Australian Government
Australian Transport Safety Bureau

Collision with terrain – MD Helicopters Inc. 369D, YJ-HEL

Unua village, Malekula, Vanuatu | 26 August 2011

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2011-108
Final

Australian Government

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ATSB TRANSPORT SAFETY REPORT

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Collision with terrain
Unua village, Malekula, Vanuatu
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YJ-HEL, MD Helicopters Inc. 369D

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Published by:	Australian Transport Safety Bureau
Postal address:	PO Box 967, Civic Square ACT 2608
Office:	62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone:	1800 020 616, from overseas +61 2 6257 4150
	Accident and incident notification: 1800 011 034 (24 hours)
Facsimile:	02 6247 3117, from overseas +61 2 6247 3117
Email:	atsbinfo@atsb.gov.au
Internet:	www.atsb.gov.au

SAFETY SUMMARY

What happened

On 26 August 2011, the pilot of an MD Helicopter Inc. 369D helicopter, registered YJ-HEL, was conducting sling load operations near a small village 183 km north-north-west of Port Vila, Vanuatu. As the helicopter approached the village, with two passengers onboard, witnesses heard a single, loud bang and watched the helicopter fall 10 to 15 m to the ground before coming to rest on its right side. One of the passengers received minor injuries and was able to exit the helicopter unaided. The other passenger received serious injuries and the pilot was fatally injured.

What the ATSB found

The ATSB found that as the helicopter approached the village to land, the wire rope attached to the helicopter's cargo hook contacted a tree. That contact resulted in the rope fouling on the main rotor blades, which in turn led to the detachment of segments of the rotor blades and the tail boom. This rendered the helicopter uncontrollable. It was also found that the occupants of the helicopter were not wearing the installed shoulder harness restraints or using flight helmets during the flight.

What has been done as a result

This investigation was conducted by the ATSB at the request of the Civil Aviation Authority of Vanuatu and no organisational or systemic issues that might adversely affect the future of aviation operations in Vanuatu were identified.

Safety message

The circumstances of this accident serve as a reminder that the severity of contact injuries in survivable helicopter accidents can be significantly reduced by the use of shoulder harnesses and protective flight helmets. As such, pilots and operators should consider the use of such equipment in the interest of enhancing survivability should an accident occur.

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Prepared By

Australian Transport Safety Bureau
PO Box 967, Civic Square ACT 2608 Australia
www.atsb.gov.au

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Figures 1 and 4: Google Earth
Figure 2: Mr Peter Lewis

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau 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; 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.

Purpose of safety investigations

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. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

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.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes appropriate, or to raise general awareness of important safety information in the industry. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

TERMINOLOGY USED IN THIS REPORT

Occurrence: accident or incident.

Safety factor: an event or condition that increases safety risk. In other words, it is something that, if it occurred in the future, would increase the likelihood of an occurrence, and/or the severity of the adverse consequences associated with an occurrence. Safety factors include the occurrence events (e.g. engine failure, signal passed at danger, grounding), individual actions (e.g. errors and violations), local conditions, current risk controls and organisational influences.

Contributing safety factor: a safety factor that, had it not occurred or existed at the time of an occurrence, then either: (a) the occurrence would probably not have occurred; or (b) the adverse consequences associated with the occurrence would probably not have occurred or have been as serious, or (c) another contributing safety factor would probably not have occurred or existed.

Other safety factor: a safety factor identified during an occurrence investigation which did not meet the definition of contributing safety factor but was still considered to be important to communicate in an investigation report in the interests of improved transport safety.

Other key finding: any finding, other than that associated with safety factors, considered important to include in an investigation report. Such findings may resolve ambiguity or controversy, describe possible scenarios or safety factors when firm safety factor findings were not able to be made, or note events or conditions which 'saved the day' or played an important role in reducing the risk associated with an occurrence.

Safety issue: a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.

