Rope Connections for Kernmantle Rope Extension

20171021-TER-REC0004 Terrestrial Rescue Recommendation

1. Introduction

On occasion, there is a need to extend ropes to be used within a rescue, when joining conventional kernmantle ropes used for rescues purposes, a limited range of knots/bends offer the best performance when working with rescue loads.

This recommendation identifies the knots to be used for this purpose.

2. Recommendation

Suitable knots for connecting ropes to extend them are:

- Ropes with sewn terminations: 10 mm standard maillon connector
- Ropes with NO GROUND CONTACT:
  - Double or Triple Fisherman's Bend.
- Rope with NO GROUND CONTACT BUT HIGH TENSION:
  - Reef (square) Bend with Double Fisherman's backup
  - Double or Triple Fisherman's Bend or
  - Figure Eight Bend
- Ropes WITH GROUND CONTACT:
  - Flat Double Overhand Knot
  - Postman's Knot
  - Single Flat Overhand Knot with ropes of the same diameter and type

Pictures of these knots can be found in the glossary in section 4.

All knots must be properly dressed and all strands must be individually set prior to use. Bends require tails to be at least 10 times the rope diameter. Knots require sufficient tail to allow at least one roll.

3. Explanatory notes

The highest strength performance for connecting conventional kernmantle ropes is to use sewn rope loops terminations in conjunction with a 10 mm oval maillon rapide. This method of connection also provides the highest level of protection against jamming the rope connection into cracks and fissures.

Where knots have to be tied to achieve the connection, it is recommended that only a limited number of knot types are used. These knots maintain a good strength performance after they have been tied and dressed properly.

When there is no risk of the rope(s) being in contact with the ground and/or running over edges then a Double or Triple Fisherman's Bend can be used.

Similarly where ropes are subject to high tension it can make it very difficult to untie these knots, the use of a reef bend with double fisherman's bends as back up or Figure of Eight bend may be used. An example of an application for these ties would be to join ropes for use in aerial ropeways.

Where knots may be in contact with the edges the use of double overhand knot or postman's knot allow the ties the move across ground with a reduced risk of jamming.

4. Glossary

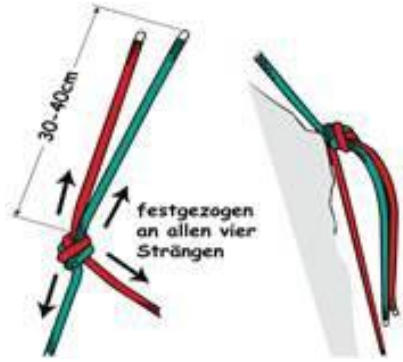
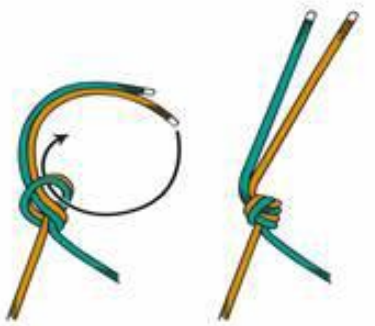
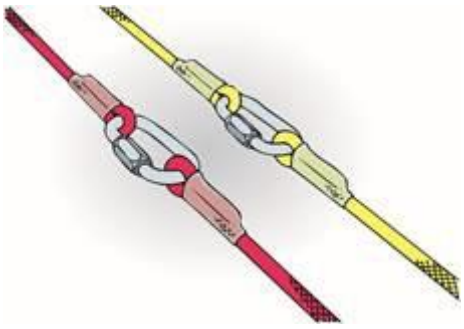
Flat Single Overhand Knot	 
Flat Double Overhand Knot	 

Figure of Eight Bend	
Flat Figure of Eight Knot	
Reef (square) Bend with Double Fisherman's Backup	

Double Fisherman's Bend	 
Triple Fisherman's Bend	
Sewn Loop/Maillon Connections	

Postman's Knot	
Dressing a Knot	A knot that has good form/shape with the rope strands correctly laid up; rope tails, loops or eyes are of a suitable length for use.
Setting a Knot	Once a knot has been dressed it should be set by firmly pulling/loading the ropes, tails or loops to firmly tighten all the strands used to tie it.

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History of Revisions	
issued	1996 Karpacz (PL)
revised	2000 Chamonix (F)
revised	2010 Stary Smocovec (SK)
revised	2013 Bol (HR)
revised	2014 South Lake Tahoe (US)
revised	2017 Soldeu (AND)