

Gel Free ADSS Cable Placement Procedure

Revised

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Abstract

Gel free or “all dry” Dielectric Self-Supporting (ADSS) Cable is designed so its tensile strength member will provide the necessary resistance to sag to overcome the effects of its own weight, ice and wind loading, so the cable span will remain serviceable, even over very long spans, for its entire lifetime. It is gel-free, containing water blocking powder, yarn, and ribbon to block water entry into the cable. This document describes the placement method of Gel free ADSS Cable.

Keywords

Gel free ADSS, Snow shoes, Slack length, Stationary reel method



1.0 Introduction

- 1.1 These cables are designed to be strong enough to allow longer lengths of cable to be installed between support towers. ADSS cable is designed to be light weight and small in diameter to reduce the load on tower structures due to cable weight, wind, and ice. ADSS(All-Dielectric Self-Supporting) cable is ideal for installation in distribution as well as transmission environments, even when live-line installations are required. There is no support strand or messenger wire required. Installation is achieved in a single pass, making ADSS an economical and simple means of building a fiber optic network.
- 1.2 This document is designed to work as a supplement to the information contained in Sterlite's Application Note, Issued in September 2012, All Dielectric Self-Supporting (ADSS) Cable Placement Procedures. The information contained in above aforesaid mentioned Application Note is valid for the placement of gel free ADSS cable.

2.0 References

See Sterlite's Application Note, Issued in September 2012, All Dielectric Self-Supporting (ADSS) Cable Placement Procedures.

3.0 Safety

All safety points raised in Section 2 of Sterlite's Application Note, Issued in September 2012, All Dielectric Self-Supporting (ADSS) Cable Placement Application Note are applicable for the placement of Gel free ADSS cable.

4.0 Installation Methods Summary

- 4.1 Sterlite recommends the Stationary Reel Method to place Gel free ADSS cable. It is the most widely used method to place all types of aerial cable. The stationary reel method is often slower than the moving reel method, but can be used anywhere since it does not require an unobstructed right-of-way or vehicular access to the pole line.
- 4.2 The equipment and hardware used to place gel free ADSS cable is summarized in Section 6.3 of Sterlite's Application Note, Issued in September 2012, All Dielectric Self-Supporting (ADSS) Cable Placement Application Note.
- 4.3 The bulk of the information about a placement job will be obtained by the examination of past records on the same support structures and the visit to the job site on the route survey.
- 4.4 As a rule of thumb, most ADSS cable routes should have at least three aligned support structures before the first large misalignment is encountered.