Risk level: the ATSB's assessment of the risk level associated with a safety issue is noted in the Findings section of the investigation report. It reflects the risk level as it existed at the time of the occurrence. That risk level may subsequently have been reduced as a result of safety actions taken by individuals or organisations during the course of an investigation.

Safety issues are broadly classified in terms of their level of risk as follows:

- **Critical** safety issue: associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation unless corrective safety action has already been taken.
- **Significant** safety issue: associated with a risk level regarded as acceptable only if it is kept as low as reasonably practicable. The ATSB may issue a safety recommendation or a safety advisory notice if it assesses that further safety action may be practicable.
- **Minor** safety issue: associated with a broadly acceptable level of risk, although the ATSB may sometimes issue a safety advisory notice.

Safety action: the steps taken or proposed to be taken by a person, organisation or agency in response to a safety issue.

FACTUAL INFORMATION

Background

On 29 August 2011, the Civil Aviation Authority of Vanuatu (CAAV) requested Australian Transport Safety Bureau (ATSB) assistance in the conduct of a not-for-blame investigation into this accident. The ATSB agreed to provide assistance in accordance with paragraph 5.1 to Annex 13 *Aircraft Accident and Incident Investigation* to the Convention on International Civil Aviation (done at Chicago 1944), which allowed for States to delegate all or part of an investigation to another State by mutual arrangement and consent.

While the investigation was conducted in Vanuatu in accordance with Vanuatu's laws, the ATSB also commenced an investigation under the Australian Transport Safety Investigation Act 2003 (the Act). The Act allows for an investigation to be commenced where the appropriate authority of a foreign country requests assistance and requires the release of an investigation report as soon as practicable after the completion of the ATSB investigation.

History of the flight

At 0705 Vanuatu Time[1] on 26 August 2011, an MD Helicopter Inc. 369D helicopter (369D), registered YJ-HEL (HEL), departed Luganville, Espiritu Santo for Unua village, Malekula, about 91 km to the south-south-east (Figure 1). The purpose of the flight was to conduct sling load operations[2] in support of the construction of a telecommunication tower near Unua. The operation had commenced on the previous day following the 183 km transit of the helicopter and crew, consisting of the pilot and a ground crewman, from Port Vila, Efate to Unua (Figure 1). About 7.2 hours were flown by the pilot on that day, which included a transit from Unua to Luganville for the night.

On return to Unua at about 0740 on the accident day, the crewman exited the helicopter and remained on the ground for the majority of the day to manage the attachment of the loads to the helicopter's sling. By about 1400, thirty four loads had been transported the 2 km from the village to the elevated construction site.

While waiting for the final loads to be prepared, the pilot elected to reposition two surplus drums of aviation turbine fuel to Norsup, about 28 km north-west of Unua (Figure 1). The pilot departed Unua at about 1440 and returned to the village at about 1505 to transport the final loads to the construction site.

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1 Vanuatu Time was Coordinated Universal Time (UTC) + 11 hours.

2 The external carriage, lowering, or picking up of a load, cargo, or passengers by a helicopter by means of a bucket, net, harness, sling, or stretcher that is suspended beneath the helicopter.

Figure 1: Operating area

At about 1525 the helicopter arrived at the construction site with the final sling load, consisting of two drums of water. The load was disconnected by the construction personnel while the helicopter hovered above the drums. The pilot then landed nearby in order to collect the role equipment and two passengers for return to Unua. One of the passengers[3] recalled that the pilot exited the helicopter and supervised the construction workers loading the equipment into the rear cabin. That passenger could not recall if the pilot loaded any items into the helicopter prior to departing the site. Once the cargo was loaded, the pilot and two passengers boarded the helicopter, secured their lap belts without using the installed shoulder restraints (see the section titled *Aircraft information*) and departed for Unua.

The ground crewman had observed the helicopter approach the village on multiple occasions over the preceding 2 days. He recalled that the pilot used the same approach direction and profile during those approaches such that the sling, consisting of a 5 m long wire rope and an attached yellow swivel/hook assembly (see the section titled *Aircraft information*), cleared a specific tree along the approach flightpath by between 4 and 6 m.

