WIRE ROPE SAFE WORK PRACTICES

APPROVED JANUARY 4 2011

Wire rope is any stranded, braided cable made of metal. It can be used for hoisting, craning, towing, and guard rail construction.

Wire rope safe work practices and procedures

Take care when handling wire rope to prevent damage to the rope or the individual wire strands that will affect the strength and performance of the rope.

Prevent the formation of kinks because this displaces the strands of wire from their original position and relation to each other, causing severe bending and unequal strand tension. This distortion and wire displacement cannot be corrected, even under high tension, because a permanent weak spot remains in the rope. Displaced or raised wires indicate a previous kink, but do not show the extent of the damage to the inner rope wires.

Wire rope should never be pulled over a non-operating support such as a spindle bar, a pin, or an inoperative sheave because this causes severe abrasion to the outer strand wires.

A properly operating sheave or snatch block is essential to safety and to the long life of the rope. The use of worn sheaves with flat grooves should be avoided since they do not provide sufficient support to prevent the distortion and flattening of the rope as it passes over the sheave.

Sheaves having nicked or broken flanges are likely to cut or otherwise damage the rope and should not be used. An even distribution of wire rope coils over the hoist drum is essential to smooth operation and to preventing rope from cutting down through or crushing other coils on the drum, which can damage the ropeand cause difficulty in unreeling it.

Inspection and maintenance

To maintain wire rope in serviceable condition, three types of inspection should be carried out when it is in daily use:

- Daily inspections
- Monthly inspections
- Quarterly inspections

More frequently, more thorough inspections should be made if the condition of the rope indicates the need for them.

If wire rope has been idle for more than a month, a thorough inspection must be carried out before it is used.

Daily inspections

All running rope in continuous service should be inspected each working day before the rope is used for the first time. This inspection should cover the eye (the dead end of the rope where it is fixed to the boom) and the portion of the rope used most extensively in daily operation.

The eye should be inspected for abrasion, corrosion, broken wire, and loose or broken servings/seizing (the small wire wrapped around the wire rope to prevent fraying at the end of a non-rotating wire rope).

The remainder of the rope length normally used for daily operation should be inspected for areas showing kinks, sharp bends, or any evidence of damage or excess wear.

Idle rope

All rope that has been idle for a month or more must be given a thorough inspection that covers all types of deterioration before it re-enters service.

Replacement

It is difficult to determine the exact time to replace wire rope because many variable factors are involved. An experienced person must evaluate the remaining strength in a used rope taking into consideration the deterioration revealed during inspection.

One of the following reasons is sufficient for considering rope replacement:

- Six randomly distributed broken wires in one rope lay
- Three broken wires in one strand in one rope lay
- Wear of one-third of the original diameter of outside individual wires
- Kinking, crushing, bird caging, pining (flattening of strands) or any other damage resulting in distortion of the rope structure
- Reductions of more than 1/32 of an inch (.79mm) from the new condition nominal rope diameter

Installing wire rope clips safe work procedure

To install wire rope clips, do the following:

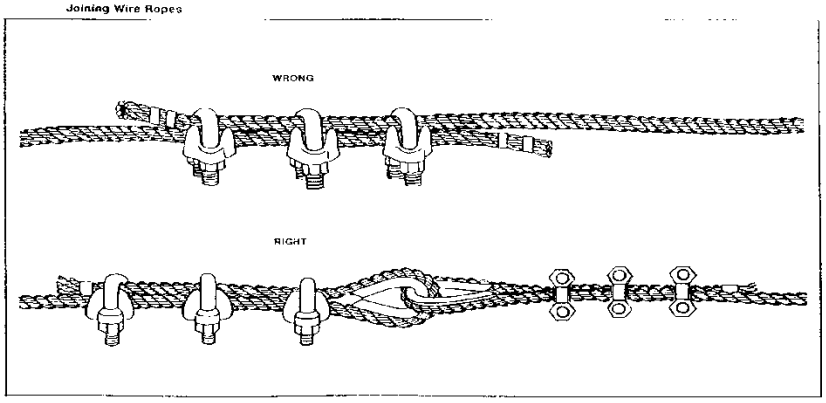
1. Wire the thimble to the rope at the desired point, band the rope around the thimble, and secure it temporarily by wiring the rope members together.
2. Attach the clip farthest from the thimble first and tighten it (be sure the base of the saddle rests upon the live end of the rope and the “U” bolts on the short end).

3. Put the clip nearest the thimble on next, but *do not* tighten it. (If one or more additional clips are to be attached, place them at an equal distance apart between the clips already attached.)
4. Attach all clips in the same manner as the clip farthest from the thimble.
5. Before tightening a clip, place some stress on the rope to take up the slack and equalize the tension on both sides of the clip. (***Do not*** apply too much stress, because if you do, the clip attached in step 1 will not hold.)
6. Tighten all clips to the recommended torque.

For further information, see the appropriate provincial regulations.

