



AIRWORTHINESS BULLETIN

AWB 25-033 Issue 1 – 9 July 2018

Helicopter Personnel Winching - Inadvertent Disconnect

1. Effectivity

May include, but not limited to, the following Helicopter winch hook and Personnel Carrying Device Systems (PCDS) combinations:

- Lifesavings Systems Corp. (LSC) D-Lok Hoist hook - P/N 410, 410G; and
- Safety Equipment Technical Services (SETS) Rescue Strop – P/N HW-STP; or
- Safety Equipment Technical Services (SETS) Y-Piece – P/N HW-YP

2. Purpose

To alert Search and Rescue (SAR) and Emergency Medical Services (EMS) operators to the potential for inadvertent release of a Human External Cargo (HEC) load from the winch hook, particularly with retrievals from water.

It highlights the mechanics of a new and previously unanticipated ring reversal disconnect.

3. Background

A SAR operator was despatched to conduct a search and rescue mission over water at night. The survivor was found and a Paramedic was winched into the water. The Paramedic passed the connected Rescue Strop over the head and under the arms of the survivor, checked the connections and made hand signals to the Crewman to raise them. As the Paramedic and survivor started to ascend the Paramedic wrapped his legs around the survivor, but immediately felt the survivor slip away. The survivor had become disconnected from the winch hook and remained in the water still in the strop, as the Paramedic continued to rise towards the hovering Helicopter. The survivor was subsequently retrieved using the same equipment.

The investigation discovered a form of ring reversal could occur with the hook and PCDS equipment that involves the attaching ring and webbing combining to depress both latches on the locking gate of the winch hook.

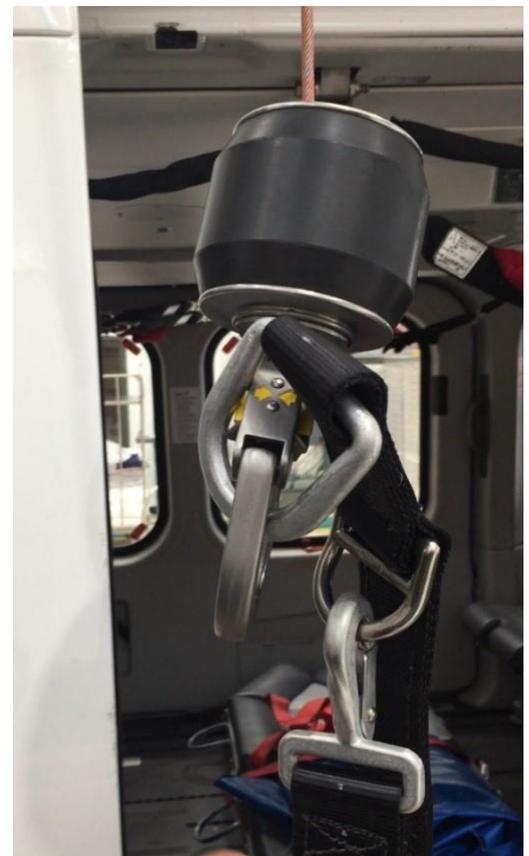


Figure 1 - Ring reversal with ring and webbing about to activate the dual lock latch gate



Subsequently it was identified that the same issue could occur with the SETS Y-Piece which contains the same D-ring attachment point.

It should be noted that all pieces of equipment mentioned in this AWB follow the latest recommendations and design practices, including those that are found in [CASA AWB 25-030](#) and [FAA SAFO 16015](#).

The investigation identified that during ring reversal, the ring can depress the lock on one side easily and fully. The webbing draped over the hook gate will often get caught on the high side of the guard of the opposite lock. However, it can also position directly onto the lock. Thus, any tension on the webbing easily depresses the second lock permitting the spring-loaded locking gate to open with the weight on the strop and disconnection follows, i.e. when winching in commences. If release occurs immediately, this is not necessarily a hazardous condition. However, if the webbing hangs up on the guard it is foreseeable that vibration and movement on the hook could allow the webbing to slide down activating the second lock at any point during the hoist which could result in a hazardous condition.

