

# “Haggie Hints”



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

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## ***Measuring Rope Diameters***

In many jurisdictions, the measuring and recording of rope diameters is compulsory and when the rope in question has fallen below a prescribed value (generally 5% for a Flattened Strand Hoist rope), the rope must be removed from service. Even if rope diameter readings are not compulsory, it is a valuable tool in assessing the condition of a rope.

### ***PROBLEM:***

There is neither a defined method of measuring nor to what datum the information must be compared and therefore, inconsistencies exist.

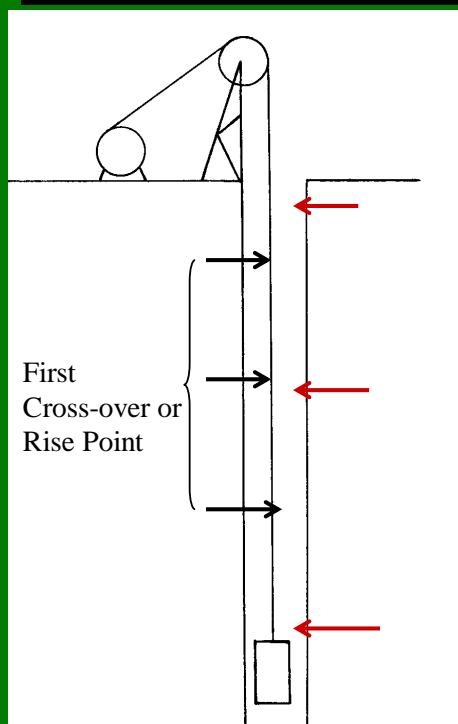
### ***DISCUSSION:***

#### **➤ *Location:***

- In most cases, the diameters are and should be taken at the collar on a safe, suitable bulkhead while insuring that the conveyance is descending.
- Mines are currently measuring at various positions, some measure every 100 ft while others take the reading further

apart. At very least, there should be a reading taken with the conveyance at the top, in the middle and at the bottom of the shaft plus at the point where the rope rises on the drum from one layer to the other (measuring as close to the first cross-over as possible). Whatever spacing is chosen, it is essential that the diameters are taken at those locations each and every time. **Consistency is crucial !** The following slide (Fig.#1) from our training seminar illustrates the minimum locations at which the rope diameters should be recorded.

## Monitoring Rope Diameters



- After the rope has worked for 3 to 4 weeks, as a minimum, measure and record rope diameters at:-
  - Above the conveyance
  - Mid shaft
  - Drum end
  - First cross-over on each layer
- On a regular basis, go back to those same locations and record diameters

Figure #1

- While it is more practical to measure the rope with an empty conveyance, it could be done with a load, however, it is the change in rope diameter that is important so again, the same load condition must exist each time the diameters are taken.

