

**DATA SUMMARY**

**LOCATION**

Date and time	<b>Sunday, 3 May 2009; 10:15 local time<sup>1</sup></b>
Site	<b>Palafrugel (Gerona) municipal limits</b>

**AIRCRAFT**

Registration	<b>G-KPAO</b>
Type and model	<b>ROBINSON R-44</b>
Operator	<b>Avonair</b>

**Engines**

Type and model	<b>LYCOMING O-540-F1B5</b>
Number	<b>1</b>

**CREW**

**Pilot in command**

Age	<b>55 years old</b>
Licence	<b>Commercial helicopter pilot CPL(H)</b>
Total flight hours	<b>2,200 h</b>
Flight hours on the type	<b>2,000 h</b>

**INJURIES**

	Fatal	Serious	Minor/None
Crew			<b>1</b>
Passengers			<b>2</b>
Third persons			

**DAMAGE**

Aircraft	<b>Minor</b>
Third parties	<b>None</b>

**FLIGHT DATA**

Operation	<b>General aviation – Pleasure</b>
Phase of flight	<b>En route</b>

**REPORT**

Date of approval	<b>1 October 2009</b>
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<sup>1</sup> The reference time used in this report is local time. To obtain UTC, subtract two hours from local time.

## 1. FACTUAL INFORMATION

### 1.1. Description of event

The Robinson R-44 helicopter, registration G-KPAO, had departed from Ampuria Brava (LEAP) airport in Gerona at 10:00 for Castellon airport (LECN) with three persons on board (pilot and two passengers), as noted in the flight plan.

Once en route, the pilot informed LEAP that he was leaving the local frequency, and requested permission from ATC to change to 120.90 MHz, which is the approach frequency for Gerona airport (LEGE). He was cleared to do so, and he then received instructions to proceed to the Bagur VOR (BGR VOR) and from there to head southeast (SE) to the Calella VOR (CLE VOR).

When he was 3 NM past the BGR VOR, there was a loss of power to the engine.

The pilot declared an emergency and entered autorotation, landing in a nearby olive grove. Upon touching down the vertical stabilizer impacted one of the trees.

The occupants were uninjured and exited the aircraft under their own power before radioing in their position and status.

There was damage to the lower part of the helicopter's vertical stabilizer.

### 1.2. Crew information

The pilot held a valid commercial helicopter pilot's license CPL(H) issued by the English authority, as well as the corresponding medical certificate.

He had 2,200 h of flying experience, 2,000 of which had been on the type.

### 1.3. Aircraft information

The helicopter was manufactured with serial number 0382 and was outfitted with a six-cylinder LYCOMING O-540-F1B5 engine. It had a valid airworthiness certificate.



Figure 1. Photograph of broken guide

As noted in the maintenance records, it had passed all inspections satisfactorily.

The engine inspections had been conducted as specified in the manufacturer's various service bulletins. One of them, specifically 338 C, dated 22 November 2004, details the procedure for inspecting the clearance between the rod and the guide and it specifies maximum and minimum allowed values of 0.015" and 0.030", respectively.

#### 1.4. Post-accident inspection

The post-accident inspection revealed that the pushrod for the number 2 cylinder exhaust valve was broken and its external guide bent. They were disassembled and inspected. The cap and tappet, which are located at the end of the pushrod, as shown in Figure 2, were also disassembled. Damage was observed on the tappet.

The remaining cylinders were examined to see if they complied with the specifications required in Service Bulletin 338 C. It was noted that the No. 1 and 3 cylinders had clearances of 0.300", No. 4 cylinder 0.027", No. 5 cylinder 0.017", and No. 6 cylinder 0.028". In other words, two were at the upper limit, two others were close to the maximum although within limits and another was close to the minimum, though also within limits.

In light of the damage suffered to the lower section of the vertical stabilizer, the tail cone was disassembled to check for possible structural damage. The upper part of the

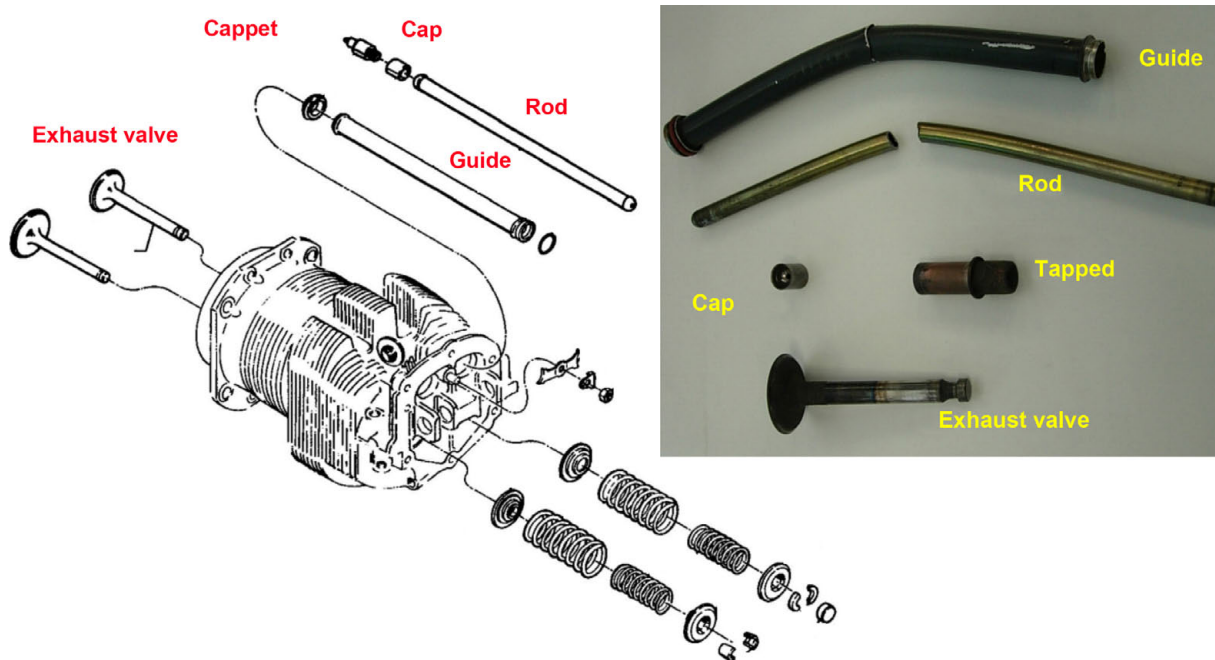


Figure 2. Broken guide, pushrod, tappet and cap

vertical stabilizer, which showed no signs of damage to the naked eye, was inspected using liquid penetrants. No cracks were found.

## **2. ANALYSIS AND CONCLUSIONS**

After measuring the clearance of the cylinders, it was noted that these were close to the limits in every case, meaning it was possible that the maximum allowed clearance was exceeded in the No. 2 cylinder.

An excessive clearance between the rod and the guide means the latter is not perfectly straight, resulting in increased friction and also allowing excessive amounts of oil to pass through, which then accumulates between the rod and guide. When it solidifies, it contributes to limiting valve movement. Both factors favor a potential blockage of the valve.

The incident occurred because the No. 2 cylinder exhaust valve was blocked in the closed position, which resulted in the breaking of the rod and the bending of the guide. This led to a loss of power that forced the pilot to perform an emergency landing.