

New Cable — Care & Treatment

To get the maximum trouble-free service from a cable, it is very important to give special consideration to how a new cable is treated on its first few runs in the field. During the manufacturing of a cable the tension is only a few hundred pounds, the cable is passed from one reel to another so no rotation is possible and the temperature is always moderate. In field operations the cable is under very high tension, is free to rotate, and subjected to very high temperatures.

In field operations the higher tensions and temperature cause several important changes in the cable:

- When a new cable is first lowered in a well, the tension on the cable generates a torque and the cable end needs to rotate to relieve this torque. If the end is carrying a tool that can easily rotate, the cable will spin out hundreds of turns to relieve this initial torque and become “normalized”. The amount of rotation depends on depth, tension and type of cable.
- During manufacturing, the inner armor wires are partially embedded into the plastic core by means of pinch rollers or pre-form rollers. With the high tensions in field operations the armor wires exert an increased radial pressure on the core causing further embedment in the core resulting in a reduction in diameter. Higher downhole temperatures soften the plastic which will cause this diameter reduction to occur more rapidly. When the inner armor wires are “fully embedded”, the diameter of the cable will stabilize, which normally occurs in 20 or 30 operations. In the case of monocables the diameter reduction is only a few thousandths but unless the cable is allowed to rotate it will result in loose outer armor wires which can accumulate into a “bird cage”.
- When the effective core diameter is reduced due to embedment, the armor wires wrap around this smaller diameter, resulting in an increase in cable length.
- Cable can also be forced to excessively unwind as a result of using a hydraulic pack-off to control pressure, not enough clearance in flow tubes, poor truck and sheave alignment or an incorrect sheave groove. Cables forced to unwind have a reduced breaking strength, are more susceptible to drum crush and loose outer armor wires that can be “milked” into a “bird cage”. A typical new cable is more susceptible to all of the problems associated with cable torque and rotation as there is minimal friction between the inner and outer armor wires. After a number of field operations the spaces between the armor wires become filled with mud and corrosion byproducts which increases the friction between the armor layers reducing the problem caused by forced cable rotation.

Based on the above explanations, here are a few DO's and DON'Ts that should be observed when breaking in a NEW cable:

DO:

- Run in and out of the well at half the normal speed.
- Run .004” clearance in flow tubes.
- Use sheave wheels with the proper groove size.

DON'T:

- Run tools that restrict cable rotation.
- Run in deviated holes.
- Apply any pressure with a hydraulic packer.