

ACCIDENT

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| Aircraft Type and Registration: | Robinson R44 Raven II, G-CDEY | |
| No & Type of Engines: | 1 Lycoming IO-540-AE1A5 piston engine | |
| Year of Manufacture: | 2004 | |
| Date & Time (UTC): | 10 March 2005 at 1700 hrs | |
| Location: | Langley Castle Hotel, Haydon Bridge, Northumberland | |
| Type of Flight: | Private | |
| Persons on Board: | Crew - 1 | Passengers - 2 |
| Injuries: | Crew - None | Passengers - None |
| Nature of Damage: | Helicopter destroyed | |
| Commander's Licence: | Private Pilot's Licence | |
| Commander's Age: | 59 years | |
| Commander's Flying Experience: | Approx 130 hours (of which about 50 were on type) Last 90 days - approx 11 hours Last 28 days - approx 8 hours | |
| Information Source: | Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB | |

History of flight

The pilot took off from Manchester's Barton Airfield with two colleagues as passengers late in the morning on the day of the accident. They flew to Carlisle racecourse where they spent the rest of the afternoon. They intended to fly that evening to a hotel situated about 35 nm away for a meeting with some business partners who were already at the hotel. At about 1400 hrs one of the group at the hotel telephoned the pilot to give him a description of the hotel landing site and to inform him that the correct landing point would be marked with a white sheet.

The group took off from the racecourse at about 1710 hrs and flew for about 20 minutes to get to the hotel. On arriving the pilot overflowed the landing site before

starting his approach. The landing site next to the hotel consisted of a grass area approximately 60 m by 50 m, which sloped downhill, away from the hotel. It was surrounded on three sides by tall trees.

The pilot completed his approach and brought the helicopter into a low hover, turning to face up the slope to land. The helicopter then touched down and the pilot stated that at that moment he lost control, the helicopter pitching forward and striking one of its main rotor blades on the ground. The helicopter then turned through 180°, striking the end of its tail into the ground. The helicopter came to rest upright with the engine still running but a fire quickly developed; the flames growing rapidly

around the cabin. Fortunately, all three people on board were able to vacate the aircraft unassisted and apart from some singed hair, they were otherwise unhurt.

The weather was described by the pilot as good, with a 10 kt surface wind, ample visibility and a cloud base of 3,000 ft. Sunset that day was at 1804 hrs.

Some time after the accident the pilot returned to the landing site in another R44 helicopter with a flying instructor and this time carried out a successful landing. The instructor reported that the slope on the landing site varied with much of it sloping 10° or more, but with some small areas being nearly level. He also commented that when below the level of the trees surrounding the landing site, sight of the horizon was effectively lost.

Analysis

The pilot had little flying experience and had only owned this particular aircraft for about two weeks prior to the accident. He had received training to land on sloping ground during his initial training on the Robinson R22 and again during his conversion training for the R44, although he states that this was well before the accident.

From the description provided by the pilot of the event, when landing on the slope he had mistakenly believed, whilst lowering the collective, that the full weight of the helicopter was on its skids with the collective in mid-travel, prompting him to lower the collective rapidly to its minimum pitch position. The helicopter did not have its full weight on the skids at this time causing it to settle quickly in a marked tail-down attitude as the collective was fully lowered. The motion took the pilot by surprise and he instinctively reacted by pushing the cyclic rapidly forward, but without raising the collective. This caused the helicopter to pitch forward

and strike its main rotors on the ground ahead resulting in the remaining impact sequence described. In view of the subsequent fire it was extremely fortunate that the helicopter remained upright and that the occupants were able to escape unimpeded.

Discussions with the instructor, who subsequently flew with the pilot back to the hotel, indicate that the landing site presented numerous problems. The tall trees limited the choice of direction of approach and surrounding the aircraft as they did, would have reduced the available light considerably on the final approach when attempting to land near dusk. The slope of the landing site seems to have varied, but there was certainly a large area over which the slope was probably either at or above the landing capabilities for many light helicopters such as the R44. This, combined with a loss of visual horizon when descending below tree top level, presented a challenging landing site for any pilot.

The pilot accepted these points and also mentioned the added pressures of flying an aircraft with passengers to such a venue, especially when they are business partners. Whilst he was confident he could land at the site, he felt it would not have provided a favourable reflection on his flying abilities had he failed to do so.

The manager of the hotel stated that approximately 10 helicopters a year land at the unofficial landing site and have done so for many years without any apparent problems. He did concede, however, that he had little if any knowledge of helicopter operations. Without such knowledge he was not in a position to provide pilots with any sort of guidance about the site other than to point out its location and the obvious hazards such as the surrounding trees. He was not aware that the degree of slope would present a problem and no pilot had ever complained about it to him. In his absence, and in the

absence of any form of written brief, none of his staff were in a position to provide any comprehensive information to pilots seeking permission to land at the hotel.

In investigating this accident it has not been possible to obtain the sloping ground limits for the R44 helicopter either for landing or for shutting down but the flying school, where the pilot was taught, recommends a limit of 10° for landing on a slope. The foundations for this 'empirical' and unofficial advice are not clear and similar but slightly different advice might be given by other training schools.

Neither the US Federal Aviation Regulations (FAR-27) nor the European Joint Airworthiness Regulations (JAR 27) require helicopter manufacturers to determine or publish guidance on sloping ground limits. Enquiries with the helicopter manufacturer have revealed that they do not publish any sloping ground limits because such limits are affected by numerous variable factors,

including wind conditions, ground conditions, pilot skill and experience. Whilst this view is accepted in part, there are physical limitations such as maximum rotor tilt angles which are not variable and so could be published.

Conclusion

The private pilot had little flying experience and was attempting to land at a difficult landing site for which he had little information. It is possible that had he known the degree of the sloping ground and been able to compare this against published sloping ground limits for his own helicopter, he may not have attempted the landing. In the event, whilst attempting to land, he applied an inappropriate landing technique followed by an inappropriate recovery technique when the helicopter appeared to be tipping backwards. This led to the main rotors striking the ground, destroying the helicopter.