AMBOR
STRUCTURES

Direct Embedded Pole Installation Manual

Before operating or maintaining our products, please read this leaflet carefully first. This leaflet contains the most possible issues but not all of them. If met with any problems, you can call to our after-service department to get sufficient support.

Introduction and Safety Guidelines

- Read through the manual in its entirety prior to assembly and installation of the tower with the raising and lowering system.
- WARNING: Improper use may cause property damage, serious injury, or death; therefore, it is highly recommended that trained professionals are installing the towers and operating the raising/lowering system.
- Use extreme caution near overhead power lines or underground utilities. Observe all safety precautions for high-voltage equipment.
- Operator must have relative operation certifications or qualification certifications for electrical installations. Follow all applicable building and electrical codes.
- This manual gives basic assembly procedures for the direct embedded pole, it's not a comprehensive guide to all possible situations. Direct any questions to your representative.

Safety

- All planning should take place prior to installation to determine the required clearance and ensure proper space for raising and lowering the tower.
- The work area should be kept clean and free from trip hazards.
- Products should be inspected for damage prior to use. If any damage is noted, parts must be replaced or repaired immediately, per manufacturer's recommendation.
- When construction or erection of free-standing objects is planned, it must be in compliance with local ordinances and local design specifications (i.e. wind speed requirements)
- Tower grounding must follow local ordinances.
- During tower installation, all operators must wear head protection, foot protection and take safety precaution.

- NEVER stand or walk beneath a tower in the middle of the installation. Operators must remain a minimum of two meters from the pole when operating the equipment.
- Installation and/or assembly during severe weather conditions must be avoided, especially electrical storm activity (lightning).
- Maximum allowable wind speed during installation or maintenance is 12m/s.
- SAFETY FIRST! Caution and common sense must be used when installing/using this product.

Prior to Tower Assembly:

1. Check shipment and verify there are no missing items per drawings or BOMs, including every small part like hardware.
2. Check the products and make sure there is no damage on the products and no destruction of the galvanizing.
3. Check the minimum slip joint marks on each pole section are still clean enough, usually, they are marked by a painting pan. Remark the minimum slip joints according to the drawings if any of them are not clean enough.
4. Discuss picking options with your Crane Operator. Make sure to discuss and plan out the proper pick points and complete tower erection.
5. Mark the pole position on the ground. Clean surrounding area and make sure there is no rocks or anything that may affect the installation work or damage the facilities.

Foundation Hole Excavating

1. Figure out foundation hole size and depth per the tower design or foundation design, choose the appropriate facility like auger crane for the foundation hole excavating.

2. Excavate holes to the request size and depth, usually the hole depth can be a little bit deeper than requested value but should not be 8 inches deeper than the recommended depth.

Bottom Section Installation

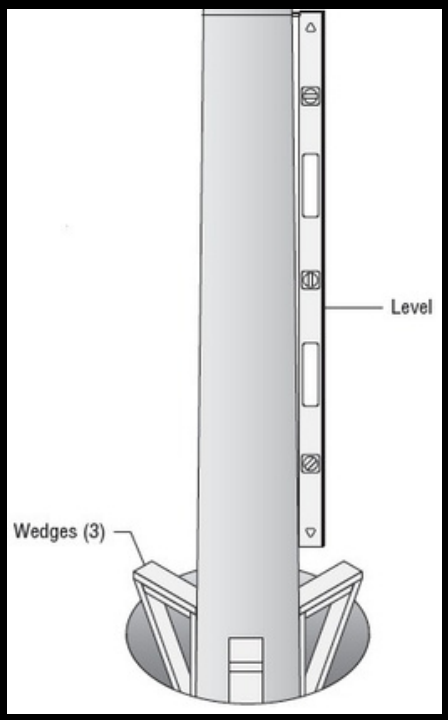
1. Clean the surrounding area of the foundation hole to make sure things like dirt, and sand will not fall into the hole during tower installation.

2. Backfill the hole with a little bit of broken stones on the bottom of the hole, make sure the depth left is still sufficient.

3. Lift the bottom section with a crane by the two jacking lugs on top (Make sure any parts like the electrical control box that would be installed on bottom section are already installed).

4. Operate the crane to slowly lower the tower to the foundation hole. Align the section to the correct orientation (Important, like the fixtures to the field when other sections are installed) and lower the pole bottom into center of hole until it rests on the bottom.

5. Plumb base and wedge the pole into position. Use levels to help, one level on each side of the pole and make sure the bubble on both level looks the same.



