SHERMAN+REILLY

UNDERGROUND CONNECTOR GUIDANCE

E-49-D

E-35-D

SHERMAN-REILLY.COM

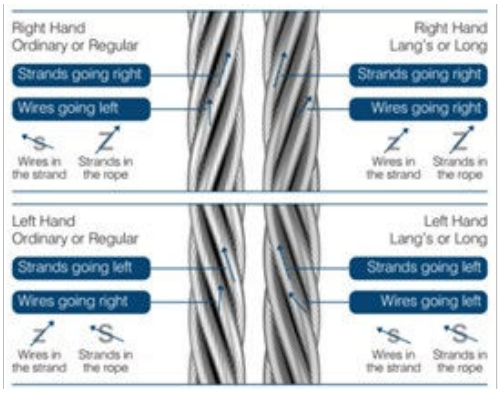
Underground Wire Rope and Rotation Resistant Connectors

1. Definitions

1.1. Types of underground cables

1.1.1. It is possible to visually determine the types of wire rope. The various types of rope have different benefits and requirements for pulling. When comparing twisted wire rope verses braided wire rope, twisted ropes typically have a higher working load than braided ropes of the same OD. Braided ropes are generally more expensive but can be used with freely rotating connectors. Twisted ropes require the use of underground connectors that are rotation resistant.

1.1.2. Right hand lay & left hand lay underground cables are twisted wire ropes. The strands lay next to each other and do not overlap.



1.1.3. Braided wire rope is fabricated using a braiding motion. Different types of braids used to make rope include double braids, solid braids, and hollow braids. The strands overlap each other. Braided ropes are generally more expensive and have a larger minimum bend radius but can be used with freely rotating connectors.

1.2. Types of Connectors/Swivels

1.2.1. Overhead swivels freely swivel under load to release any twist in the rope or conductor. There are some swivels marketed for overhead and underground use. These swivels freely rotate and can damage twisted wire ropes. Do not assume all underground connectors are rotation resistant. Check with the manufacturer to confirm whether it can be used with twisted wire rope.

1.2.2. Underground connectors compatible with twisted ropes are rotation resistant. Connectors that are marketed as underground/overhead connectors cannot be used with twisted wire rope. Freely rotating swivels allow ropes strands to unravel or deform, which reduces the working load of the ropes.

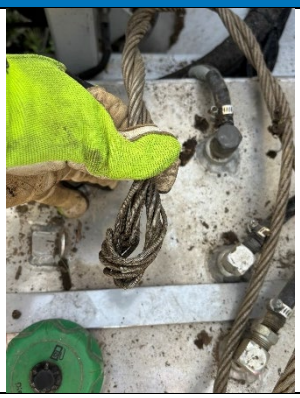
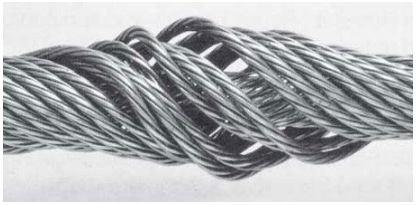
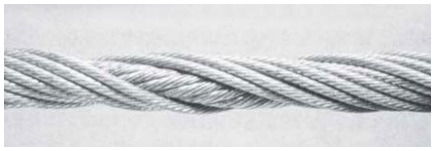
1.2.3. The Sherman+Reilly Duct Dawgs utilize twisted wire rope. Always use a Sherman+Reilly E-35-D or E-49-D rotation resistant underground connector. These connectors are specially designed for underground wire ropes and are fitted with an axial brake, not a bearing. This makes them rotation resistant which prevents damage to twisted wire ropes. It is not recommended to pull these connectors over sheaves.

