

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Robinson R44 Raven II, G-IGJC	
<b>No &amp; Type of Engines:</b>	1 Lycoming IO-540-AE1A5 piston engine	
<b>Year of Manufacture:</b>	2008	
<b>Date &amp; Time (UTC):</b>	22 November 2008 at 1550 hrs	
<b>Location:</b>	Liverpool Airport	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 3
<b>Injuries:</b>	Crew - 1 (Minor)	Passengers - 1 (Minor)
<b>Nature of Damage:</b>	Aircraft damaged beyond economic repair	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	48 years	
<b>Commander's Flying Experience:</b>	104 hours (of which 21 were on type) Last 90 days - 20 hours Last 28 days - 17 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

**Synopsis**

When the collective was raised on takeoff the helicopter began to rotate quickly. Unable to regain control in flight the pilot lowered the helicopter to the ground where it rolled over.

**History of the flight**

The pilot and three passengers boarded the helicopter with the intention of conducting a local flight from the general aviation apron at Liverpool Airport. After completing normal starting procedures the pilot commenced the takeoff. In doing so, he raised the collective control more quickly than normal, causing the aircraft to lift very rapidly and yaw. Judging that the yaw was to the left the pilot applied right yaw pedal but with this input the helicopter span faster.

The pilot was thrown repeatedly against the right cockpit door during this manoeuvre and found it difficult to remain in his seat or control the helicopter. Because of the risk of colliding with parked aircraft nearby, he decided to lower the helicopter gently to the ground. He realised that this would probably result in it turning over. His next recollection was that the helicopter was lying on its left side with substantial damage to the rotor blades and left cockpit area. Pieces of the main rotor had also caused damage to the engine cowling of an aircraft parked approximately 100 m away.

Several witnesses went to assist the occupants, who vacated the aircraft through the topmost (normally the right) cabin door. The aerodrome fire and rescue service

also attended although, despite some fuel leakage, there was no fire. The pilot and one passenger received minor injuries and the others were unhurt.

#### **Other information**

Viewed from above, the main rotor of the R44 rotates anticlockwise. Consequently, in the absence of pilot inputs, the helicopter would tend to rotate clockwise (or to the right as viewed from the cockpit) as the collective was raised and power applied to the main rotor. Instructors familiar with the type commented that a swift upward application of the collective might cause considerable yaw to the right, but that this tendency could be controlled easily with the application of opposite (left) yaw pedal, even after rotation had developed.

The pilot stated that in retrospect he was not certain of the direction of yaw of the helicopter immediately after takeoff. An instructor with whom he discussed the

accident had heard from several witnesses that rotation had in fact been to the right. Other witnesses contacted by the AAIB were unable to recall the direction of rotation.

Technical records indicated that the aircraft had flown for 14 hours since receiving a scheduled maintenance inspection on 24 October 2008. The next check was due in 34 flying hours or on 23 April 2009, which ever occurred first. There was no record of any maintenance activity or mechanical defect that might have affected the accident.

#### **Discussion**

It is likely that the helicopter yawed right as the collective was raised. It might have been possible to recover the aircraft to controlled flight by applying left yaw pedal but application of right yaw pedal probably increased the rate of rotation.

