

Pre-Rigging

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Prerequisites

Before attempting this module, you must have demonstrated that you can properly:

1. Use and care for rope.
2. Use and care for vertical rescue equipment.
3. Tie correctly and without hesitation all the knots specified in this training package.
4. Apply the principles of vertical mobility.
5. Apply the principles of vertical rescue.
6. Apply the principles of safe rigging.
7. Demonstrate an aptitude for vertical rescue operations.
8. Demonstrate an appreciation and understanding of the hazards, aims and requirements of vertical rescue.

Objectives

At the completion of this module, you should be able to:

1. Explain the aim and principle of pre-rigging.
2. Identify examples of pre-rigging.
3. Suggest possible systems or sub-assemblies which lend themselves to pre-rigging.
4. Explain why knots should not, in general, be left tight in rope.
5. Explain why permanent knots are acceptable in some pre-rigs.
6. Describe safe protocols for use with pre-rigs using both permanent and non-permanent knots.

Terms

Permanent Knot: A knot tied in rope, tape or cord which is intended never to be undone.

Pre-Rigging: Assembling or rigging systems or sub-assemblies prior to a rescue for the purpose of reducing on-the-job time to access the casualty and perform the rescue.

Introduction

Pre-rigging is the hands-on side of preparation for a vertical rescue. The aim is to rig identified systems or sub-assemblies prior to the event in order to reduce the time to access and rescue a casualty.

To apply Pre-Rigging to vertical rescue requires:

- Accurate intelligence of the nature and scope of vertical rescues to be performed.
- Experience
- Sound knowledge of vertical rescue systems.

WARNING

Pre-Rigging without adequate planning and experience could lead to increased response times. De-rigging a pre-rig in order to do a job, should be an exception rather than a rule. Regular critical reviews of pre-rigging protocols adopted by the unit are necessary to avoid inappropriate pre-rigging.

IF IT DOESN'T SAVE TIME ON THE JOB - DON'T PRE-RIG.

Few units have sufficient equipment to pre-rig all the possible systems they may need. Compromise and skillful application of the principles of pre-rigging will yield the required on the job time benefits, without the need for extra/excessive dedicated equipment.

Care and Maintenance and Pre-Rigging

One of the golden rules of ropemanship has been around for a long time: "Do not leave knots in ropes". If a knot is left tight in a rope for a long period of time, the rope will take on a permanent set - it will be deformed if the knot is untied. This does result in

weakness if the deformed part of the rope is loaded *after untying*. If the knot is never untied, there is no reason to believe the knot is weaker than a newly tied knot. To distinguish a permanent knot from a normal knot, it is suggested that permanent knots be identified by heat shrink or a cable tie fastened around the knot itself. **Retying a knot after deformation of the rope is observed is unacceptable practice and must not be done. The deformed section of rope should be cut off.**

This provides the basis for some reasonable protocols when it comes to pre-rigging. If the knot will never be untied again, such as in a prusik loop, say, don't loosen or untie it. If it may have to be untied, make sure it is untied after use - if pre-rigging is desired, retie it but do not tighten the knot! When the knot is about to be used, check it, dress it (if it wasn't correctly dressed) and tighten it.

WARNING

Pre-Rigging does not negate the need for inspection and checking of all ropes and equipment after every job. Inspection and checks are an integral part of pre-rigging, and critical to the safety of all users.

Systems or sub-assemblies must not be pre-rigged unless they have been inspected and checked.

Rigs with Permanent Knots

Examples of rigs with permanent knots include:

- Prusik loops
- Ascender rigs (foot loops, safeties, etc)
- Cow's tails (for use as a safety when attached to the harness)
- Etriers
- Haul safe or haul-trak personal haul systems
- Leg loops or chest harness tied from tape

Other possibilities which may be suitable for permanent knots are:

- Some haul systems e.g. Rescue mate

- Short lengths of rope used either as slings, or to assist in knot passes during hauling operations
- Loops in each end of a reversible safety line

The important thing to consider in any of these cases, if permanent knots are to be used they must *never* be untied. This means it is pointless considering the use of permanent knots in say a rescue mate if you intend stripping the rope out of the rescue mate occasionally for some other purpose.

Where permanent knots are used, it may be worth considering the use of tube tape over any permanent loops to help increase the wear life of the loop.

Pre-Rigging Without Permanent Knots

This is where the scope is to really improve response times in vertical rescue. This type of pre-rigging is currently used, for example, in:

- Bagging ropes (assuming it is bagged ready to deploy)

However, it may be used in many other situations, such as:

- Reversible safeties
- Larkin Frame Back Guys
- Haul Systems
- Load lines (possibly?)
- Partial assemblies of Larkin Frame in the bag
- Stretcher spider
- Slings

Bagging Rope

The procedure when bagging a rope is as follows:

- Untie all tight knots in the rope
- Tie a stopper knot in the end
 - If the bag has a hole big enough to accept the rope, tie a figure eight 0.5m from the end and poke through the hole from the inside, then tie another figure eight on the outside. This keeps the bag

on the rope, and the rope in the bag.

