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Report C 1999:37e
Incident involving aircraft SE-DUO
16 December 1998
in the airspace over Armenia
L-01/99

Translated by Bob Arnesen

1999-09-17

L-01/99

Swedish Civil Aviation
Administration

601 79 NORRKÖPING

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The Swedish Board of Accident Investigation (Statens haverikommission, SHK) has investigated an incident which occurred on 16 December 1999, onboard an aircraft with the registration SE-DUO.

In accordance with section 14 of the Ordinance on the Investigation of Accidents (1990:717) the Board submits herewith a final report of the investigation.

Olle Lundström

Monica J Wismar

This is an English translation of the Swedish final report. If there are any discrepancies the Swedish report is valid.

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Report finalised 1999-09-17

<i>Aircraft: registration and type</i>	SE-DUO, Boeing 757-200
<i>Owner</i>	NBB-Blue Scandinavia Lease Partnership One/ Britannia Airways AB, Box 611, 194 26 Upplands Väsby, Sweden
<i>Time of incident</i>	16 December 1999 at 2020 hrs. in darkness <i>Note:</i> All times in the report are given in Swedish normal time (SNT) = UTC + 1 hour
<i>Place</i>	In the airspace over Armenia, (approx. pos. N4115 E4448; at Flight Level 350 , corresponding to 10650 meters above standard sea level)
<i>Type of flight</i>	Charter flight
<i>Weather</i>	Tbilisi Airport (Georgia) at 2100 hrs., wind 080 degrees at 8 knots, visibility more than 10 km , scattered cloudbase at 5000 ft, Temp. +6 degrees C, dewpoint +1 degree C, altimeter QNH 1024 hPa
<i>Numbers on board: crew</i>	2/6
<i>passengers</i>	204 adults and 13 children
<i>Personal injury</i>	None
<i>Damage to aircraft</i>	None
<i>Other damage</i>	None
<i>Commander's age and licence</i>	52 years old, ATPL
<i>Commander's total flying hours</i>	15,256 hours, 1397 hours on type
<i>Commander's flying hours and number of landings previous 90 days</i>	130 hours, all on type
<i>First Officer's age and licence</i>	40 years old, ATPL
<i>First Officer's total flying hours</i>	7287 hours, 545 hours on type
<i>First Officer's flying hours and number of landings previous 90 days</i>	155 hours, all on type

The Board of Accident Investigation (SHK) was notified on 04 January 1999 that an incident with an aircraft registered SE-DUO had occurred in the airspace over Armenia on 16 December 1998 at 2020 hrs.

The incident has been investigated by SHK represented by Olle Lundström, Chairman, and Monica J Wismar , Chief investigator flight operations.

The investigation was assisted by aviation medicine expert Tommy Åkerblom.

The investigation was followed by the Swedish Civil Aviation Administration represented by Jan Führ and Max Danielsson.

SHK investigates accidents and incidents with regard to safety. The sole objective of the investigations is the prevention of similar occurrences in the future. It is not the purpose of this activity to apportion blame or liability.

SUMMARY

A charter flight on the return leg to the Stockholm/ Arlanda airport in Sweden departed the Sharjah airport in the United Arab Emirates at 1750 hrs. Approximately two and a half hours into the flight the commander became ill, experiencing strong cramps and showing signs of incapacitation. The First Officer was unable to communicate with him and it became necessary for the cabin crew to move him out of the cockpit.

A medical doctor travelling as a passenger was consulted but she was unable to determine the cause of his continued incapacitation. Her recommendation was to land as soon as possible and seek proper hospital attention. The First Officer then decided that the flight would make an immediate enroute diversion to Tbilisi, it being the nearest suitable airport. Air Traffic Control (ATC) was alerted by a PAN-urgency call and medical assistance was requested upon landing.

Preparations were made by the crew for the impending landing which would be made at an overweight of approximately 9.1 tonnes above maximum. The First Officer was assisted by a commercial pilot travelling as a passenger. The remaining passengers proved to be very understanding and co-operative when informed by the purser of the reason for the enroute diversion.

A smooth manual landing was made at 2051 hrs. and the aircraft was met by an ambulance. The commander was transferred to a hospital escorted by one of the cabin attendants.

The commander had previously during two isolated incidents suffered from fainting spells, the later incident even being accompanied by cramps.

