

SAFELY DE-COILING OF STEEL WIRE ROPE FROM SHIPPING PACKAGE OR ROPE DRUM

Shiekh Majhrul Islam¹, Prakash Kumar Sen², Shailendra Kumar Bohidar³

¹Student of Mechanical Engineering, Kirodimal Institute of Technology, Raigarh, (India)

²Student of M.Tech Manufacturing Management, BITS Pilani (India)

³Ph.D. Research Scholar, Kalinga University, Raipur(India)

ABSTRACTS

There is a simple and direct relationship between steel business profitability and maintenance cost. It take sales of many tons of steel to obtain enough profit. This amount of tonnage varies of course, with each company's product, processing cost, labor cost, unscheduled down time problems machinery repair cost, and various other business cost. With today's global economy, steel business profits are typically decreasing and maintenance cost must do likewise. Prolonging machinery operating duration has the same positive business effect as the sales department selling of many tons of steel. In the steel industry, crane are critical to processing steel. Crane maintenance personnel are finding it is better to work smarter than harder. The largest maintenance expenses incurred for modern, fast and long span electric overhead travelling (EOT crane) is incurred for maintenance activity. The wire rope handling and changing activity in crane is the critical work in crane maintenance. There is always a danger of kinking a wire rope if we improperly unreel or uncoil it. Due to the large length of wire rope used in crane therefore spare wire rope cutting and wire rope handling process is important. Great care of wire rope needed when the rope is removed or uncoil from the shipping package or wire rope drums ince it can be permanently damage by improper unreeling. Hence it has to use wire rope unreeling stand for safely unreeling of wire rope so that wire rope could be saved from damage and also the men could be saved from injury.

Keywords: *Wire Rope Handling, Electric Cable Handling*

I. INTRODUCTION

Wire rope is the important element for industrial use such as in crane maintenance department it is very critical because it is used for carry the load. Crane maintenance persons have to face difficulties for wire rope changing activity in crane and also for spare wire rope length cutting. Its handling is very important so that wire rope could be saved from damage. Due to improper unreeling or uncoiling of wire rope from shipping package, imbalance in wire rope produced. Which is unsafe for both man and wire rope. In wire rope it may result in open or closed kinks and for man any injuries may cause. And also maintenance persons have to face problem for wire rope length cutting in shortage of manpower.



Fig.1: Unsafe Situation Without Using Wire Rope Uncoiling Stand

Great care of wire rope needed when the rope is removed or uncoil from the shipping package or wire rope drum since it can be permanently damage by improper unreeling. Due to improper unreeling of wire rope from the shipping package imbalance in wire rope produced which is unsafe for both men and wire rope. In wire rope it may result in open or closed kinks and for man any injuries may caused. Also there is a problem of unreeling the wire rope in shortage of manpower.

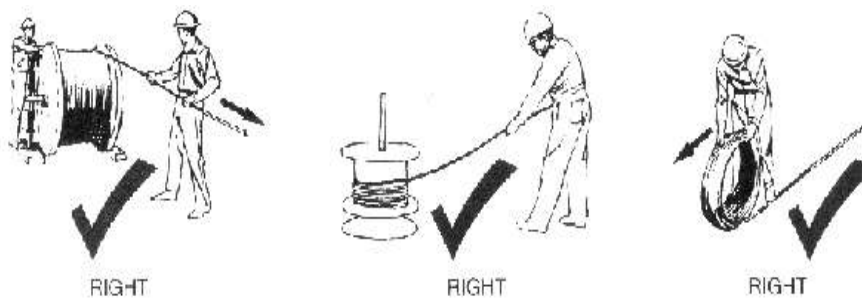


Fig.2: Safe Situation by Using Wire Rope Uncoiling Stand

Wire rope unreeling stands (Horizontal & Vertical both type) helps to uncoil wire rope with safe and comfort condition. When wire rope is pulled from shipping package or wire rope drum so the shipping package rotates about the axis, therefore its needed very less force to pull the rope from shipping package. Also no kinks are generated in wire rope due to proper balance and working persons are also safe due to no wave form in wire rope. Hence it has to use wire rope unreeling stand for safely unreeling of wire rope so that wire rope could be saved from damage and also the men could be saved from injury.

II. PROBLEM IDENTIFICATION

2.1 Following Problems Were Identified

2.1.1 Great Care is Needed

It is needed to be taken a great care for wire rope uncoiling because when wire rope is removed or uncoil from the shipping package since it can be permanently damage by improper unreeling or uncoiling. Because of the imbalances produce in wire rope kinks are generated which is non repairable problem in wire rope. There for great is needed while uncoiling wire rope. In the industries where wire rope is used such as in the crane maintenance department there is many works so that all time it is not possible to take great care for this types of routing activity which is one of the problem for maintenance persons.

