

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Robinson R44 Astro, G-YIHK	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-540-F1B5 piston engine	
<b>Year of Manufacture:</b>	1999	
<b>Date &amp; Time (UTC):</b>	21 July 2008 at 1230 hrs	
<b>Location:</b>	Delph, near Oldham, Lancashire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - 1 (Serious)	Passengers - N/A
<b>Nature of Damage:</b>	Damaged beyond economic repair	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	48 years	
<b>Commander's Flying Experience:</b>	360 hours (of which 21 were on type) Last 90 days - 11 hours Last 28 days - 11 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

### Synopsis

The pilot lost control of the helicopter, after entering the hover at a private site at Delph, near Oldham, Lancashire. A large change in wind direction caused the aircraft to begin to rotate. The pilot managed to increase the helicopter's height as it continued to rotate. At about 200 ft agl the helicopter stopped rotating and the low main rotor rpm ( $N_R$ ) warning sounded. The pilot lowered the collective lever and elected to land in a field below. Just before impacting the ground the pilot raised the collective lever to try and cushion the impact. Nevertheless, the pilot was seriously injured and the helicopter was damaged beyond economic repair.

### History of the flight

The pilot stated that he was returning to a landing site outside his house at Delph, near Oldham, Lancashire and approached it from the north-east. The site is situated in a valley and is about 885 ft amsl. As he approached the site he noted from the windsock that the wind was from the north-north-west at approximately 20 kt and flew downwind for approximately ½ nm. He turned into wind and approached the site on a north-easterly heading which was his normal approach heading with a northerly wind. Just after entering the hover over the landing site, at approximately 30 ft, he noticed the windsock went vertically upwards and at the same time the helicopter started to rotate clockwise. The pilot responded by applying full left pedal but the rotation

continued. The helicopter started to drift downwind towards some trees while continuing to rotate, so the pilot raised the collective lever fully to increase the helicopter's height. Having climbed to about 200 ft agl the helicopter stopped rotating and was now flying downwind with zero kt IAS. The pilot pushed forward on the cyclic to try to increase the IAS but the low main rotor rpm ( $N_R$ ) warning sounded ( $N_R$  less than 97%), so the pilot lowered the collective to try to increase the  $N_R$ . The helicopter subsequently descended rapidly.

The pilot elected to land on a relatively flat area in a field beneath him rather than risk a more dangerous landing on a very steep area further downwind. Just prior to touchdown the pilot raised the collective to cushion the landing. The helicopter landing heavily in an upright attitude before rolling over onto its left side. The pilot was seriously injured but was able to turn off the engine and fuel supply. He was removed from the helicopter about 10 mins after the accident by paramedics from an air ambulance and taken to hospital.

### **Pilot's comments**

The pilot commented that, from his experience, landings can be 'tricky' with the wind from the north-west as the wind tends to 'shift a lot.' He added that he felt he was a little slow in applying the left rudder pedal and did not check the  $N_R$  after the low  $N_R$  warning sounded.

### **Weather**

An aftercast was obtained from the Met Office. It stated that at the time of the accident the wind at 1,000 ft amsl was likely to have been from 340°/25-32 kt and the

surface wind from 320°/15-25 kt. It added that the surrounding terrain could have caused localized rapid changes in the wind's speed and direction.

### **Discussion**

The helicopter entered the hover, out of ground effect, with the wind from the 10 o'clock direction and was subjected to a large wind shift. As a result the pilot lost directional control, possibly due to loss of tail rotor effectiveness (LTE).

The pilot applied full left rudder to counter the rotation and raised the collective to gain height; this over-pitched the main rotor blades causing the  $N_R$  to reduce. At approximately 200 ft agl the helicopter was now in the avoid curve with a low  $N_R$ . Having tried to regain the  $N_R$  by lowering the collective the pilot was committed to landing due to the high rate of descent and insufficient height available to recover to normal flight.

The pilot did not check the  $N_R$  after the warning sounded and therefore the amount of  $N_R$  decay is unknown. Had he done so, and the  $N_R$  had been close to the normal operating range, it would have been an option to lower the collective lever partially, to compensate for the low  $N_R$ . This would have reduced the pitch on the main rotor and may have enabled the helicopter to fly away with a reduced  $N_R$  before the IAS increased.