ACCIDENT

Aircraft Type and Registration: Robinson R44 Raven II, G-IGJC

No & Type of Engines: 1 Lycoming IO-540-AE1A5 piston engine

Year of Manufacture: 2008

Date & Time (UTC): 22 November 2008 at 1550 hrs

Location: Liverpool Airport

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - 3

Injuries: Crew - 1 (Minor) Passengers - 1 (Minor)

Nature of Damage: Aircraft damaged beyond economic repair

Commander's Licence: Private Pilot's Licence

Commander's Age: 48 years

Commander's Flying Experience: 104 hours (of which 21 were on type)

Last 90 days - 20 hours Last 28 days - 17 hours

Information Source: 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. 6	44WB	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	0	5214
Bearing Assy/Lower Sheave	C181-3	J	5315
Sprag Clutch	C188-3	Н	6044
Tail Rotor Drive Shaft*	D196-1	D	2607
Lower Swashplate*	C198-2	М	5233
Main Rotor Drive Shaft	C251-2	0	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	Н	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	Н	4052
Denotes Life-Limited Parts		11	

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	New	2200 TBO		INSTLD.RHC PC#424WE
Sprag Clutch	C188-3	227	SEP 10 '08	New 2200 TBO 5-1-10		5-1-10	INSTLD.RHC P'C#424WE
TR Driveshaft	D196-1	3240	SEP 10 '08	New	4400 Life	5-1-10	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	New	2200 TBO		INSTLD.RHC PC#424WE
MRGB Sump	C263-2	2835	SEP 10 '08	New	2200 Life	5-1-10	INSTLD.RHC PC#424WE
MRGB Housing	C264-1	5351	SEP 10 '08	New	2200 Life		INSTLD.RHC PC#424WE
TR Gearset	C545-1	5547	SEP 19:08	New	2200 Life		INSTLD.RHC.PC#424WE
TR Guard	D079-1	5437	SEP 10 08	New	2200 Life	5-1-10	INSTLD.RHC PC#424WE
Hyd. Resv. Assy	D211-2	3907	SEP 10 '08	New	2200 TBO	5-1-100 (1/1)	INSTLD.RHC PC#424WE
Hyd. Servo Assy	D212-1	10885	SEP 10 '08	New	2200 TBO	5-1-10	INSTLD.RHC PC#424WE
Hyd. Servo Assy	D212-1	10886	SEP 10 '08	New	2200 TBO	14,7	INSTLD.RHC PC#424WE
Hyd. Servo Assy	D212-1	10893	SEP 10 '08	New	2200 TBO	5-1-10	INSTLD,RHC PC#424WE
Hyd. Pump Assy	D500-1	4052	SEP 10 '08	New	2200 TBO		INSTLD.RHC PC#424WE
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GENCY RT, NO.	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.
#424WE	m R. Blade	C016-5	535-16979	5-1-10	New	2200 Life 12 VRLIFE		
#424WE	M R Blade	C016-5	7026	5-1-10	New	2206 Life 12 YR Life		
#424WE	MR Spindle	C 158-1	12365	5-1-10	New	2200 LiFe -		
#424WE	MR spindle	C 158-1	12367	5-1-10	New	2200 Like -		
#424WE	FRAMEASSY	CO20-1	3436	5-1-10	New	2200 Life-		
#424WE	MRGBSump		3687	5-1-10	New	2200 LiFe		
7//424WE	Pail Come Assy		5884	5-1-10	New	4400 Life		
0#424WE	HOR: 2 STAB		5829	5-1-10	New	4400 Life		
7//424WE			3882	5-1-10	New	2200 Life		-
:#424WE	Clutch Shakt	C/66-4	5214	5-1-10	NEW	2200 TBO		
7#424WE	SPRag Clotch	C188-3	6044	5-1-10 1417 5-1-10	NEW	2200 TBO		
7//424WE	TR GUARD	D079-1	6347	5-1-10	New	2200Life		
0#424WE	HYDServo	D212-1	0420	5-1-10	OVH	2200 TBO		
0#424WE	HYDServo	D212-1	0985	5-1-10	OVH	2200TB0		
	Hyoservo	17-1160	3653	3-1-10	OUH	2200TBO		
	TRDS	D196-1	2607	5-1-10	New	4400 Life		
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& ELECTRONIC CHECKS