During the previous approaches the crewman had focussed on the yellow swivel/hook assembly in preparation for attaching the next external load. The crewman stated that, as the helicopter approached the village with the passengers onboard, he did not see the sling and that the helicopter's skids passed about 3 m above the same tree. The crewman recalled that all other aspects of the approach were unchanged from those observed during the previous 2 days and that the helicopter appeared to be operating normally as it approached.

Another witness in the village advised that, as the helicopter approached, he heard a noise that he assessed indicated there may have been a problem with the aircraft. In

[3] Due to injuries sustained in the accident, the investigation team was only able to interview one of the two passengers. Additionally, due to jurisdictional impediments, the team was unable to interview any of the other witnesses at the construction site.

response, he moved to a position where he could see the helicopter and, as it descended towards the village landing site, he saw the attached wire rope contact a tree before flying up into the main rotor blades.

One of the passengers reported that the helicopter appeared to be operating normally during the return from the construction site until on final approach into Unua, when there was a single loud bang and the helicopter began falling. In response, the passenger focussed on bracing for impact and could not recall whether the pilot said or did anything.

The ground crewman also recalled a single loud bang as the helicopter approached the village. That was followed by violent shaking/vibrating of the helicopter and smoke from the vicinity of either the engine compartment or the tail boom area. The helicopter was reported to then yaw to the right with the pilot appearing slumped at the controls. The helicopter fell 10 to 15 m to the ground and came to rest on its right side. The engine continued to operate for a short period before stopping without the intervention of the personnel on the ground.

One of the passengers received minor injuries and was able to exit the helicopter unaided. The other passenger received serious injuries and the pilot was fatally injured. The helicopter was seriously damaged[4] and there was minimal disruption to the surrounding environment.

Personnel information

The pilot held Vanuatu Commercial Pilot (Helicopter and Aeroplane) Licences that were issued by the CAAV in 1993. He was appropriately endorsed to operate the 369D helicopter and held aircraft maintenance qualifications that were issued by the Australian Civil Aviation Safety Authority (CASA) and recognised by the CAAV.

The pilot held a CASA Class 1 Medical Certificate with the requirement that distance correction was to be worn and reading correction was to be available during flight. The CASA-issued medical certificate met the requirements for the pilot to exercise the privileges of his Vanuatu-issued flight crew licence, provided that he complied with the vision correction requirements. The ground crewman advised that he had previously seen the pilot wear glasses; however, he was not wearing them on the day of the accident.

The pilot's logbook indicated that, at the time of the accident, he had accrued in excess of 14,000 hours of flight time with extensive experience in the 369D. The logbook also indicated that the pilot's most recent flight crew competency check was carried out in accordance with New Zealand Civil Aviation Rules Part 135 *Air operations – Helicopters and Small Aeroplanes* on 26 September 2010.

The helicopter operator advised that the pilot had been employed by the company for the previous 2 years flying HEL on similar sling load operations.

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[4] The *Transport Safety Regulations 2003* definition of 'serious damage' includes the destruction of the transport vehicle.

Aircraft information

The MD Helicopters Inc. 369D is a five-seat[5], single main and tail rotor-equipped helicopter that is powered by a gas turbine engine and equipped with skid-type landing gear. The accident aircraft was fitted with high skids, a cargo hook and a mirror, which was attached to the toe of the left skid and enabled the pilot to view the helicopter's cargo hook and a segment of the attached sling (Figure 2).

The helicopter was being operated with the left-front door removed to enable the pilot to view the underslung loads. A 5 m long wire rope was connected to the helicopter's cargo hook at one end and to a yellow swivel/hook assembly at the hook end of the rope to allow for those operations (see the section titled *Wreckage examination*).