(Diagrams follow)

Joining Wire Ropes



Never use any kind of clip to directly connect two straight lengths of rope. If this is necessary, use the clips to form an eye (with thimble) in each length and connect the eyes together. (Fig. 1.86)

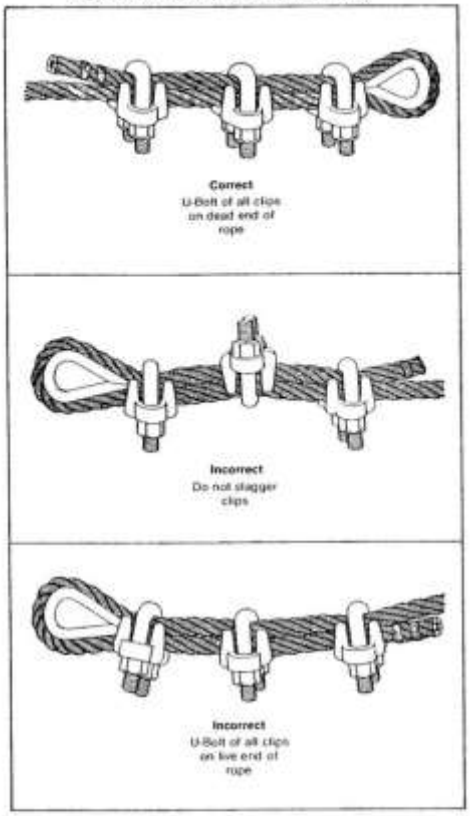
INSTALLATION OF WIRE ROPE CLIPS

Rope Diameter (Inches)	Minimum No. of Clips	Amount of Rope Turn Back From Thimble (Inches)	Torque in Foot-Pounds Unlubricated Bolts
1/8	2	3 1/4	—
3/16	2	3 3/4	—
1/4	2	4 3/4	15
5/16	2	5 1/2	30
3/8	2	6 1/2	45
7/16	2	7	65
1/2	3	11 1/2	65
9/16	3	12	95
5/8	3	12	95
3/4	4	18	130
7/8	4	19	225
1	5	26	225
1 1/8	6	34	225
1 1/4	6	37	360
1 3/8	7	44	360
1 1/2	7	48	360
1 5/8	7	51	430
1 3/4	7	53	590
2	8	71	750
2 1/4	8	73	750
2 1/2	9	84	750
2 3/4	10	100	750
3	10	106	1200

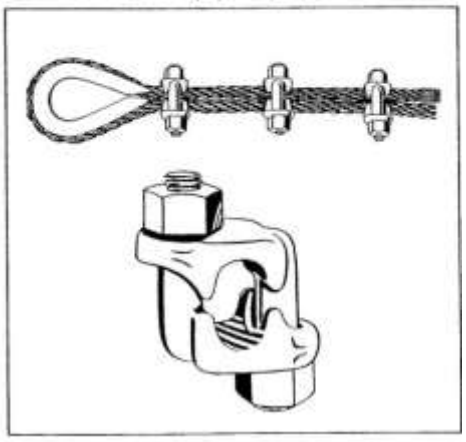
INSTALLATION OF DOUBLE SADDLE CLIPS

Rope Diameter (Inches)	Minimum No. of Clips	Amount of Rope to Turn Back (Inches)	Torque in Foot-Pounds Unlubricated Bolts
3/16	2	4	30
1/4	2	4	30
5/16	2	5	30
3/8	2	5 1/2	45
7/16	2	6 1/2	65
1/2	3	11	65
9/16	3	12 3/4	130
5/8	3	13 1/2	130
3/4	3	16	225
7/8	4	26	225
1	5	37	225
1 1/8	5	41	360
1 1/4	6	55	360
1 3/8	6	62	500
1 1/2	6	66	500

Right and Wrong Ways of Using Cable Clips



Double Saddle Clips (Fist Grip Clips)



Proper Method of Installing Cable Clips

STEP 1

APPLY FIRST CLIP — one base width from dead end of wire rope — U-Bolt over dead end — live end rests in clip saddle. Tighten nuts evenly to recommended torque.

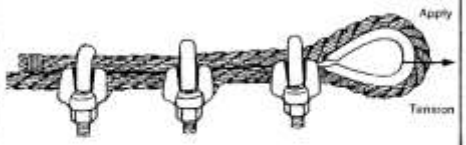
STEP 2

APPLY SECOND CLIP — nearest loop as possible — U-Bolt over dead end — turn on nuts firm but DO NOT TIGHTEN.

STEP 3

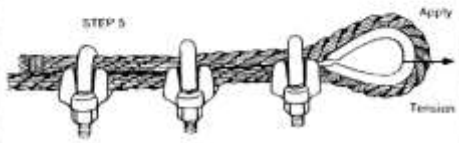
ALL OTHER CLIPS — Space equally between first two.

STEP 4



Apply tension and tighten all nuts to recommended torque.

STEP 5



Recheck nut torque after rope has been in operation.