Load Testing

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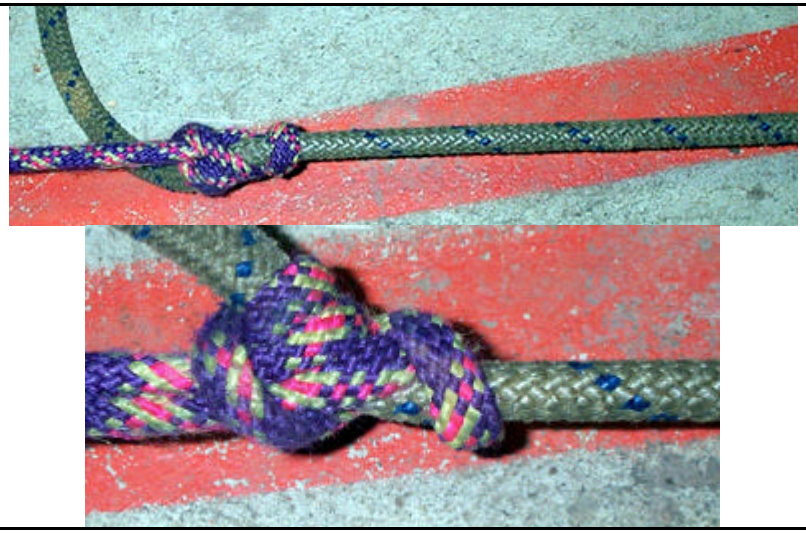
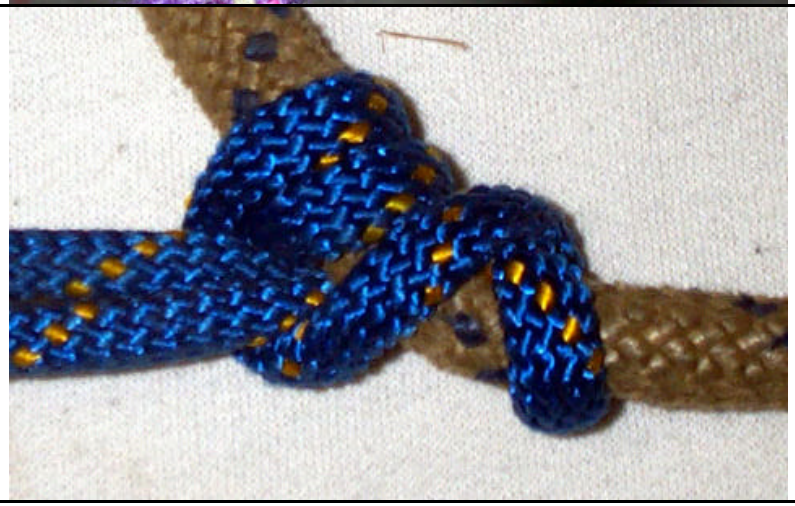
The following load tests were completed in the Oberon State Emergency Service (SES) headquarters on the evening of July 29, 2004. The load cell is a StraightPoint NIP/5T 5 tonne load cell with remote read out unit. Calibration data confirms this load cell is accurate to +/- 2kgs over full scale. Force was applied using a 2.5 tonne Tirfor hand winch with a 2:1 MA pulley.

All tests were done on an old piece of 11mm Bluewater II static life rescue line.

Test	Failure Load, kgs	Photo	Notes
7mm double wrap prusik loop	371		Prusik loop slipped at 371 kgs. Loop was well used and condemned due to localised damage to the sheath.

Test	Failure Load, kgs	Photo	Notes
7mm triple wrap prusik loop	>710		Prusik loop itself failed at 710 kgs at the location of previous sheath damage. (Same loop as used in the 7mm double wrap prusik test).
6mm double wrap prusik loop	409		Prusik loop slipped at 409 kgs. Compare this with the double wrap 7mm loop and the “biting” effect of smaller diameter prusik loops is evident. The prusik loop appeared new though the history of the loop was not known.

Test	Failure Load, kgs	Photo	Notes
6mm triple wrap prusik loop	921		Prusik loop slipped at 921 kgs. Same prusik loop as above.
6mm 4 wrap Klemheist knot	935		Loop failed in the knot at 935 kgs after slipping approximately 210mm and twisting the 11mm load line until the knot could not slip anymore. If you ever want to make a rope simulate a boa constrictor… this is how you do it!

