

**Ref. No 46/06/ZZ**

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# **FINAL REPORT**

**Investigation into accident by  
Robinson R 22 OK-LEA  
at Palačov on 13 Februar 2006**

Prague  
August 2006

## **A) Introduction**

Operator: NISA AIR spol. s r.o., Liberec  
Aircraft manufacturer and type: Robinson Helicopter Co. U.S.A., Beta II.  
Registration: OK-LEA  
Place of accident: village Palačov  
Date and Time: 13. Februar 2006, 13:45 (All times in this report are UTC)

## **B) Synopsis**

On 13 February 2006 Air Accident Investigation Institute of the Czech Republic was notified of a Robinson R 22 helicopter accident that had taken place near the village of Palačov in northern Moravia. As the helicopter engine did not work well during the return flight, the pilot tried unsuccessfully to make an emergency landing bring his aircraft down to land. The helicopter was destroyed but the crew sustained no injury during the manoeuvre. Based on the notification an investigation into the accident got started.

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

Investigator in charge: Karel Mařík

Member: Milan Pecník

Member: Lubomír Střihavka

The Final Report was released by:

ÚSTAV PRO ODBORNĚ TECHNICKÉ ZJIŠŤOVÁNÍ PŘÍČIN LETECKÝCH NEHOD  
Beranových 130  
199 01 PRAHA 99

On the 22 August 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 Flight**

On 13 February 2006 the crew of an R 22 helicopter was on a scheduled VFR flight to take a regular monthly check of a pipeline. At the last stage of the scheduled route the aircraft flew into a snow shower with a visibility of 1 to 1.5 km. After a few minutes of flight, the main rotor's low RPM indicator was activated. The pilot reacted to the

situation by lowering collective setting while increasing throttle using hand control. This action resulted in RPM increasing from 90 to 95 percent. At the same time the pilot saw that the gage checking the carburetor temperature indicates 8 – 10 °C and CAT gage needle is closely approaching the yellow arc, which shows temperature range not recommended for flight. So the pilot immediately set the carburetor heat at maximum.

As the RPM did not go up as expected, the pilot decided to make an emergency landing on the nearest even flat surface in the flight direction. The helicopter had flown 80 to 100 meter above the ground till that time, the pilot said. After choosing a right surface to land, the pilot began to descend with the headlight on as he knew he was landing on snow land. At a height of around 15 m above the ground, according to his estimate, he tried to bring the helicopter to hover. However, at that instant the snow under the aircraft got stirred up, making the pilot lose control of its position in space completely. Subsequently, first the helicopter's undercarriage skid and then its rotor blades caught the snowy ground causing the aircraft to capsize. The pilot shut the fuel valve, switched off the electricity circuit, and left with the other passengers the helicopter.

## 1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor	0	0	0
None	0/1	0/1	0

## 1.3 Damage to aircraft

The front fuselage shell had been contorted and the vertical bulkhead at the place of main rotor supporting tube distorted. The upper parts of fuel tanks had been contorted but not pierced. The main rotor blades had been deformed, the engine slightly damaged.

## 1.4 Other damage

NIL

## 1.5 Personnel information

a]

### Pilot

Male, age 42, Czech Citizen

Total number of flying hours: 4 000

Number of flying hours on R22: 1 000

- last 90 days: 90
- last 30 days: 30
- last 24 hours: 5

PPL qualification and medical qualification: valid

b] **Passenger**

Without effect on the occurrence.

**1.6 Aircraft information**

Type and Model: ROBINSON R22 BETA II.  
Registration: OK-LEA  
Serial Number: 2998  
Year of construction : 1999  
Operator and owner: NISA AIR spol. s r.o.  
Airworthiness: valid  
The last revision on 6. january 2006 with total numer flying hours 1944.5  
Used Fuel: AVGAS 100LL

**1.7 Meteorological information**

There was dry fog, visibility 5,000 m with snow showers, cloud base 1.300 m, wind speed 4 kt from direction 220° at the accident location.  
Light conditions: scattered daylight

**1.8 Aids to navigation**

NIL

**1.9 Communications**

NIL

**1.10 Aerodrome information**

NIL

**1.11 Flight recorders**

NIL

**1.12 Wreckage and impact information**

The helicopter fell on terrain covered in ca 60 cm thick layer of snow. Some small debris of aircraft were scattered in the close vicinity of the fuselage.