## ROBINSON HELICOPTER COMPANY R44II

## SERIALIZED COMPONENT PARTS LIST

SHIP S/N: 12499 REG . NO. 644WB DATE: 6/1/2010

PART NAME	PART NO	REV	SERIAL NO
Main Rotor Gear Box	C006-5	AD	5351
Main Rotor Blade*	C016-5	Z	6979
Main Rotor Blade*	C016-5	Z	7026
Main Rotor Swashplate	C017-4	Z	4819
Welded Frame Assy (upper)*	C020-1	U	3436
Tail Rotor Gear Box	C021-1	K	4779
Tail Cone Assembly*	C023-1	AH	5884
Tail -Rotor Blade*	C029-2	L	7601
Tail Rotor Blade*	C029-2	L	7605
Tail Rotor Hub Assembly*	D062-2	C	4620
Pitch Control Assy T.R.	C031-1	J	5354
Horizontal Stabilizer*	C044-1	U	5829
Actuator Assembly	C051-2	U	5017
Lycoming Eng . IO-540-AE1A5	C145-2	W	L-33140-48E
Main Rotor Gear Set*	C146-5	L	5382
Main Rotor Hub*	C154-1	E	3882
Main Rotor Spindle*	C158-1	I	12365
Main Rotor Spindle*	C158-1	I	12367
Shaft-Clutch (C018)	C166-4	O	5214
Bearing Assy/Lower Sheave	C181-3	J	5315
Sprag Clutch	C188-3	H	6044
Tail Rotor Drive Shaft*	D196-1	D	2607
Lower Swashplate*	C198-2	M	5233
Main Rotor Drive Shaft	C251-2	O	R5835
Main Rotor Gear Box Sump*	C263-2	G	3687
M.R.G.B. Housing*	C264-1	J	5351
Tail Rotor Gear Set*	C545-1	H	5547
Tail Rotor Guard*	D079-1	U	6347
Hydraulic Reservoir	D211-2	J	3907
Hydraulic Servo	D212-1	I	0985
Hydraulic Servo	D212-1	I	0420
Hydraulic Servo	D212-1	I	3653
Governor Controller	D278-2	E	2570
Hydraulic Pump Assy	D500-1	H	4052

\* Denotes Life-Limited Parts

### LIFE LIMITED PARTS OR OVERHAUL REQUIREMENTS

NAME OF PART	PART NUMBER	SERIAL NUMBER	INSTALLATION DATE/HOURS	TIME ON PART AT INSTALL	LIFE LIMIT OR T.B.O.	REMOVAL DATE/HOURS	AGENCY CERT. NO.
Bearing Assy	C181-3	5315	SEP 10 '08 0	New	2200 TBO		INSTLD.RHC PC#424WE
Sprag Clutch	C188-3	227	SEP 10 '08 0	New	2200 TBO	5-1-10 14.7	INSTLD.RHC PC#424WE
TR Driveshaft	D196-1	3240	SEP 10 '08 0	New	4400 Life	5-1-10 14.7	INSTLD.RHC PC#424WE
Lower Swashplate	C198-2	5233	SEP 10 '08 0	New	4400 Life		INSTLD.RHC PC#424WE
MR Driveshaft	C251-2	R5835	SEP 10 '08 0	New	2200 TBO		INSTLD.RHC PC#424WE
MRGB Sump	C263-2	2835	SEP 10 '08 0	New	2200 Life	5-1-10 14.7	INSTLD.RHC PC#424WE
MRGB Housing	C264-1	5351	SEP 10 '08 0	New	2200 Life		INSTLD.RHC PC#424WE
TR Gearset	C545-1	5547	SEP 10 '08 0	New	2200 Life		INSTLD.RHC PC#424WE
TR Guard	D079-1	5437	SEP 10 '08 0	New	2200 Life	5-1-10 14.7	INSTLD.RHC PC#424WE
Hyd. Resv. Assy	D211-2	3907	SEP 10 '08 0	New	2200 TBO	<del>5-1-10</del> 14.7	INSTLD.RHC PC#424WE
Hyd. Servo Assy	D212-1	10885	SEP 10 '08 0	New	2200 TBO	5-1-10 14.7	INSTLD.RHC PC#424WE
Hyd. Servo Assy	D212-1	10886	SEP 10 '08 0	New	2200 TBO	5-1-10 14.7	INSTLD.RHC PC#424WE
Hyd. Servo Assy	D212-1	10893	SEP 10 '08 0	New	2200 TBO	5-1-10 14.7	INSTLD.RHC PC#424WE
Hyd. Pump Assy	D500-1	4052	SEP 10 '08 0	New	2200 TBO		INSTLD.RHC PC#424WE

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