1.3. Inspection of wire ropes

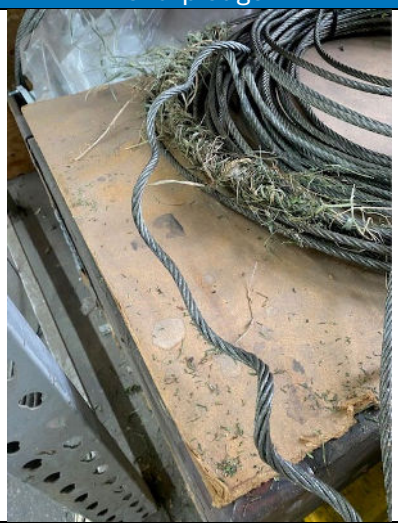
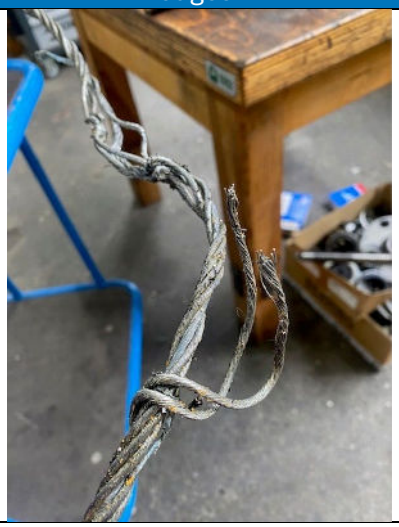
1.3.1. The first step to ensuring the underground twisted wire rope is not damaged is to use the correct connector. Other reasons for rope damage include an excess of bending or abrasion such as pulling the rope over a small radius or sharp edge. The ideal wire rope positioning in conduit is centered and off the sidewalls. To reduce friction, it is recommended to apply a lubricant as needed during the pull. Follow the lubricant manufacturer's guidelines for the quantity of lubricant necessary based on the conduit size and length of the pull.

1.3.2. Failure to follow the guidelines listed within this document can result in damage to wire rope and/or shorten rope life. Prior to and during each use, visually inspect the wire rope for damage or deformation. Affected portions of rope cannot be repaired and should be taken out of service. Deformation will reduce the working load of ropes. Note that failure to repair or replace damaged rope can damage the winch bullwheels, equipment, or injure personnel.

1.3.3. Rope damage and deformation examples:

Hockling may occur when a free swiveling connector allows the rope to untwist and folds back onto itself.	Birdcaging may occur when a free swiveling connector allows the rope strands to twist apart enough to permanently deform.	Stretching may occur when the rope is pulled beyond its capacity resulting in elongation of the strands. Visually inspect for a visible core and measure if there is any reduction in rope OD.
		

Crushing may occur when the rope is pulled over sharp edges.	Kinks may occur when a free swiveling connector is used or the rope is pulled over sharp edges.
	

Pigtailing/memory is spiraling in the rope and may occur when the rope is pulled over a small radius or sharp edge.	Unraveling may occur when a free swiveling connector allows the rope strands to twist apart.	Broken strands may occur when the rope is overloaded or when some strands are pulled over sharp edges.
		

1.4. Inspection of underground connectors

The E-35-D and E-49-D underground connectors will freely spin with no tension but will lock up at roughly 450 lbs. of tension. The connector should freely spin in your hand. The level of rotation resistance is proportional to the pulling load. If a freely rotating connector is used, the rope will be allowed to rotate. If the rope rotates beyond its ability to elastically unravel and return to its original shape, it will damage the rope. Always use the smallest UG connector that meets the max line tension for the pull to ensure the connector resists rotation. Each of these connectors are stamped with the following text. Note the Working Load Limits (WLL) for each size connector. Sherman+Reilly UG connectors will be darker than overhead connectors and will have flat head screws. Overhead connectors have a shinier finish and will have Phillips head screws.

E-35-D connector stamped text:	**E-49-D connector stamped text:**
SHERMAN&REILLY INC. CHATTANOOGA TN USA UNDERGROUND USE ONLY **MODEL – E-35-D** **MAX WLL 3000 LBS** Additional stamped text: PSA E35D SWL=15kN	SHERMAN&REILLY INC. CHATTANOOGA TN USA UNDERGROUND USE ONLY **MODEL – E-49-D** **MAX WLL 8800 LBS** Additional stamped text: PSA E49D SWL=40kN

⚠WARNING

These connectors are not designed to be pulled over sheaves or bullwheels.

1.4.1. The connectors are not designed to be pulled over sheaves or bullwheels.

1.4.2. Before each use, visually inspect the connector for any obvious damage such as major dents, check that the underground connector freely spins, that the pins are fully tightened, and verify there is not any axial and radial movement.

Check Your UG Connectors

First check that the underground connector freely rotates.

Then check that there is no radial play by pushing and pulling the two halves.

Lastly check that there is no axial play by attempting to pull the two halves apart.

If the connector does not pass these checks, do not use it.

1.4.3 The manufacturer recommends replacing the connectors every 50 hours of use or once a year, whichever comes first.

1.4.4 Prior to each pull, inspect the winch line. Check for frays and damage at the eye and throughout the line. Ensure the line is through each sheave and the storage reel is uniformly laid. Excessive deformation can damage the bullwheels.

See the Sherman+Reilly product page for the E-35-D and E-49-D underground connectors at

https://www.sherman-reilly.com/product/underground-connectors/

We are dedicated to getting every lineman home every night, no exceptions.

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Publication of this document and the safety precautions in it does not in any way represent an all-inclusive list.

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