ACCIDENT

Aircraft Type and Registration:	Robinson R44 Raven, G-EKKO
No & Type of Engines:	1 Lycoming O-540-F1B5 piston engine
Year of Manufacture:	2000
Date & Time (UTC):	29 March 2009 at 1314 hrs
Location:	Swansea Airport
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Minor) Passengers - 1 (Serious)
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	62 years
Commander's Flying Experience:	984 hours (of which 40 were on type) Last 90 days - 50 hours Last 28 days - 4 hours
Information Source:	AAIB Field Investigation

Synopsis

The aircraft was about to depart when it began to rotate to the left whilst still on the ground. It rotated through about five complete revolutions before the rotors struck the ground and the aircraft rolled onto its side. The removable left seat flying controls were found fitted and engineering evidence indicates that either one or both of the left yaw pedals had been applied at the time of the accident.

Background

The owner of the aircraft had gained a private pilot's licence on fixed wing aircraft in 1991 and helicopters in 1993. His only helicopter rating was on the R22 but this had lapsed about three years prior to the accident. He had previously owned a R22 and had accumulated about 600 hours on type.

He had recently purchased G-EKKO and was intending to become rated on the R44 so that he could fly it himself. On the day of the accident he had planned a local flight with a friend, who was a qualified private pilot with a valid rating on both the R22 and R44 helicopter.

History of the flight

The pilot and owner were seen completing a walk-round check of the aircraft, which was positioned on the airport apron. They then boarded the aircraft, the pilot occupying the front right seat and the owner the front left. Shortly afterwards the aircraft was heard to start and, with the rotors running, the owner requested departure instructions over the radio for a VFR flight to

the west. The weather at the time was reported as good with a wind of 160 degrees at 8 kt.

The owner then called "LIFTING". The engine noise was heard to increase and, with the aircraft still on the ground, it began to rotate to the left. It continued to rotate at an increasingly rapid rate, completing approximately five rotations. The aircraft then pitched forwards until the main rotor blades came into contact with the tarmac and the aircraft rolled onto its left side, the tail rotor and empennage separating from the fuselage.

The pilot was able to climb out of the aircraft through his door and he assisted the owner out of the aircraft through the broken windscreen. Both men were injured, the owner receiving serious injuries. The airfield fire and rescue service was quickly in attendance and spread foam on fuel that had leaked from the aircraft.

During the accident sequence pieces of the rotor blades were projected over 100 m from the main wreckage. Despite several people being in the vicinity of the aircraft, no third party was injured.

Aircraft information

The Robinson R44 is a four-seat, single-engined helicopter. It can be fitted with dual controls, which consist of dual sets of yaw pedals, dual collective sticks and a T-bar cyclic stick which has a left and right grip. This T-bar cyclic has a removable grip assembly for the left hand pilot which is marked with a decal *"Solo from right seat only"*. The left collective lever and yaw pedals are also removable. There is a note in the *"daily or preflight checks*" on page 4-5 of the R44 Pilot's Operating Handbook that states:

> *'CAUTION*
>
> *Remove left seat controls if person in that seat is not a rated helicopter pilot.'*

The main rotor blades on an R44 rotate anti-clockwise (when viewed from above). To counteract the nose-right torque of the main rotor blades the tail rotor provides thrust that acts in an anti-clockwise direction in the hover. An input on the left yaw pedal is required on takeoff to maintain directional control. The amount required will depend on various factors including wind strength and direction, and aircraft weight.

Engineering examination

The aircraft was inspected with particular attention being paid to the yaw controls, the tail rotor, and tail rotor drive systems.

The inboard end-plate on the left rudder pedals for the left-hand seat were bent, almost certainly as a result of the impact sequence. Such was the deformation to the end plate that the pedals were stuck in a 'left pedal input' position since it was not possible for the pedals to cross beyond the neutral position . This was consistent with the yaw pedals being in the left pedal forward position when the damage occurred, which might have been a result of an action by either one, or both, of the occupants.

All the damage to the yaw controls, the tail rotor, and tail rotor drive systems were consistent with overload from the impact sequence, and nothing significant was found with these and other aircraft systems that might have contributed to the accident.

All the removable left seat flying controls were found fitted to the aircraft with the *"Solo from right seat only"* decal in place and clearly legible.

Comment

Neither the pilot nor the owner had any recollection of the events leading to the accident. The existing evidence indicates that the accident was caused by either one, or both, of the occupants applying excessive left yaw, probably as the aircraft became light on its skids, when attempting to takeoff.

Accidents to helicopters such as this can be particularly dangerous as a consequence of flying aircraft debris. A recent accident to a Robinson R44 at Goodwood Airfield (AAIB Report EW/G2009/05/26) resulted in a member of the public losing part of a leg. They had been struck by a piece of the aircraft's main rotor which became detached when the aircraft rolled onto its side on the airfield apron.