



MINISTRY OF INFRASTRUCTURE
STATE COMMISSION ON AIRCRAFT ACCIDENT INVESTIGATION

FINAL REPORT

Serious Incident No: 518/07

**Declaration of emergency due to a predicted
low quantity of fuel
by the flight crew of Boeing 737,
registration marks: EI-DHS
21 December, 2007
Warszawa – Okęcie (EPWA) TMA**

*This report is a document presenting
the position of the State Commission on Aircraft Accident Investigation concerning circumstances
of the air occurrence, its causes and safety recommendations.*

*The report is the result of the investigation carried out in accordance with the applicable domestic
and international legal provisions for prevention purposes only. The investigation was conducted
without the need of application of legal evidential procedure.*

*In connection with the Article 134 of the “Aviation Law” Act (Journal of Laws 2006, No. 100, item.
696 with amendments), the wording used in this report may not be considered as an indication of
the person guilty or responsible for the occurrence.*

The Commission makes no judgments about fault and responsibility.

*In connection with the above, any form of use of this report for any purpose other than air
accidents and serious incidents prevention, can lead to wrong conclusions and interpretations.*

*This report was drawn up in Polish. Other language versions may be drawn up for information
purposes only.*

Warsaw, 2011

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GENERAL INFORMATION

Type and model of aircraft : **Boeing 737-8AS**

Aircraft registration marks: **EI-DHS**

Aircraft Commander : **Airline Transport Pilot Licence
(ATPL)**

Flight Organizer : **Ryanair Ltd**

Aircraft User : **Ryanair**

Aircraft Owner : **Ryanair Ltd**

Place of the incident : **Warszawa – Okęcie aerodrome
(EPWA), TMA**

Date of the incident : **21 December, 2007 21:03 UTC**

The degree of damage to the aircraft : **No damage**

Injuries to persons : **No injuries**

SYNOPSIS

Note: all times in the report are expressed in UTC (local time (LMT)= UTC + 1 hour)

On 21 December 2007 the flight crew of Boeing 737, registration marks: EI-DHS was performing a flight from Bergamo (LIME) to Kraków - Balice (EPKK). Due to adverse weather conditions (below minimum for landing) the crew were diverted to Łódź – Lublinek aerodrome (EPLL). During ILS Cat 1 approach at the decision altitude the crew had no visual contact with the runway and because of this they abandoned approach and flew to Warszawa – Okęcie (EPWA). The Flight Management System (FMS) had calculated that upon reaching EPWA aerodrome the remaining fuel quantity would amount to 900 kg, which was below the minimum required by the carrier Operational Instruction (1200 kg). The crew informed accordingly EPWA airport approach control (APP) and declared emergency situation (MAY DAY), due to expected low quantity of fuel. The APP controller at EPWA acknowledged EI-DHS in an emergency situation, and ensured it landing priority delaying departures of other aircraft. The flight crew landed safely. After termination of taxiing the fuel reserve was 1400 kg.

Investigation of the occurrence was conducted by the SCAAI Investigating Team in the following composition:

MSc. Eng. Bogdan Fydrych - Investigator-in-Charge– SCAAI Member;

D. (Eng.) Tomasz Smolicz – Member of the Team - SCAAI Expert

Based on analysis of the involved persons statements and evidence gathered during the investigation, the SCAAI Investigating Team determined the following causes of the serious air incident:

Discrepancy between the quantity of fuel recorded in the Flight Plan and the quantity calculated by FMS, which caused uncertainty of the flight crew as to the quantity of fuel which led to declaration of emergency.

SCAAI have made one safety recommendation after conclusion of the investigation.

1. FACTUAL INFORMATION

1.1. History of the flight.

On 21 December 2007 the flight crew of Boeing 737, registration marks: EI-DHS was performing a flight from Bergamo (LIME) to Kraków - Balice (EPKK). Meteorological conditions, according to the report received by the crew prior to the flight, allowed operation of the flight. Upon reaching area of EPKK aerodrome, the weather conditions deteriorated significantly below the minimum for landing. The crew decided to wait in holding pattern, assuming that it would be possible to land at EPKK.