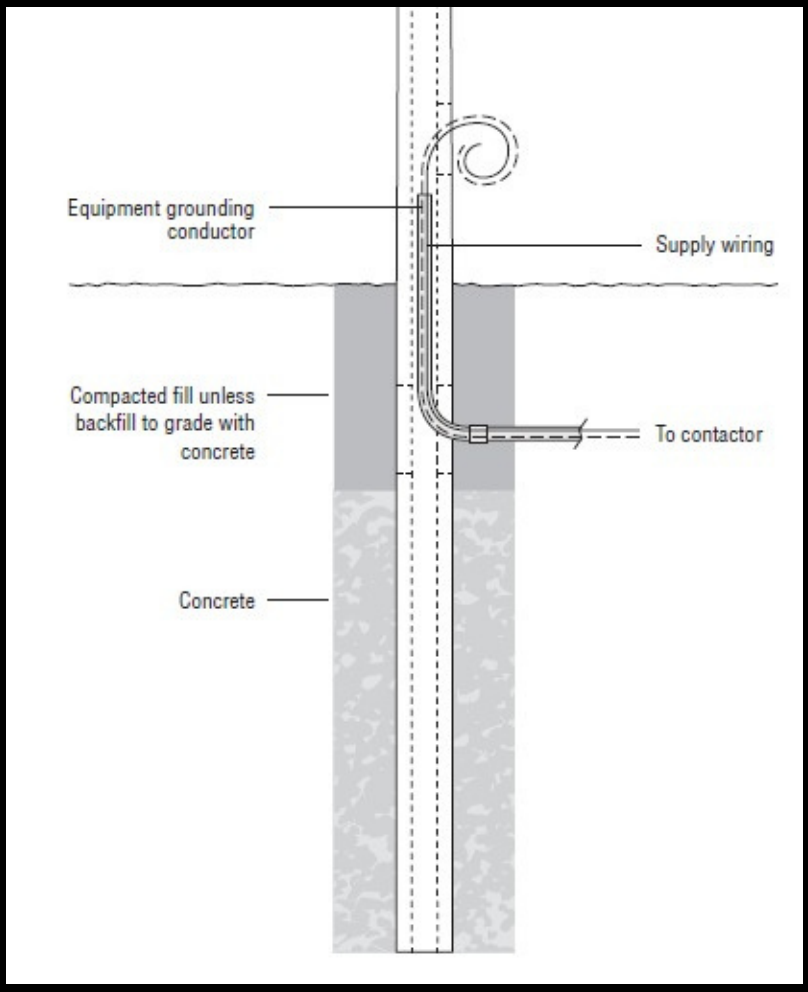
6. Lower the lifting hook and remove the lifting wire rope.

7. Make sure there is no water in the hole, it MUST be removed prior to backfilling with concrete. The water will mix with the concrete and flood into the inside of the base, filling the inside conduit and weakening the foundation.

8. Backfill with concrete in 2-foot to 3-foot increments to just below the underground wire access hole. Check plumb after each increment. If the pole gets out of plumb, simply push it back into plumb before the concrete sets. Check plumb of the pole a final time. Allow concrete to cure until it can no longer be readily penetrated with a 1/2-inch diameter rod and hammer. Normally 12 to 24 hours is required.

9. Have your electrician install all underground conduit and wiring, including equipment grounding conductor. You may also install wiring after standing pole.

10. Backfill with compacted soil to finished grade unless alternate foundation design requires concrete to finished grade.

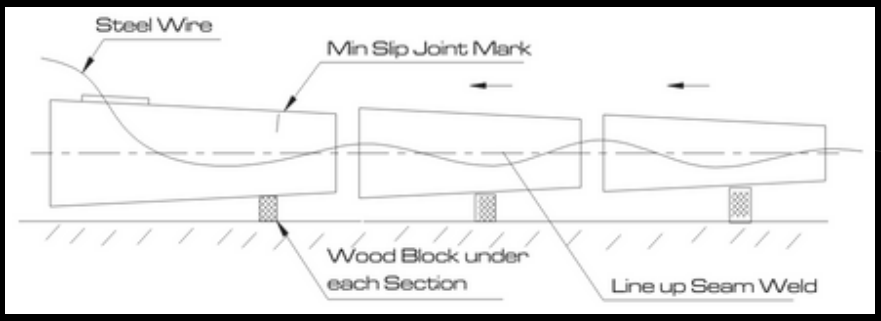


Join Tower Sections

1. Locate the other pole sections, and all accessories like cross arms near the correct foundation hole, and make sure all parts are on the right spot.

2. Arrange tower sections in order with the male and female ends aligned. Make sure each section is propped up off of the ground or protected to prevent damage to the tower shaft. Align the sections by the seam welds, the jacking lugs on adjacent sections also need to be aligned.

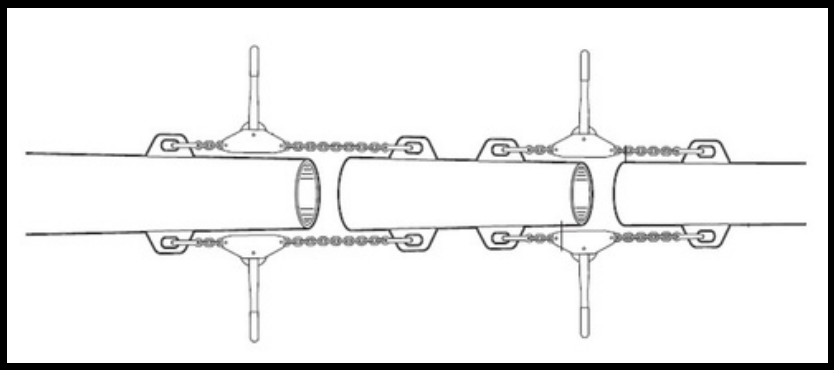
3. Before joining tower sections together, place a steel wire (or iron wire) longer than the tower inside the pole shafts from the bottom maintenance door (or any place the cables needs to get inside the pole) to the top of the top section. This wire will be used for installation guidance of cables that need to be installed inside the pole. Such work should be done along with the tower section assembling.



