

AirMed & Rescue

November 2020

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Rescue equipment – are you doing it right?

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Selecting the right equipment for your helicopter rescue mission can be a daunting task. Rob Munday from SR3 Rescue Concepts considers whether or not there is an answer for what is the 'right' rescue kit

There is a lot of confusion and uncertainty surrounding the 'correct' equipment that should be used in the helicopter rescue world. Often, operators use the same gear for decades, and can be reluctant to consider new options, let alone implement them. I often see examples of questionable gear being utilized in ways that I hadn't even thought possible that left me thinking: 'why'? This short piece is not the Magna Carta, nor is it going to be some kind of silver bullet for all organizations. The intent is to start a

conversation and get people thinking about ways to improve, implement change, and ultimately increase the level of safety for everyone involved.

Hardware – steel solutions

Hardware is always an interesting topic when it comes to aircraft rigging, and best practice suggests that steel is a better choice of material for high-workload situations than its aluminum equivalent. Steel can generally take more of a beating and often exhibits obvious signs of fatigue before failure, whereas aluminum items like carabiners and buckles have been known to fail with much less warning. A good rule of thumb is to utilize steel hardware for all human-load bearing connections where the additional weight of

steel is not of critical concern. When rigging a fall protection system within an aircraft cabin, thought needs to be given to what's known as 'load sharing' – ensuring that each hardpoint you use is not being overloaded in the event of a worst-case scenario fall. If you are planning on performing hoist rescues and your hoist is limited to 600lb, you should anticipate the potential for a 600-lb fall to occur, which relies on your in-cabin fall protection system to arrest. Redundancy should also be considered. We recommend that you look at your system and, wherever practical, create a backup so you are not relying on a single point which, in the event of failure, would result in serious consequences. Any equipment or rigging that will remain in the aircraft on a routine basis should be secured in a more permanent fashion. We recommend the use of what's known as 'quick links', made of steel, which can be tightened with a wrench and witness paint applied for easy pre-flight inspection. In saying that, there are circumstances where aluminum hardware is preferred. In situations like technical rescue, and for non-human equipment, it may be the preferred choice.

Lock vs non-lock

Another favourite topic of mine is locking vs non-locking hardware. Much confusion surrounds the definitions of 'double' and 'triple' action locking methods. The best way to think about this is to consider the action of opening the gate to be included in the count, and then make 'triple action' your minimum standard. So, if a carabiner requires a twist before the gate can be opened, that's a double action carabiner, and doesn't leave you with a huge margin of safety. If that same carabiner were to require an additional action to unlock the gate, you're in business! The same rule applies to snap hooks; there are several triple-action options available that significantly reduce the chance of inadvertent opening. The common theme is simple. You should be considering:

- The number of actions required to open the gate of your connectors,
- How easy these actions are to perform, both deliberately and inadvertently,
- The consequences of those actions if the unexpected occurs.

Look at everything with a critical eye, and actively try and find ways to cause a failure of your specific system. Modern carabiners and >



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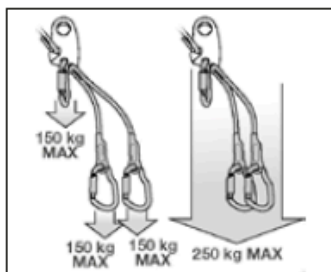
Petzl LEZARD

The **LEZARD** is designed for helivac rescues at height. An adjustable tail will instantly eject from the anchor on the wall, or cliff, if the helicopter is exposed to turbulence or needs to quickly leave a stationary position. This will immediately free the rescuer and victim from the wall, while keeping them securely attached to the helicopter.

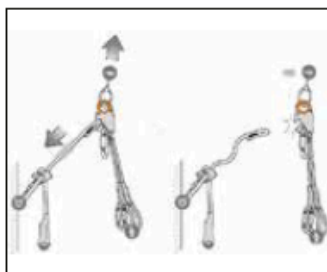
Using the LEZARD helivac lanyard is easy due to instant identification of color-coded attachment elements. The gold colored ADJUST on the yellow releasable tail allows for quick and precise length adjustments.

To learn more about the LEZARD and other Petzl solutions, visit [Petzl.com](https://www.petzl.com)

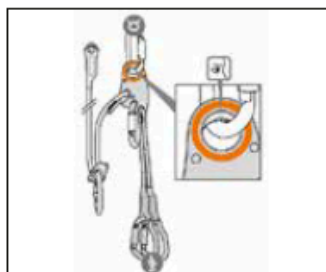
NOTE: Because of the specificity of the LEZARD helivac lanyard, training on how to use the product is mandatory, through Petzl or a certified body.



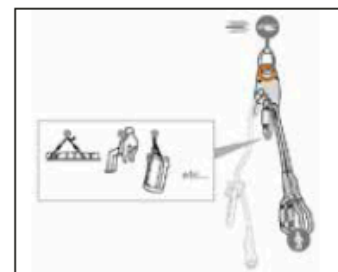
Individual and total load capacity for each attachment elements



When the LEZARD is connected to both the helicopter and the cliff, if an upward tensile load of at least 20 kg is applied to the anchored adjustable lanyard, the LEZARD releases its adjustable tail.



