

**Ref. No 019/06/ZZ**

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# **FINAL REPORT**

**Investigation into the serious incident  
of aircraft ATR 42-300,  
registration EI-SLC,  
at LKPR on 24 January 2006**

Prague  
April 2006

**A) Introduction**

Operator: Air Contractoras (Ireland)  
Aircraft type: Avions De Transport Regional, ATR 42-300  
Registration: EI-SLC  
Place of Incident: Prague / Ruzyně Airport (LKPR)  
Date and Time: 24.1.2006, 20:47 (All times in this report are UTC)

## **B) Synopsis**

On 26 January 2006 AAI received from Air Accident Investigation Unit of Ireland (AAIU) a report of the serious incident of an Air Contractoras ATR 42-300 aircraft. The pilot of the airplane, which was on ABR 7020 flight from Praha – Ruzyně Airport (LKPR) to Paris Roissy – Charles de Gaulle (LFPG) had requested on 24 January 2006 before departure from LKPR that the plane be de-iced by Menzies Aviation (Czech) Ltd. After de-icing, as the plane waited at the r/w holding point, ATC was called and the agent of the handling company informed the pilot in command (PIC) that a malfunction of the de-icing device had been detected and asked him to return to the ramp for new de-icing. At the ramp some ice was found on the de-iced parts of the plane. Using another de-icing rig the plane was de-iced again and then departed safely.

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

Investigator in charge: Ing Stanislav Suchý  
Member: Ondřej Zich - Menzies Aviation (Czech)

The Final report was released by:

AIR ACCIDENTS INVESTIGATION INSTITUTE  
Beranových 130  
199 01 PRAHA 99

On the 11 April 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 AAI archive)

## **1 Factual information**

### **1.1 History of the incident**

On 26 January 2006 the crew of an Air Contractoras ATR-42-300 during preparation for ABR 7020 flight from Praha – Ruzyně Airport (LKPR) to Paris Roissy – Charles de Gaulle Airport (LFPG) found out that while the plane parked at LKPR, ice had formed on the plane's surface. The pilot in command (PIC) asked Menzies de-ice the plane. He requested to have the plane de-iced using de-icing fluid Type II (Kilfrost) with ratio

75% fluid to 25 % water and mixture temperature 80 deg. centigrade. The de-icing procedure finished, service men checked the airplane surface visually. The surfaces were clean with vapour rising from them. The PIC received standardised notification of the de-icing operation includes de-icing code. After receiving information that the de-icing was over, the PIC taxied to the RWY 24 holding point where he waited about 2 minutes to allow the engines to warm up. The PIC said that while waiting he noticed some drips from the fluid on the leading edge of the wing.

The operator, who was responsible for the de-icing process said that when the de-icing process was finished the rig driver wanted print out a report which contains the volumes of water and de-icing fluid used. The printer in the cab did not produce the report. The rig driver notified this to the operator, who repeated print out of the report. Again the printer did not produce the report. Looking at the cab gauges, the operator discovered a discrepancy between the value set at 75% on the control console and the figures indicating actual volume of water (360 l) and de-icing fluid (40 l) at quantity gauges when the de-icing finished. The staff at once informed Menzies about the situation. A Menzies agent through ATC asked the pilot in command to establish contact on frequency of Menzies dispatching centre.

At 20:47:40 the crew reported on TWR frequency that he was as the second at the RWY 24 holding point. An executive controller (TWR EC) gave him the instruction to get in contact with the Menzies dispatching.

After that, the PIC was informed about the de-icing facility malfunction and asked by the dispatcher to return to the de-icing ramp to be de-icing again. The staff found out that residues of the de-icing fluid had created icy patches on the ground.

At 20:49:21 the PIC announced on TWR frequency he had been informed about the de-icing trouble and asked to return to the ramp. With regard to the traffic he had to wait until 20:52:40 for the TWR EC instruction to taxi on TWY Z back to the de-icing ramp. There ice was found on the parts of the plane that had been de-iced. The airplane was therefore de-iced again from a second rig, first with 75% mixture then 100%. Then the airplane was checked visually to depart safely at 21:20.

## 1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor/ None	0/2	0	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 53, was a holder of ATPL(A), had a PIC qualification for the type ATR 42 and a valid medical certificate. He has flown total all types 4150 hours, on the type ATR 42 he has flown 3900 hours.

The F/O, aged 46, was a holder of ATPL(A), had a valid medical certificate. He has flown total all types 2150 hours, on the type ATR 42 he has flown 50 hours.

The de-icing staff consist of the trained spray operator with two years experience and the rig driver.

## **1.6 Aircraft information**

Type and Model:	ATR 42-300
Registration:	EI-SLC
Manufacturer:	Avions De Transport Regional
Serial number:	082
Total flight time:	32538 hours

## **1.7 Meteorological information**

According METAR/SPECI was 26 January 2006 about 20:00 – 21:00 during pre flight preparation at LKPR following meteorological conditions:

The surface winds:	VRB / 0-4 kt
The temperature:	- 14°~ -16°C
Icing condition:	thick frost on parked A/C

## **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 and on the frequency of Menzies Dispatching centre 131,45 MHz.

