



Australian Government

Australian Transport Safety Bureau

# Safety Advisory Notice

Helicopter rescue hoist operators

Number: AO-2020-013-SAN-001

## Rescue hoist cable failure

The ATSB advises helicopter operators involved in hoist operations that improper stowage of the rescue hoist hook assembly can lead to excessive movement and accelerated wear of the wire rope. If undetected, the wear and associated damage can significantly reduce the cable integrity and operational safety of the hoist system. Should the cable fail while under load during operation, personnel being winched may sustain serious or fatal injuries.

### What happened

On 4 February 2020, an Airbus Helicopters AS 350 B3 was being operated in support of NSW National Parks and Wildlife Service activities. Winching of personnel and equipment was being conducted when the operating crewman detected a technical issue with the wire rope cable of the hoist system fitted to the helicopter. The outer strands of the cable toward its termination into the hook assembly had loosened in respect of the inner core. Such loosening is known to occur during repeated short length winch deployment and retrieval cycles.

The crewman attempted to reset the cable strands using an accepted maintenance practise known as cable conditioning. The following day, the cable strands had not reset and remained loose, which prompted a second conditioning operation.

During that conditioning operation, and while under load, the cable fractured at the hook assembly, releasing the 'dummy' weight to the ground. There was no damage to the helicopter or injuries to personnel.

### Why did it happen

Although the investigation is ongoing, the ATSB's examination of the helicopter winch system identified that the wire rope cable failed near to the swaged ball-end that terminated into the hook assembly (see images below). Detailed technical examination identified that significant wear had occurred to the individual stainless steel wires comprising the cable, leading to reduced cross-section and an associated gross loss of tensile strength. The cable had accrued just 617 cycles of its 1,500 cycle life-limit. Examination of another rescue hoist from the operator identified similar wear damage had also occurred to that cable.

The ATSB identified that the wear associated with the cable failure probably occurred due to improper stowage of the hook assembly following hoisting operations. A hook that is not firmly seated or with the bump stop spring not sufficiently compressed can move during exposure to airframe vibrations and rotor downwash buffeting during normal helicopter operations. That movement can lead to accelerated wear of the hoist cable close to the ball-end fitting where it enters the hook assembly.

A rescue hoist cable that exhibits ongoing loosening of the outer strands, may have accrued damage from incorrect stowage following hoist operations. If the hook assembly is not firmly seated or is noted to be incorrectly stowed, during the required post-flight inspection particular attention should be paid to the ball-end of the cable for evidence of localised thinning or necking-down, broken wires or deformed strands. Such defects can reduce the cable integrity and compromise the safety of the rescue hoist system.



Rescue hoist and hook assembly  
(Source: NSW Parks and Wildlife Service)



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**AO-2020-013-SAN-001:** The ATSB advises all helicopter operators and flight crew involved in rescue hoist operations to review their current operational practices to ensure hoist operation and hook stowage are in accordance with the hoist manufacturers' published procedures.

In addition, the ATSB advises those operators, flight crew and maintainers to closely review the pre- and post-flight inspection requirements of the hook and cable assembly, along with any recurring scheduled maintenance of the hoist system, to ensure that they are completed in accordance with the manufacturers' instructions.

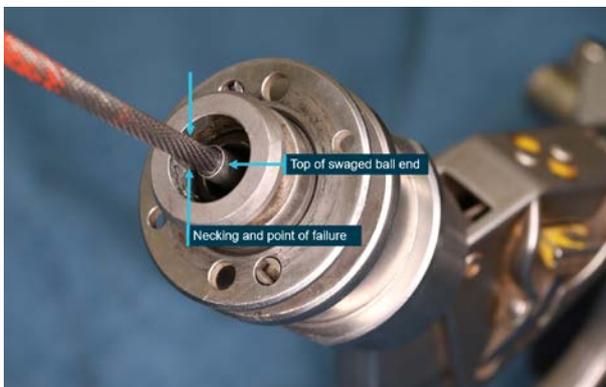
Read more about this ATSB investigation: [AO-2020-013](#)



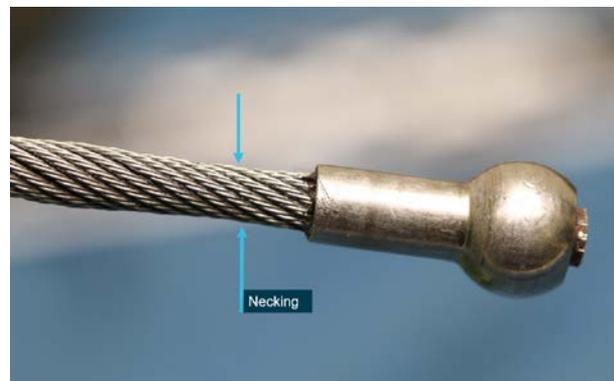
Failed cable and hook assembly from VH-UAH  
(Source: ATSB)



Close view of the failed cable from within hook assembly  
(Source: ATSB)



Exemplar hook assembly noting the failure location (Source: ATSB)



Damaged cable with necking due to wear  
(Source: ATSB)

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