The adjustment tail cannot release if there is no weight applied to the LEZARD lock mechanism.



Connection for equipment or for a casualty when a higher point is needed.



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snap hooks are well designed. Even triple-action hardware can and should be easy to manipulate with practice, and should not be a reason to disregard it as a viable option in any circumstance outside of military operations. Auto-locking hardware should be preferred in most circumstances, as it removes the human element of simply forgetting to lock the gate closed. It is our opinion that screw gate carabiners have no place onboard a helicopter, and should be avoided at all costs. They are simply far too easy to find themselves in an unlocked state, and pose a significant hazard if this were to occur.

Restraint systems options

The aircraft cabin provides a huge opportunity for unsafe conditions when looking at 'safety' restraint systems such as retractable lanyards or adjustable length straps. These devices are used in two common scenarios – firstly, to secure the hoist operator and other rescue personnel inside the cabin during a rescue, and, to facilitate the safe and secure transition of personnel from safely in their seat with seatbelt on, to a position outside the cabin, suspended on the hoist hook and ready to be lowered. The basic principle of any fall protection equipment is simple. It is either a 'fall prevention' or a 'fall arrest' device, and the two should not be confused. A fall prevention device, as the name suggests, stops a fall from occurring and is the preferred option. It is generally kept either under tension, or with minimal slack, and holds the crew member in a position where a loss of balance results in only minor consequences. A fall arrest device does nothing at all until a fall has actually occurred, and the results of such a fall can end in the crew member potentially falling a significant distance, perhaps even outside the door and below the level of the cabin floor, before the fall is arrested. This can often occur when a fixed-length lanyard is adjusted too loosely for the mission, or a retractable lanyard is installed in a poor location inside the cabin. Regardless of the restraint lanyard you choose to use on board your aircraft, a triple-action hardware connector should always be the preferred choice.

Task-specific kit

A frustration of mine is seeing equipment being used for rescue that is of poor quality, unsuitable for the task, or that clearly serves other purposes outside of its primary function. As aviation professionals, we hold the aircraft

we fly, maintain and ultimately rely on to a very high standard. There is no reason why we shouldn't hold our rescue equipment to that same high standard. Regular inspections, maintenance, and replacement of equipment that is deemed questionable for use should be standard procedure.

The simplest way to maintain that high standard should be to clearly identify equipment that will form part of a dedicated rescue kit, and keep it set aside for that specific purpose. This equipment includes hardware like carabiners and lanyards, as well as harnesses, longlines (if performing short-haul human external cargo (HEC) missions) and rescue devices that will be used to retrieve injured or inaccessible subjects. This equipment should always be inspected



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pre- and post-use, cleaned, dried, and stored in a warm, dry ventilated area, ready for its next life-saving mission. You should be able to account for the entire life cycle of a piece of equipment. Keeping track of all your gear is of critical importance to ensure that the kit remains serviceable and safe to use for years to come.

Inadvertent release risk

On the topic of long-line rescue, also known as short haul, HEC, Class D fixed line and others, it's important to note that it's unacceptable these days to simply connect the long line via a single attachment point to the belly hook of the aircraft. All too often, we hear stories of inadvertent cargo releases occurring in the field during the transport of

non-human loads, which are often relatively inconsequential. However, if people are on the end of the line, it is essential to utilize a backup connection point. Regardless of whether that be a factory or aftermarket dual-hook setup, or a 'belly-band', or as the Federal Aviation Administration calls them, 'Portable Safety Device' – which is effectively a strap that wraps around the fuselage, through the door openings and collects at a backup hook under the aircraft – it is essential that some form of backup is in your system. While this 'belly band' method does usually require the addition of a crewperson in the aft cabin to release the hardware in the event of an emergency, the increase in safety is a worthwhile pursuit.

Hoist hook options

Lastly, with specific regard to hoist operations, serious consideration should be given to the type of hoist hook you are using. There are many different types commercially available, and while special use operations, such as specific areas of the armed forces, require exceptions to the rules, there are few excuses why the hoist hook in use shouldn't meet the same standard as a triple action carabiner mentioned earlier. The D-Lok hook produced by Lifesaving Systems is a great example of this, as it requires the independent actions of depressing two separate buttons (actions 1 and 2) prior to the third action of physically opening the gate to be possible. If you haven't heard of dynamic rollout, and are still using a hook that does not automatically lock, you are doing yourself and the people you rescue a disservice, simple as that. An online search will yield numerous fatal accidents reports due to this phenomenon, and this modern equipment is simply too affordable and easy to use for excuses to be made.

Review, research and prevent accidents happening

Regardless of whether you agree with what's written above or have differing views, I encourage you all to take a very critical inward inspection of your own systems, kits and procedures and actively try to find the faults – plug the holes in the Swiss cheese, so to speak. Ultimately, it is your life on the line and it's always painful to read about preventable accidents that could have been avoided simply by sharing known information between colleagues. After all – 'you don't know what you don't know'. ●

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