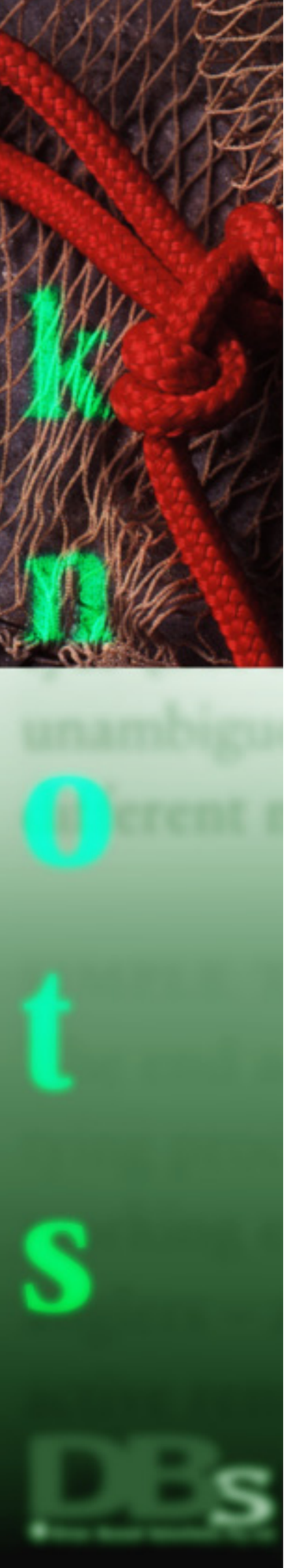

Rope type and care

In rescue situations, 11mm Static kernmantle rope is commonly used. Static rope has low stretch characteristics, is lightweight, strong and easy to handle. Dynamic ropes are used for fall arresting situations, due to their 'bungy effect' properties.

Rope must be cared for to maintain its design properties. Dirt and grit will damage the inner core, which carries the load. The outer sheath is merely a protective layer to the inner core fibres. Contact with all chemicals, petroleum products and contaminants must be avoided to maintain rope life.

Coiling the rope correctly will keep the inner core from twisting, and preserve rope life, particularly important when the rope is used in a pulley system. Twisting of the rope will increase friction, and cause hauling system failure.

Industrial ropes are rated at a minimum of 3000kg. This allows any knots in the system to reduce the rope strength to 2000kg. By further de-rating the rope by a factor of 7 to 1, the SWL (safe working load) is a minimum of 285kg. This allows two persons to safely use the one working rope for ascending and descending. The rescue operator uses a second independent rope as a safety line.

Karabiners are used to connect ropes, slings and harnesses. They should be rated above 3000 kg. Loadings are marked on the spine, and should be checked before use. Karabiners must be loaded and positioned correctly to maintain their design strength. Only lockable Karabiners are to be used.

Alloy Karabiners are lightweight, but subject to failure if dropped onto hard surfaces. They should only be used on harnesses, and personal fixing situations where excess weight is critical.

Steel karabiners have greater load capacities (5000kg and higher) and should be used in all rigging and anchor situations. They resist damage and maintain a longer life cycle in working situations.

Overview – the weakest section in the rigging determines the strength of a rope system. All components must be assessed and rated according to manufacturers specifications. Rescue loads are rated at 200kg, not including 'fall factors', so a risk analysis must meet this requirement if operations are to be safe and efficient.