2.1.2 More Manpower Required

When wire rope uncoiling stand is not used for uncoiling the wire rope from the bundle. More manpower is required for safely pulling the rope from the shipping package. For long length cutting of wire rope (about more than 100mtr) sometimes it's needed some external pulling arrangement such as hydra or crane. When there is any sudden break down comes in machine such as in overhead crane on that time maintenance persons have to take quick action for length cutting of wire rope on that cases if sufficient manpower is not available so it is very difficult to cut the length of wire rope and also the delay time is increased.

2.1.3 Wire Rope Uncoiling Time Increase

When right technics are not used to un- winding the wire rope from the rope drum so the delay time is increased because working persons quickly becomes tired due to one by one unreeling of wire rope coils so they takes more time for rest therefore the uncoiling time is increased.

2.1.4 Create Unsafe Situation During Wire Rope Length Cutting

When wire rope length cutting is needed so the maintenance persons have to un wound one by one coils of wire rope from the bundle because wire rope bundle is laid on the ground without using uncoiling stand. When wire rope coils is unwound one by one from the bundle so the wave forms on the wire rope which creates jerk on the rope therefore the person who is held the rope may be injured.

III. FORMATION OF KINKS IN WIRE ROPE

Kink is the permanent defect formed in wire rope due to improper uncoiling of wire rope by which wire rope is bended & twisted and dislocated from its position which is non repairable. If kinked wire rope is used in any kind of application so that wire rope will cause fertile failure.

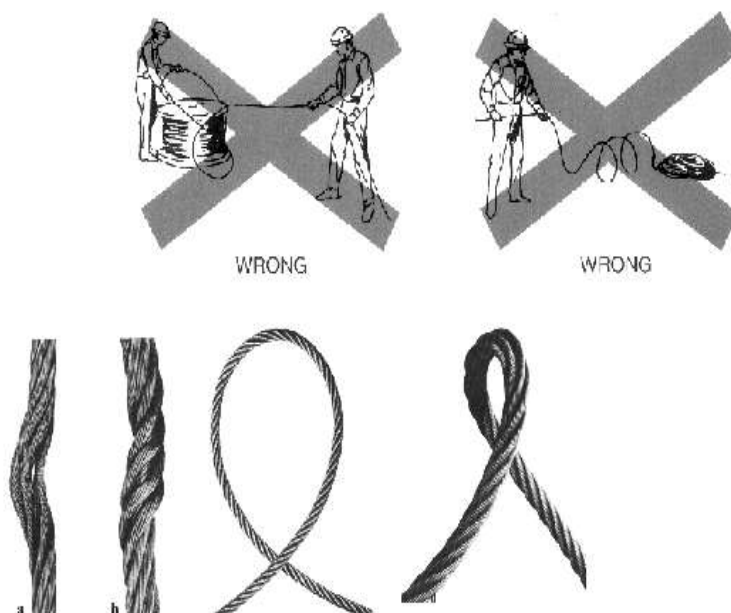
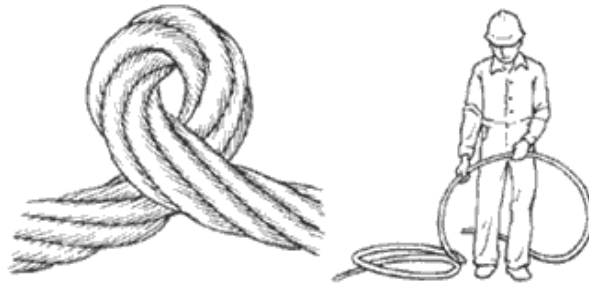


Fig.3: Formation of Kink in Wire Rope

A twist or curl, as in wire rope caused by doubling or bending upon itself. Kinks formed due to extraction of loops in wire rope. Kink is the permanent defect formed in wire rope due to improper uncoiling by which imbalance produces in wire rope which causes loops of wire rope which caused to bending upon itself therefore kinks produces.



A kink such as this is often caused by improper handling and uncoiling as shown

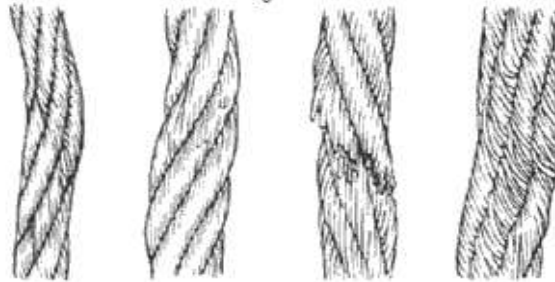


Fig.4: Effect of Kinks in Wire Rope

This rope shows the severe damage that results when kinked rope are used. Local wear, Distortion, misplaced wires and easily failure are inevitable.

IV. IMPLEMENTATION

HOW TO SAFELY UNCOIL THE WIRE ROPE FROM SHIPPING PACKAGE?

By making vertical & horizontal unreeling stand we can easily unreel or uncoil the wire rope and prevent wire rope damage during uncoiling from shipping package.