5.0 Stationary-Reel Placing Method for All Dry ADSS Cable

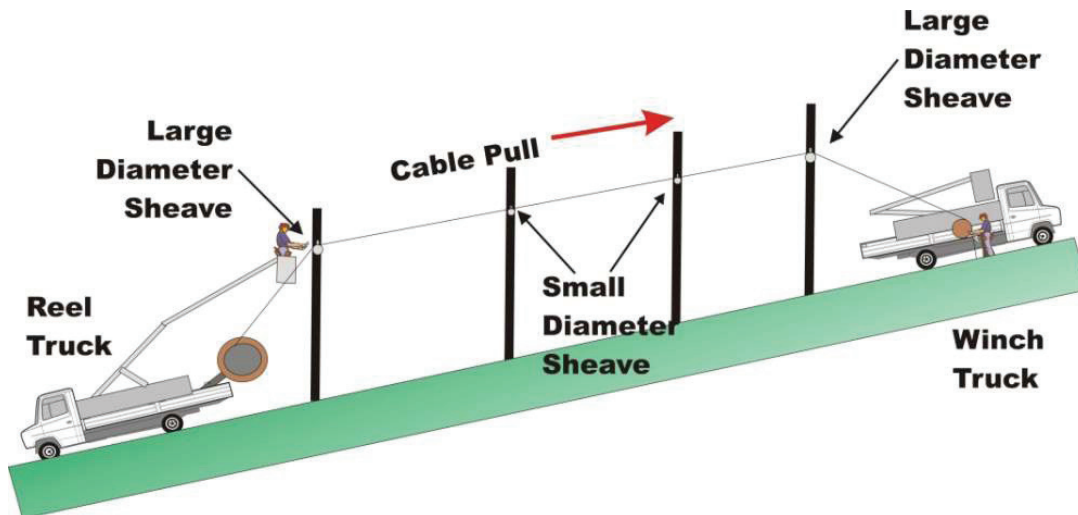


Figure 1– Stationary Reel Placing Method for All Dry ADSS Cable

- 5.1 Sterlite recommends the use of the Stationary Reel Method to place ADSS Aerial cable as described in this Section. The Moving Reel Method is used by some contractors, however it is NOT recommended by Sterlite.
- 5.2 Two or three trucks are recommended for use with the stationary reel method: one truck requires a bucket lift to mount sheaves and blocks to pull cable, the second truck is the winch truck equipped with a cable trailer with a reel brake and a bucket lift to assist in the cable tensioning operation. Each truck has a driver and one technician to control the operation from that truck (position cable and control the winch operation). A second technician assisting the bucket truck operation will be helpful to tension the cable and a technician to operate the cable trailer and feed cable. Additional technicians are required to observe the key locations where cable is being supported from the pole line.

Rigging the Pole Line

- 5.3 Pole line support structures will carry all support hardware for the stationary reel method. Each support is fitted with a temporary cable block, sheave, or quadrant block to support the cable and to provide a smooth pathway as the cable is pulled into place in the aerial plant.
- 5.4 The sheave or traveler at the first support pole should have a radius at least 20 times the diameter of the cable being placed.
- 5.5 Position a sheave at each intermediate support structure (supports between dead-end supports). Intermediate supports should be positioned in good alignment with the cable route for smooth feeding of cable to the aerial span.
- 5.6 Misalignments in the cable alignment of 20° or more should be provided with a sheave having a radius at least 20 times the diameter of the cable being placed. Dead-end points will be formed in the cable at poles where the cable route experiences misalignments of 20° or more.



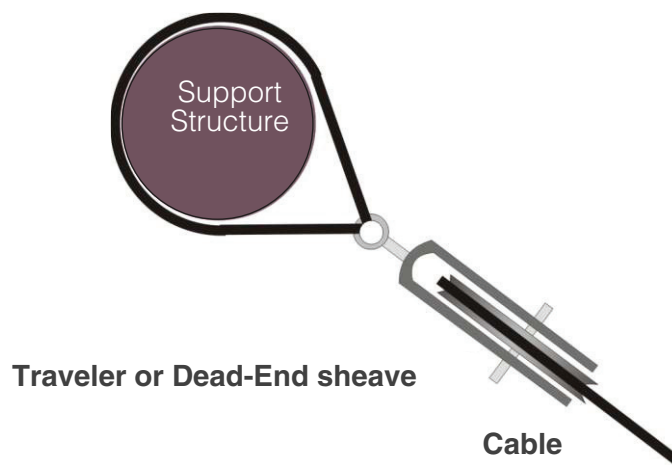


Figure 2- Supported traveler or sheave at down-feed from end support structure

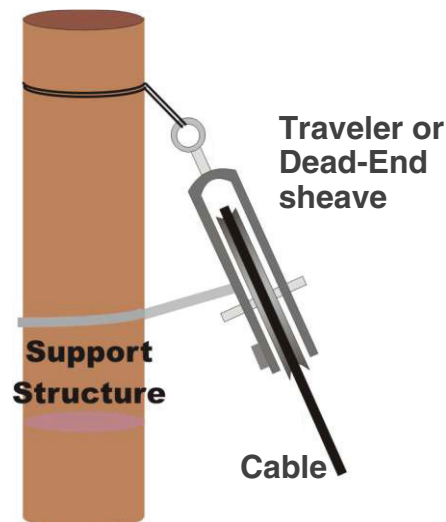


Figure 3- Supported traveler or sheave at feed-end support structure

- 5.7 A winchline shall be selected having a unit weight close to the weight of the ADSS cable. If the winchline is matched to the weight to the cable, the placing tension at the cable winch will approximately equal to the maximum tension at the cable.
- 5.8 A hand line can be used to pull the winch line from the winch to the cable feed end of the cable link. The hand line can be laid over the cable sheave at each support pole and connected to the winchline. It can be used to pull the cable over the cable sheave at that support. One by one each cable sheave can be threaded with the winch line until the winch line reaches the cable reel at the feed end of the link.
- 5.9 The connection between cable and winch line shall be made with a tension-limiting (fused), ball bearing type break-away swivel. Vinyl tape shall be used to smooth the transitions along the surface of the pulling array.



