

Horizontal Manual Pole Assembly & Installation

For In-Ground Mounted Utility Poles

1.0 Purpose

The purpose of this technical instruction is to detail those actions necessary to ensure that steel power pole sections are joined, assembled and installed in compliance with the applicable design standards.

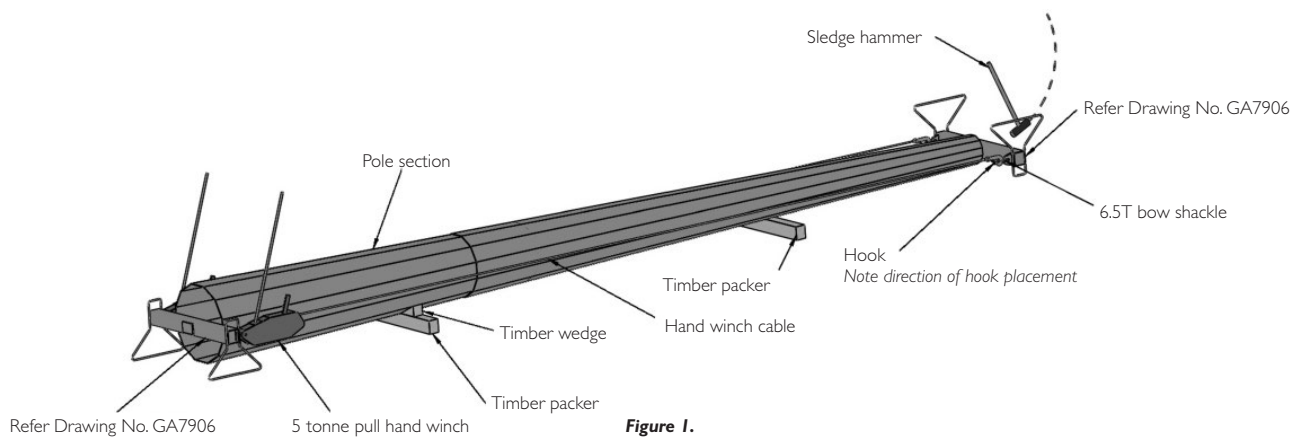
2.0 Scope

This procedure applies to the joining/assembly and installation of in-ground mounted steel power poles. Methods of horizontal pole assembly are detailed.

3.0 Procedure Details

Horizontal Pole Assembly

- 3.1 Each site should determine, document and train its personnel in safe work methods relevant to the site and to the pole assembly and installation.
- 3.2 Arrange the base section onto packing and level so that the underside of the pole section will be horizontal. If winching assembly lugs have been provided on either side of the section, arrange these so that they are horizontal. The height of the packing should be such that the base section is well clear of the ground.
- 3.3 Make sure that the pole base section is wedged to prevent rotation (refer figure 1).



- 3.4 Check that the design slip distance and minimum slip distance, are correctly marked near the top of the section. If the final slip length achieved is to be recorded then mark an additional spot 300mm past the design slip distance as a measuring reference.
- 3.5 Check that the packing is a minimum of 300mm clear of the slip joint length shown on the drawings to allow for any horizontal movement of the column during assembly.

- 3.6** Sling the next section for assembly at its centre of gravity and engage the sections as far as easily possible, making sure that perfect alignment of the pole sections is maintained. Rotate the section being slung as necessary to maintain perfect alignment of the corner fold lines. Pole sections must be aligned both horizontally, when viewed from the side (refer figure 2), and must also at the same time be in a straight line when viewed from the end of the section (refer figure 3). The crane used to engage the next section can be used to hold the added section in perfect alignment while the joint assembly is being carried out.

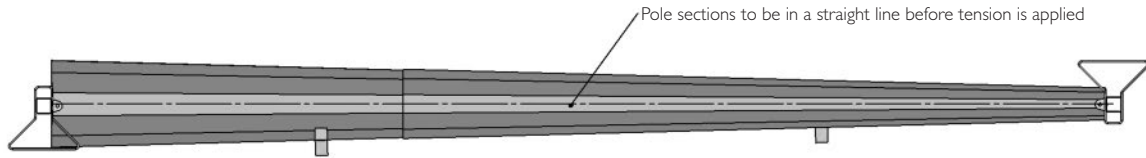


Figure 2.