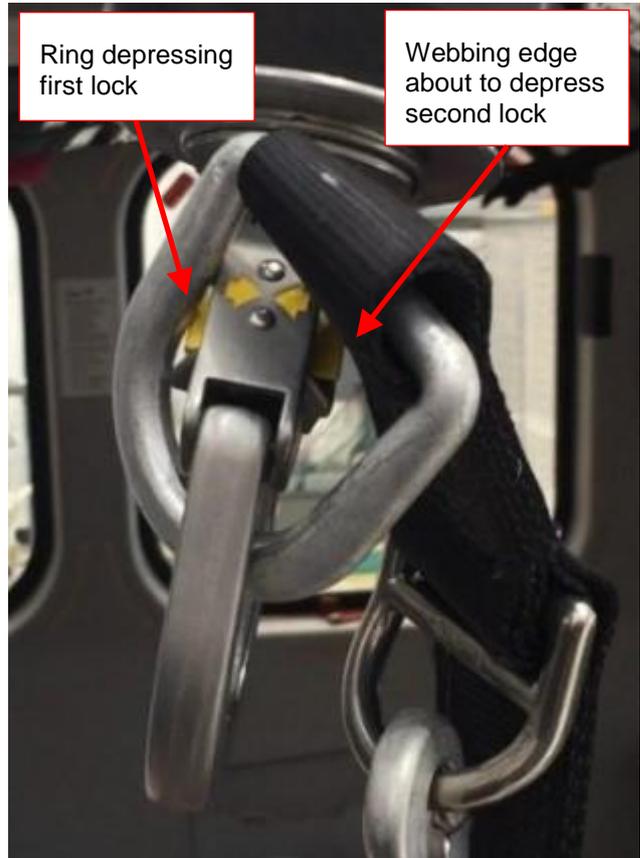


Figure 2 - Detailed view of gate lock activation

This [video](#) shows the disconnect mechanism.

CASA is aware of only one incident in 15 years using this combination of equipment which is commonly in use. Whilst extremely unlikely to reoccur, there is the potential for harm if the gate inadvertently opened at height.

SETS equipment is CASA approved under an Australian Technical Standards Order (ATSO). The LSC D-Lok hook is approved as part of the hoist installation.

FAA Technical Standards Orders (TSO) and ATSOs are design and manufacturing approvals which do not include installation. For fixed equipment, separate installation approval is required. For operational equipment it is the aircraft operator's responsibility to ensure compatibility between role equipment. Hook manufacturers cannot envisage every possible piece of equipment to be installed on their hook, nor can PCDS manufacturers design for every hook on the market.

At the time of publication, both equipment manufacturers were planning to release variations of their equipment designs to independently prevent the subject occurrence.

4. Recommendations

- a. All operators should ensure PCDS equipment used is compatible with their winch hook including susceptibility to ring reversal and dynamic rollout. See [CASA AWB 25-030](#) for further descriptions.
- b. Operators with the applicable equipment should immediately put into place operational defences such as training and procedures to ensure the ring reversal doesn't occur or can be detected upon initial winching and acted upon before a hazardous condition develops.
- c. Operators with the applicable equipment should consider airworthiness defences such as revised equipment or equipment combinations that guard against such occurrences.
- d. Operators with other equipment, including those utilising D-rings with similar dimensions to the Bourdon Forge D-ring P/N 2087, should recheck compatibility and susceptibility of winching equipment to the scenario provided in this AWB.

5. References

[CASA AWB 25-030](#) 'Helicopter Personnel Winching - Human External Cargo (HEC) Operations'

[FAA SAFO 16015](#) 'Possibility of D-ring Reversal or Dynamic Rollout During Winching and Longline Operations'

[ATSO-C1003](#) 'Helicopter External Personnel Lifting Devices'

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link email address:

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