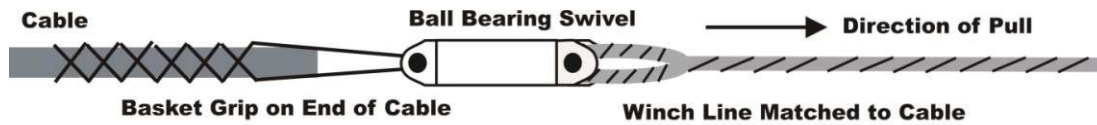


Figure 4– Cable placement array using ball-bearing swivel to connect winch line to cable

- 5.10 Position the cable reel at the feed end pole support of the cable link. The reel can be positioned in its cable trailer at least 50 to 60 feet from the first support and in good alignment with the cable alignment to provide clear and unobstructed passage of the cable to the cable route.
- 5.11 Position the winch at least 50 to 60 feet from the last pole line support. A fiber optic cable tension measuring running-line dynamometer and/or tension limiting cable winch shall be used to pull the cable into place through all supports. The winch shall be aligned with the cable route to provide clear and unobstructed passage for the winch line as it passes through the large diameter sheaves on the first and final cable support structures.
- 5.12 Begin the pull when all technicians indicate a “ready” status. Start the pull slowly at first and increase speed as it becomes clear that the placement is going smoothly. Care should be taken when the cable pulling eye passes over a cable sheave at pole. If there is a misalignment, be prepared to stop the placement.
- 5.13 The swivel insures the ADSS cable will not experience an induced twist as the pulling line enters and exits each sheave. A 'flag' (strip of red cloth taped to the cable jacket) shall be attached just ahead of the dead-end support at the 12 o'clock position on the ADSS cable sheath. This flag should remain stationary during placement if the placing operation is not imposing any torsion to the cable. If the flag rotates around the cable as pulling progresses, the pull shall be stopped and the tension relieved. As the tension is relieved, the flag should reverse the rotation it experienced during the pull.
- 5.14 The cable tension should remain low during placement. It must not exceed the maximum installation tension recommended by Sterlite. Special attention must be paid to maintaining an even tension and placing speed.
- 5.15 After the cable has been pulled into position, transfer it from the sheaves to the permanent cable supports as it is tensioned to the level specified by Sterlite Engineering to meet the expected maximum loading for its cable weight and span length.

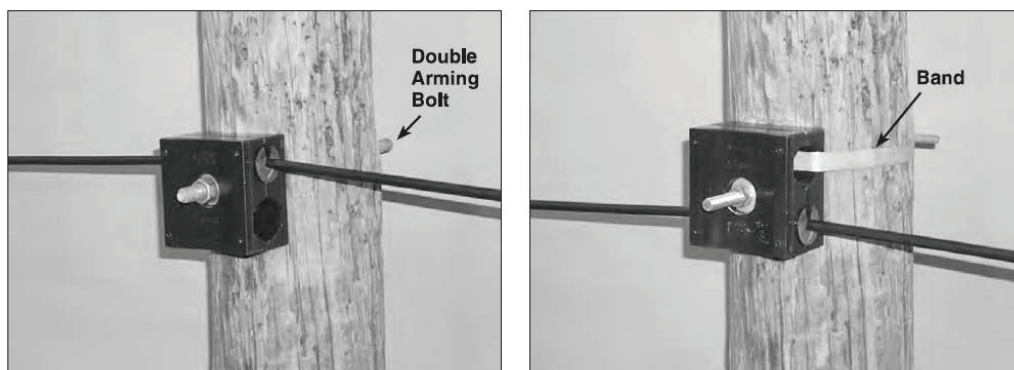


Figure 5– FIBERLIGN® Lite Supports bolt mounted and band mounted



- 5.16 Gel free ADSS cable has no filling compound in the buffer tubes, creating a small possibility of fiber movement within a buffer tube as the cable is exposed to vibration, wind gusts, and temperature changes during its service life. To eliminate the possibility of fiber/multitube interaction, Sterlite requires approximately 100 feet of cable be stored in a cable loop on both sides of a splice within two spans of each splice. These storage loops can be multiple coils of cable or cable wrapped around snow shoe storage templates. Similarly, a storage loop should be placed approximately every 2500 feet along each cable. Each of these storage loops should be hung from the cable away from the support poles (mid-span). This procedure will minimize fiber movement in all dry ADSS cable for the entire length. In addition, these cable loops can be used to distribute spare cable for maintenance along the cable when positioned close to the locations where they may be needed.