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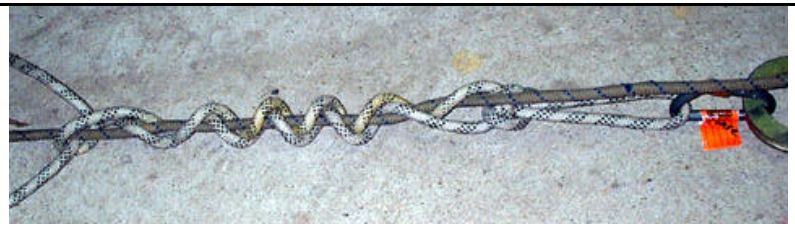
11mm Rope Dog	>150		The 11mm rope dog was loaded to 150 kgs without slippage, however, the load had to be released and reapplied in order to straighten out a sling problem at one of the anchor points. On reapplication of the load the rope dog failed to reach the previous hold load of 150 kgs before slipping. The performance of the rope dog may have been affected by the rope combination: the load line was very stiff old Bluewater II while the rope dog was from very supple Edelrid 11mm static. Rope dogs are not part of NSW SES VR Protocol.
Abnormally loaded Figure Eight Bend	1371		The 11mm load line failed in the knot exactly the same way it failed in a previous test at Kiama. **The abnormally loaded figure eight bend is not part of NSW SES VR protocol. It has received much publicity in recreational canyoning circles as a suitable knot to join ropes because it presents a smooth face to pull down over the edge and so reduces the risk of jamming the knot on the edge, however, the author has observed first hand this knot slipping through while canyoners have been abseiling on it, and so expressly warns against the use of this knot. Both load tests the author has observed on this knot have shown significant slippage up until a high enough load was developed to "lock" the knot. The author speculates that**

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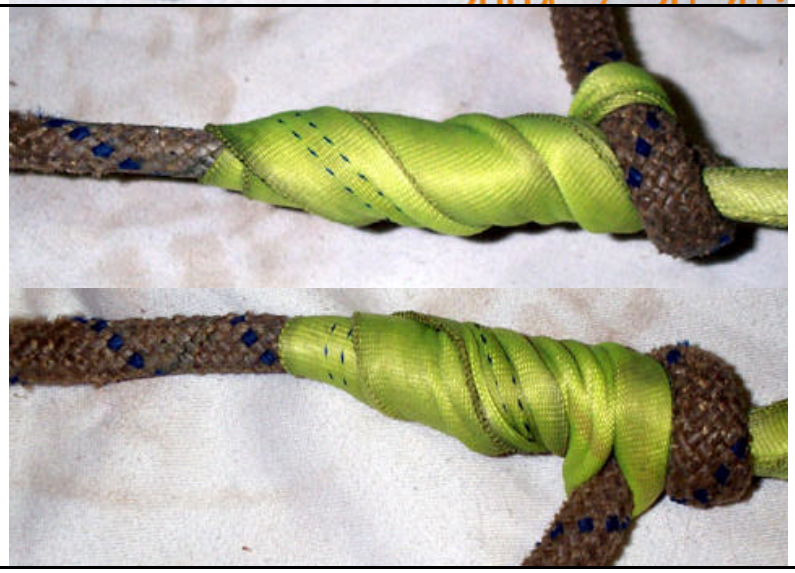
			**during abseiling activities there is insufficient load to "lock" the knot and so the knot continues to slip and should not be considered safe for life support.**
Klemheist tape knot	>1371		This knot was tested simultaneously with the abnormally loaded figure eight bend. Up until the figure eight failed, the Klemheist was behaving exactly the same was as the 6mm rope Klemheist in that it steadily twisted the 11mm load line as the knot slipped. The tape was 25mm mil-spec tube tape.

