

“Haggie Hints”



by George Delorme
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Haggie North America - Meeting your hoisting needs!

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CARING FOR DEAD WRAPS

In issue 1 of our Haggie Hints written in 1999, the need to perform DRUM END CUTS was discussed in detail. This “cut and slip” program is recommended to expose a fresh section of rope to the normal wear that results from the cross-over action during multi layered spooling on a drum hoist. During the drum end cut procedure, the dead wraps are affected, however, it should be recognized that the need to attend to the dead wraps is a separate and distinct requirement and we will now discuss the subject of caring for dead wraps.

PROBLEM:

Dead wraps suffer in two ways:-

1. Since these wraps do not move nor have the opportunity to rotate, they are subject to heavy wear caused by the wraps of rope coiled above them.
2. Any section of new rope will permanently stretch when loaded. In the working part of rope, the permanent stretch causes the overall suspended length to become longer and we simply wind more rope on the drum to accommodate the increase in length. In the dead wraps, however, the increase in length is trapped with the result that they

become loose and are no longer wrapped tightly on the drum surface. This is of no concern if we do not coil on top of them but when we do, this looseness leads to problems.

DISCUSSION:

1. The wear on these stationary "dead" wraps is greatest where the upper layers "Cross-over" especially at the spot where the loud "snap" is heard as the rope rises from one layer to the other. The working length of the rope has the advantage of rotating so the wear is distributed around the rope circumference. But on the dead wraps, the same surface takes the abuse each time. Very often, the short section of rope coming out of the drum spout may be the most vulnerable. An active wrap will rest in between two dead wraps and will cause a very distinct, straight line wear pattern on each wrap. The following sketch (Fig. 1) shows the pressure points and Fig. 2 shows the resulting straight line damage on a dead wrap.

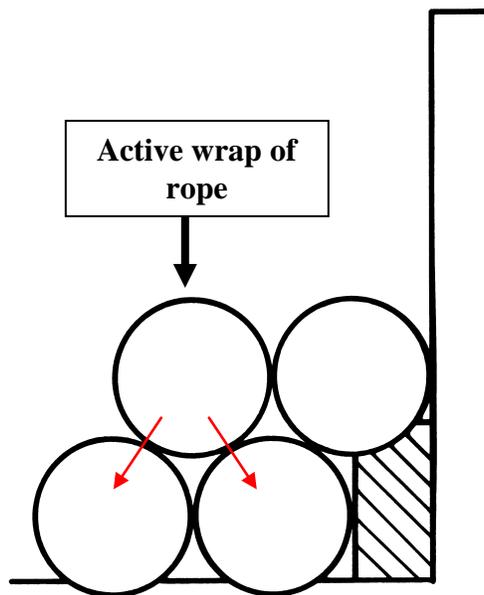


Fig. 1 – Dead wraps under pressure from active rope

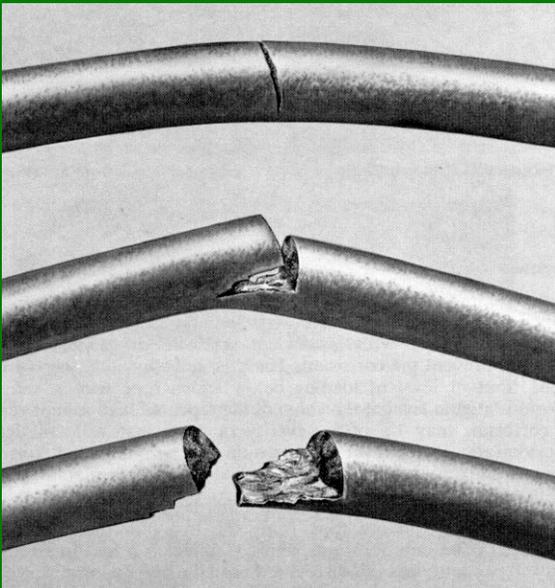


Fig. 2 – Straight line damage on a dead wrap

2. As previously mentioned, the looseness in the dead wraps is a problem which increases significantly as the length of rope acting as dead wraps is greater than normal e.g. when there is more than one full layer. Basically, when the dead wraps are loose and not sitting firmly on the drum face, the layers of rope spooled on top apply a tremendous pressure on the loose wraps and in so doing, apply an axial compressive force to the rope.

On normal production hoists, where there is usually $\frac{1}{2}$ or less of the bottom layer acting as dead wraps, the axial compression forces will cause the loose rope to experience secondary bending of the outer wires. In many cases where the dead wraps are loose and have not been re-tensioned for some time, they will often be described as looking like a "porcupine" because there are so many broken wires. The following slide from our training seminar illustrates the point.

#1D - On the "Dead" wraps



- n When wraps are loose, the pressure from the working rope "compresses" dead wraps causing secondary bending of outer wires
- n "Step" type bending fatigue failure on dead wraps
- n When excessive dead wraps exist, raised strands or "bird caging" may occur

If a situation exists that forces us to have more than one full layer of dead wraps e.g. shaft sinking, then the problem will be greater because of the large amount of looseness that can accumulate. In these situations, the rope may very well "birdcage" forcing some of the strands to protrude through the upper layers of rope. In the past, the author has seen situations on a sinking hoist where 3 strands of a 34x7 have worked their way through the 3 layers of dead wraps and in another case, the wires of a 1.515" diameter FLC migrate to the top layers. In the photos below, this installation had 2 full layers of dead rope and as shown, 8 strands of a 6 stranded hoist rope have birdcaged and have worked their way up above the second layer. The birdcage occurred on the third wrap from the spout on the first layer.



CONCLUSION:

The wear taking place on the dead wraps should be monitored at the same time as the inspection of the "Rise Points" and "Cross-Overs". This will help determine the frequency of Drum End Cuts. This cut and slip program will expose a fresh section of rope to the abuse and will solve most of your problems with wear. We can augment the process by applying a heavy coat of a good quality, open gear grease to the dead wraps.

The subject of loose dead wraps and the associated problems is widely known and this is why we normally apply tension during the installation of new ropes. The applied tension should be approximately $\frac{1}{2}$ the normal working tension and this load is normally applied by doubling down with a loaded conveyance or by the use of a double capstan winch.

We know that new ropes stretch considerable during the first few months of operation as do the rope acting as dead wraps. This is why it is our standard recommendation that the first re-tensioning be carried out after the initial stretch comes out usually within 3 months or so. After the initial stretch is removed, the frequency can coincide with the normal drum end cuts (approximately every 6 months or 10,000 cycles for a production hoist). When tensioning the dead wrap, we should apply the tension to all wraps i.e. come within $\frac{1}{2}$ of a wrap from the drum spout. It is also a good idea to grease the drum surface to insure that all the tension is applied to each wrap. Just as a reminder, the section of rope that will be positioned under the clamping devise(s) on the drum must be cleaned using cement powder only (no solvents of any type). This is accomplished by applying a layer of cement powder to the area of the rope by hand and subsequently wiping it clean with a wire brush. This will have to be repeated several times until the rope surface is clean. A final check using a clean, white cloth will verify that the rope surface is free of grease. If the clamping devise is a two part, bolted clamps - insure that all bolts are tightened to the correct torque value and that there is still a gap between the two halves once tightened to the correct value. A final check to verify bolt torque should be completed before applying tension to the dead wraps.