



Australian Government

Australian Transport Safety Bureau

Collision with terrain involving a Bell 412, VH-ESD

72 km WNW of Townsville, Queensland, 23 May 2014

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Addendum

Page	Change	Date

Collision with terrain involving a Bell 412, VH-ESD

What happened

On 23 May 2014, at about 0810 Eastern Standard Time (EST), the crew of a Bell 412 helicopter, registered VH-ESD, were tasked by the Queensland Emergency Medical System Coordination Centre (QCC) to conduct a rescue in the Mount Spec area about 72 km WNW of their base in Townsville, Queensland. Due to the inaccessibility of the area by road and the reported condition of the patient, the crew planned to conduct a winching operation. The crew consisted of a pilot, an air crew officer (ACO), a rescue crew officer (RCO), a paramedic and a doctor.

VH-ESD



Source: Operator

At about 0855, the helicopter arrived at the location provided by the QCC and the crew observed smoke indicating where the injured person was located. The pilot conducted two orbits of the site and the crew inspected the area and assessed the risks associated with the task. The site was in a river valley with a series of cascading waterfalls. The pilot elected to face the helicopter down the slope, to provide a greater power margin to be able to exit the area, without having to climb away. In this position, there were obstacles from the waterfall and higher ground behind the helicopter, and a clear area ahead. The crew also discussed the tag line, which attached to the corner of the stretcher to prevent it spinning around during winching. It was normally operated by the RCO on the ground, who would walk backwards to create an angle between himself and the stretcher, however this was not possible at this site due to a vertical drop behind the RCO. The pilot would be required to manoeuvre the helicopter rearwards to create the tag line angle.

The pilot then established the helicopter in a hover about 100 ft above the ground, and reported that his reference point, used to maintain the helicopter's position in the hover, was a tree in about his 3 o'clock position and about 7 m from the helicopter. The ACO moved to the rear door, and took over the 'reference' of the helicopter. In this role, the ACO directed the pilot to manoeuvre the helicopter as required to perform the operation and remain clear of all obstacles.

As previously briefed, the doctor and RCO were winched down to the site together, and subsequently the paramedic was lowered. By this time the helicopter had been in the hover with the power in the take-off range for about 4 minutes, with a 5 minute limit at this power setting; consequently the pilot conducted an orbit before returning to winch the stretcher and rescue equipment down. No problems were encountered during this sequence of winches.

The pilot and ACO then departed the immediate vicinity in the helicopter and initial contact was established with the crew on the ground via UHF radio. After about 10 minutes, communication on the ground was again attempted, however due to a loud interference noise on the radio they were unable to communicate with the ground crew. They then returned and overflew the area to ascertain using hand signals, whether the ground crew were ready to be picked up. The RCO waved them away and the helicopter departed and conducted an orbit of the area. The ACO was then able to establish radio communication with the RCO who advised when they were ready. The sequence of recovery winches was confirmed between the ACO and RCO. On returning to the winching site, due to the interference noise on the radio affecting their ability to communicate with each other, the pilot and ACO deselected the radios.

The winch recovery of the doctor and stretcher commenced. During the initial recovery phase, the pilot stated that due to the 5 minute power limit, a circuit would be required before the final recovery of the RCO and paramedic. The ACO then directed the pilot to manoeuvre the helicopter

backwards to set the tag line on the stretcher and winched up the doctor and the stretcher. During this winch, the helicopter had twice drifted to the left and the ACO directed the pilot to manoeuvre the helicopter right.

To manoeuvre the stretcher into the helicopter, the ACO directed the pilot to move forwards and to the right to provide a buffer at the tail of the helicopter, and then handed the visual reference over to the pilot, which was standard operating procedure for the organisation, while the ACO's attention was focused on securing the stretcher inside the cabin.

About 1 minute later, the ACO returned to the door and observed that the helicopter had drifted back and left and he immediately directed the pilot to manoeuvre up and to the right, however the tail rotor collided with the foliage of a tree. The RCO attempted to alert the pilot to the proximity of vegetation to the tail of the helicopter over the radio but the radios in the helicopter were deselected. The pilot advised that he was again about 4 minutes into the 5 minute hover power limit and had to go around prior to picking up the RCO and paramedic. The ACO advised that the helicopter had collided with some light foliage and the pilot assumed it was the main rotor blades that had struck the vegetation. The ACO pointed out to the pilot some vegetation similar to that which the helicopter had collided with. The pilot had not detected any strike, there were no abnormal indications or vibrations and the helicopter was operating normally.

The RCO and paramedic were then winched into the helicopter and the ACO returned to the front seat. The crew discussed whether it was necessary to divert to Townsville Airport, but elected to proceed to the hospital. The paramedic and doctor later stated that the tail had been close to the vegetation but the pilot reported that at that time, he had in his mind that it was the main rotor blades rather than the tail rotor blades that had struck the foliage.

After landing at the hospital, the pilot exited the helicopter and inspected the main rotor blades. The ACO then advised that it was the tail rotor not the main rotor that had struck the foliage and the pilot observed some ripples on the tail rotor blades and called the base engineer to inspect the helicopter (Figure 1).

Figure 1: Damage to ESD tail rotor



Source: Operator

The engineering inspection revealed that the tail rotor blades required replacement and the tail rotor gear boxes and hub assembly required inspection.

Pilot comments

The pilot reported that he thought that the main rotor blades had struck the foliage, not the tail rotor. He reported that had he known that it had struck the tail rotor, he would have either diverted to the airport or landed in a paddock to inspect the rotor blades prior to continuing the flight.

The company had a standard task risk analysis (TRA), which stated that prior to commencing the winching operation, the pilot was to brief the crew for a recovery if visual reference is lost, and he omitted the briefing. While he had the reference, and was therefore responsible for maintaining the helicopter position and obstacle clearance, he is unsure whether he momentarily shifted his focus inside to check the power, and was unaware that the helicopter had drifted backwards.

As a senior pilot, his main tasks are checking and training flights and administration, and he rarely conducts operational flights.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Operator of VH-ESD

As a result of this occurrence, the operator has advised the ATSB that they are taking the following safety actions:

- Operational staff will be reminded of the importance of applying the controls listed in the winching task risk analysis (TRA), possibly via a Safety Bulletin.
- Senior staff are to provide advice to crew regarding actions to be taken following any event or incident, specifically the desirability of conducting a safe out-landing.
- The currency requirements for management and training and checking pilots are to be reviewed, in particular with respect to operational tasks.
- Technical staff will review the compatibility between the Bell 412s and the radios used by the RCOs.
- In-cockpit reminder lists of any treatments or controls mandated by Task Risk Analyses are to be provided.
- The next crew resource management (CRM) training is to focus on information sharing, feedback loops and cockpit gradients.

Safety message

This incident highlights to helicopter pilots the importance maintaining a good reference point when operating in confined areas and to establish the helicopter into the safest position possible particularly while the other crew members' attention is focused inside the cabin. It also provides a reminder to clarify understanding between crew members, as in this incident the ACO knew the tail rotor had struck foliage and the pilot had thought it was the main rotor and based his decisions on that belief.

General details

Occurrence details

Date and time:	23 May 2014 – 0920 EST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	69 km NW Townsville, Queensland	
	Latitude: 18° 45.62' S	Longitude: 146° 22.23' E

Helicopter details

Manufacturer and model:	Bell Helicopter Company 412	
Registration:	VH-ESD	
Serial number:	36026	
Type of operation:	Aerial work - EMS	
Persons on board:	Crew – 5	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.