ACCIDENT

Aircraft Type and Registration:	Robinson R22 BETA, G-BXOA	
No & Type of Engines:	1 Lycoming O-320-B2C piston engine	
Year of Manufacture:	1997 (Serial no: 1614)	
Date & Time (UTC):	1 September 2023 at 1325 hrs	
Location:	Welshpool Airport, Powys	
Type of Flight:	Experience flight	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - 1 (Minor)
Nature of Damage:	Damaged beyond economical repair	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	41 years	
Commander's Flying Experience:	842 hours (of which 300 were on type) Last 90 days - 152 hours Last 28 days - 47 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further AAIB enquiries	

Synopsis

The helicopter, in a low hover, suffered from a dynamic rollover during a flight with a passenger on a helicopter experience day. The accounts of the pilot and passenger differed as to who was controlling the cyclic during the moments before the helicopter struck the ground; the AAIB investigation was unable to resolve these differences.

History of the flight

The passenger, who had no previous experience of flying a helicopter, was participating in a full day's helicopter experience with an instructor. The passenger advised that this was not in preparation to commence formal training towards a PPL(H). The accident occurred at the end of the second flight.

The pilot and passenger met at the airfield at about 0930 hrs. Shortly afterwards, the pilot, who was an instructor, showed the passenger around the helicopter. This included an explanation of the operation of the tail and main rotor systems and the controls in the cockpit. The pilot stated that a safety brief was then provided, which included the procedure they would use when transferring command of the flight controls between each other. This used the phraseology "you have control" and "I have control". The pilot advised that he would perform the takeoff but, when they were straight and level in the cruise, control of the cyclic would be passed to the passenger. The pilot explained to the passenger that the

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controls were very sensitive and that he would have his hand near the cyclic control whilst the passenger had control of it.

During the cruise, the pilot stated that the passenger had on occasion applied cyclic inputs in the opposite direction to that required. The pilot had taken control back almost immediately before explaining what the correct inputs should have been. The pilot also reported that on one occasion the passenger had not released his grasp on the cyclic when instructed and had needed to repeat the instruction.

After some further practice, the pilot considered that the passenger's performance was sufficient to allow him to spend a few minutes in the hover whilst controlling the cyclic. The passenger maintained the helicopter in a static hover for a few seconds before the helicopter started to drift and the instructor intervened. During one occasion, the pilot described that "heavy" forward cyclic had been applied in response to the helicopter moving forward. The pilot subsequently landed the helicopter to provide a break for the passenger, debrief him and refuel the helicopter in advance of the second part of the lesson. This would include refining the use of the cyclic as well as control of the yaw pedals and collective.

As the helicopter departed the apron the air/ground radio operator radioed the pilot to advise him that he may have seen some "spray" from the engine. The pilot checked the engine instruments, whose indications were normal, before hover taxiing back to the apron where he checked the ground where the helicopter had been parked. Nothing unusual was observed and the pilot proceeded with the flight.

Having completed the training exercise on the use of the tail rotor pedals and collective, the pilot flew the helicopter back to the airfield where the passenger was to further practise control of the cyclic whilst in the hover. The pilot advised that he considered that the passenger's control of the cyclic had improved but it was still occasionally abrupt, and that he had needed to repeat a few times the command to release the controls back to him.

Having brought the helicopter into a stable hover at a height of approximately 10 to 15 ft above the ground, control of the cyclic was passed to the passenger. Control of the yaw pedals and collective remained with the pilot. The pilot stated that the helicopter started to drift backwards, to which the passenger applied a "heavy" forward cyclic input. The helicopter then drifted left at which point the pilot advised the passenger that he was taking control before trying to apply right cyclic. However, the pilot stated that the passenger did not release his grasp and had applied left cyclic. The helicopter moved left whilst also dropping, which the pilot tried to counter with collective and cyclic inputs but was unable to prevent the front of the left skid of the helicopter from contacting the ground. The helicopter subsequently fell onto its left side due to dynamic rollover.

As the helicopter struck the ground, the windscreen broke and detached from the helicopter. The passenger, who was sitting in the right seat, was momentarily suspended in his seat by the multipoint harness before releasing himself. Both occupants then vacated the helicopter through the windscreen aperture and moved away from the helicopter. The pilot

and passenger had no external injuries evident. However, the passenger reported that the next day he had visited a hospital due to pain in his upper body.

The passenger's account of the accident sequence differed from that of the pilot. He stated that he had immediately released his grip of the cyclic control when commanded by the pilot, and that the helicopter "accelerated forward" before it "swerved to the right" and then "to the left and hit the ground".

Figure 1
Accident site

Conclusion

The pilot considered that the accident had occurred due to the passenger not releasing the controls when commanded, and applying left cyclic which was counter to the direction required and which opposed the input the pilot was trying to apply.

The passenger stated that he did apply forward cyclic but, upon being told that the pilot was taking control, he immediately released his grip on the cyclic as instructed. The passenger also advised that he "was not in control of the yaw pedals or collective at that time".

The AAIB investigation was unable to resolve the differences between these two statements, but this accident highlights the importance of clear communication and setting out responsibilities as part of the pre-flight brief and, should it be deemed appropriate, the ability of the pilot to stop the flight at any time.

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