

1. Rope Selection Criteria

Ensure that the correct type of wire rope is selected for the equipment by referring to the OEM's instruction manual or other relevant documents. If in doubt contact Bridon or Bridon's distributor for guidance.

1.1 Rope Strength

If necessary, refer to the appropriate Regulations and/or application standards and calculate the maximum force to which the rope will be subjected.

The calculation may take into account the mass to be lifted or moved, any shock loading, effects of high speed, acceleration, any sudden starts or stops, frequency of operation and sheave bearing friction.

By applying the relevant design factor and, where applicable, the efficiency of the rope termination, the required minimum breaking load or force of the rope will be determined, the values of which are available from the relevant National or International standards or from specific Product Data literature. If in doubt ask for advice from Bridon.

1.2 Bending fatigue

The size and number of sheaves in the system will influence the performance of the rope.

Wire rope which bends around sheaves, rollers or drums will deteriorate through bending fatigue¹. Reverse bending and high speed will accelerate the process. Therefore, under such conditions select a rope with high bending fatigue resistance. Refer to Product Data Information, and if in doubt ask for advice.

1.3 Abrasion

Wire rope which is subject to abrasion will become progressively weaker as a result of:

Externally - dragging it through overburden, sand or other abrasive materials and passing around a sheave, roller or drum.

Internally - being loaded or bent.

Abrasion weakens the rope by removing metal from both the inner and outer wires. Therefore, a rope with large outer wires should normally be selected.

1.4 Vibration

Vibration in wire rope will cause deterioration. This may become apparent in the form of wire fractures where the vibration is absorbed.

These fractures may be internal only and will not be visually identified.

1.5 Distortion

Wire rope can be distorted due to high pressure against a sheave; improperly sized grooves or as a result of multi-layer spooling on a drum.

Rope with a steel core is more resistant to crushing and distortion.

1.6 Corrosion

Rope with a large number of small wires is more susceptible to corrosion than rope with a small number of large wires. Therefore, if corrosion is expected to have a significant effect on rope performance select a galvanized rope with as large an outer wire size as possible bearing in mind the other conditions (e.g. bending and abrasion) under which the rope will be operating. The rope may have to be lubricated frequently in service or a galvanized rope may be selected.

1.7 Cabling

'Cabling' of rope reeving due to block rotation can occur if the rope is incorrectly selected. Applications involving high lifts are particularly vulnerable to this condition therefore, ropes specifically designed to resist rotation need to be selected.

1.8 Fixing of Rope Ends

Ropes which have high rotation characteristics must not be selected unless both ends of the rope are fixed or the load is guided and unable to rotate.

1.9 Connecting Ropes

In the event that it is necessary to connect one rope to another (in series) it is essential that they have the required strength, are of the same type and both have the same lay direction (i.e. connect 'right' lay to 'right' lay).

Failure to heed this warning could result in catastrophic failure particularly at a termination which is capable of being pulled apart (i.e. splice) due to unlaying.

1.10 Rope Length

Rope length and /or difference in length between two or more ropes used in a set may be a critical factor and must be considered along with rope selection.

Wire rope will elongate under load. Other factors such as temperature, rope rotation and internal wear will also have an effect. These factors should also be considered during rope selection.

1.11 Preformed and Non-preformed Ropes

Single layer round strand rope is normally supplied preformed. However, if a non-preformed rope is selected then personnel responsible for its installation and/or maintenance need to take particular care when handling such rope, especially when cutting. For the purposes of this instruction, Rotation Resistant ropes should be regarded as non-preformed ropes.

1.12 Operating Temperatures

Wire rope with a steel core should be selected if there is any evidence to suggest that a fiber core will not provide adequate support to the outer strands and/or if the temperature of the working environment may be expected to exceed 180 °C.

For operating temperatures above 200 °F de-rating of the minimum breaking force of the rope is necessary (e.g. between 200 °F and 400 °F reduce by 10%; between 400 °F and 600 °F reduce by 25%; between 600 °F and 800 °F reduce by 35%).

Do not use ropes with high carbon wires above 800 °F.

Failure to observe this general guidance could result in failure of the ropes to support the load.

For temperatures over 800°F, other materials such as stainless steel or other special alloys should be considered.

Rope lubricants and any synthetic filling and/or covering materials may become ineffective at certain low or high operating temperature levels.

Certain types of rope end terminations also have limiting operating temperatures and the manufacturer or Bridon should be consulted where there is any doubt. Ropes with aluminium ferrules must not be used at temperatures in excess of 300°F.