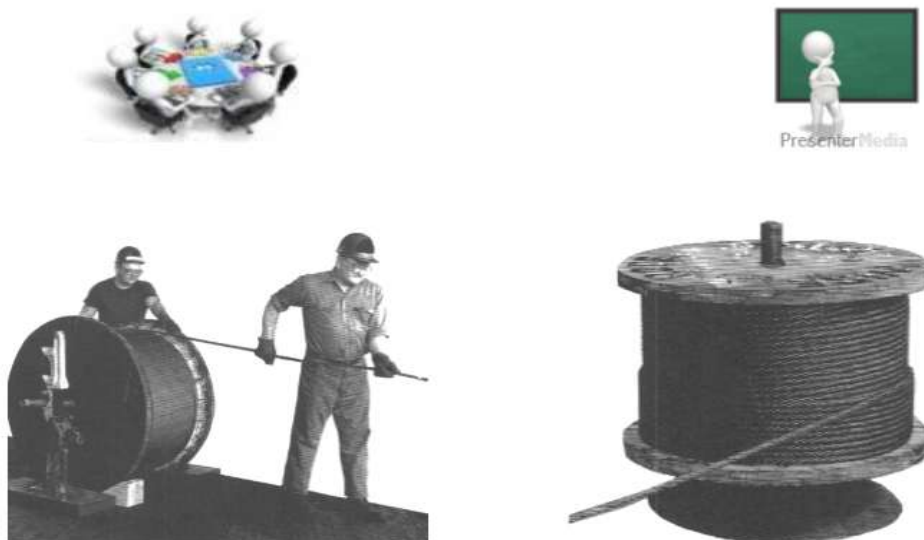


Fig.5: Wire Rope Un-Coiling Stand

Wire rope unreeling stands (Horizontal & Vertical both type) helps to unreel wire rope with safe and comfort condition. When wire rope is pulled from shipping package or wire rope drum so the shipping package rotates about the axis, the reforeits needed very less force to pull the rope from shipping package. Also no kinks are

generated in wire rope due to proper balance and working persons are also safe due to no wave form in wire rope

4.1 Types of Wire Rope Un-Coiling Stand

There are mainly two types of wire rope unreeling or un-coiling stand:

4.1.1 Horizontal Wire Rope Un-Coiling Stand

Horizontal uncoiling stand has the simple arrangement of two vertical box channel supporting leg (in some places jacks can be used) on which upper side there is an arc shape where the solid or hollow (any type can be used) round shaft is introduced with mounting the wire rope.



Fig.6: Horizontal Wire Rope Un-Coiling Stand

Firstly the wire rope drum or shipping package is lifted with the help of crane or hydra and it's mounted to unreeling stand with introducing the shaft inside the hole of shipping package as shown above. Now it can be safely pulled due to the shipping package rotates easily with respect to horizontal axis. Therefore it is called horizontal unreeling or uncoiling stand. By this applications simple construction wire rope handling and length cutting becomes very easy and with less manpower.

4.2 Vertical Wire Rope Uncoiling Stand

It is the mechanical arrangement to provide rotary motion for shipping package or wire rope drum. In this arrangement a thrust bearing is introduced between the two circular plates. On the upper parts plate a shaft is welded in which the rope drum is introduced vertically. The bearing is expensive element therefore in low budget it can also be made by machining of plates to make cones and waste ball bearings which can be introduced between the cones. Both horizontal and vertical unreeling stand can be made from the waste materials of any steel plant.



Fig.7: Vertical Wire Rope Un-Coiling Stand



Fig. 8: Vertical Wire Rope Un-Coiling Stand with Rope Drum

When the wire rope is pulled by holding the end of bundle so it rotate easily with respect to vertical axis. And therefore less pulling force is required due to thrust bearing is used. Hence there is an easy and comfort condition formed when pulling wire rope and there is no generation of kinks due to proper balance. Therefore steel wire rope can be saved from damage.

V. BENEFITS OF USING WIRE ROPE UNCOILING STANDS

- Prevention from wire rope damage like open or closed kinks during unreeling.
- Less man power required during wire rope uncoiling.
- Reduction in unsafe act and prevention from injuries during uncoiling.
- Moral of team increased.
- Self-Confidence among the team members increased.
- Team members highly motivated to tackle any problem and create positive thinking.

VI. CONCLUSION

This paper reviews the safe operation of wire rope uncoiling from shipping package or rope drum so that it can be prevented from generations of kinks in wire rope. From the use of wire rope uncoiling stand wire rope length cutting is becomes very easy even in shortage of manpower and also it prevents the jerks developed in wire rope therefore working persons are safe from any injury. Fabrication of wire rope unreeling stand is very easy

because it can be fabricated even from the scrap materials used in any steel plant. In Electric overhead traveling crane maintenance department where wire rope is used this kind of uncoiling stand is very useful for wire rope changing in crane and also spare wire rope length cutting purpose. Hence the uncoiling stand is useful for safe action during wire rope handling.

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