- 5.19 The “line of sight” method to determine sag requires a technician to climb both structures on either side of the span being checked. The structure closest to the reel end of the system is tensioned. Then the next structure is marked using bright colored tape with the objective mid-span sag value from the height of the attachment. The technician returns to the reel end structure and measures down the support the mid-span sag value and places his line of sight at that same height. This technician should be in radio contact with the take-up operator and give instructions of how much excess sag is in the cable. The tension in the dead-end segment shall be adjusted so the sag in all the spans is equal or less than the design installation sag. The technician that tensions the cable will look up the increase in tension required to make the final sag adjustment. The technician on the support structure will monitor the change in sag and alert the technician applying tension when the sag is acceptable. At the correct sag, the cable catenary rises to match the bright colored tape mark on the opposite structure. Once the sag matches the objective value, the take-up side tension structure can be climbed and fastened down. The maximum sag shall always be brought up the proper sag, not loosened and brought down to the objective sag.

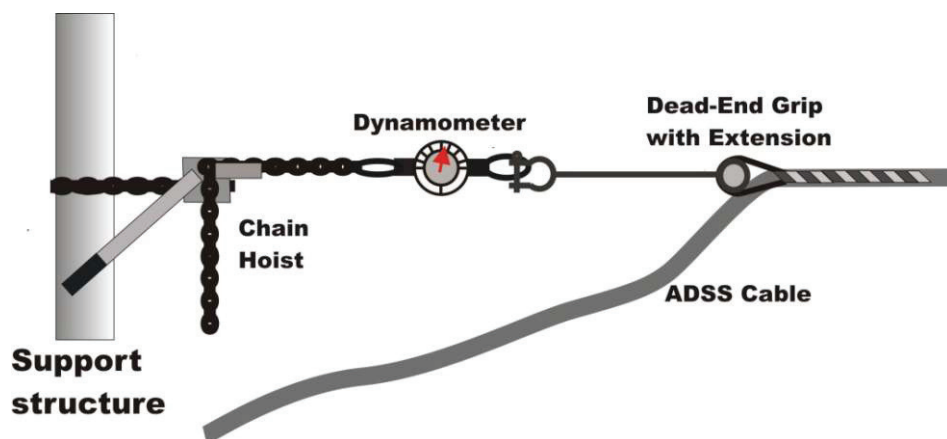


Figure 8- Cable Tensioning Setup Using Dead-end Grip and Calibrated Dynamometer Attached to Dead-Ended Support Structure

- 5.20 The system dead-end segment shall first be adjusted for sag and dead ended at the appropriate structures. Dead-ends shall have a drip loop between the two dead-ends on the pole support. An extension link will be required to get sufficient distance from the support structure to allow the drip loop to be made at the dead-end point. The drip loop should be positioned downward and be at least 12 inches deep.
- 5.21 At spans that are in line, tangent supports should be carefully installed and the cable should be placed in the support.





Figure 9- Tangent Support: A double funnel shaped support to hold the cable to it support structure on a well aligned point in the cable route (mating cable misaligned 15°)

- 5.22 For spans with large misalignments, AGS Supports can be used with extreme caution being exercised during the transfer of the cable from traveler to the AGS. The transfer of the cable to permanent support hardware shall proceed as rapidly as can be safely done.