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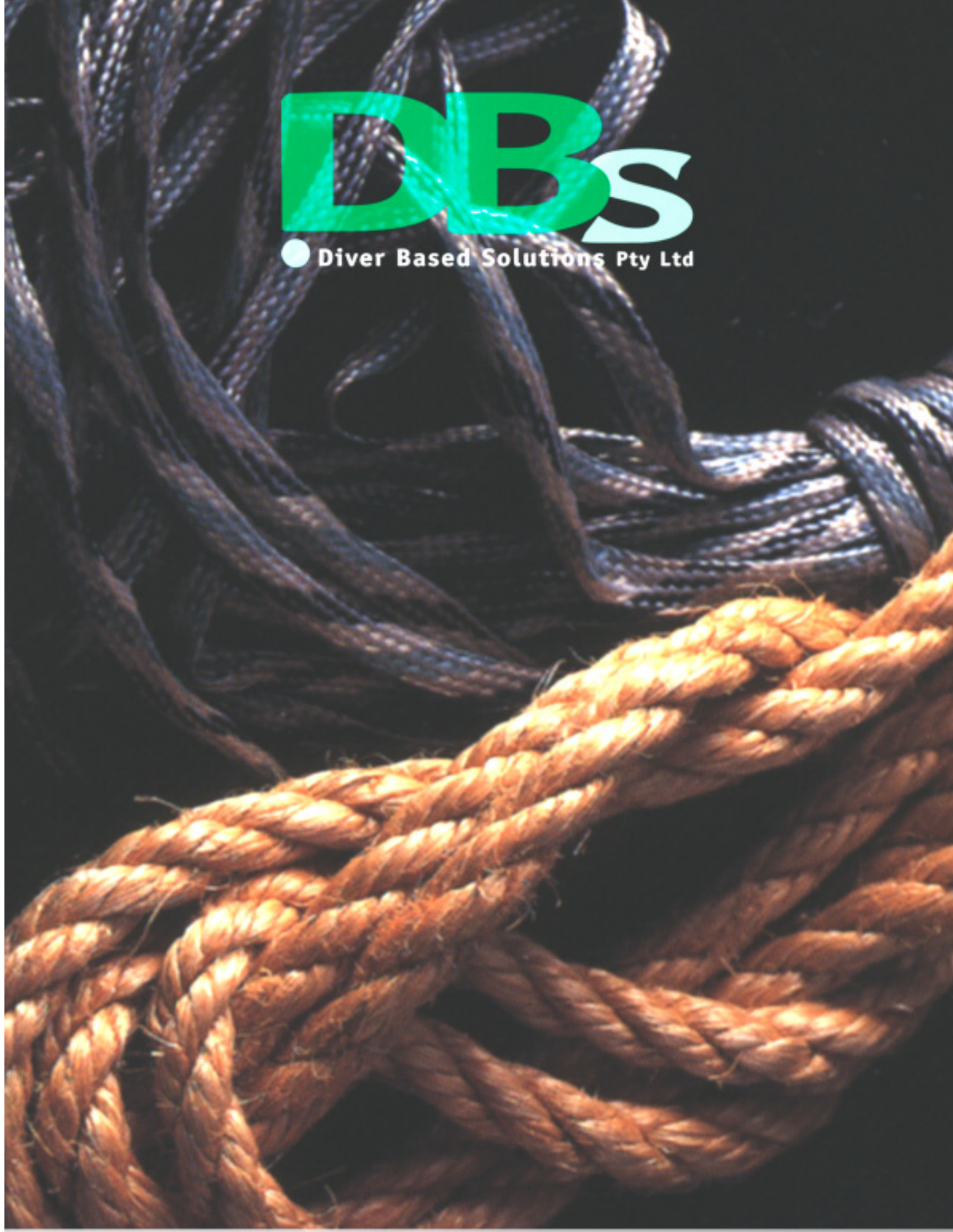


Knots and Ropes for Rescue and Safety

BACKGROUND – All knots reduce rope strength by some degree. These commonly used knots are selected for their safety characteristics. They have been load tested to failure, and perform better than many common knots used in other fields, such as fishing and boating. These knots leave a rope strength of 70% and better, if tied and dressed correctly.

All tail ends must be 'backed up' with a simple 'overhand' knot or barrel knot, to avoid slippage or accidental parting of a knot.
Knots must be properly finished off, or 'dressed' to maintain maximum strength. This helps prevent areas of the rope 'crossing over' each other, and helps decrease unnecessary load on the knot. Knot tying is a 'motor skill', and must be constantly practiced to train the mind and hands to co-ordinate efficiently.

Barrel knot –used for backing up the tails of other knots, is one half of a double fisherman's knot, forms a high strength slip knot for attaching to pulley beckets and can form a stopper knot in the end of hauling system lines.