## **1.10 Aerodrome information**

At time of the serious incident RWY 24 was in use at LKPR. The A/C was parked and de-iced on stand C 2A apron Cargo.

## **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**

The Menzies personnel reported that the defective rig was examined by maintenance personnel and a relay C3-B39 R420 was found to be faulty and a valve F43 was partially open. Upon receiving information regarding the rig check the inspection and investigation into probable failures in relay R420 and open position of valve F43 was done by the manufacturer on 3 February 2006.

The manufacturer of the rig realized that the rig to be in good condition and maintenance seems to have been done regularly. During the inspection no faults appeared, and the rig was working correctly. During the investigation into relay C3-B39 R420 no indications of malfunction were found.

### **1.17 Organizational and management information**

The de-icing was conducted by a trained staff of Menzies, who used the de-icing rig Elephant MY s.n. ON490 Vestergraad Company A/S. It was checked in the morning of that day using a refractometer and found to be alright. On that day it had been used for the first time for the de-icing of EL-SLC airplane.

The Menzies Ramp manager immediately made a recommendation to AEA incorporated remedial measures, which changed de-icing procedures. During de-icing operation by the Elephant MY rig, the check by refractometer should to be carried out. Prior to the standardised notification of the pilot in command that de-icing operation was completed the ratio check shall be carried out by reading the volume on the cab gauges and the print out.

### **1.18 Additional information**

NIL

### **1.19 Useful or effective investigation techniques**

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

## **2 Analysis**

2.1 The PIC requested that de-icing be made with the desired concentration of de-icing fluid taking into account the ice accretion on the plane and the actual weather conditions.

2.2 The desired fluid / water mixture 75/25% of the de-icing liquid and water was set at the control console of the rig and checked on the same day using a relevant refractometer test. Then a de-icing procedure was applied to the upper wing surfaces and tailplane. When the de-icing was over, the Menzies ground staff presented the pilot in command with the standardised notification includes the anti-icing codes.

The first sign of the wrong de-icing with incorrect concentration of the de-icing fluid was the discrepancy between water consumption and de-icing liquid consumption that the operator noticed on the consumption indicators in the driver's cab. After the mistake had been discovered, the Menzies ground staff took the necessary steps to

halt the plane's take-off, inform the pilot in command about the situation and have the plane de-iced again.

Another sign of the de-icing defect was the result of the ramp check showing icy spots of frozen de-icing fluid residues on the airplane surfaces.

The check by the Menzies staff revealed a C3-B39 R420 defective relay in the electric circuit of the rig and the flush/bleed valve F 43 had been found partially open. The investigation done by manufacturer have shown no indications of malfunction of relay C3-B39 R420 and the flush/bleed valve F 43 position had been fixed using a piece of metal wire.

The overall check of the unit showed the unit to be in good condition, during check the unit worked properly and no faults of relay C3-B39 R420 appeared. It was not possible to eliminate the possibility of non-permanent malfunction of relay. In the extremely unlikely event of the failure in relay C3-B39 R420 and open position of the flush/bleed valve F 43, the fluid out of the nozzle would be only water. The readings on the gauges of water and the fluid which the operator of the rig have seemed did not correspond this possibility.

### **3 Conclusions**

#### **3.1 The commission has come to the following conclusions:**

- The crew was type-rated;
- The airplane had airworthy certificate, maintenance certificate and operation permit;
- The pilot in command proceeded correctly when demanding de-icing;
- The de-icing fluid consumption did not correspond to the required and set concentration due to the defect of C3-B39 relay so that the airplane surfaces were sprayed with hot water with a minimum amount of de-icing liquid;
- On that day in the morning, the de-icing rig was checked, however it had been used for the first time for de-icing EL-SLC aircraft;
- The ground staff detected the wrong mixture dosing only after reporting to the pilot in command and after the plane left the ramp. The staff responded correctly to the situation;
- The Menzies staff checked the rig and the malfunction of the C3-B39 R420 relay in the electric circuit and the flush/bleed valve F 43 partially open had been found;
- During the investigation done by manufacturer no indications of the C3-B39 R420 relay and the flush/bleed valve F 43 were found. The facts on events are contradictory with conclusion of rig testing and checking by manufacturer and with operating mode of the rig. The check showed the gauges of water and fluid are not able to detect a fluid mixing problem.

#### **3.2 The causes**

- The cause of malfunction probably was a random malfunction of the de-icing rig, which could not be determined nor excluded during this investigation.

#### **4 Safety recommendations**

The manufacturer of the Elephant MY rig should modify the system of de-icing unit to:

- indicate every possible mix failure and/or to immediately automatically stop de-icing spraying;
- measure a precise consumption of water and fluid added to the spray nozzle;
- add a spring to automatically close the flush/bleed valve F 43 after the pumps have been bled.

Prague, April 2006