Accident

Aircraft Type and Registration:	RAF 2000 GTX-SE, G-CDJN	
No & Type of Engines:	1 Subaru EJ22 piston engine	
Year of Manufacture:	2005 (Serial no: PFA G/13-1363)	
Date & Time (UTC):	15 September 2023 at 1405 hrs	
Location:	Great Heck Airstrip, North Yorkshire	
Type of Flight:	Private	
Persons on Board:	Crew – 1	Passengers – None
Injuries:	Crew – None	Passengers – N/A
Nature of Damage:	Rotor blades detached and aircraft damaged through water immersion	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	76 years	
Commander's Flying Experience:	2,206 hours (of which 712 were on type) Last 90 days – 21 hours Last 28 days – 14 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

Shortly after takeoff, the gyrocopter lost performance and, from a low height, started to descend. The pilot manoeuvred away from a line of trees and conducted a forced landing in a nearby canal. The pilot considers that distraction had led him to leave the rotor brake applied and was the cause of the reduction in performance.

History of the flight

The pilot positioned his gyrocopter to take off towards the south from Great Heck Airstrip. The pilot was experienced on type, so he got in, started the engine and completed the checklists from memory. Whilst pre-rotating the rotor, he realised he had forgotten his pen and sun cap. He shut down the engine, applied the rotor brake, and exited the gyrocopter to get them.

When he re-entered the gyrocopter, he restarted the engine and later remarked that it took "an unusually long time" to pre-rotate the rotor to takeoff rpm, but he did not think about it further at the time. He took off and the gyrocopter initially climbed away, before starting to descend as it flew towards a canal which ran perpendicular to the end of the runway.

The pilot reported being startled by the descent and, as he could not fly over a line of trees ahead of him and there was a railway line to his left, he turned right to fly into wind along

the canal. The canal banks were too narrow to land on without striking foliage, so the pilot decided to ditch in the canal. The main rotor struck the canal bank and detached during the ditching. The aircraft sank but the pilot escaped via the passenger door as the pilot's door was wedged against the canal bank.

Pilot's comments

Shortly after the accident, the pilot spoke with a friend who was in a nearby field, who told the pilot he heard a sound as if the engine speed was reducing. The pilot thought this was possibly the Doppler effect of the aircraft flying away from the friend's position as, although he did not have time to check his instruments, he thought the engine was working normally.

With hindsight, the pilot believes he left the rotor brake applied when he re-entered the aircraft after getting his pen and sun cap. He said that had he re-started his checklist from the beginning, he would have remembered to check that the rotor brake was disengaged before pre-rotating the rotor. G-CDJN was not fitted with a rotor brake warning light that would have served as a reminder; the warning light is not part of the standard RAF-2000 build kit. The pilot stated that, although the rotor brake is not particularly effective when cold, it would have become more so as it warmed up due to friction.

The pilot provided the checklists from another aircraft of the same type. There were two versions dated to 2001 and 2004, which both stated that the rotor brake can be engaged during taxi if one is fitted. Neither checklist had an item to check that the rotor brake is disengaged before engaging the main rotor clutch before takeoff. However, in the pilot's copy, a check '*rotor brake off, swing rotor*' had been added in pen at the start of the *'before starting engine'* checks.

The pilot owns another gyrocopter which has a rotor brake warning light installed. He remarked that he planned to install one on G-CDJN but had not got around to doing so.

AAIB comment

Performing checklists without interruption is important on all aircraft types. In this case, the interruption caused by needing to exit the aircraft probably resulted in the rotor brake being left applied. As the rotor brake warmed up due to friction, it would have become more effective, and this led to the loss of performance and resulting forced landing. Given that there was a railway line to his left and a tree line ahead, the pilot had limited options available to him and it was fortunate that he was able to exit the aircraft uninjured after it sank in the canal.

The checklist provided by the original manufacturer who supplied G-CDJN did not include a step to check that the rotor brake was disengaged before pre-rotation, but the pilot's copy had been amended by hand. The AAIB is unaware of any previous events in which the rotor brake had been left applied prior to takeoff and the manufacturer which supplied G-CDJN is no longer in business, so a Safety Recommendation to include this on the checklist is not deemed necessary. However, the AAIB has shared this finding with the organisation currently responsible for the RAF-2000 design.

Identifying available options before flight can improve forced landing outcomes if problems occur shortly after takeoff. This is particularly true where obstacles (such as buildings or railway lines), uneven terrain, woodland, or water are nearby which are not conducive to a safe forced landing. The CAA have published Safety Sense leaflets[1] which contain helpful information on strip flying and distraction.

Footnote

[1] https://www.caa.co.uk/general-aviation/safety-topics/safety-sense-leaflets/ [accessed January 2024].