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MAINTENANCE RECORD F.A.R. 43.9 DESCRIPTION OF WORK PERFORMED

AGENCY & CERTIFICATE NO.

DATE OF AIRCRAFT TIME IN SERVICE		DESCRIPTION OF WORK PERFORMED OR APPROVED DATA USED	WORK PERFORMED/RETURNED TO SERVICE		
ROBINSON Engine: Ly Inspected I New & ove Corporate 04-Dec-09 removed f	R44 "RAVEN II" SP coming IO-540-AE 1 IAW a 100hour/ANN erhauled life limited p Helicopters of San D ; Cove Helicopter inv from aircraft C- FSZE	ASB5 SN: L-33140-48E UAL inspection per FAR Part 43 appendix D and RHC R44 morats installed; see life limited components section of aircrafiego invoices # 2411, #2424 thru 2426, # 2430; Sage-Popovoice # 2010-36 dated 4/15/2010. Used/serviceable parts in and installed on N644WB. Main rotor gearbox OH by Robin installed Emergency Landing Light Kit. Aircraft sanded, prepute trim. Applicable decals re-applied IAW the POH. Pre Chemical Page 1875 Serviced main rotor transmission with 3	vich, Inc. purchase order dated istalled: Main cabin assembly ison Helicopter, see repair order inced, and painted with DuPont Nasson		
ADs verified	r and fan wheel, all a ed through 2010 13/	djusted to < .2 IPS. Serviced main rotor transmission with 3 14: None applicable at this date. een inspected IAW an ANNUAL inspection and found airwo			
06/24/2010	N644W8	RYYIT S/n 12499 ATT: 15.	/		
	CARTIFICATI	WE REQUESTED AND HAVE ISSUED F	STANDARD AIRMORTHINES		
	CERTIFICATE	(FAD FORM \$100-2) DATED 06-74-2010	AEXT INSPECTION		
	DUE ARRU	16 06-30-2011.			
	1/1/	An DART4001259A			

/FACTORY BULLETIN COMPLIANCE RECORD

INSPECTION & MAINTENANCE RECORD

TYPE OF A.D. 1 TIME/RECUR.	NEXT COMP. DATE/HRS./CYCLE	AUTHORIZED SIGNATURE CERTIFICATE NO.	DATE	TOTAL TIME			R MAINTENANCE PERFORMED CY & CERTIFICATE NO.	
			Instal Inspe PN 25 15W5 BTDC AD 20 AD 20	576526-1, SN ACP7231 50 oil. Compression che . Plugs cleaned, inspec 008-14-07 Lycomir 009-02-03 Precisio	"RAVEN II" SN 12499 ANNUAL inspection pe, overhauled by Aircra ecked hot at #1-78/80 ited, and gapped to .0: Ing fuel injector lines in Airmotive fuel servors been inspected IAW at the contract of the contr	Aircraft Hobbs: 15.9 N644WB r FAR Part 43, appendix C aft Accessories, Inc. Cleaned, #2-76/80, #3-78/80, #4-7. 16". ADs verified through 2 Per para i(2) & (k Para (g) & (j) an ANNUAL inspection and	d screen and serviced wit 4/80, #5-74/80, #6-74/80 010 13/14: NEXT DUE: 115.9 Ho NEXT DUE: Oil chang	th 8 quarts Aeroshell 0. Timing verified at 23 obbs or injector maint. ge or 69.5 Hobbs
			A			White programme and the second		AN MINOSTER STREET