

4. Handling and Installation

- 4.1 Handling and installation of the rope should be carried out in accordance with a detailed plan and should be supervised by a competent person.

Incorrectly supervised handling and installation procedures may result in serious injury to persons in the vicinity of the operation as well as those persons directly involved in the handling and installation.

- 4.2 Wear suitable protective clothing such as overalls, industrial gloves, helmet, eye protectors and safety footwear (and respirator, particularly where the emission of fumes due to heat is likely).

Failure to wear suitable protective clothing and equipment may result in skin problems from over exposure to certain types of rope lubricants and dressings; burns from sparks, rope ends, molten lubricants and metals when cutting ropes or preparing sockets for re-use; respiratory or other internal problems from the inhalation of fumes when cutting ropes or preparing sockets for re-use; eye injuries from sparks when cutting ropes; lacerations to the body from wire and rope ends; bruising of the body and damage to limbs due to rope recoil, backlash and any sudden deviation from the line of path of rope.

- 4.3 Ensure that the correct rope has been supplied by checking to see that the description on the Certificate is in accordance with that specified in the purchaser's order.
- 4.4 Check by measurement that the nominal diameter of the new rope conforms to the nominal size stated on the Certificate.

For verification purposes, measure the diameter by using a suitable rope vernier fitted with jaws broad enough to cover not less than two adjacent strands. Take two sets of measurements spaced at least 3' apart, ensuring that they are taken at the largest cross-sectional dimension of the rope. At each point take measurements at right angles to each other.

The average of these four measurements should be within the tolerances specified in the appropriate Standard or Specification.

For a more general assessment of rope diameter use a rope calliper. ([See Fig 1](#))

- 4.5 Examine the rope visually to ensure that no damage or obvious signs of deterioration have taken place during storage or transportation to the installation site.
- 4.6 Check the working area around the equipment for any potential hazards which may affect the safe installation of the rope.
- 4.7 Check the condition of the rope-related equipment in accordance with the OEM's instructions. Include the following -

Drum

Check the general condition of the drum.

If the drum is grooved, check the radius and pitch and ensure that the grooves will satisfactorily accommodate the size of the new rope ([see Fig 3](#)).

Check the condition and position of the kicker plates or wear plates, if fitted, to ensure that the new rope will spool correctly on the drum.

Sheaves

Ensure that the grooving is of the correct shape and size for the new rope

Check that all sheaves are free to rotate and in good condition.

Rope guards

Check that any rope guards are correctly fitted and are in good condition.

Check the condition of any wear plates or rollers which are protecting structural members.

Failure to carry out any of the above could result in unsatisfactory and unsafe rope performance.

Note: Grooves must have clearance for the rope and provide adequate circumferential support to allow for free movement of the strands and facilitate bending. When grooves become worn and the rope is pinched at the sides, strand and wire movement is restricted and the ability of the rope to bend is reduced.

When a new rope is fitted a variation in size compared with the old worn rope will be apparent. The new rope may not fit correctly into the previously worn groove profile and unnecessary wear and rope distortion is likely to occur. This may be remedied by machining out the grooves before the new rope is installed. Before carrying out such action the sheaves or drum should be examined to ensure that there will be sufficient strength remaining in the underlying material to safely support the rope.

The competent person should be familiar with the requirements of the appropriate application/machinery standard.

Note: General guidance to users is given in the Wire Rope Users Manual.

Transfer the wire rope carefully from the storage area to the installation site.

Coils

Place the coil on the ground and roll it out straight ensuring that it does not become contaminated with dust/grit, moisture or any other harmful material.

If the coil is too large to physically handle it may be placed on a 'swift' turntable and the outside end of the rope pulled out allowing the coil to rotate.

Never pull a rope away from a stationary coil as this will induce turn into the rope and kinks will form. These will adversely affect rope performance.

Reels

Pass a shaft through the reel and place the reel in a suitable stand which allows it to rotate and be braked to avoid overrun during installation. Where multi-layer coiling is involved it may be necessary for the reel to be placed in equipment which has the capability of providing a back tension in the rope as it is being transferred from reel to drum. This is to ensure that the underlying (and subsequent) laps are wound tightly on the drum.