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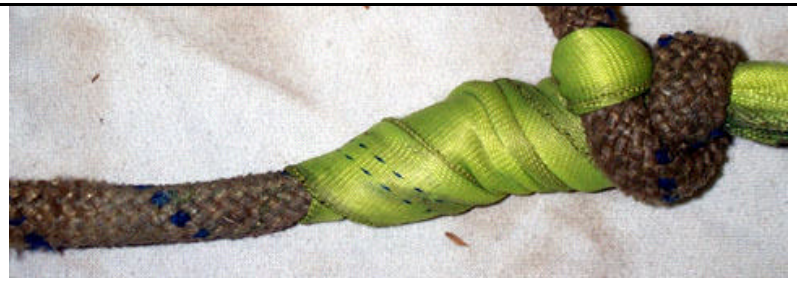
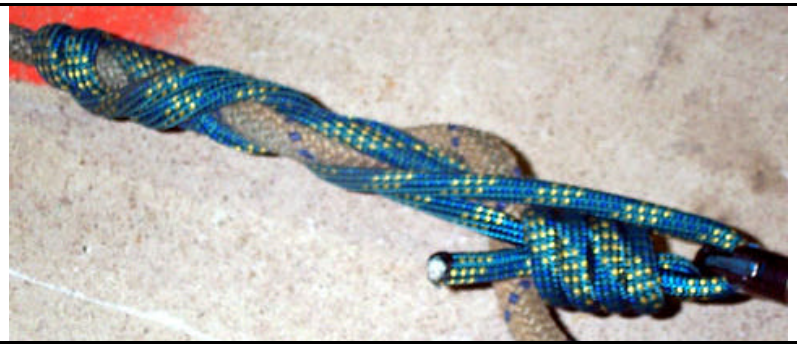
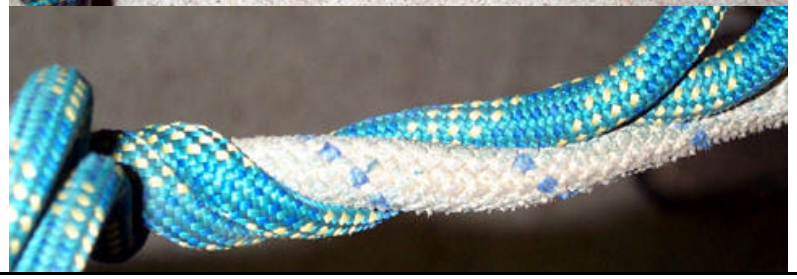
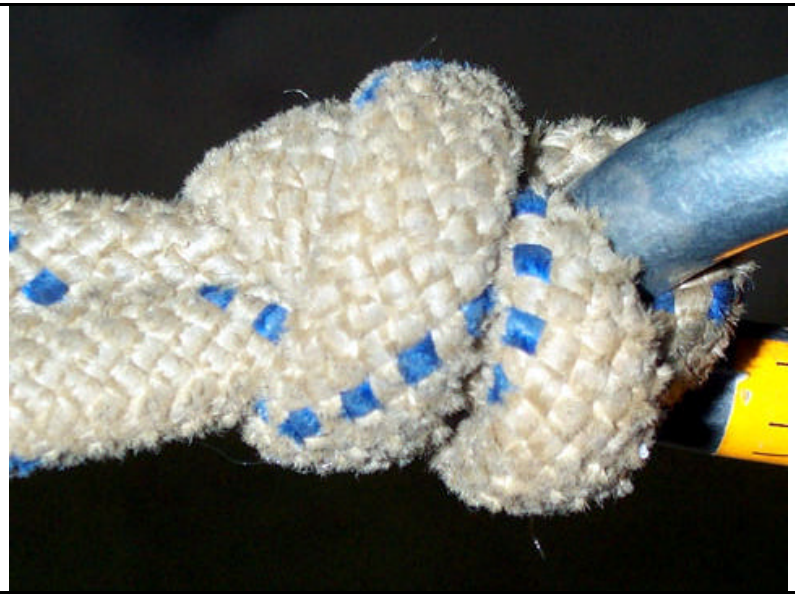
			
8mm French prusik	773		Slipped about 200mm at a maximum load of 773 kgs twice before welding to the rope. The prusik sling was fairly new 8mm static kernmantel cord. Note the weave patter of a French Prusik under load is similar to a rope dog, except that the overlapping part does not alternate as it does in a rope dog.

Test	Failure Load, kgs	Photo	Notes
		 	

Test	Failure Load, kgs	Photo	Notes
Half Double Fishermans Loop	>1371		This Half Double Fisherman's Loop was used to anchor the load line to the load cell for all the tests. This knot is not part of the NSW SES VR protocol. This knot was tested as it is a common anchor knot used by equipment suppliers in pre-rigged systems. It is compact and grips the attachment point (karabiner) very tightly. This test was not definitive. Further testing is required to compare it with both the Double Fisherman's Loop and the Figure Eight Loop which are preferred methods in the NSW SES VR Protocol. The author intuitively expects the Half Double fisherman's loop to fail at lower loads than the Double Fishermans loop.

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