The incident was caused by the commander suffering from an acute illness, which was considered to be an epileptic fit.

Recommendations

None.

1. FACTUAL INFORMATION

1.1 History of the flight

The crew had been tasked to carry out the return portion of a Swedish charter flight from the Sharjah airport in the United Arab Emirates to the Stockholm/ Arlanda airport in Sweden, on the 16th December 1998. The flight departed at 1750 hrs. After approximately two and a half hours into the flight the commander became ill , suffering from acute cramps and showing clear signs of incapacitation. The First Officer ordered the cabin crew to move the commander out of the cockpit into the forward galley where first aid was initiated. A medical doctor travelling as a passenger provided assistance but was unable to determine the reason for the commanders illness and continued incapacitation. Her recommendation was to get the commander to a hospital as soon as possible. The First Officer determined that Tbilisi was the nearest suitable airport and after making a PAN-urgency call to ATC there, requested an immediate landing and medical assistance upon arrival. He was cleared to leave his cruising flight level FL350 (10650 meters) and received radar vectors for an ILS approach to runway 31L. Another commercial pilot travelling as a passenger onboard assisted during the descent and approach with checklist reading and in the conversion of cleared descent levels from meters to feet. Preparations were made for an overweight landing, which would be approximately 9.1 tonnes above maximum. A smooth manual landing was made at 2051 hrs.

The passengers proved to be most co-operative and understanding when informed by the purser of the reason for the enroute diversion.

The commander was transferred by ambulance to a nearby hospital under the escort of one of the cabin attendants. The passengers were allowed to disembark into the terminal where refreshments were served.

The incident occurred at FL350 (10650 m) at estimated position N4115 E4448.

Additional Facts

After landing the First Officer contacted his company's head office in Stockholm to relay the circumstances of the enroute diversion. A mobile telephone carried onboard as part of the ships equipment was used as normal landlines were unreliable.

Preparations were made to send an air ambulance to fly a seriously ill passenger to Stockholm and also to send a relief crew to fly the aircraft home. The SOS International office in Copenhagen arranged for the charter of a small jet aircraft which arrived in Tbilisi on December 17th . The commander was released from medical care at the hospital and was together with the ill passenger flown by air ambulance to Stockholm.

An additional small jet aircraft was chartered and it departed Stockholm the same day at 1200 hrs. with a relief crew and a qualified aircraft engineer onboard. After a fuel stop in Moscow it continued on to Tbilisi where it landed at 1710 hrs.

The engineer performed an overweight landing inspection and determined that the aircraft was airworthy. The charter flight could then continue and departed Tbilisi at 1833 hrs. arriving at the Stockholm/Arlanda airport at 2243 hrs.

The crew that had been relieved flew back to Stockholm in the jet chartered to fly down the relieving crew.

1.2 Personal injuries

	<i>Crew</i>	<i>Passengers</i>	<i>Other</i>	<i>Total</i>
Fatal	-	-	-	-
Seriously injured	-	-	-	-
Slightly injured	-	-	-	-
No injuries	8	217	-	225
Total	8	217	-	225

1.3 Damage to the aircraft

None.

1.4 Other damage

None.

1.5 The crew

1.5.1 *The Commander*

The commander was 52 years old at the time and had a valid ATP Licence.

Flying hours

<i>previous</i>	<i>24 hrs</i>	<i>90 days</i>	<i>Total</i>
All types	-	130	15256
This type	-	130	1397

Flight training on A/C type concluded in 29 October 1996.

Latest PFT (periodic flight training) carried out in 11 November 1998 on a B-757 simulator. Latest EMC (emergency training) carried out 27 November 1998. He had been under medical observation by the Swedish CAA since 1990, which meant that all his medical renewals were additionally reviewed by a CAA chief doctor. He did during the period 1992-94 have a multicrew restriction on his licence, meaning he was not allowed to fly solo or together with another pilot with operational restrictions.

1.5.2 *The First Officer*

The first officer was 40 years old at the time and had a valid ATP Licence.

Flying hours

<i>previous</i>	<i>24 hrs</i>	<i>90 days</i>	<i>Total</i>
All types	-	155	7287
This type	-	155	1397

Flight training on A/C type concluded 21 December 1997.

Latest PFT carried out 02 December 1998 on a B-757 simulator. Latest EMC carried out 27 November 1998.