- Position the reel and stand such that the fleet angle during installation is limited to 1.5 degrees.

- If a loop forms in the rope ensure that it does not tighten to form a kink.

A kink can severely affect the strength of a six strand rope and can result in distortion of a Rotation Resistant rope leading to its immediate discard.

Ensure that the reel stand is mounted so as not to create a reverse bend during reeving (i.e. for a winch drum with an overlap rope, take the rope off the top of the reel).

4.9 Ensure that any equipment or machinery to be roped is correctly and safely positioned and isolated from normal usage before installation commences. Refer to the OEM's

instruction manual and the relevant 'Code of Practice'.

- 4.10** When releasing the outboard end of the rope from a reel or coil, ensure that this is done in a controlled manner. On release of the bindings and servings used for packaging, the rope will want to straighten itself from its previously bent position. Unless controlled, this could be a violent action. Stand clear.

Failure to control could result in injury.

Ensure that the as-manufactured condition of the rope is maintained during installation.

If installing the new rope with the aid of an old one, one method is to fit a wire rope sock (or stocking) to each of the rope ends. Always ensure that the open end of the sock (or stocking) is securely attached to the rope by a serving or alternatively by a clip. Connect the two ends via a length of fiber rope of adequate strength in order to avoid turn being transmitted from the old rope into the new rope. Alternatively a length of fiber or steel rope of adequate strength may be reeved into the system for use as a pilot/messenger line. Do not use a swivel during the installation of the rope.

- 4.11** Monitor the rope carefully as it is being pulled into the system and make sure that it is not obstructed by any part of the structure or mechanism which may cause the rope to come free.

Failure to monitor during this operation could result in injury.

This entire operation should be carried out carefully and slowly under the supervision of a competent person.

- 4.12** Take particular care and note the manufacturer's instructions when the rope is required to be cut. Apply secure servings on both sides of the cut mark.

Ensure that the length of serving is at least equal to two rope diameters. (Note: Special servings are required for spiral ropes, i.e. spiral strand and locked coil.)

One serving either side of the cut is normally sufficient for preformed ropes. For non-preformed ropes, (i.e. Rotation Resistant ropes) a minimum of two servings each side of the cut will be necessary.

Arrange and position the rope in such a manner that at the completion of the cutting operation the rope ends will remain in position, thus avoiding any backlash or any other undesirable movement.

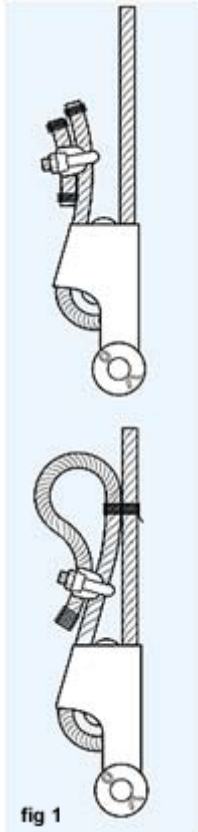
Cut the rope with a high speed abrasive disc cutter. Other suitable mechanical or hydraulic shearing equipment may be used although not recommended when a rope end is required to be welded or brazed.

When using a disc cutter be aware of the danger from sparks, disc fragmentation and fumes.

Ensure adequate ventilation to avoid any build-up of fumes from the rope and its constituent parts including any fiber core (natural or synthetic) any rope lubricant(s) and any synthetic filling and/or covering material.

Rope produced from carbon steel wires in the form shipped is not considered a health hazard. During subsequent processing (e.g. cutting, welding, grinding, cleaning) dust and fumes may be produced which contain elements which may affect exposed workers.

The products used in the manufacture of steel wire ropes for lubrication and protection present minimal hazard to the user in the form shipped. The user must however, take reasonable care to minimize skin and eye contact and also avoid breathing their vapor and mist.



4.13 Ensure that any fittings such as clamps or fixtures are clean and undamaged before securing rope ends.

Make sure that all fittings are secure in accordance with the OEM's instruction manual or manufacturer's instructions and take particular note of any specific safety requirements e.g. torque values (and frequency of any re-application of torque).