Figure 2: YJ-HEL

The helicopter was also equipped with seat belt harnesses that consisted of lap belts and inertia reel shoulder restraints for each of the three front-seat occupants. The operator's chief pilot advised that the shoulder harnesses were generally not used during of sling load operations due to a tendency for them to lock when not pulled directly forward. When locked they restricted the pilot's ability to lean out of the cockpit and view the attached load.

The chief pilot and ground crewman reported that the pilot did not routinely use the shoulder restraints. Images taken immediately following the accident showed that the pilot was not using the shoulder restraints.

The helicopter's technical log (TL) and installed hour meter indicated that, at the time of the accident the helicopter had been operated for a total of 8,919.1 hours, including 6.6 hours on the accident day.

Wreckage and impact information

The main wreckage came to rest in the village about 73 m along the approach direction from the tree that was reported to have been contacted by the sling (Figure 3). A number of components, including segments of two of the main rotor blades and the tail boom detached during the accident sequence and were found up to 108 m from the main wreckage (Figure 4).

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[5] At the time of the accident the rear cabin seats had been removed from the helicopter allowing only three occupants to be carried in the front cabin. The pilot occupied the left-front seat.

Figure 3: Accident site[6]

Figure 4: Wreckage distribution

Wreckage examination

Examination of the helicopter identified that it initially contacted the ground on its left-rear side before coming to rest on its right side (Figure 5). There was extensive damage to the forward fuselage/cabin area, landing gear and main rotor blades. The tail boom had detached about 47 cm from the fuselage attachment point and was found about 29 m from the main wreckage. The relative lack of damage to the tail

[6] The image was taken following the movement of a number of the helicopter components, including the detached tail boom.

rotor and stabilisers, together with contact/paint transfer marks on the fuselage, tail boom and one of the main rotor blades identified that the tail boom detached while the helicopter was airborne.

The wire rope was found connected to the helicopter's cargo hook; however, the last 70 cm of the rope, including the hook, had separated and was identified several meters from the wreckage (Figure 6). Examination of the rope identified that it had failed due to overstress.

The yellow swivel/hook assembly was removed from the accident site by unknown persons prior to the arrival of the investigation team and was unable to be examined. Witnesses advised that shortly after the accident, the swivel/hook assembly was found separate from the wire rope and some distance from the main wreckage. Examination of the hook at the end of the wire rope did not identify any evidence of damage to either the hook or the keeper to indicate that the swivel/hook assembly had forcibly detached from the wire rope hook during the accident sequence.

Figure 5: Main wreckage

Figure 6: Detached 70 cm segment of the wire rope, including the yellow hook

Numerous marks on the main rotor blades and fuselage indicated that the wire rope and main rotor blade/s had contacted the fuselage (Figure 7). Additionally, examination the leading edge of one of the main rotor blades showed evidence of contact with the wire rope. A large segment of the blade separated at that point (Figure 8).

Examination of the engine and the main and tail rotor systems did not identify any defect or pre-existing damage that would have affected the normal operation of the helicopter. A quantity of clear fuel was recovered from the engine fuel filter.

Continuity of the drive train and the flight controls was established.

Figure 7: Fuselage contact marks

Figure 8: Indications of wire rope contact with a main rotor blade leading edge

Medical and pathological information

An external post-mortem examination of the pilot was conducted at Port Vila Central Hospital on the day of the accident. That examination identified that the pilot had sustained injuries to several areas of the body, including the head. Although noted as being associated with the helicopter accident, no specific cause of death was stated.

Organisational and management information

Sling load procedure

The procedures relating to the conduct of sling loading were detailed in the company operations manual and included the requirement to comply with Part 133 *Helicopter External Load Operations* of the New Zealand Civil Aviation Rules.[7] The chief pilot advised that, with the exception of the operations manual requirements, the specific conduct of sling loading was the responsibility of the pilot in command and, as such, varied between pilots.