1.5.3 *The Cabin Crew*

<i>Sex/Age</i>	<i>Completed training on type</i>	<i>Latest EMC</i>
1. Female, 39 (purser)	January 1996	27 August 1998
2. Male, 28	May 1997	02 October 1998
3. Female, 32	August 1996	03 September 1998
4. Male, 34	November 1996	17 September 1998
5. Female, 33	January 1996	25 August 1998
6. Female, 38	January 1996	17 November 1998

1.6 **The aircraft**

<i>Owner:</i>	NBB-Blue Scandinavia Lease Partnership One/ Britannia Airways AB, Box 611, Upplands Väsby, Sweden
<i>Type:</i>	Boeing 757-200
<i>Serial number:</i>	24792 (Line nr. 279)
<i>Year of manufacture:</i>	1990
<i>Gross weight:</i>	Max Allowed landing weight 89811 kg, Actual 98900 kg
<i>Centre of gravity:</i>	MAC 51/ LIZFW 55
<i>Engine manufacture:</i>	Rolls Royce
<i>Engine model:</i>	RB211-535
<i>Number of engines:</i>	2

The aircraft had a valid Certificate of Airworthiness.

1.7 **Meteorological information**

Weather upon landing at the Tbilisi airport reported at 2100 hrs. : wind 080 degrees at 8 knots, visibility more than 10 km, cloudbase scattered at 5000 ft, temperature +6 degrees C, dewpoint +1 degree C, altimeter QNH 1024 hPa

1.8 **Navigational aids**

Both the aircraft and the airport were equipped with all the normal navigation equipment and aids.

1.9 Radio communications

All radio communication was relayed in English without problem.

1.10 Airport data

The Tbilisi airport with the name Lochini (UGGG) has two parallel runways designated 13R/31L and 13L/31R. The runway used for landing 31L is 3000 meters long and 45 meters wide.

1.11 Flight and sound recorders

The aircraft was equipped with a Digital Flight Data Recorder (DFDR) and Cockpit Voice Recorder (CVR). SHK has not found any circumstance that would merit a readout from these recorders.

1.12 Site of incident

The commander became ill during flight at an altitude of 10650 meters in the airspace over Armenia.

1.13 Medical information

1.13.1 *The Commander's Recollection of the Incident*

The crew had had a four day layover in Sharjah, during which the commander had experienced lower back pains. During this time he took no medicine for the discomfort and on the day of the departure only had a stiff back, the earlier pains having subsided. The crew had met before departure to eat a meal together and they all ate the same food. After about two hours into the flight he experienced an involuntary flickering sensation in his left field of vision for about 30-60 seconds, making it hard to read the airspeed indicator. He then left the cockpit to go to the lavatory and he felt no dizziness or unsteadiness during this time. While in the lavatory he tried to check his own peripheral vision by moving a finger laterally from the outside edge inwards and he noted a reduction on the left side. He then returned to the cockpit. His next recollection is that he found himself believing that he was in a dreamlike state, lying on the floor, and that he felt the speedbrakes extended. After this he remembers only small fragments of the remainder of the trip. When he was carried off the aircraft he felt he was conscious and was able to orient himself. He now had a very strong back pain and he did receive an injection from the attending doctor, most likely containing a painkiller. During his 12 hour stay at the hospital he felt normal except for the back pains, and he was given more injections. After his release he was flown by air ambulance to Stockholm. His medical journal and other papers from the hospital in Tbilisi have not been made available.

1.13.2 *The Crew's Recollection of the Incident*

The first officer noted that the commander came back onto the flightdeck, returned to his seat and did up his seatbelt. Shortly thereafter he began to turn his body to the left and stopped abruptly halfway through the turn, as if his spine had locked. Seconds later the commander suffered some kind of fit. His eyes were open and his hands were held in close to his body, bent at ninety degrees to his underarms. His knees were bent inwards toward each other and his feet bent upwards towards his shins. His back was rounded off in a hunched position, with his neck pushed back against the seatback and his head tilted backwards with an open mouth. The first officer was unable to communicate with him during the time the fit lasted, which was approximately 15-30 seconds. When the purser came into the cockpit he was still unconscious, with his head and body leaning to the left and his eyes and mouth open. His body became completely relaxed when he was moved from his seat and onto the floor in the forward galley. She laid him so that his air passages were free and then checked his pulse, which was weak and fast. His blood pressure was measured at 146/65. After a few minutes he was able to move but still unable to communicate. He was given oxygen and after a few minutes began to complain of back pains. She was now able to communicate with him but he seemed confused and disoriented. His legs were shaking involuntarily the whole time.

