ACCIDENT

Aircraft Type and Registration:	Robinson R44 Raven, G-ODHG
No & Type of Engines:	1 Lycoming O-540-F1B5 piston engine
Year of Manufacture:	2001
Date & Time (UTC):	1 December 2005 at 0915 hrs
Location:	Sywell Airfield, Northants
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	59 years
Commander's Flying Experience:	104 hours (of which 11 were on type) Last 90 days - 21 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

Whilst lifting into the hover the helicopter yawed and rolled to the left, pivoting around the rear of the left skid landing gear. The main rotor blades struck the ground and the helicopter rolled onto its right side.

History of the flight

On the day before the accident the pilot had flown from Ireland to Cannock in a Robinson R22. He had been forced to abandon his flight to the intended destination of Sywell due to bad weather. On the day of the accident, the pilot and an instructor planned to fly G-ODHG to Cannock to recover the R22 back to Sywell.

The pilot intended to hover taxi G-ODHG to the eastern side of the airfield in order to collect the instructor before departing for Cannock. The surface wind was from 200° at 10 kt, and the visibility was 8 km with a cloudbase between 800 and 1,000 ft. The helicopter was refuelled to full in both the main and auxiliary tanks. It was parked on the main parking area on the western side of the airfield adjacent to another R44, which was behind and to the left, and an R22, which was to the right. The pilot completed his pre-flight inspection, started the helicopter and, having carried out the pre-takeoff checks, raised the collective lever. The helicopter yawed to the left and the nose pitched up. The pilot lowered the collective lever whilst correcting the left yaw with right tail rotor control pedal and the helicopter settled on the ground. Following the yaw to the left, G-ODHG was then facing the R44 which had previously been behind and to the left.

The pilot again raised the collective lever to lift the helicopter into the hover and moved the cyclic control aft in order to prevent movement towards the parked R44. The helicopter again yawed to the left and the nose pitched up. He continued to raise the collective lever and attempted to correct the yaw and nose-up pitch but the helicopter pivoted around the rear of the left skid landing gear. It rolled to the left and the main rotor blades struck the ground; the helicopter came to rest on its right side. The pilot was uninjured and was able to release himself; he vacated the helicopter through the front left door. The AFRS attended the scene immediately.

Pilot experience

The pilot had learned to fly on the R22 and had flown 92.4 hours on the type, of which 16.4 hours were as PIC. He converted to the R44 and had flown 11.6 hours on the type, of which 3.2 hours were as PIC. All his flying, on both the R22 and R44, was from the PIC seat, which is the front right seat.

Having converted to the R44 the pilot had not flown the type solo, with a full fuel load, prior to the accident flight.

Weight and CG

The weight and CG calculation for the accident flight is set out below with the CG envelope included at Figure 1.

The CG range at 1,909 lb is from 92 inches to 102.5 inches aft of the datum, which is 100 inches forward of the main rotor shaft centreline.

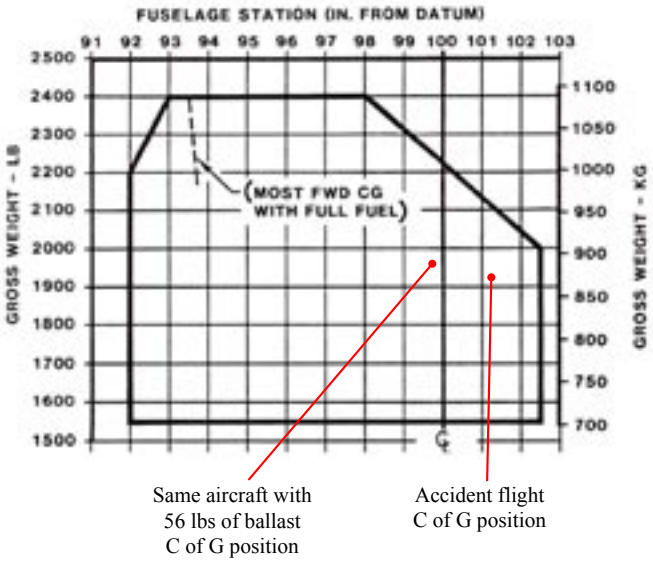

Figure 1

Analysis

The accident flight was the first occasion on which the pilot had flown the R44 solo with a full fuel load. As a consequence, the CG was close to the aft limit but within the CG limits for the All Up Weight (AUW).

Given the close proximity to the other parked helicopters the pilot wanted to ensure that when he lifted into the hover his helicopter did not drift towards them. It is

		Arm (inch)	Weight (lbs)	Moment (in/lb)
Basic Weight		—	1460	154890
Pilot		49.5	155	7672.5
Fuel	**Aux**	102	110	11220
	Main	106	184	19504
TOTAL		—	1909	193286.5

CG Inches from the datum = 193286.5 ÷ 1909 = 101.25

possible that he put in too much left tail rotor control pedal on the first attempted lift into the hover. This created the marked yaw to the left prior to lowering the collective lever.

The second lift into the hover was made facing the parked R44 and the combination of aft CG, left pedal and increased aft cyclic caused the helicopter to yaw to the left and adopt a high nose-up attitude. The pilot had not experienced such extreme attitudes and motion before and despite his attempts to control the helicopter he was unable to prevent the main rotor blades striking the ground.

Conclusions

The pilot considered that the aft CG was a major factor in the accident. To address the problem he now places 56 lb of ballast in the left front seat when flying solo with full fuel. This moves the CG forward to 99.7 inches which reduces the need to counter nose-up pitch when lifting into the hover. Additionally when flying the R22 solo with full fuel, less forward cyclic is required than in the R44.