



ROPE CONSTRUCTION METHODS



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DOZENS of methods are used to construct ropes. Examples of rope construction methods include laid (or twisted), three-strand twisted, eight-strand, twelve-strand, plaited, round plait, braided, double-braided and kernmantle. Most fall protection systems use laid or kernmantle ropes.

Laid ropes, also known as twisted ropes, are the most common. "Laid" is a generic term referring to ropes constructed by twisting a number of fibers together. The manufacturing process begins by twisting individual fibers together to create yarns. The yarns are then twisted into strands. The strands are twisted together once more to make the finished rope.

The number of fibers in the yarn will determine a strand's diameter and, eventually, the final rope diameter. Varying the tightness of twists used to make yarns and strands will result in ropes with different characteristics. A rope containing tight twists will be stiff, rigid and difficult to use. However, it will also be more resistant to abrasion. Varying the direction of the twists will result in ropes with different load-bearing characteristics. Laid ropes are inexpensive to make, easily inspected, can be made from almost any material and can be back-spliced. Laid ropes are often used as vertical lifelines, temporary horizontal lifelines, or in shorter lengths, as lanyards.

Kernmantle ropes are also used as components in fall protection and rescue systems.

Kernmantle ropes consist of two parts: the kern and the mantle. The kern is the inner bundle of strands that provides most of the rope's strength. The mantle is the rope's outer sheath and exists mainly to protect the load-bearing kern.

Kernmantle ropes can be static (low stretch) or dynamic (high stretch). To make a static rope, the kern fibers are either braided or placed parallel to each other inside the mantle. Under load, the fibers inside a static rope do not stretch very much (typically less than 4 percent at 10 percent of the rope's breaking strength). To make a dynamic rope, the kern fibers are placed loosely or twisted inside the mantle so they will stretch when placed under load (typically by more than 4 percent).