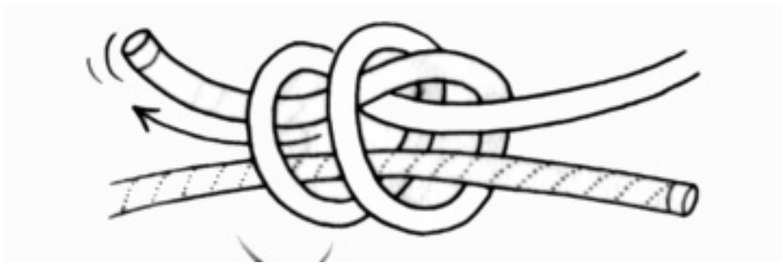
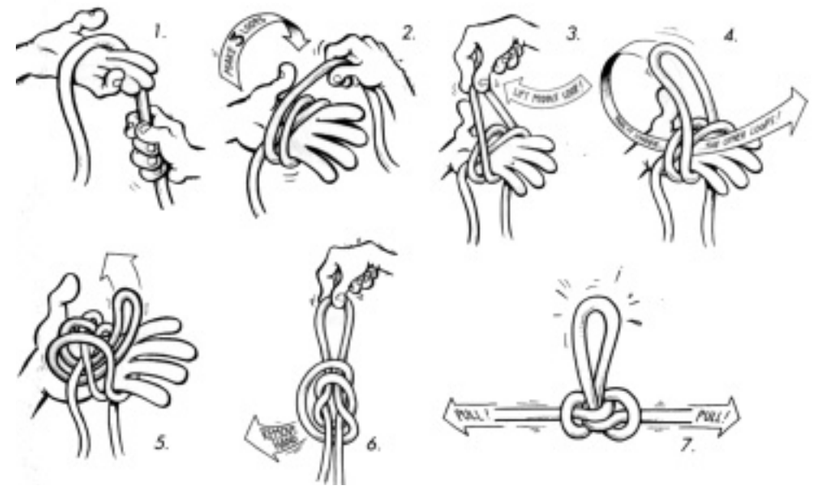


Figure of Eight – is the basis of the next two knots. It is the most versatile rescue and climbing knot, due to the many combinations available. It has a large energy absorbing capacity, and remains easy to untie after loading.

Alpine Butterfly – Used to form an inline loop, that can be loaded in all directions. Can also isolate a damaged section of rope, without cutting and joining.



Double Fisherman's knot – This is used for joining a rope into a looped sling, or joining two ropes together, when later untying is not critical.

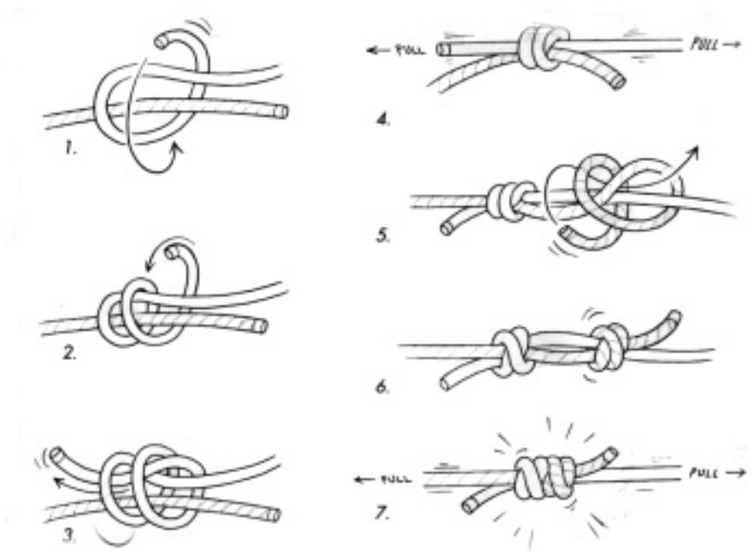
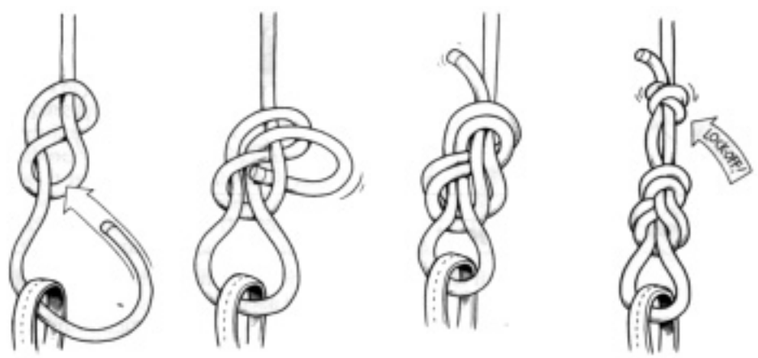


Figure of Eight on the Bight - When a pre-formed loop is required for attaching to a karabiner.

Figure of Eight Re-threaded – Used as a tie-in knot for direct attachment to a harness or anchor point. Also used for joining two ropes together, when later untying is necessary.



Double Bowline – has been superseded by the Figure of Eight as a safety knot, but still has a place for quick, reliable tie -offs.