Accident location coordinates: 49° 33' 26.5'' N 17° 55' 42.6'' E  
Height above sea level: 300 m.

**1.13 Medical and pathological information**

The crew was breathalysed negative for alcohol by the Police of the Czech Republic.

#### **1.14 Fire**

NIL

#### **1.15 Survival aspects**

NIL

#### **1.16 Tests and research**

After being transported to the air base at the town of Mladá Boleslav, the helicopter was examined by an expert commission lead by a AAI member assisted by two employees of the operator. The commission found out that the front fuselage shell was contorted in the whole length of cabin, the fire bulkhead was distorted at the place of main rotor supporting tube, and the main rotor tube fairing was deformed. The upper parts of fuel tanks were distorted but not perforated. Levers of carb heat assist were connected properly to provide good function and cooperated well with collective setting. The carburetor heat connecting rod was 20 mm pulled from the position "SHUT" so the throttle controlling heat input to the carburetor was almost closed.

When checking out the carb heat assist, it has been verified that after the maximum heat air supply to carburetor is adjusted manually, movements of the collective lever, due to carb heat assist actions, will cause the heat assist lever to move, which will practically override the original manual setting. It is likely that this happened and led to the emergency landing.

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

NIL

#### **1.18 Additional information**

NIL

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

The accident was investigated in accordance with the L 13 Regulation on investigation of air accidents and incidents in civil aviation.

## **2 Analysis**

The pilot held required valid licenses for the flight

The helicopter was airworthy to execute the flight

The pilot had finished the scheduled mission and was on return flight towards the airbase. In doing so he flew through a snow shower that might have negative effects on temperature conditions in the engine carburetor. It is not clear from the pilot's statement if he checked the carb temperature or increased the air temperature coming into it. According to his statement, the pilot reacted to the sudden drop of main rotor RPM but the helicopter failed to respond adequately. The pilot said he had noticed the carb temperature approached its limit value and tried to raise it through pulling the rod

controlling warm air supply into the carb. At the same time he was looking for terrain on which to land safely. Once he found a convenient surface, he wanted during descent to bring the aircraft to hover to be able to eliminate stirring up the snow below him and finish the landing manoeuvre. However he failed to do so because of insufficient engine power. He lost control of the helicopter position and first the undercarriage skid and then rotor blades caught on the snow land. The rotor blades got distorted and the aircraft capsized. The tail rotor was destroyed too.

The rod controlling hot air supply into the carburetor, as found by the commission examining the wreckage, was in a position corresponding to very small amount of air, which is in contradiction with the pilot's statement that he had set the carb heat to maximum. Taking into account the functioning of carb heat assist, it is obvious that the pulling rod might have moved back due to collective control during landing as described in Section 1.16 – Tests and Research.

### **3 Conclusions**

The cause of the accident was wrong manoeuvring when landing onto land covered in snow, which was substantially affected by the helicopter incapability to go to "hover regime" due to small RPM of the main rotor.

It could not be fully clarified why the engine revolutions and power dropped spontaneously. However the findings indicate that it may have been caused by the fact that the carburetor diffuser was not heated enough, causing insufficient fuel supply, which in turn was due to wrong setting of hot air supply into the carburetor.

### **4 Safety recommendations**

More attention must be paid to the carb diffuser air temperature in winter months. When in doubt, it is necessary to increase air input to maximum without delay and manually eliminate the diminishing hand-controlled hot air supply into carburetor due to the carburetor heat assist device.

Prague, 22. August 2006