Robinson R44, G-SYTN

AAIB Bulletin No: 10/2002	**Ref: EW/G2002/06/18**	**Category: 2.3**
Aircraft Type and Registration:	Robinson R44, G-SYTN	
No & Type of Engines:	1 Lycoming O-540-F1B5 piston engine	
Year of Manufacture:	2002	
Date & Time (UTC):	16 June 2002 at 1942 hrs	
Location:	Aylesbury, Bucks	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Tail boom detached, main rotors damaged	
Commander's Licence:	Private Pilots Licence (Helicopters)	
Commander's Age:	57 years	
Commander's Flying Experience:	380 hours (of which 250 were on type)	
	Last 90 days - 28 hours	
	Last 28 days - 9 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Circumstances of the accident

The aircraft was on a flight from Denham to a private landing site in Leicestershire. Approximately 12 minutes after take-off, while cruising at 1,500 feet, the pilot noticed that the engine needle of the dual engine/rotor tachometer was indicating zero. He immediately confirmed that the throttle governor was on before putting the aircraft into what was described as an "urgent precautionary descent", which subsequently developed into an autorotative landing.

The choice of landing field was constrained by the fact that the helicopter was flying downwind (with a tailwind of about 12 kt) and was passing over some substantial electricity transmission cables at the time. The pilot considered that a turn into wind was not possible because of the proximity to the cables. The chosen field contained a standing cereal crop and as the aircraft touched down it started to pitch forward, which the pilot countered by applying aft cyclic control.

During the landing, the tail boom was severed by a main rotor blade strike, immediately ahead of the tail rotor assembly. Neither occupant was injured during the event.

Subsequent investigation

The maintenance organisation that recovered the aircraft started and ran the engine successfully prior to the recovery operation. Subsequently, the engine was taken to an overhaul agent where it was test run, in addition to being subjected to shock load and overspeed inspections. No faults were found.

The dual tachometer was sent to the helicopter manufacturer in the United States for investigation. The repair note indicated that 'reflowed' solder joints were found on a capacitor within the engine tachometer section of the unit and that a 'solder bridge' had occurred on a printed circuit board. The latter refers to an unintentional solder connection between adjacent conductors. A 'reflowed' joint describes a connection that has been re-made simply by using a soldering iron to melt the solder and allowing it to re-solidify. The absence of flux in this process means that such a joint is likely to be more resistive than one that is re-made by melting and removing the existing solder before applying new solder and flux.

The unit was rectified and released to the maintenance organisation, who stated that they were unaware of similar tachometer failures.

Discussion

It was apparent that a manufacturing defect had resulted in the failure of the engine tachometer and that this caused the pilot to believe that the engine had failed.

However, the other indications associated with an engine failure, such as sudden yaw, change in engine noise, low oil pressure and low rotor rpm audio warning, were absent in this case.

During the pilot's initial training, some ten years before, he was made aware of the urgent requirement to lower the collective lever in the event of an engine failure, in order to prevent a loss of main rotor speed and the probable catastrophic results of not doing so. This was uppermost in his mind at the time of the tachometer failure.

After this event, the pilot has undertaken some refresher training and now considers that regular recurrent training in emergency procedures is an essential part of maintaining flying currency.