Due to lack of improvement of meteorological conditions, operational services of the operator ordered the flight crew to fly to Łódź - Lublinek aerodrome (EPLL). During ILS Cat 1 approach at the decision altitude the crew had no visual contact with the runway and because of this they abandoned approach and decided to fly to Warszawa – Okęcie aerodrome (EPWA).

Flight Management System (FMS) had calculated that upon reaching EPWA aerodrome the remaining fuel quantity would amount to 900 kg, which was below the minimum required by the carrier Operational Instruction (1200 kg).

The crew informed the EPWA airport approach control (APP) and declared emergency situation (MAY DAY), due to expected low quantity of fuel. APP controller of EPWA declared the emergency situation, notified appropriate services and ensured landing priority for Boeing 737 delaying departures of other aircraft. The crew landed safely and accompanied by a unit of the airport fire brigade taxied to a parking stand. After termination of taxiing the fuel quantity remaining to be 1400 kg. This was above the minimum permissible quantity specified in the carrier Operational Instruction.

1.2. Injuries to persons

No injuries.

1.3. Damage to aircraft

No damage.

1.4. Other damage

None.

1.5 Personnel information

1.5.1. Captain

- Male, aged 39 ;
- Total flight time: 5500 hrs;
- Flight time on B 737: 1200 hrs;
- Flight time over the last 24 hrs: 4 hrs 12 min;

- Flight time over the last 28 days: 53 hrs 9 min;
- Medical examinations valid until: 16.08.2008;
- Rest period prior to the flight: 20 hrs 5 min.

1.5.2. Co-pilot

- Male, aged 27;
- Total flight time: 2300 hrs;
- Flight time on B 737: 1900 hrs;
- Flight time over the last 24 hrs: 9 hrs 58 min;
- Flight time over the last 28 days: 62 hrs 10 min;
- Medical examinations valid until: 12.06.2008;
- Rest period prior to the flight: 14 hrs 59 min.

1.6. Aircraft information.

Type: Boeing 737 – 800;

- Serial number : 33580;
- Registration marks: EI-DHS;
- Maximum Take off Weight (MTOW): 74990 kg;
- Year of manufacture: 2005.

1.7. Meteorological information.

EPKK aerodrome

ATIS “Oscar” 19:35 hrs

- RVR visibility: 250m;
- Temperature: -8C°;
- Dew point: -9C°;
- QNH: 1031 hPa.

Time (UTC):	Temp.:	Dew point:	Humidity:	Sea level pressure:	Visibility:	Wind direction:	Wind speed:	Weather conditions:
20:00	-5.0 °C	-6.0 °C	93%	1032 hPa	0.1 km	calm	calm	Freezing mist
20:30	-8.0 °C	-9.0 °C	93%	1032 hPa	0.3 km	calm	calm	Freezing mist

EPLL aerodrome:

Time (UTC):	Temp.:	Dew point:	Humidity:	Sea level pressure:	Visibility:	Wind direction:	Wind speed:	Weather conditions:
20:30	-5.0 °C	-6.0 °C	93%	1031 hPa	2.0 km	SE	1.0 m/s	cloudy
21:00	-5.0 °C	-6.0 °C	93%	1031 hPa	2.5 km	S	1.0 m/s	cloudy

EPWA aerodrome 20:45hrs

- Prędkość wiatru: 4 kts (2 m/s);
- Wind direction 130 degrees; alternating: 110-170 degrees;

- Visibility: 4000m;
- Temperature: -4C°;
- Dew point: -4C°;
- QNH: 1032 hPa.

1.8. Aids to navigation

No concerns regarding aids to navigation were raised.

1.9. Communications

No concerns regarding communications were raised.

1.10. Aerodrome information

Kraków - Balice (EPKK) and Łódź - Lublinek (EPLL) aerodromes each have one runway and ILS Category I.

Warszawa - Okęcie (EPWA) aerodrome has 2 intersecting runways and ILS Category II.

1.11. Flight recorders

Not analyzed.

1.12. Wreckage and impact information

Not applicable.

1.13. Medical and pathological information

Not applicable.

1.14. Fire

Fire did not occur.

1.15. Survival aspects

Not applicable.

1.16. Tests and research.

SCAAI Investigation Team analyzed pilots and air traffic controllers statements and available documents.