The chief pilot stated that the pilot had developed his own operating procedure over many years of conducting sling load operations and that he applied that process consistently. This included the use of the wire rope and swivel/hook assembly as well as the use of the skid-mounted mirror to view the cargo hook. The pilot reportedly limited the involvement of other personnel in the preparation of the role equipment, preferring to connect and disconnect the sling to and from the helicopter himself.

The ground crewman advised that, following completion of the previous day's sling load operations, the pilot had manually released the sling from the cargo hook while the helicopter hovered above the village landing site (Figure 3).

Additional information

Effectiveness of harnesses and flight helmets

A study[8] of the injuries sustained by pilots involved in fatal helicopter accidents reviewed 84 autopsy reports relating to 74 helicopter accidents that occurred between 1993 and 1999. Analysis of the data, which was retrieved from the United States (US) Federal Aviation Administration autopsy database, concluded:

> It appears that the use of a shoulder restraint and some form of protection to the head can significantly influence the pattern of injuries in potentially survivable accidents...

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[7] See http://www.caa.govt.nz/rules/Rule_Consolidations/Part_133_Consolidation.pdf

[8] Taneja, N, Wiegmann D.A. (2002). Analysis of Injuries among Pilots Killed in fatal Helicopter Accidents. In *Aviation, Space, and Environmental Medicine Vol. 74, No. 4 April 2003*. Aerospace Medical association, Alexandria VA p.337.

A second study[9] of data relating to survivable helicopter accidents involving US Army aircraft between 1972 and 1988 considered the protection afforded by the use of flight helmets. This study concluded that:

> In the helicopter crashes studied, the risk of fatal head injury was 6 times greater in unhelmeted occupants compared to those wearing the SPH-4 [United States Army flight helmet]...

and that:

> ...by wearing a good protective helmet...crewmembers can reduce their chances of sustaining severe head injuries in a serious but potentially survivable crash by a factor of five. All personnel regularly participating in helicopter flight (civilian or military) should be equipped with protective headgear.

[9] Crowley J.S. (1991). Should Helicopter Frequent Flyers Wear Head Protection? A Study of Helmet Effectiveness. In *Journal of Occupational Medicine Vol. 33, No. 7 July 1991*. American College of Occupational Medicine p.766.

ANALYSIS

Development of the accident

The physical evidence and witness accounts indicated that, as the helicopter approached the village to land, the wire rope attached to the helicopter's cargo hook contacted a tree. That contact resulted in the rope fouling the main rotor blades, which led to the detachment of segments of the rotor blades and tail boom. That damage rendered the helicopter uncontrollable and resulted in it colliding with the terrain within the confines of the village.

The account of one of the ground witnesses raised the possibility that there may have been a problem with the helicopter prior to the contact between the wire rope and the tree/main rotor blades. That recollection was not consistent with the observations of the passenger and ground crewman, who both stated that the helicopter operated normally prior to a single, loud noise that immediately preceded the helicopter departing controlled flight. Additionally, the continued operation of the engine following the accident, together with the absence of any pre-existing mechanical problems identified during examination of the wreckage, indicated that the helicopter was probably operating normally prior to the sling contacting the tree/main rotor blades. That is, the lower approach profile was not associated with an aircraft emergency.

Given the pilot's considerable experience, and the consistency of the previous approaches described by the ground crewman, it was considered unlikely that the final descent profile was the result of a misjudged approach by the pilot. Recognising that good visual acuity is necessary for the safe operation of aircraft generally, based on the progress of the flight as described by the ground crewman, the pilot's conduct of operation without corrective glasses did not appear to have adversely influenced his ability to operate the helicopter that day. However, glasses are prescribed where necessary to ensure the necessary visual acuity over all working distances.

The report from the ground crewman that the pilot appeared to have slumped at the controls suggested the possibility that the pilot may have suffered an incapacitating event during the approach. Although the absence of a specialist medical report prevented a determination of the specific cause of death, the stable approach described by the witnesses prior to the tree contact was inconsistent with the expected behaviour of the helicopter without the controlling inputs of the pilot. It was considered more likely that the reported slumping of the pilot followed the wire rope's contact with the tree/main rotor blades, and was the result of the subsequent violent movement of the helicopter or possibly the effect of detaching parts of the aircraft or the wire rope contacting the pilot.