1.13.3 *Previous Illnesses*

In January 1990 during a visit to the Canary Islands the commander had experienced a fainting spell accompanied by a short memory loss while exercising lightly. He had not slept well during the night and had suffered at the time from a slight throat infection. The attending doctor at the time examined him and could find no fault, citing only a fainting spell.

In September 1991 while playing golf he again experienced a fainting spell accompanied by a short memory loss and tonic-clonic spasms during a 30 second period. During the night he had not slept well. According to his medical journal and a statement given by his golf partner that day, he had said that he felt dizzy and began to feel ill. He squatted down and said that he had seen something crawling on the ground. He then fell backwards and his legs shot out straight. His whole body shook involuntarily for 15-20 seconds. He was breathing heavily and he had a very fast pulse. An ambulance arrived within 15 minutes, at which time he had regained consciousness and orientation and was able to say that he felt ill and was tired.

An extensive examination of his heart and brain were done at the time and no fault was found. In the opinion of an attending neurologist both previous incidents were probably the result of low blood pressure. No evidence could be found to support a diagnosis of epilepsy, even after the cramps experienced during the second incident. However an epileptic fit could not be entirely ruled out.

Otherwise the commander had been deemed to be very healthy and fit. His medical renewals every six months since 1992 have been without remarks.

1.14 **Fire**

Not Applicable.

1.15 Survival aspects

Not Applicable.

1.16 Special tests and investigations

Not Applicable.

1.17 The airline's organisation and management

Britannia Airways AB is certified to provide international commercial air transport with heavy aircraft. Their head office is situated in the city of Upplands-Väsby in northern Stockholm. Daily operations are governed by the company's Flight Operations Manual, where Part A lays down the company's general policy and routines and Part B describes policy and handling of specific aircraft types. There is also a Cabin Crew Manual describing policy and routines for all cabin attendants. Company policy concerning the incapacitation of crew members is contained in both of these manuals. Training for the recognition of incapacitation and how to handle it is performed regularly by both pilots and cabin attendants.

1.18 Other information*Crew De-briefing*

Generally speaking there was a calm and co-operative atmosphere onboard the aircraft during the whole of the incident. The passengers showed no signs of anxiety or uneasiness and proved to be most co-operative. The airport authorities at the Tbilisi airport were very helpful, considering that the terminal building was officially closed upon landing, but then reopened upon request. Normal telephone landlines were unfortunately not reliable. This problem was solved by using the mobile phone provided onboard.

There were many calls made between the crew and head office in Stockholm. The crew had great difficulty in getting their calls through to head office as the phone was quite often busy. The need for a separate line through to head office for crews involved in incidents or accidents was expressed.

2 ANALYSIS**2.1 *The Flight***

SHK can determine that the crew acted in a very professional and co-operative manner, considering their great concern for the wellbeing of the commander. The decision to initiate an enroute diversion and seek immediate medical help, as recommended by the doctor onboard, was correct. The decision by the first officer to employ the aid of another commercial pilot onboard to help out in the cockpit showed good resource management. Even though the other pilot was not certified on type, he proved invaluable in performing such tasks as checklist reading and converting meters to feet, easing the workload. He also proved to be of great psychological support for the first officer.

SHK's investigation revealed that the company's policy for incapacitation amongst crew members was followed and had functioned well.

2.2 *Acute Illness*

The sequence of events concerning the commander's acute illness is well documented through statements received by witnesses and himself. Taking into consideration the nature, the time frame and the earlier events, it is the opinion of SHK's medical expert that the commander suffered from a general and unprovoked epileptic fit.

3 CONCLUSIONS

3.1 Findings

- a) The pilots were qualified to perform the flight.
- b) The aircraft was airworthy.
- c) The commander became acutely ill during the flight.
- d) The commander had twice earlier suffered from fainting spells, accompanied by cramps during the latter event.
- e) The landing was made with 9.1 tonnes overweight.

3.2 Causes of the incident

The incident was caused by the commander becoming acutely ill during the flight, with the most probable cause for this being an epileptic fit.

4 RECOMMENDATIONS

None.