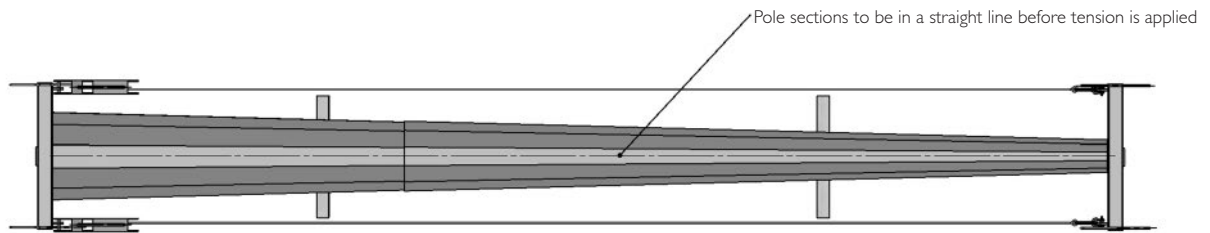


Figure 3.

Pole sections and climbing rung clips, if applicable, must be aligned along the length of the pole in accordance with the relevant pole drawings.

- 3.7** Assemble two 3 tonne lift, 5 tonne pull hand winches (this may vary for larger transmission poles to 20 tonne total compression), one each side of the pole. Attach the hand winch cables to the lightweight SHS steel cross beams at both ends of the pole sections being joined and block up the cross beams as necessary so that the cross beams are on the pole centre line.
- 3.8** It is important that the cross beams at either end are parallel with each other when viewed from the end (refer figure 4).
- 3.9** If winching lugs have been provided on the pole section, these may be used in place of the cross beams. If a combination of winching lugs and a cross beam is used, ensure that the plane of the winching lugs is parallel with the cross beam. Only one section of the pole is to be assembled at a time starting from the base section.

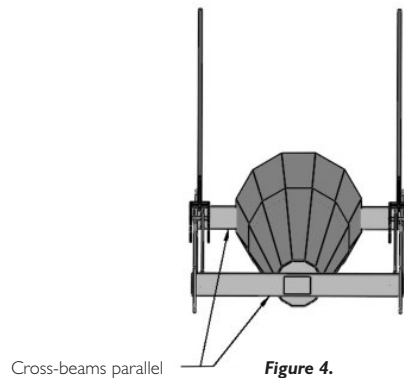


Figure 4.

- 3.10** Under strict supervision, operate the hand winches in unison to ensure that telescoping of the sections proceeds evenly about the column axis. During this operation the cross beam can be hammered on the striking plate (refer figure 1), and the external surface of the slip joint can also be hammered via wooden block to assist in achieving a sound joint.
- 3.11** Misalignment of the sections for any reason may lead to jamming, which will prevent good telescoping of the joint and may be difficult to rectify.
- 3.12** Continue to apply pressure as described in 3.9 above **until no further movement can be achieved**. Check the design slip joint length with respect to the actual slip joint length achieved. If the slip joint length achieved is less than the design slip length, check that the minimum slip length has been achieved and that the joint appears to be tight all round. Contact INGAL EPS if the slip distance achieved is less than the minimum.
- 3.13** Before removing the crane sling, pack up the newly assembled section to the required level ensuring that the packing is at least 300mm clear of the next joint to be made. Proceed in the above manner until the pole is fully assembled, keeping a careful check on alignment.

