MINISTRY OF TRANSPORT, CONSTRUCTION AND REGIONAL DEVELOPMENT OF THE SLOVAK REPUBLIC
Aviation and Maritime Investigation Authority
Nám. slobody 6, P.O.BOX 100, 810 05 Bratislava 15

Reg. No.: SKS2011003

F I N A L R E P O R T

on investigation of serious incident

of helicopter **Eurocopter AS-355N**

registration No. **OM-IKM**

Date: 26.06.2011

Place: Poprad Airport / LZTT

A. INTRODUCTION

The investigation of air accident, serious incident, has been conducted pursuant to Art. 18 of the Act No 143/1998 on Civil Aviation (Civil Aviation Act) and on Amendment of Certain Acts and in accordance with the Regulation (EU) No. 996/2010 of the European Parliament and of the Council on investigation and prevention of civil aviation accidents and incidents, governing the investigation of civil aviation accidents and incidents.

The final report is issued in accordance with the Regulation L 13 that is the application of the provisions of ANNEX 13 Air Accident and Incident Investigation to the Convention on International Civil Aviation.

The exclusive aim of investigation is to establish causes of accident, serious incident, and to prevent their occurrence, but not to refer to any fault or liability of persons.

This final report, its individual parts or other documents related to the investigation of the air accident in question have an informative character and can only be used as recommendation for the implementation of measures to prevent occurrence of other air accidents and serious incidents with similar causes.

Operator / Owner:	EHC service, s.r.o. / Grafobal Group, a.s.
Type of operation:	air transport
Type of aircraft:	Eurocopter Ecureuil, AS-355N

Registration number:	OM-IKM
Take-off site:	Stará Lesná
Planned landing site:	Bratislava Airport / LZIB
Flight phase:	after take-off

Date and time of detection of occurrence: 26.06.2011, 15 h 40 min

Note: All time data in this report are stated in the UTC time.

B. INFORMATIVE SUMMARY

The pilot transported passengers on the route Stará Lesná – LZIB with the helicopter.

During the take-off the left engine lost power and thick smoke penetrated into the cockpit. The pilot checked the flight indicators, steadied the flight and decided to make an emergency landing at the airport LZTT.

The helicopter landed at LZTT with its right engine working. After landing the pilot turned the right engine off and left the helicopter together with the passengers unharmed.

Person appointed for investigation of causes of serious incident:

Ing. Igor BENEK

Report issued by:

The Aviation and Maritime Investigation Authority
of the Ministry of Transport, Construction and Regional Development
of the Slovak Republic