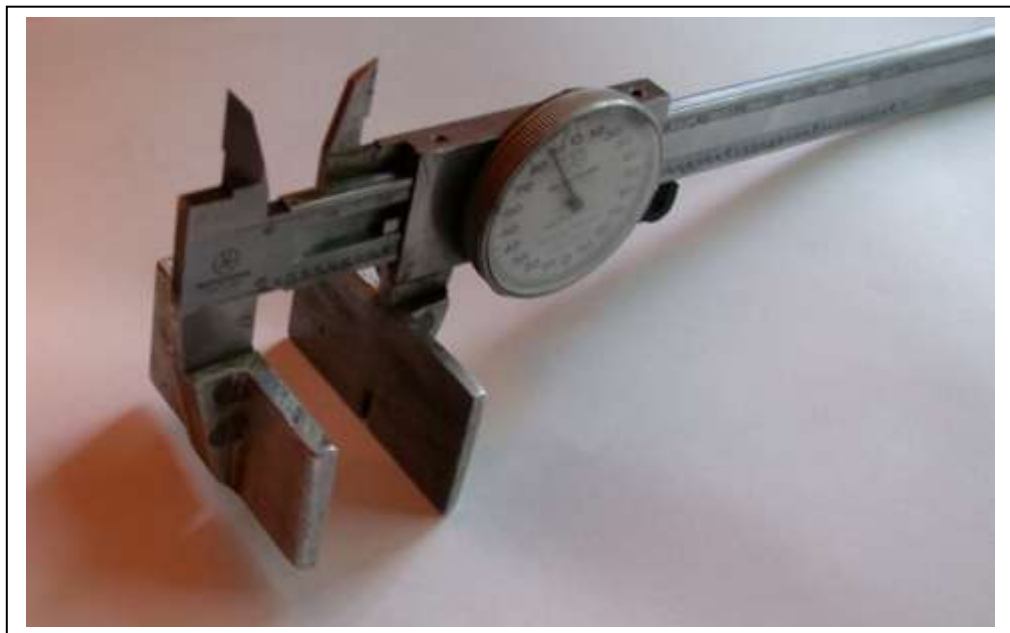
➤ ***Datum or Reference Point:***

- Sometimes, the nominal rope diameter is used but we will see that there is a better method.
- We know that most manufacturers will design their mining ropes to be 2% - 3% oversize and theoretically, once the constructional stretch has come out of the rope, it should be standing at the nominal value. However, as was described in Haggie Hints # 5, there is a substantial change in both lay length and rope diameter when a rope is worked in a vertical shaft and therefore, comparing these reading to the nominal diameter will give us false information.
- A much better method would be to hoist with the rope for several weeks so that the lay and diameter change occurs. Because of rope weight, it is normal for the rope diameter above the conveyance to be larger and when all the rope is suspended, the diameter at the collar will be smaller.
- It is essential to allow the rope to work for 3 to 4 weeks so that most of the constructional stretch is removed and then take the readings at the determined locations.

**This now becomes our datum and it is to these diameters that we must then make our comparisons!**

➤ ***Method of Measuring:***

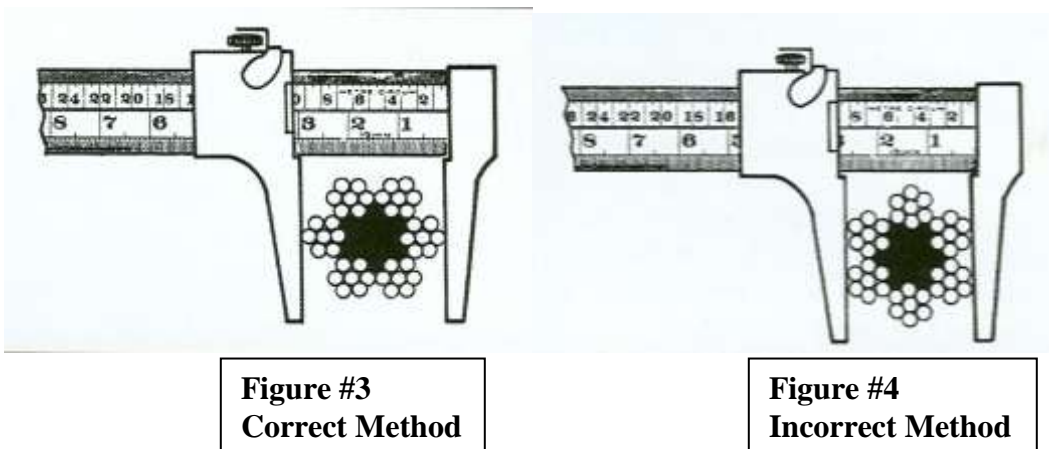
- Most of the mines do an excellent job of measuring rope diameters but, in order to ensure consistency, the following suggestions are being provided.
- Many mines record a Maximum and Minimum diameter. This may be of limited value because as Fig.# 3 and # 4 show, the true diameter is only achieved when the measurement is taken across two opposite strands.
- In addition, in order to help gain consistency, a caliper with "jaws" will make the job easier. See Fig. #2 below - this simply involves attaching a small angle to normal calipers.



**Figure #2**

- At the location selected, there are several alternative methods of taking the diameters.
  1. The caliper should be slid in one plane (horizontal) for a short length, approaching a lay length, and the maximum reading recorded. This maximum will occur when the calipers are placed over a pair of opposite strands - See Figure 3. The calipers are then rotated 90° (vertical) and the procedure repeated. Both of the readings should be recorded which will not only give a good diameter reading but show any "ovality" in the rope. This method is facilitated greatly if the calipers have jaws as shown in Fig. #2.
  2. Using a circumference tape, measure the overall diameter.
  3. At the selected point in the rope, the caliper must be placed over each pair of opposite strands i.e. three separate reading for a six-strand rope and the readings are then averaged.

In the author's opinion, method 1 and possibly method 2 as "confirmation" are the best.



➤ ***Recording Readings:***

- The diameter readings should be recorded in a chart format that will show both the diameter measured and the % loss from the datum or reference point.
- A graph showing the diameters will definitely help visualize the changes occurring in the rope.

**CONCLUSION:**

- Recording rope diameter changes compared to known, stable datum points will give the rope inspector an additional piece of information with which to judge the rope's true condition.