Pole Installation

- 3.14** Safety considerations should be reviewed prior to any pole lift.
- 3.15** Before lifting the pole, ensure the pole orientation is correct with respect to any cross arms and the direction of the power line. If necessary, rotate the pole on the packing prior to lifting to facilitate the orientation.
- 3.16** Centre the lifting crane (A) as shown in figure 5. Attach a sling formed into a cradle arrangement (refer figure 5) at approximately two thirds of the pole height from the base. Attach shackles to the lifting sling and fix them to the link ring. Attach a lifting sling around the link ring and to the hook of the crane. Attach a wire rope, chain or hand winch between the base section winching lugs and link ring. Use appropriate shackles as required. The wire rope or chain should be made relatively taut prior to commencing to lift the assembled pole (refer figure 6). The purpose of the above arrangement is to ensure that the wire rope is taut as the pole is lifted, and to stop the cradle sling from slipping up the column while also transferring the lifting force back to the pole base. All lifting tackle must be checked for its capacity and adequacy for the mass of pole being lifted.
- 3.17** Figure 6 shows the sling around the pole as not choked and the method described ensures that the safety wire rope or chain will be taut and will prevent any pole sections separating in the unlikely event that a pole section joint has not been correctly assembled. A correctly assembled section will not separate on lifting.
- 3.18** Alternatively, a choked sling arrangement can be used. If this arrangement is used it is very important that the wire rope or chain between the base winching lugs and the lifting link ring or uppermost pole section winching lugs is taut.
- 3.19** For some larger poles it may be necessary to use a small mobile crane (B) to "tail in" the base end of the column as the main crane (A) is lifting. This will avoid the base dragging on the ground and maintain control of the base until the pole is held vertical by the lifting crane (refer figure 5).
- 3.20** Following the above, the pole may now be lifted into the foundation hole. Keep well clear of the base of the pole while it is being lifted. The pole can be rotated into the correct alignment by hand or by choking a sling around the base above ground level and using a crow bar to help manoeuvre the pole.
- 3.21** The pole should be sufficiently secured to enable satisfactory placement and compaction of the fill and to maintain vertical alignment or back rake as required for the pole, while the pole foundation is stabilised.
- 3.22** Release the load from the lifting crane (A) once the pole is satisfactorily secured in position. If the lifting sling has not been choked, the lifting sling cradle and wire rope should easily slide down the pole as the lifting cable is run down.
- 3.23** Remove the lifting tackle and wire safety rope.