C. MAIN PART OF REPORT

1. FACTUAL INFORMATION

1.1 History of the flight

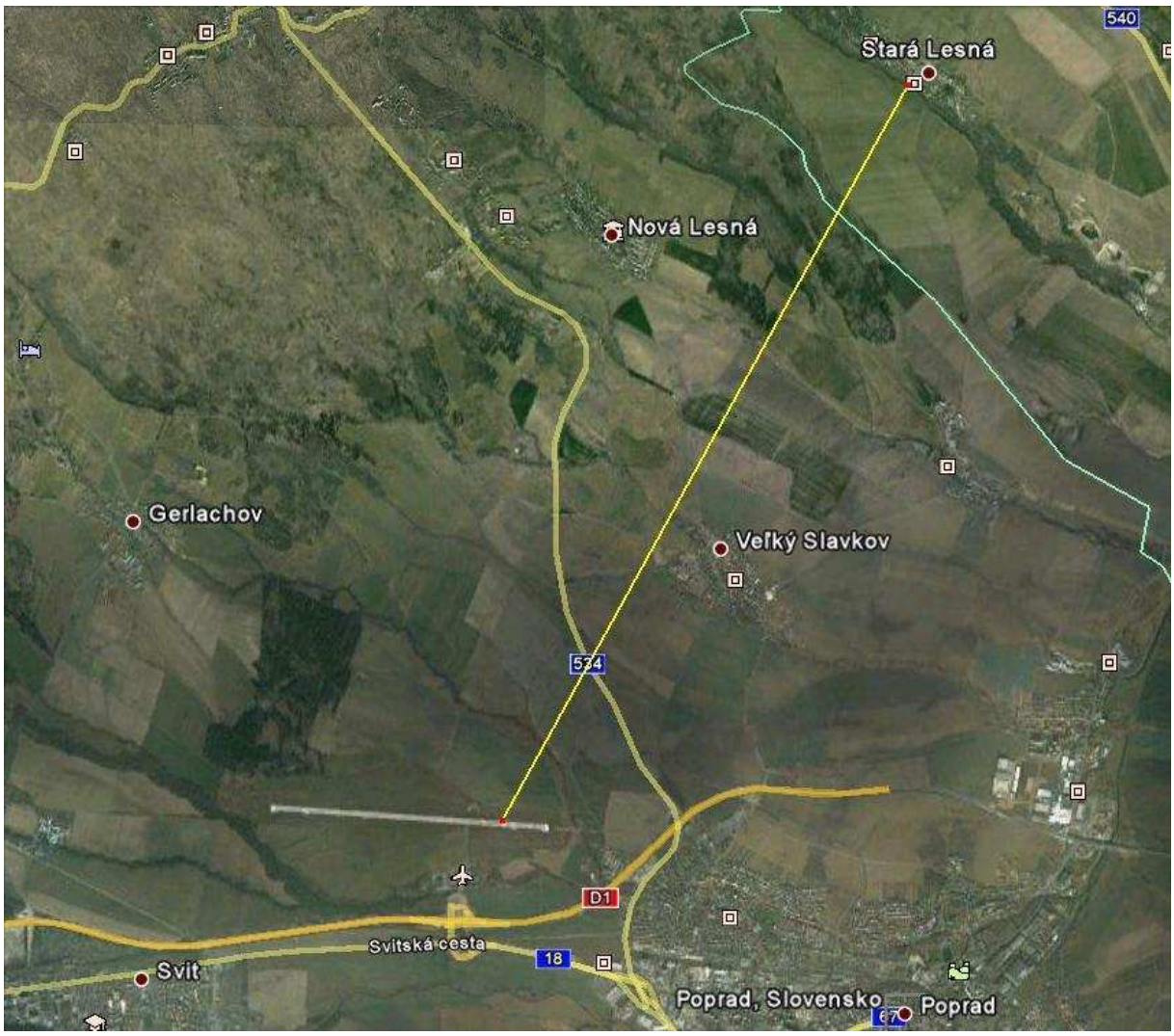
After refuelling at LZTT the pilot flew to Stará Lesná to collect the passengers and then made a take-off from LZIB.

After take-off in a gentle right-hand bend in altitude of 20 m above the ground and speed of 30 kt the left-side engine lost speed and oil pressure. The pilot reduced the angle of blades of the primary rotor and pushed the control lever of cyclics forward to gain speed of advance.

When the helicopter approached the ground in the altitude of 2-3 m thick smoke penetrated into the cockpit. The pilot said that he had checked the flight indicators, steadied the flight and decided to make an emergency landing at LZTT, because the drenched ground had been unsuitable for landing. During the flight he closed the fuel supply to the left-side engine because of the fire hazard in the helicopter.

The helicopter landed at LZTT with its right-side engine working. After the landing the pilot turned the right-side engine off and left the helicopter together with the passengers. The following check by the pilot detected the oiling-up of the helicopter.

Daytime:	Day
Meteorological conditions:	VMC



1.2 Injuries to persons

Injury	Crew	Passengers	Other persons
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	1	4	

1.3 Damage to aircraft

The preliminary inspection detected a crack on the hose supplying oil to the left-side engine cooler. The following thorough inspection by an expert, representative of Eurocopter, detected local damage to the tail boom – distortion of skin, which was classified as minor.