In the context that the pilot was likely in control of the approach, the contact between the tree and the wire rope suggested that the pilot was unaware that the wire rope was still connected to the helicopter. The investigation was unable to determine whether the operation of the helicopter by the pilot without the stipulated distance vision correction may have influenced his ability to identify via the mirror that the rope was still connected to the cargo hook, or the extent to which any degradation his depth perception might have affected the outcome.

The absence of any damage to the wire rope hook indicated that the separation of the rope and swivel/hook assembly did not occur during the accident sequence. This meant that whereas it was reported that the pilot always used the wire rope with the swivel/hook assembly attached, it was more likely that the swivel/hook was not connected to the wire rope hook during the final approach to the village. That was consistent with the ground crewman's recollection that he did not see the yellow swivel/hook that he had observed during the previous approaches.

Given that the pilot alone managed the connection and disconnection of the sling, and the absence of the swivel/hook from the sling, it was likely that the pilot removed it while on the ground at the construction site. That removal contrasted with the procedure used by the pilot on the previous day, where the sling (including the swivel/hook) was disconnected on return to the village. The lack of available witness accounts prevented any further determination of the circumstances concerning the removal of the swivel/hook assembly at the construction site.

Accident survivability

As the pilot's specific cause of death was not identified, it was not possible to assess whether the use of shoulder restraints and a flight helmet would have prevented the fatal injuries sustained during this accident. Despite that, studies have identified that the severity of contact injuries in survivable helicopter accidents, such as this occurrence, can be significantly reduced by the use of shoulder harnesses and protective helmets.

FINDINGS

From the evidence available, the following findings are made with respect to the collision with terrain that occurred at Unua village, Malekula Island, Vanuatu on 26 August 2011 and involved an MD Helicopters Inc. 369D helicopter, registered YJ-HEL. They should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- The pilot was probably unaware that the wire rope was connected to the helicopter and therefore did not take into account its length when assessing the required terrain clearance during the final approach to the village.
- The approach profile flown into the village resulted in the wire rope fouling on the trees and subsequently contacting the main rotor blades.
- The damage that resulted from wire rope contact with the main rotor blades rendered the helicopter uncontrollable.

Other safety factors

- The occupants of the helicopter did not use the installed shoulder harness restraints, resulting in a greater risk of injury during the collision with terrain.
- The occupants of the helicopter were not wearing helmets, resulting in a greater risk of injury during the collision with the terrain.
- The pilot was not wearing the distance vision correction required by his aviation medical certificate, which had the potential to affect his visual acuity during flight.

APPENDIX A: SOURCES AND SUBMISSIONS

Sources of Information

The sources of information during the investigation included:

- the owners and operators of the helicopter
- the ground crewman and other witnesses to the accident
- the Vanuatu Civil Aviation Authority (CAAV)
- the Civil Aviation Safety Authority (CASA)
- 'Spidertracks' flight tracking data.

References

Taneja, N, Wiegmann D.A. (2002). Analysis of Injuries among Pilots Killed in fatal Helicopter Accidents. In *Aviation, Space, and Environmental Medicine Vol. 74, No. 4 April 2003*. Aerospace Medical association, Alexandria VA p.337.

Crowley J.S. (1991). Should Helicopter Frequent Flyers Wear Head Protection? A Study of Helmet Effectiveness. In *Journal of Occupational Medicine Vol. 33, No. 7 July 1991* American College of Occupational Medicine p.766.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the owners and operators of the helicopter, the ground crewman, the CAAV and CASA. A submission was received from the operator of the helicopter. The submission was reviewed and, where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

24 Hours 1800 020 616
Web www.atsb.gov.au
Twitter @ATSBinfo
Email atsbinfo@atsb.gov.au

Investigation

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