

ACCIDENT

Aircraft Type and Registration:	Robinson R44 Raven, G-EVEE	
No & Type of Engines:	1 Lycoming O-540-F1B5 piston engine	
Year of Manufacture:	2005 (Serial no: 1517)	
Date & Time (UTC):	29 May 2016 at 1200 hrs	
Location:	Near Chiltern Park, Oxfordshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 3
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to skids	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	19 years	
Commander's Flying Experience:	148 hours (of which 31 were on type) Last 90 days - 8 hours Last 28 days - 7 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The pilot was performing a cross-country flight when the low fuel warning activated. While manoeuvring to land, the engine was temporarily starved of fuel and ran down. The pilot conducted an autorotation to land in a field during which the helicopter sustained damage to its skid assembly.

History of the flight

The pilot reported that he was routing from Perranporth, in Cornwall, to a private site in Oxfordshire near the Stokenchurch mast, via Dunkeswell Airfield. The first leg of approximately 80 nm had been without incident, though it had taken 20 minutes longer than he had planned. He calculated the next leg as being 100 nm long and estimated that it would take one hour.

The R44 Pilot's Operating Handbook does not provide, and is not required to provide, fuel consumption figures. The pilot planned on a fuel consumption of 16 USG per hour and experienced instructors have advised AAIB that this was an appropriate figure for planning.

The pilot's weight and balance calculation showed that, with his passengers, he could carry a maximum of 25 USG of fuel. He had dipped the fuel tanks on arrival at Dunkeswell and, as 7 USG remained on board, he requested an uplift of 18 USG, which airfield

records show as being provided. The pilot estimated that 25 USG would be sufficient fuel for his route, plus about 40 minutes of reserves.

During the flight the pilot noticed that his groundspeed was slower than planned and he recalled seeing 90 kt on his GPS. He had estimated that this would increase his flight time by about six minutes.

As he passed south abeam RAF Benson the pilot considered diverting to Chiltern Park airfield for fuel but considered that he would still achieve his original planned landing site. However, shortly after this the LOW FUEL warning light came on. This red warning is set to activate when slightly over 3 USG of fuel remained and therefore allows, at most, 10 minutes of flight time, to include landing.

The pilot decided to land at a farm he had just passed and, selecting a field to land in, made a right turn with about 25° angle of bank. During the turn, the engine ran down to about 50% power, the rotor rpm drooped and the rotor rpm warning horn sounded.

The pilot entered autorotation and conducted a forced landing, during which the helicopter touched down heavily in a field of standing crop, damaging the skid assembly. The helicopter's four occupants were uninjured.

Operating advice

The Pilot's Operating Handbook section titled '*Safety Tips*' contains Robinson Helicopter Safety Notice SN-15, titled: '*Fuel Exhaustion Can Be Fatal*' that cautions pilots on the hazards associated with running out of fuel and suggests precautions that should be taken to avoid doing so. The following precautions are recommended while the helicopter is in flight:

'Continually check both hour meter and fuel gauges. If either indicates low fuel, LAND.'

'Always land to refuel before the main tank fuel gauge reads less than 1/4 full.'

'NEVER allow the fuel quantity to become so low in flight that the low fuel warning light comes on.'

CAA General Aviation Safety Sense Leaflet 17 titled '*Helicopter Airmanship*' (published on the CAA website) provides general guidance to helicopter pilots. Section 3.9 '*Fuel planning*' includes the following recommendations:

'Always plan to land by the time the tank(s) are down to the greater of 1/4 tank or 45 minutes, but don't rely solely on the gauge(s) or low fuel warning.'

'Remember, a headwind may be stronger than forecast, which particularly affects slower-flying helicopters. Frequent use of carb heat/hot air will also increase fuel consumption.'

'Know the hourly fuel consumption of your helicopter. In flight, check that the gauge(s) agree with your calculations.'

Survivability

The damage to the skids was consistent with that intended to improve crashworthiness in a heavy landing and minimise occupant injury.

Conclusion

The pilot considered that he may have misjudged the amount of fuel on board and underestimated the effects of the headwind. When the low fuel warning illuminated, manoeuvring towards the landing site momentarily starved the engine of fuel.