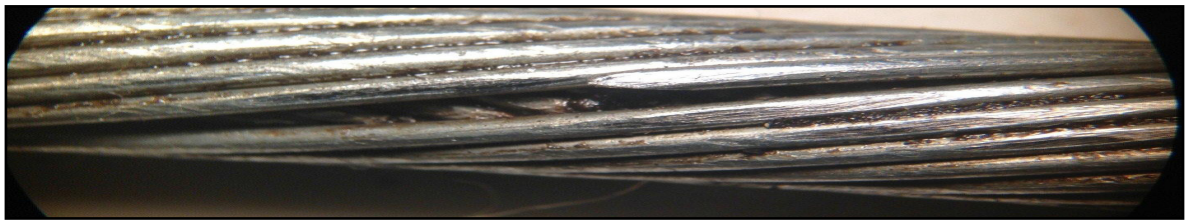
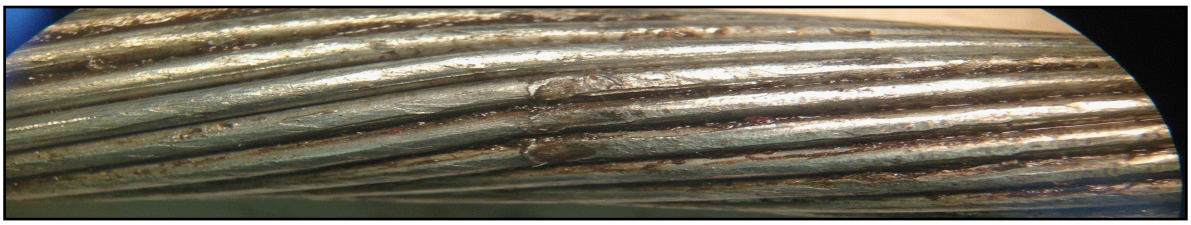
Wireline Cables Forensics 101 - Part 2: A review of how forensics is used to determine the cause of wireline failures.

Forensic Analysis of Wireline Cables – Mechanical Damage

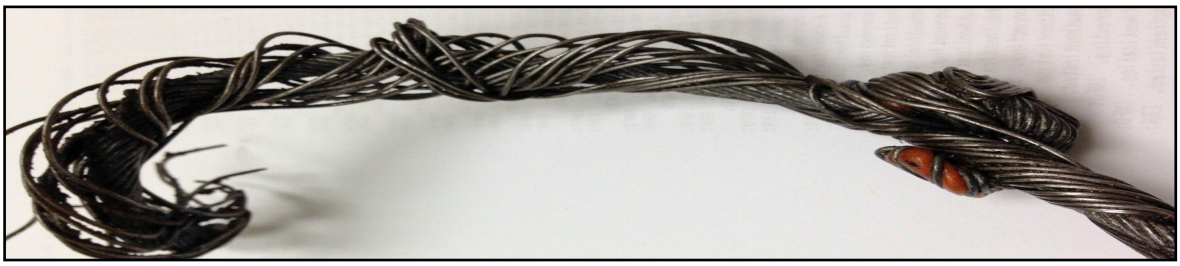
This second part of our series on forensic analysis of wireline failures focuses on looking for mechanical damage mainly on the outer surfaces of the armor protecting the wireline cable. Mechanical damage could be due to factors overlooked during operations or improper handling. This mostly affects the outer or inner armor wires causing reduced strength or wire breakage leading to cable failures.

In the photos shown below it can be seen that mechanical damage caused due to external impact has resulted in armor wire breakage.





Loose cable, can lead to birdcages in the armor. This can happen if the cable is not serviced at regular intervals as recommended by the manufacturer. In the photos shown below it can be seen that excessive rotation under load has caused loose armor wires.



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Abrasion of the outer armor by rubbing against a hard surface or incorrectly sized sheave can result in flattening effect on the outer armor. In the photo shown below it can be seen that the outer armor has flattened and is also affected by corrosion.

Another effect of damage due to loose armor can be seen in the picture below. This damage was most likely caused when it passed through the flow tube.

The picture shown below is from a crossed armor wire getting squeezed through a flow tube. The crossing of the armor wire probably occurred during re-heading and the crossed wire travelled all the way up to the flow tube and got jammed and broke.

In the picture shown below it can be seen that the armor wires have been smashed due to heavy impact causing them to break.

Examination of wireline for mechanical damage can be crucial in forensic analysis to determine its failure. As can be seen from the examples shown here, a lot of information can be obtained from the type of mechanical damage directly from handling the wireline, operations, operating environment, etc.

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