

**Aviation Safety Investigation Report
199703335**

**Bell Helicopter Co
JetRanger III**

12 October 1997

Readers are advised that the Australian Transport Safety Bureau investigates for the sole purpose of enhancing transport safety. Consequently, Bureau reports are confined to matters of safety significance and may be misleading if used for any other purposes.

Investigations commenced on or before 30 June 2003, including the publication of reports as a result of those investigations, are authorised by the Executive Director of the Bureau in accordance with Part 2A of the Air Navigation Act 1920.

Investigations commenced after 1 July 2003, including the publication of reports as a result of those investigations, are authorised by the Executive Director of the Bureau in accordance with the Transport Safety Investigation Act 2003 (TSI Act). Reports released under the TSI Act are not admissible as evidence in any civil or criminal proceedings.

NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

The rear seat passenger disembarked from the left (downhill) side, unloaded his equipment, and moved away from the helicopter towards the front as briefed. The front seat passenger disembarked from the left side, unloaded his equipment, climbed back on to the left skid, and reached into the cockpit through the door. The pilot said that he had been observing the site to his right to ensure it was clear, and when he looked back towards the front he realised the right skid was just off the ground. The pilot said he noticed a cool strong wind coming through his open window when the helicopter started to roll. He moved the cyclic control to the right but this had no effect. The pilot said he then pulled in collective but the helicopter continued to roll to the left and the left skid did not leave the ground. He then noticed the passenger on the top step on the left side. The pilot said he yelled at the passenger who immediately jumped off the step, closed the door and faced the helicopter with his arms outstretched. The helicopter continued to roll to the left and the passenger ran away directly to the left of the helicopter. As the weight came off the skids, the helicopter began to slide sideways down the slope. The slide was stopped, half a metre later by a partially buried stump and the helicopter rolled over. The pilot was unable to recover control before the rotor blades made contact with the passenger and the ground. The passenger was struck by at least one main rotor blade, and was fatally injured.

Analysis

The helicopter was sitting on uneven ground. There was more weight on the front half of the skids than the rear half. The helicopter's centre of gravity moved aft when the passengers disembarked and removed their equipment. The pilot reported a wind gust from the right, and this, associated with the aft CG movement may have then been sufficient to cause the helicopter to rock left and aft. With no collective pitch applied, the pilot's action of moving the cyclic would have had little or no recovery effect on the helicopter's movement. However, when the helicopter had pitched up and rolled left, the pilot then began raising the collective. With the wind speed gusting to 20 knots, the rotor would have been experiencing translational lift. This would have increased the effectiveness of any collective application, probably causing the helicopter to become light on the skids. Additionally, the helicopter's movement would have caused a component of the wind to enter the rotor disc from below. This would effectively increase the lift on the advancing blade, reduce lift on the retreating blade, and cause the rotor to flap away from the wind. This would have also increased the helicopter's tendency to roll left.

It was after the helicopter began the movement and pilot had applied collective that the passenger was noticed standing on the left skid. The passenger jumping off the left skid associated with the pilot raising the collective, may have been sufficient to permit the helicopter to slide left as it continued rolling. The left skid then contacted the partially buried stump, which would have had the effect of translating the helicopter's sideways movement into a rolling moment about the left skid. This rolling moment would have been exacerbated by the pilot raising the collective because a component of the rotor's lift would have been directed to the left. It is probable that the helicopter was very rapidly entering a condition known as dynamic rollover, where the only possible recovery action was to fully lower the collective. However, it is unlikely that the pilot had sufficient time to recognise the developing the situation and to take the appropriate action before the rollover became unrecoverable.