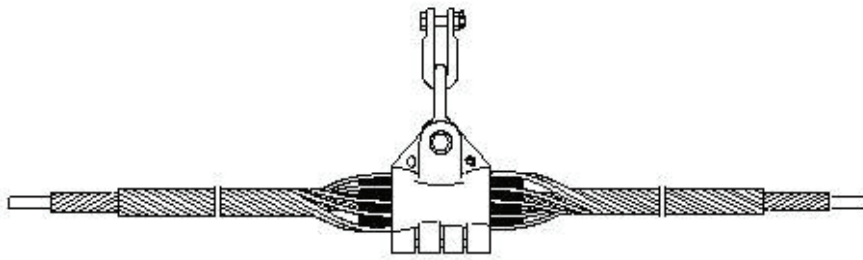


Figure 10– Armor Grip Suspension (AGS): Grip that is used at support points where the misaligned angular offset is $\leq 25^\circ$ and 40°

- 5.23 The ADSS cable must not be kept in the sheaves more than one week without approval from Sterlite. In bad weather this time should be reduced. Local bonding and grounding practices need to be used to properly ground the support hardware (dead-end, tangential, and AGS).
- 5.24 If the system requires dampers to control Aeolian vibration, they should be installed after the permanent support hardware is in place on each individual structure.



Figure 11– Aeolian Vibration Damper used to induce a higher order of cable vibration



- 5.25 Splicing should be performed on the ground in a controlled environment such as a tent, van, The splice closure can then be stored aerially, at ground level in a pedestal or cabinet, or underground in a hand hole or manhole. Sufficient cable should be provided to allow the cable to descend the structure and enter a splicing vehicle or splicing area. Three to six meters of cable shall be discarded after cable placement from each cable end to eliminate the possibility of encountering damaged or stressed fibers. Then typically, each cable end should have at least 15 to 30 meters or more from the dead-end attachment, depending on the support structure size. Be sure to account for any future maintenance operations, at least 15 meters of cable shall be coiled as an extra length to loop/coil between the each dead-end section and the dead-end and splice closure (minimum 4 turns - care must be taken not to exceed the minimum bending radius defined in Sterlite cable data sheet).
- 5.26 Sufficient slack for each cable end must be provided in the final span near each splice location for each of the two mating cables to enable the splice to be made and to provide for any future cable maintenance. When the splice has been completed, the splice closure shall be safely mounted on the support structure and the excess cable from each mating cable shall be wrapped separately around a pair of snow shoe templates supported from the cable they serve or neatly coiled from cable coils suspended from the cable they serve. Special care is required to assure that the cable's minimum bend radius is observed during this process.

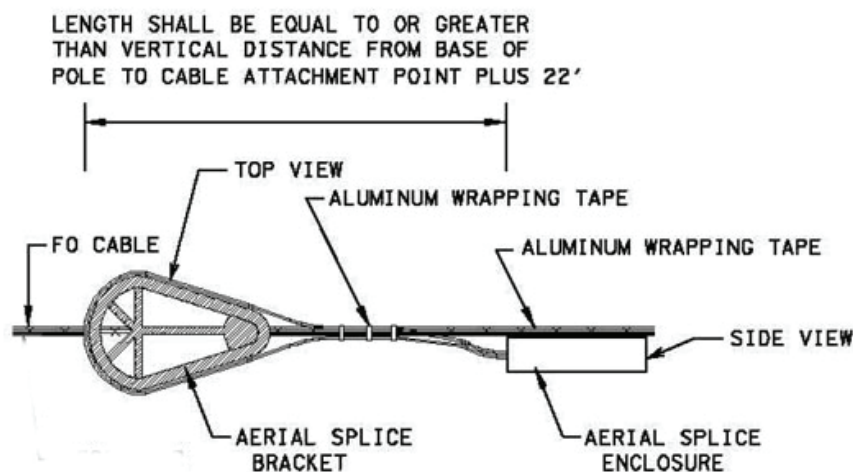


Figure 12- Snow Shoe Used to Store Slack Cable at Each Cable End

Additional Information

If there are additional questions on this topic or other fiber optic issues, please contact Sterlite Technologies at:

Contact Information

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www.sterlitetechnologies.com

¹ This slack length shall be equal to the height of the cable on the support structure plus the distance from the support structure to the location where the splice will be made in a trailer or tent. In addition, at least 3 to 6 meters of fiber must be provided to make the splice. Company policy shall be followed to determine if extra cable is required at the cable ends to store as slack cable to enable maintenance operations on the cable route or if that slack cable can be stored at selected spots along the cable length.

