passed this information to the landing traffic CSA 761 and CSA 7KG. At that time the TOM 444 crew reported it was in front of RWY 31 holding possition. At 17:56 the CSA 761 crew reported that B/A was in line with "Medium to poor" estimate.

At 17:58:40 the TOM 444 crew requested line up for RWY 31. But a CSA 7KG plane was on the final followed by a CSA 701 on approach, so TWR EC cancel lining up and transmitted that TOM must because of landing aircrafts hold another 2 to 3 minutes. At 18:00:40 TWR EC advised the B/A measuring vehicle operator that in 3 minutes after the take-off of one aircraft in the slot before the landing of the next aircraft he would allow access to RWY 31 to measure B/A.

At 18:01, CSA 701 landed, TWR EC cleared TOM 444 to line up on the runway and transmitted to the landing CSA 665 information that B/A was “Medium to poor”.

At 18:02:20, as CSA 701 left RWY 31, TWR EC cleared the TOM 444 for take off. The TOM 444 crew started its take-off run using full T/O thrust at 18:03. The captain commented that, after passing a speed of 80 kts, he could not maintain lateral control of the aircraft on the runway covered in snow and slush. At 18:03:13, having travelled around 300 m from the beginning of the take off run, the crew reported a rejected take off. TWR EC than gave the TOM 444 the instruction to vacate runway via TWY G. The TOM 444 crew commented that used full manual braking and idle reverse to slow the aircraft down to a taxi speed of 10 kts using about 5,000 ft of runway. The TOM 444 crew valued the B/A and advised TWR EC that B/A coefficient to be “Poor” and vacated RWY 31 taking exit to TWY G. TWR EC passed this information to the landing CSA 665 and at the same time informed the airport operations office that TOM 444 had not been able to take off from RWY 31. At 18:05:50 TWR EC transmitted “Go around” instruction to CSA 665.

At 18:06:35 TWR EC issued the airport maintenance with instructions to go to RWY 13 and to conduct the B/A check. The accurate B/A coefficient obtained by check was 16/17/18; the runway was all covered in slush and dry snow up to 5 mm thick.

At 18:13 TWR EC coordinated further steps with APP, operation on RWY 31 was suspended and TWR EC ordered to clear the runway.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor/ None	0/5	0/65	0

1.3 Damage to aircraft

There was no damage to the aircraft.

1.4 Other damage

There was no other damage.

1.5 Personnel information

The PIC, aged 42, was a holder of ATPL(A), had a PIC qualification for the type B 737 and a valid medical certificate. He had a total of 14097 flying hours of which 8047 hours were as PIC. On the type B 737 he has flown 186 hours.

The F/O, aged 23, was a holder of CPL(A), had a valid medical certificate. He had total of 463 flying hours, on the type B 737 of which 158 hours were on type.

1.6 Aircraft information

Type and Model:	Boeing 737-3Q8
Registration:	G-THOF
Manufacturer:	Boeing
Serial number:	26314
Total flight time:	31 393 hours

Operating cycles:	18 151
Certificate of Airworthiness:	valid

1.7 Meteorological information

According METAR/SPECI was 28 Decenber 2005 about 17:00 – 18:00 during pre flight preparation at LKPR following meteorological conditions:

The situation:	snow bearing clouds with falls of snow
The surface winds:	310 – 350°/ 8 - 12 kt
The temperature:	- 5° ~ -6°C
Icing condition:	thik frost at 2000 – 10 000 ft

1.5 Aids to navigation

Radio-navigation at LKPR had no effect on the incident.

1.6 Communications

The communication between the crew and air traffic services was on frequencies ATS Ruzyně Delivery 120,05 MHz, Ruzyně Ground 121,9 MHz and Ruzyně Tower 118,1 MHz. The communication was readable.

1.10 Aerodrome information

RWY 24 was in use at LKPR at 16:58 but the conditions worsened gradually to B/A 17/22/13 as measured with a high pressure tyre device (SHF). Regular winter maintenance work was being done on RWY 31, scheduled to be finished by 18:00.

At 16:58 the runway was cleared, braking action measurements giving results of 71/65/80 SFH. RWY 31 was re-opened for operations and the SNOWTAM 0122 was issued. At 17:50 a co-ordination talk between TWR and the airport management was held with the result that the B/A measuring vehicle should be waiting on RWY 06 by THR 13 to take the measurement of B/A values in a window between landing aircraft. However the measurement was not taken until 18:04, giving B/A results of 16/17/18, the runway being all covered in wet and dry snow layer up to 5 mm thick.

1.11 Flight recorders

Flight recorders were not used in this investigation. The ATS records on TWR were used.