- If the bag has a loop inside, tie a figure eight loop through the loop in the bag.
- If no way of attaching the rope to the bag, tie a loose figure eight loop as a stopper.
- Feed the rope into the bag in a random pattern, avoiding coils and kinks. Inspect the rope whilst doing so.
- When all the rope is in the bag, tie a loose figure eight loop in the top end of the rope. After tightening, the rope will be ready for rigging and deployment.
 - If the pack has a clip at the top, connect the clip through the figure eight loop. This aids finding the end of the rope, and signifies that the rope is correctly bagged, checked and ready for use.
- Complete the rope log

Do not tighten any of the knots when bagging rope. Final tightening should occur just before use.

Reversible Safety (with permanent knots)

- Attach a karabiner to the reversible safety descender
- Tie a figure eight loop in each end of the reversible safety line
 - Ensure the knots are tight (if permanent knots are to be used)
 - Use tube tape in permanent loops to improve wearability
- Rig the line into the descender ready for use
- Use a karabiner to attach the ascender to the reversible safety line, and lock the karabiner gate
- Tie the shock cord to the front of the ascender
- Halve and chain the reversible safety line (away from the descender)
- Chain the shock cord (away from the ascender)

After each use of the reversible safety:

- Reverse the reversible safety line so wear is distributed, and the same section of

rope is not always set in the descender when stored

- Inspect the rope
- Inspect and check all equipment
- Complete the rope log
- Halve and chain the rope (away from the descender)
- Chain the shock cord (away from the ascender)

Larkin Frame Back Guy

- Tie a figure eight loop in each end of the rope
- Attach one loop to the anchor karabiner along with the descender
- Reeve the back guy pulley to the rope and attach the karabiner ready for attachment to the Larkin Frame
- Reeve the rope through the descender with about 5m rope to the running end.

After each use of the Back Guy:

- Reverse the guy rope
- Inspect the rope
- Complete the rope log
- Untie and retie (loosely) the figure eight loops unless permanent knots are used.

Haul System

- Tie a figure eight loop in each end of the rope
- Reeve pulleys on the rope as required and fit with karabiners ready for attachment
- Attach ascender and lock its attachment karabiner
- If a piggy back system is the normal rig, tie a loose alpine butterfly in the approximate typical position in the system where the anchor is required and connect to a karabiner

After each use of the haul system:

- Reverse the rope to distribute wear
- Untie and retie (loosely) the end loops, unless permanent knots are used
- Inspect the rope
- Complete the rope log

Load line

If a rope is dedicated to the load line, and will not be used for access or other purposes, the load line can be pre-rigged with the stretcher attendant tie in and a stopper knot, and reeved through the main brake (descender), which is attached to the anchor karabiner.

To distribute wear, the rope should be reversed after each use. Permanent knots should not be used in the load line due to the possibility of needing to extend the line (requiring the untying of the stopper knot). As a result all knots should be untied and retied loosely after each job.

It is quite unlikely that pre-rigging a load line will give a significant time advantage. A rope bagged as described above only requires the tying of an alpine butterfly for the stretcher attachment point, and reeving through the main brake to be ready to run.

Larkin Rescue Frame

Assembly of the Larkin Frame can be greatly sped up by pre-assembling some parts:

- Leave connectors in poles on disassembly. Joiners should be left in the lower sections so the upper sections are ready for assembly into a half size frame if required.
- Leave pins in connector/pole subassemblies
- Leave hinge pole and “hip bones” assembled

Stretcher Spider

Stretcher spider should be left pre-rigged with karabiners for attachment to the stretcher.

Slings

Slings tied from tape can be pre-rigged. The instance of the need to join tapes is less frequent than using a single tape to do a job, so there is a net benefit in pre-tying the slings. Loosely tie the sling before packaging the sling for storage. Tapes 5m long and under, fold repeatedly until a single overhand knot can be tied in it to produce a handy, recognizable parcel. Tapes longer

than 5 metres should be chained away from the knot. This makes long and short slings readily recognizable, and handleable.

When used:

- Tighten and check the knot
- Rig as required

After use:

- De-rig
- Untie the knot
- Inspect the tape
- Loosely tie the knot, and parcel the tape

Questions for Review

1. Explain why permanent knots should not be untied.
2. Explain why knots other than intentional permanent knots should be untied after each job.
3. List 5 examples where permanent knots are commonly used.
4. Explain the procedure for correctly bagging a rope.
5. Discuss the adverse affects of inappropriately applied pre-rigging.
6. What is the aim of pre-rigging?

Activities

1. Set up your own VM kit, and practice donning the kit in the minimum time possible. (A good guide is about 2 minutes from opening the kit bag to asking for a gear check).
2. Set up a pre-rigged reversible safety. Practice rigging, and pre-rigging options to minimize rigging time on the job.
3. Set up a pre-rigged haul system. Practice rigging, and pre-rigging options to minimize rigging time on the job.
4. Practice assembly and disassembly of the Larkin Rescue Frame, with the aim of minimizing assembly/rigging time.
5. Develop and practice your unit's pre-rigging protocols with the team, to minimize the over time to set up a total VR system.