1.4 Other damages

The Aviation and Maritime Investigation Authority was not informed about circumstances with potential application of other claims for compensation of damages towards a third party.

1.5 Personnel information

Pilot:

Citizen of the Slovak Republic, aged of 59 years, holder of the commercial helicopter pilot licence CPL(H) No. SK07860106, issued by the Civil Aviation Authority of SR, with marked validity until 13.05.2016.

Qualifications:

Types of helicopters: AS 355N/NP, BELL 206B,L , H269/300C
Instructor: AS 355N/NP, BELL 206B,L , H269/300C

Flying experience:

Total number of flight hours:	8,500 h
Total number of flight hours with AS 355:	830 h

1.6 Aircraft information

a) **Airframe**

Type:	AS-355N
Serial No:	5708
Year of manufacture:	2002
Manufacturer:	Eurocopter
Total number of flight hours:	1638 h 00 min

Certificate of airworthiness No. 0829 issued on 10.11.2008 with marked validity until 01.12.2012.

b) **Engines**

Type:	Arrius 1A
Serial No:	2380 – left-side engine
Serial No:	2378 – right-side engine
Manufacturer:	Turbomeca

Total number of operating hours 1,551 h 00 min since manufacture, 559h since G/O

The engines were incorporated into the helicopter in 2002. Their G/O was implemented in 2008.

c) **Main rotor / blades**

Manufacturer:	Eurocopter
Type:	P/N: 355A11003004
Blades worked:	S/N 30770 - TSN : 1638 h 00 min
	S/N 30965 - TSN : 1638 h 00 min
	S/N 21888 - TSN : 606 h 00 min

The blades were incorporated into the helicopter in 2009.

Balancing rotor – blades composition:

Type:	P/N: 355A12-0050-04
composition worked:	S/N 17595 – TSN : 113 h 15 min

The blades composition were incorporated into the helicopter in 2011.

d) **Weight of helicopter at the time of serious incident**:

Empty weight of helicopter		1651.0	kg
Weight of crew		210.0	kg
Weight of luggage		0.0	kg
Weight of fuel	about 0 l x 0.72 kg/l	500.0	kg
Weight of oil	about 0 l x 0.90 kg/l	14.0	kg

Total weight of helicopter at the time of serious incident: 2,375.0 kg

Maximum permissible take-off weight of helicopter according to the Flight Manual is 2,600 kg.

Apart from the crew, the helicopter carried no other load or cargo with potential effect on the change of its c.g. position or trimming.

The weight of helicopter was within the permissible range at the time of serious incident.

Regular revision of the helicopter was implemented after 1,597 h 20 min of flight. No findings or faults with relevance for the serious incident were detected.

Type of fuel: JET A1.

1.7 Meteorological situation

Cloudiness 3/8, visibility above 10 km, temperature 20° C, north to north-west wind with speed of 3-5 m/s.

The Slovak Hydrometeorological Institute (SHMI) prepared information on precipitation total in the location of Stará Lesná in the period from 16.06.2011 to 25.06.2011.

Date	Precipitation total (mm)	Duration of precipitation
16.06.2011	4,0	10:45-10:55, 12:40-14:43, 15:15-16:10 h
17.06.2011	2,5	11:10-11:35, 12:15-13:50 h
18.06.2010	10,9	12:25-13:30, 21:42-24:00 h
19.06.2011	7,8	00:00-00:35, 06:30-13:20, 17:30-18:31 h
20.06.2011	0,8	07:35-10:52 h
21.06.2011	0,0	16:45-17:00 h
23.06.2011	11,6	09:30-10:00, 22:30-24:00 h
24.06.2011	0,7	00:00-01:40, 19:45-20:15 h
25.06.2011	1,6	05:00-05:15, 08:50-10:10 h