1.12 Description of incident site

NIL

1.13 Medical and pathological information

NIL

1.14 Fire

NIL

1.15 Survival aspects

NIL

1.16 Tests and research

NIL

1.17 Organizational and management information

Radio communications between the airport operation officer, the braking action measuring vehicle and TWR was maintained on the specific frequency of 121.7 MHz. Neither airport operation officer nor A/B measuring vehicle have a listener-in device to monitor communication on TWR traffic controller´s frequency and cannot hear information transmitted between TWR EC and aircraft crews.

1.18 Additional information

Immediately after the serious incident, the chief controller of the Prague Airport ATC and the manager of Prague Airport approach and aerodrome services adopted Operational Provisions concerning work of TWR controller and airport operation officer aimed at ensuring timely checks of movement areas and braking action by the use of A/B measuring vehicle.

1.19 Useful or effective investigation techniques

The serious incident has been investigated in accordance with Annex 13.

2 Analysis

2.1 The TOM 444 crew expected the conditions as reported in the ATIS “L”, giving B/A equal to 71/65/80 on RWY 31. After the end of de-icing as the plane taxied on TWY L, the crew was in contact from 17:51:28 with Ruzyně Tower on its frequency and could have heard the crews, which had just landed, report B/A coefficient “Medium to poor”. The crew could have heard the last information about the estimated B/A after the plane was cleared to enter RWY 31 and was waiting for the take-off clearance. At 18:01:37 TWR EC issued the CSA crew with the instruction to adjust the approach speed along with information about the airport conditions including the “Medium to poor” B/A estimate.

2.2 The reason why TOM 444 rejected the take-off after it used around 300 m of runway and attained a speed of 80 kts was that the crew could not maintain lateral control in the RWY 31 axis. The TOM 444 crew mentioned no problem with different or unsymmetrical thrust. After the reject, it used full manual braking and idle reverse and slowed the plane to the taxi speed using about 5,000 ft of runway. The TOM 444 crew reported that it estimated B/A coefficient as “Poor”.

2.3 After RWY 31 took over operation and particularly after the arrival of CSA 917, whose crew estimated B/A as “Medium”, the snow layer on RWY 31 was getting thicker due to a slight but continuous snowfall. Operators of the B/A measuring vehicle, who

were not familiar with B/A figures reported by aircrews because there is no listen-in device for the TWR EC frequency in their car, waited for TWR EC´s instruction to let them enter RWY 31.

2.4 The TWR EC, who had information from aircrews that RWY 31´s B/A got worse dramatically, thought that he would coordinate with APP creation of a slot between landing aircraft. However he failed to adjust suitable separation between the landing aircraft, so there was no slot long enough to check B/A on RWY 31 before the take-off of TOM 444. TWR EC failed to advise the TOM 444 crew of information about actual/worse airport conditions acquired from crews that had landed.

3 Conclusions

3.1 The commission has come to the following conclusions:

- The crew had the valid licences and necessary qualifications;
- The airplane had a valid airworthy certificate, a maintenance certificate and operation permit;
- The TOM 444, based on regurerly checked the ATIS broadcast, at no time was aware of deterioration B/A on RWY 31 of less than Good.
- Befor take off the TOM 444 crew could have hear the assessed B/A by other aircrews that had landed before;
- TWR EC did not relay to the TOM 444 crew information about airport deteriorated conditions he had from the reports of aircrews that had landed before;
- There were small time intervals between aircraft landing at LKPR, in which TWR did not manage to arrange for the B/A measuring vehicle to go to RWY 31, in spite of the fact that B/A reports from aircrews indicated sharp deterioration of airport conditions;
- The staff of the A/B measuring vehicle, rather hesitant and lacking experience, ignorant of the crews´ reports, was ready on RWY 06 waiting for TWR instruction to access RWY 13;
- The aircrew commenced take-off from RWY 31 although it could see that the braking conditions were bad due to the RWY´s snowy surface. The crew itself estimated the conditions with the “Poor” coefficient;
- A five-millimetre thick layer of slush and snow on RWY 31, where the measured braking action gave results of 16/17/18 SFH, affected the plane´s capability to maintain lateral control with full t/o thrust during the take-off run to the extent that the crew rejected the take-off for safety reason.

3.2 Cause

The cause of the incident was deteriorated conditions on RWY 31, which was covered in snow, hampering airplane lateral control during the take-off run. The RWY 31 surface status was much worse than the crew had expected relying on ATIS ”L” report on the airport conditions.

4 Safety recommendations

4.1 The airport operation officer should have a possibility of receiving necessary information by listening of radio communications on corresponding frequency of TWR EC.