

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Robinson R44 Raven II, G-PROG	
<b>No &amp; type of Engines:</b>	1 Lycoming IO-540-AE1A5 piston engine	
<b>Year of Manufacture:</b>	2006	
<b>Date &amp; Time (UTC):</b>	2 May 2006 at 1700 hrs	
<b>Location:</b>	Yeoland Conyers, Carnforth, Lancashire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - None	Passengers - N/A
<b>Nature of Damage:</b>	Damage to fuselage, tail cone, main rotor blades, main rotor head, gearboxes and engine	
<b>Commander's Licence:</b>	Student Pilot	
<b>Commander's Age:</b>	43 years	
<b>Commander's Flying Experience:</b>	110 hours (of which 10 were on type) Last 90 days - 20 hours Last 28 days - 10 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

**Synopsis**

The student pilot was carrying out the start-up and shut-down procedure in his recently purchased helicopter at private premises. While the engine was warming up with the rotor speed at 60%, the helicopter yawed to the left. The pilot reported that he corrected with right tail rotor pedal and the helicopter rolled on to its right side. He was uninjured and there was no fire.

**History of the flight**

The student pilot reported that he was carrying out the start-up and shut-down procedure on his recently purchased helicopter at private premises. He stated that he meticulously carried out the pre-flight checks, as laid down in the manufacturer's Pilot's Operating Handbook

(POH), leaving the ground handling wheels attached to the skids but in such a position that they were not supporting any of the helicopter's weight. The pilot commented that the wheels were left attached to the skids because no flight was intended.

After boarding G-PROG, the pilot carried out the *Starting Engine and Run Up* procedure, as detailed in the POH, to the point where the rotors were turning at 60% and he was waiting for all engine gauges to indicate in the green arc. Suddenly the helicopter yawed left and he immediately countered this movement with right tail rotor pedal. He reported that this control input caused an immediate correction of about 15° yaw to the right

but that in doing so the helicopter rolled on to its right side. In the process the engine stopped, so the pilot made the helicopter safe by switching off the electrics and he exited via the front left door. He was uninjured. G-PROG suffered substantial damage and fuel leaked from the filler cap, but there was no fire. The pilot stated that there was no damage to other property or other people involved.

The pilot reported that, since purchasing the helicopter in March 2006, he had carried out the start-up and shut-down procedure several times, using the manufacturer's published procedures, and had experienced no previous problems. He stated that during the start-up the governor was off, the collective was in the down position, both cyclic and collective frictions were on and that he had his hands and feet on the flying controls throughout the period that the helicopter yawed. In concluding that the accident was the result of overcorrection with the tail rotor control, the pilot was unable to recall what happened during the two or so seconds that it took for the helicopter to roll over on to its side. He considered it possible that he may also have made a cyclic input.

G-PROG had been parked on a dry, level, smooth tarmac surface, on a northerly heading, 25 metres clear of buildings and 100 metres from the nearest road. The weather was reported as being fine with a surface wind from the south-west at 8 kt. The possibility of the helicopter yawing right during rotor acceleration, as cautioned in the POH, was opposed to an extent by the potential for G-PROG to weather cock to the left in the prevailing wind. However, it is not clear what forces existed, with the rotors stabilised at 60%, to create the sudden yaw to the left.

## Discussion

With the collective fully down, a cyclic control input would most probably have been required to initiate a roll to the right. This could have resulted from the transfer of a learned skill from driving a road vehicle, where an unintended turn to the left would be corrected by a movement of the steering wheel to the right. Since the student pilot had a driving licence and was a current driver, the sudden, unexpected yaw to the left may have prompted a movement of the cyclic control to the right, as well as the reported right tail rotor input.

Civil Aviation Publication (CAP) 393, entitled *Air Navigation: the Order and the Regulations*, Section 1 The Air Navigation Order (ANO) 2005, Part 14, Article 155 (Interpretation) defines an aircraft as being in flight;

*...in the case of a piloted flying machine, from the moment when, after the embarkation of its crew for the purpose of taking off, it first moves under its own power until the moment when it next comes to rest after landing*

The student pilot reported that he was not intending to take off, therefore, by definition, from the moment that the helicopter moved under its own power until it next came to rest did not constitute the ANO meaning of flight. As such, there was no requirement for the presence of a qualified flying instructor. However, once the rotors were engaged, G-PROG had the potential for becoming airborne, one way or another, subject to any control inputs and the wind. This accident illustrates the value of starting a helicopter with it facing into wind.