Air Accident Investigation Unit Ireland

ACCIDENT REPORT
Robinson R44 II, EI-WWI
Near Baltinglass, Co Wicklow, Ireland
23 November 2010 @ 13.30 hrs

An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

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In accordance with the provisions of SI 460 of 2009, the Chief Inspector of Air Accidents, on 23 November 2010, appointed Thomas Moloney as the Investigator-in-Charge to carry out a Field Investigation into this Accident and prepare a Report. The sole purpose of this Investigation is the prevention of aviation Accidents and Incidents. It is not the purpose of the Investigation to apportion blame or liability.

Aircraft Type and Registration:	Robinson R44 II, EI-WWI
No. and Type of Engines:	1 x Lycoming IO-540-AE1A5
Aircraft Serial Number:	11799
Year of Manufacture:	2007
Date and Time (UTC):	23 November 2010 @ 13.30 hrs
Location:	Near Baltinglass, Co Wicklow, Ireland N52° 55.1′, W006° 43.6′
Type of Operation:	Private
Persons on Board:	Crew - 1 Passengers - Nil
Injuries:	Crew - Nil Passengers - Nil
Nature of Damage:	Substantial
Commander's Licence:	PPL(Helicopters) issued by U.K. Civil Aviation Authority
Commander's Details:	Male, aged 44 years
Commander's Flying Experience:	126 hours, all on type
Notification Source:	Pilot
Information Source:	AAIU Report Form submitted by Pilot, AAIU Field Investigation

SYNOPSIS

On lift off from a concrete surface, the helicopter yawed abruptly to the left. This surprised the Pilot who, failing to control the yaw, immediately elected to land on again. During this landing the tail struck the ground, and the tail-rotor assembly and empennage separated from the tail-boom. On landing, the helicopter remained upright and the Pilot shut down the engine and exited safely.

1. FACTUAL INFORMATION

1.1 History of the Flight

This was the Pilot's first flight since he and another pilot delivered the helicopter to a facility in the U.K. for annual maintenance on 28 September 2010. Following its return flight from the U.K. on 19 November 2010, which was flown by another pilot, the helicopter was stored in a purpose-built hangar on a farm. The next flight undertaken was the accident flight. On that day, the Pilot towed the helicopter out of the hangar on his own, using an electric trolley, and parked it on the concrete surface outside the hangar, facing approximately north. He recalled that it was a nice sunny day, with very light winds from a northerly direction.

The Pilot then carried out his external pre-flight checks and strapped himself in. He was clear in his recall to the Investigation that there was normal full and free movement of all controls. He then carried out the cockpit checks, using a sheet of notes as an aide memoire. He went through the list *'as per normal'*. He carried out all the required checks, and stated that 'everything went well'. At or about lift-off, the helicopter *'started to yaw or spin to the left, I tried to correct it but it wouldn't correct for me…..so I pulled the collective to lift, to try and get me out of trouble, whatever was going on……I noticed it wasn't doing anything for me so I was happy to put it back down on the ground as quickly as possible and I turned around in a circle once maybe twice, I'm not quite sure….and on setting down on the ground the clattering and the banging out of it was very loud.'* Once landed, he shut down and exited the helicopter. EI-WWI, now badly damaged, was pointing in a southerly direction, more than 20 feet from the lift-off point, on a grassy area adjacent to the concrete surface (**Photo No. 1**).

Photo No. 1: EI-WWI following the accident.

1.2 Technical Examination

AAIU Investigators inspected the helicopter at the accident site on the day following the occurrence. No pre-existing anomalies were found during examination of the control runs. The Investigation noted rotational skid marks on the concrete surface at the lift-off point. An indentation mark was identified in the rough grassy surface adjacent to the concrete area, which was consistent with a heavy downward strike from the tail-rotor guard. The tail-rotor blades had both fractured into several pieces. Blade fragments were found on the grass, including some parts which ended up forward of the final helicopter position. One of the blades exhibited red paint marks and indentations consistent with striking the tail-rotor guard, which was painted with alternate red and white stripes. The tail-rotor gearbox, with short stubs of both tail-rotor blades still attached to it, was lying on the grass adjacent to the helicopter. The entire empennage had also separated from the tail-boom and was lying on the grass close to the rear of the tail-boom. There were clear marks in the grass, adjacent to the final position of EI-WWI, which were consistent with the shape of the helicopter skids.