When terminating a rope end with a wedge socket, ensure that the rope tail cannot withdraw through the socket by securing a clamp to the tail or by following the manufacturer's instructions. The tail length should be a minimum of 20 rope diameters for all Rotation Resistant wire rope and a minimum of 6 rope diameters for 6 and 8 strand ropes.

(See Fig. 1 for two recommended methods of securing the rope tail of a wedge socket termination).

The loop back method uses a rope grip and the loop should be lashed to the live part of rope by a soft wire serving or tape to prevent flexing of the rope in service.

The method of looping back should not be used if there is a possibility of interference of the loop with the mechanism or structure.

Failure to secure in accordance with instructions could lead to loss of the rope and/or injury.

4.14 When coiling a rope on a plain (or smooth) barrel drum ensure that each lap lies tightly against the preceding lap. The application of tension in the rope greatly assists in the coiling of the rope.

Any looseness or uneven winding will result in excessive wear, crushing and distortion of the rope.

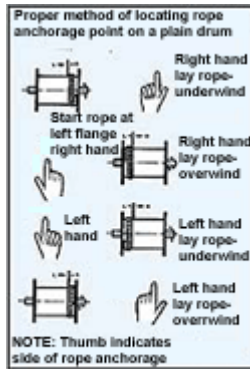


fig2

With plain barrel drums it is difficult to achieve satisfactory multi-layer coiling beyond three layers.

The direction of coiling of the rope on the drum is important, particularly when using plain barrel drums, and should be related to the direction of lay of the rope in order to induce close coiling.

(See [Fig. 2](#) for proper method of locating rope anchorage point on a plain drum.)

When multi layer spooling has to be used it should be realized that after the first layer is wound on a drum, the rope has to cross the underlying rope in order to advance across the drum in the second layer. The points at which the turns in the upper layer cross those of the lower layer are known as the cross-over points and the rope in these areas is susceptible to increased abrasion and crushing. Care should be taken when installing a rope on a drum and when operating a machine to ensure that the rope is spooled and layered correctly.

- 4.15** Check the state of re-usable rope end terminations for size, strength, defects and cleanliness before use. Non-destructive testing may be required depending on the material and circumstances of use. Ensure that the termination is fitted in accordance with the OEM,s instruction manual or manufacturer's instructions. When re-using a socket and depending on its type and dimensions, the existing cone should be pressed out. Otherwise, heat may be necessary.

When melting out sockets which have previously been filled with hot metal, the emission of toxic fumes is likely. Note that white metal contains a high proportion of lead.

Correctly locate and secure any connection pins and fittings when assembling end terminations to fixtures. Refer to manufacturer's instructions.

Failure to pay attention to any of the above could result in unsafe operation and potential injury.

- 4.16** Limit switches, if fitted, must be checked and re-adjusted, if necessary, after the rope has been installed.
- 4.17** Record the following details on the Certificate after installation has been completed: type of equipment, location, plant reference number, duty and date of installation and any re-rating information/signature of competent person. Then safely file the Certificate.
- 4.18** 'Run in' the new rope by operating the equipment slowly, preferably with a low load, for several cycles. This permits the new rope to adjust itself gradually to working conditions.

Note: Unless otherwise required by a certifying authority, the rope should be in this condition before any proof test of the equipment or machinery is carried out.

Check that the new rope is spooling correctly on the drum and that no slack or cross laps develop.

Apply as much tension as possible (2%-5% of the MBF of the rope) to ensure tight and even spooling, especially on the first layer.

Where multi-layer spooling is unavoidable, succeeding layers should spool evenly on the preceding layers of rope.

Irregular coiling usually results in severe surface wear and rope malformation, which in turn is likely to cause premature rope failure.

- 4.19** Ensure that the as-manufactured condition of the rope is maintained throughout the whole of the handling and installation operation.
- 4.20** If samples are required to be taken from the rope for subsequent testing and/or evaluation, it is essential that the condition of the rope is not disturbed. Refer to the instructions given in 4.12 and, depending on the rope type and construction, any other special manufacturer's instructions.