1.8 Aids to navigation

VHF Comm/Nav/GPS 1	GNS 530	1x
VHF Comm/Nav 2	KX 165	1x
Marker	KR 21	1x
ADF/1 Radio compass	KR 87	1x
Transponder	KT 71	1x
ICS Crew and Pas.	KMA 24H	1x
Alticoder	8800T	1x
Radioaltimeter	KRA 405B	1x
Gyrohorizon	H 140	1x
STBY horizon	AI804	1x
Compass gyro	KCS 55A	1x
DME	KN 63	1x
Emergency locator	C406-2HM	1x
CDI	KI 206	1x
RMI	KNI 582	1x
Autopilot	SFIM	1x
Coupler	SFIM	1x
STBY altimeter		1x

1.9 Communications

The helicopter was equipped by radio communication system enabling two-way radio communication at every moment of flight with all air stations.

1.10 **Aerodrome information**

Not applicable.

1.11 **Flight recorders and other recorders**

The helicopter is not equiped by flight recorders.

1.12 **Wreckage and impact information**

Not applicable.

1.13 **Medical and pathological information**

Not applicable.

1.14 **Fire**

During the flight smoke penetrated into the cockpit as a result of incidence of oil particles on the hot parts of the engine. No fire broke out.

1.15 **Survival aspects**

Research and rescue operations with use of the SAR devices were not required.

1.16 **Tests and research**

On 18.11.2011 the company Turbomeca implemented an inspection – analysis of damaged engine ARRIUS A1 S/N 2380 in its service facility in Tarnosa (FRA) and issued the Technical Report No. T11-CR1038A-1 with conclusion that the engine had not been the cause of serious incident.

In mid-February 2012 the oil hose was sent to French Elastomeric Laboratory for detection of cause of its rupture.

At the time of issue of the final report AMIA did not avail of information on the exact cause of rupture of the oil hose, because the company Eurocopter had not terminated the investigation into the cause of rupture of the oil hose.

1.17 **Organizational and management information**

Not applicable.

1.18 **Additional information**

At the time of issue of the final report AMIA did not avail of information on the exact cause of rupture of the oil hose.

1.19 **Useful or effective investigation techniques**

Standard investigation methods were used.

2. ANALYSIS

2.1. **Flight history**

The pilot of the helicopter was making a regular flight with passengers, when the left-side engine lost power and smoke penetrated into the cockpit after the take-off. The pilot assessed the situation and decided to continue the flight in direction to LZTT. The pilot´s decision not to make a field landing was motivated by his knowledge that the ground under the helicopter was drenched and potential high-speed field landing was very dangerous.

Based on information received from SHMI, the location of Stará Lesná received precipitation total of 14 mm during the last seven days before the accident. It allows the assumption that the pilot´s judgment on unsuitable, drenched ground was probably wrong. From the aspect of passenger and crew safety the field landing of the helicopter would have been probably safer, in view of the risk hazard during the flight.

Drawing upon his experiences, the pilot decided to make landing at the airport LZTT.

The pilot implemented the emergency procedures and landed with the helicopter at LZTT without causing further damage and injury to passengers.

3. CONCLUSIONS

3.1 **Findings:**

- according to submitted documentation the pilot of the helicopter had valid qualifications for the critical flight with the helicopter,
- the helicopter had a valid documentation and did not show any faults before the serious incident,
- the helicopter fulfilled the conditions of airworthiness before the critical flight,
- the meteorological conditions were suitable for the flight in question.

3.2 **Causes of serious incident:**

- rupture of hose supplying oil to the left-side engine cooler,
- the exact cause of rupture of the hose was not unambiguously detected.

4. SAFETY RECOMMENDATIONS

On the basis of the investigation of causes of serious incident of:

Helicopter: **AS-355 N**
Registration No.: **OM-IKM**
Date of serious incident: **26.06.2011**

The helicopter operator took the following preventive measure:

- on 27 June 2011 the helicopter was transported by ground to the airport LZIB, service station of EAST AIR COMPANY s.r.o., for replacement of the left-side engine and its sending for expertise.

The final report from investigation of air incident did not contain any recommendations at the time of issue.

Bratislava, 31.05.2012