The tail-rotor gearbox was removed by the Investigation and shipped to the Robinson Helicopter Company (RHC) in the USA, for disassembly and technical investigation. Before disassembly began, the gearbox was tested and found to rotate smoothly. RHC noted that the damage which caused the gearbox to separate from the tail-cone was consistent with overload from a tail-rotor blade strike. RHC reported that, while other accident-induced damage was noted, there were no pre-existing anomalies.

The Pilot provided the Technical Log Section 3, Sector Record Page of EI-WWI, showing that the Annual Inspection had been carried out by the U.K. based Company and signed off on 9 November 2010. He also submitted the Irish Aviation Authority (IAA) Airworthiness Review Certificate, valid until 8 November 2011, to the Investigation.

1.3 Pilot Information

The Pilot had commenced helicopter training in the U.K. in 2007 and he had received his R44 rating in July 2009. The rating was renewed in June 2010 and was valid until July 2011. He had flown frequently in May and June 2010, but after 22 June 2010 his only flight prior to the accident was the dual[1] ferry flight to the U.K. on 28 September 2010.

1.4 Weather Information

The Pilot confirmed that there were light winds from the north on the day of the accident, and that the day was sunny with the windsock slack.

1.5 Helicopter Safety Information

The European Aviation Safety Agency (EASA) launched the European Strategic Safety Initiative (ESSI) in 2006, with the objective of further enhancing aviation safety in Europe. One of the pillars of ESSI is the European Helicopter Safety Team (EHEST). EHEST has produced two helicopter safety leaflets entitled "HE 1, Methods to Improve Helicopter Pilot Capabilities" and "HE 2, Helicopter Airmanship – Methods to Improve Helicopter Pilots Safety". These two documents are available at the following link, **http://www.iaa.ie/index.jsp?p=97&n=510** and they are highly recommended reading for helicopter pilots of all experience levels.

1 **Dual:** The crew consisted of two pilots

2. ANALYSIS

The Pilot, a relatively low hours helicopter pilot, had not flown for seven weeks prior to the accident and that previous flight followed a three month break from flying. On the day of the accident, weather conditions were suitable for a local flight. There were no technical defects with the helicopter which had just completed its Annual Inspection. The Pilot carried out the external and internal cockpit checks and started the engine. However, as he raised the collective to apply power prior to lifting off, it seems probable that he applied too much left pedal with a resultant sudden yaw to the left as the weight started to come off the skids. Effectively he lost control momentarily, during which time the helicopter spun around at least once and perhaps twice. All of these events happened very quickly, as the Pilot acknowledged, and the tail strike probably occurred when he attempted to put the helicopter back on the ground to escape the yawing motion. There were clear marks on the grass consistent with the shape of the skids which indicated that the helicopter impacted hard on its first touch-down before it settled onto a second landing position nearby, having turned through 180° from its start-up orientation.

Ground marks indicated that the tail-rotor guard struck the ground with significant force. It is likely that the guard was then pushed upwards into the tail-rotor blades, with clear evidence of a guard/blade strike being visible on a fractured piece of tail-rotor blade. Both the blades and the guard were severely damaged in this strike. The overload forces associated with the tail-rotor strike are likely to have caused the tail-rotor gearbox and the empennage to separate from the rear of the tail-boom.

The Investigation noted rotational skid marks on the concrete surface at the take-off point, probably caused by the forward end of the skids as the helicopter commenced its yaw before it became fully airborne.

3. CONCLUSIONS

(a) Findings

1. The helicopter was properly maintained with a current Certificate of Airworthiness.
2. The Pilot was correctly licensed and rated for the flight.
3. Local weather conditions were not a factor in this accident.
4. No pre-existing technical defects or anomalies, which might have contributed to the accident, were found by the Investigation.
5. The initial yaw to the left is likely to have been the result of excessive application of left tail-rotor pedal at lift-off.
6. The Pilot attempted to put the helicopter back on the ground, but the tail-rotor guard struck the ground and was pushed upwards into the tail-rotor blades, striking and severely damaging them.
7. Overload forces due to the tail-rotor strike caused the tail-rotor gearbox and empennage to separate from the tail-boom.

(b) Probable Cause

Excessive application of left pedal at lift-off and failure to effectively counteract the resultant left yaw led to loss of control during lift-off.

(c) Contributory Cause

Lack of flying currency, with only one dual ferry flight logged during the five months prior to the accident.

4. SAFETY RECOMMENDATIONS

This Investigation does not sustain any Safety Recommendations.

-END-

In accordance with Annex 13 to the International Civil Aviation Organisation Convention, Regulation (EU) No 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of these investigations is to prevent aviation accidents and serious incidents. It is not the purpose of any such accident investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

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