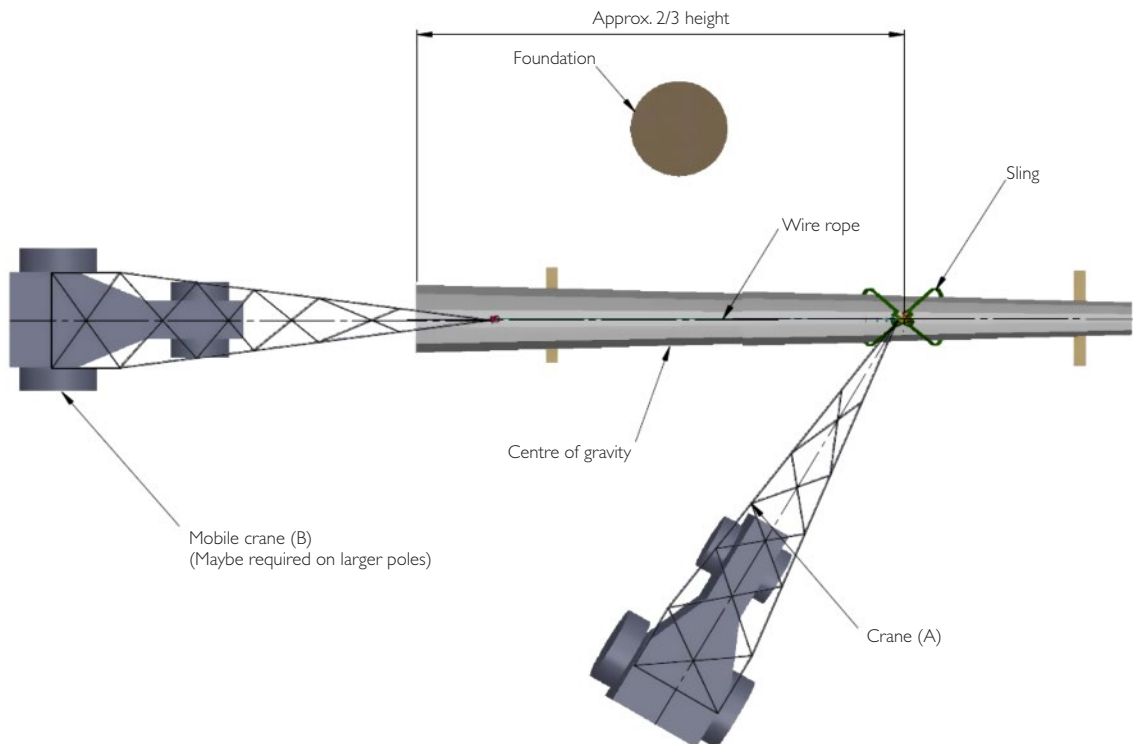


Figure 5.

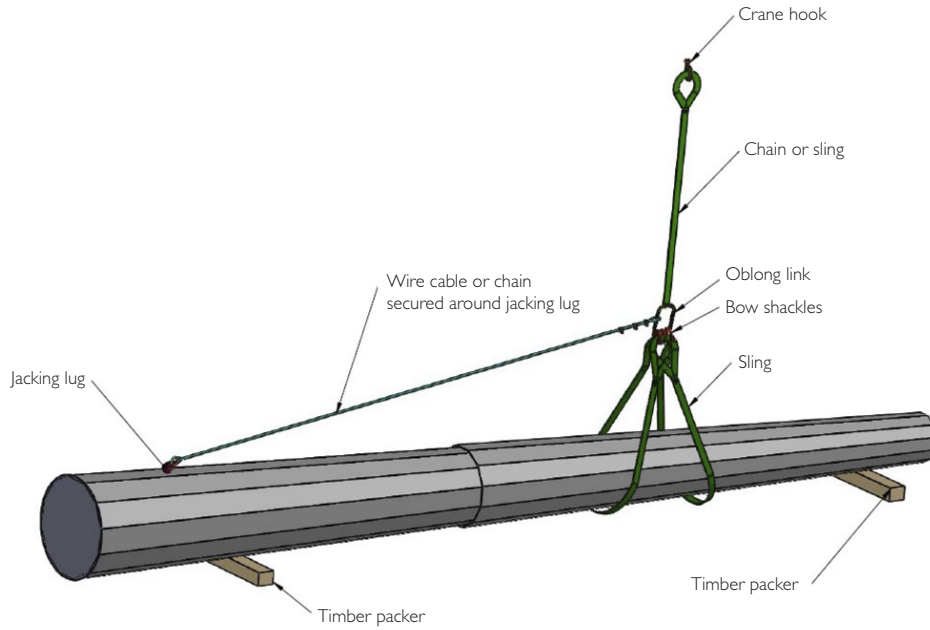


Figure 6.

4.0 Bill of Materials

Description	Qty
1 Soft Sling 6.0T 3.0m	2
2 Hand Winch 3.2T Lift 5.0T Pull capacity with Wire Rope 16mm diameter x 20.0m	2
3 Wire Rope 15.0m 3.0T WLL minimum with Thimble Eye one end, Brazed at other	1
4 Wire Rope 23.0m 3.0T WLL minimum with Thimble Eye one end, Brazed at other	1
5 Wire Rope Grip AS2076 to suit 15.0m 3.0T WLL minimum Wire Rope	3
6 Oblong Link 5.5T WLL minimum	1
7 Eye Bolt M24 3.2T WLL (in all directions) minimum	1
8 Bow Shackle 6.5T WLL minimum	5
9 Hand Winch Pulling Frame 10.0T, GA7906	2

Note: The 15m wire rope is for installation use on up to 26m length poles. The 23m wire rope is for taller standard in-ground mounted poles up to 34m length.