Frequently asked Questions

We are currently using a 5/16" Mono-conductor corrosion resistant cable in H2S environment wells (1N32WTZ-S75). Yesterday, we experienced premature shearing of the weak point at a depth of 6,400 ft. MSP (maximum suggested pull) at said depth was 3,200 pounds and it sheared at lower tension.

Can you please tell me what the probable cause of such a premature failure of the weak point is? We took all due precautions while making weak point.

June 2013

Cable heads play a vital role in all logging and perforating operations as they provide mechanical and electrical connections between the wireline cable and the tool string. A weak point inside the cable head bears the entire load of the tool string weight, which makes calculating its strength very important during your wireline operations.

There are two potential phenomenon that may contribute to a lower than expected pull-out of the rope socket. *

1. If the inner armor wires are used in a wireline's weak point and the cable is not normalized, there is potential for shearing of the weak point at a lower than expected tension. This can occur when there is looseness in the outer armor wires, which will cause them to lengthen. Due to the opposing helical wire design of a wireline cable, this may cause the inner armors to be slightly shorter with respect to the outer armor wires, which may create a situation in the weak point where it is possible that the majority of the load would be exerted on the inner armor wires exclusively. This means that the outer armor wires may not be actively engaged as a strength member in the weak point and could effectively lower the expected pull out weight. Due to the manufacturing design of wireline there is always a slight difference in the length of the inner and outer armor wires. The inner armor wires are almost always slightly shorter than the outers and when numerous pulls are made to the weak point it is common that the inner wires fatigue and break before the outer armor wires. This can have a significant impact on the expected pull out strength of the weak point as can be seen in the example below:

Example: 1N32WTZ-S75 with 4 inner armor wires and 9 outer armor wires to build rope socket at 4,850 lbs. (maximum working tension).
Inner Armor Wire Break Strength: 373.4 lbs (1.66 kN)
Outer Armor Wire Break Strength: 373.4 lbs (1.66 kN)
(4 inner armor wires)(373.4 lbs.) = 1,494 lbs.

If inner armors break prematurely, actual weak point strength: 4,850 lbs. – 1,494 lbs. = 3,356 lbs. or 69% of expected pull out strength.

2. Another potential cause of premature shearing of a weak point can occur when wires are bent at a near 180° angle over in the bonnet in a rope socket build. The stress placed on a wire when bent at an extreme angle can cause stress cracks to form in the wires and therefore degrade the integrity of the steel or alloy wire. This is especially prevalent when operating in a corrosive environment, as stress cracks can negate the

12200 NW Ambassador Drive, Kansas City, MO 64163 | 816.270.4700 | www.Camesainc.com

H2S resistance in alloy wires and will leave them vulnerable to corrosive attack, weakening the wire significantly on the outer radius of the wire bend (See fig. 1). One way to help prevent this type of damage to the wire is to utilize a straight pull cable head. This type of cable head design is common in open hole operations and is designed to use compression between cups and cones on the individual wires while keeping them straight. This eliminates the need to bend the wire and reduces the opportunity for stress cracking to occur.

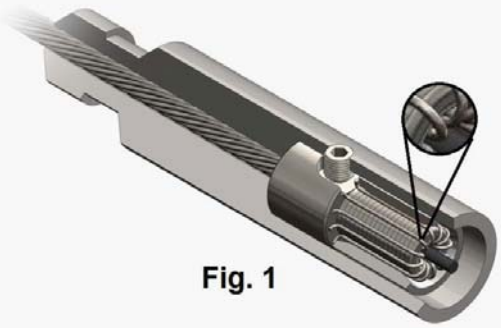

Fig. 1

Unfortunately, it is very difficult to predict when the inner armor wires will actually add to the pullout strength of a weak point. While there are cable head testing machines available that allow operators to test the strength of their weak points in a controlled environment, there are multiple factors that contribute to the strength of each weak point, including but not limited to type of rope socket design, cable manufacturer, cable and wire condition and the operator building the weak point. While Camesa does not do individual testing on weak points, many of our customers either count the inner armors at ½ of rated breaking strength during re-heading or do not count them as strength members - while others simply use all outer armor wires in their weak point builds. This is why individual testing and experience is critical when determining the build of a weak point and all factors, like those provided above, must be taken into consideration.

*Information and images supplied with approval by Hunting Titan.

Contact **Dustin Dunning** for more information or suggestions for Camesa monthly Q/A.
DustinDunning@WireCoWorldGroup.com

camesa®
A WireCo® WorldGroup Brand