1.17. Organizational and management information

SCAAI was notified about the incident by fax from Duty Officer of EPWA on 22.12. 2007 at 23:58 local time that is, in fact the Commission learned about the incident the next day, 23.12.2007 at 8:15 local time when SCAAI opened its office. Polish Air Navigation Services Agency notified SCAAI by e-mail on 24.12.2007. Due to the above timing, SCAAI had no access to the airplane cockpit voice recorder (CVR) shortly after the incident. The airplane took off again for the next flight and the audio recording of the incident circumstances was "overwritten" by the new soundtrack.

On 28 December 2007 the SCAAI notified about the occurrence to the Air Accident Investigation Unit Ireland (AAIU), the International Civil Aviation Organization (ICAO) and the

interested parties, in accordance with the recommendations of Annex 13 (Aircraft Accident and Incident Investigations).

1.18. Additional information

None.

1.19. Useful or effective investigation techniques

Not applied.

2. ANALYSIS

2.1. Occurrence analysis

In accordance with the Operational Instruction (INOP) of the operator, the fuel quantity should be not less than 2000 kg upon landing at destination airfield and not less than 1200 kg upon landing at alternate airfield.

In the analyzed occurrence the flight management system (FMS) had indicated that at the second alternate aerodrome (which was Warszawa-Okecie - EPWA) the fuel quantity would have been 900 kg (after holding procedure in the area of destination (EPKK) and unsuccessful ILS approach to the first alternate which was Łódź - Lublinek (EPLL)). As a result, the flight crew declared an emergency due to a predicted low quantity of fuel on landing.

In accordance with the appropriate procedures APP controller assured priority of landing for the crew by allowing them to shorten the route and delaying departures of other aircraft.

Shortening of the route caused that after landing at EPWA the fuel quantity was 1400 kg, which was in accordance with the operator standards.

The crew course of action was justified and consistent with the Operational Instructions. It should be also taken into account the crew stress caused by unsuccessful approach to EPLL and low quantity of fuel calculated by FMS. Reliable information about the fuel reserve is essential for the crew to choose an airport for landing.

In the investigated event the following discrepancies concerning fuel quantity were obvious:

1. according to the Flight Plan the airplane taking off from Bergamo (LIME) had 6326 kg of fuel, which corresponds to 2hrs 52 min. of flight time;
2. according to the Flight Plan records the block time between departure of LIME and arrival at EPWA was 2hrs 52 min. and the flight time was 2hrs 35min.;
3. according to the statements of the crew, at EPLL aerodrome FMS signalled that at EPWA the fuel reserve would have been 900 kg, which led to declaration of emergency;
4. after landing at EPWA it was found out that the fuel reserve was 1400 kg;

5. records in the Technical Log concerning the flight LIME - EPWA (RZR-6876 dated 21.12.07) - the quantity of fuel at LIME - 6200 kg, at EPWA - 1400 kg, flight time 2hrs 35min., which allowed to calculate the average fuel consumption - 1850 kg / h;

2.2. Evacuation action

Not applicable.

3. CONCLUSIONS

3.1. Commission findings

1. Pilots of the airplane had the required authorizations to perform the air operations.
2. Pilots, declaring the state of emergency due to low quantity of fuel, acted according to the recommendations of the Ryanair Operational Instruction.
3. Two-way radio communication between the flight crew and air traffic controllers was maintained throughout the flight.
4. The airplane had a valid certificate of airworthiness.
5. The equipment used to secure the flow of air traffic during the event was turned on and functioning.
6. The information on fuel quantity contained in the Flight Plan was incompatible with the information from FMS.
7. Declaration of emergency (May Day) by the crew of RZR 6876 was justified.

3.2. Causes of the air incident.

Discrepancy between the quantity of fuel recorded in the Flight Plan and the quantity calculated by FMS, which caused uncertainty of the flight crew as to the quantity of fuel which led to declaration of emergency.

4. SAFETY RECOMMENDATION.

Civil Aviation Authorities of Ireland, “Ryanair” operator - to verify fuel calculating process.

END

Investigator-in-Charge

MSc.Eng. Bogdan Fydrych

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