4. Tower sections assembly should be done one by one and start from bottom to the top. Place the base section at a proper position near the place the pole will be installed. Place a wooden block under the tower section at about 1.5m from the small end of the base section to make sure the small end is off the ground for joining the upper section. Soapy water may be applied on the joint overlap to increase ease of jointing. Make sure the the minimum slip joint mark is each to tell on bottom section (see tower drawing for the specific length, usually it's 1.5 times the inner diameter of the large end of the female section).

5. Lift the upper section and align its bigger end with the small end of the bottom section and try to join them together. Meanwhile, the welding lines at both sections should be aligned. Again, place a wooden padding block at the front end of this section.

6. Connect Chain Blocks (Or come-along, around 2T will be enough) on the jacking lugs near the slip joint, one block on one side, they will be used to pull sections together and seat the two tower sections.



7. Tighten the chain blocks at both sides of the sections until the sections are joined together tightly without big gaps between the two sections. The slip joint length varies according to the diameter of the shafts, but it needs to be greater than the minimum slip joint length. If the resistance is too much during this connection, a hammer can be used to strike the slip joint area to help. In order to avoid damaging the surface of the tower sections, a wooden plate or any other block should be added between the shaft and the hammer.

8. For towers with more than two sections, repeat steps above.

Other Parts Installation

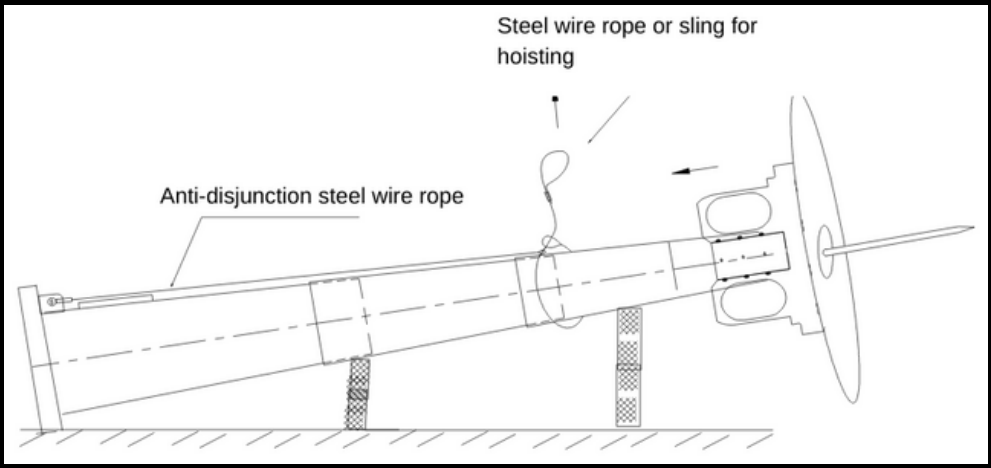
1. Other parts like cross arms, fixtures, electrical control box, power cables, anything that will be installed on the pole is recommended to be installed on the pole shaft once tower assembly work has been done and the pole hasn't been installed into the ground.

Please note the non-steel parts like fixtures, electrical control box, cables are not from Ambor, please follow the instruction from the corresponding manufacturers for the installation, please not install them at this step if installation on horizontal pole is not allowed nor preferred.

Tower Installation

Tower is ready to be installed on the bottom section into foundation after work above has been double confirmed.

As for the selection of hardware, crane, the plan may vary depending on different installation situations, therefore, a uniform installation is not required. But it must be safe and the tower and other equipment must not be damaged. Bellow installation approach can be used for reference.



1. The length of a wire rope for tower installation shall be greater than three quarters of the total length of the tower.

2. The lifting point of the tower is between two-thirds and three-quarters of the tower from bottom (This number may vary when the fixtures, cross arms on pole top is kind of too heavy).

3. One end of the hoisting wire rope shall be tied on the pole shaft under brackets like jacking lugs on the bottom section. The other end of the hoisting wire rope shall be continuously extended along the tower to the lifting point, at least about 2m extra rope beyond the lifting point shall be reserved for lifting.

4. Work with the crane operator to lift the tower into place. In order to avoid damage caused by collision with the lifting equipment, have one person pull the steel wire rope and cable hanging outside during the lifting process.

5. Guide pole into position over bottom section using steel rope and lower onto bottom section. Do not allow the pole to sit on base until it is properly aimed (next step). The Pole should rotate with reasonable force applied, but not freely.

6. Once the pole is aligned, use a level to draw a thin vertical alignment mark on pole and bottom section. Use mark to verify alignment is maintained while lowering pole and jacking onto base.

7. Lower pole into position, maintain alignment until pole seats on base. Attach two chain hoist or come-alongs to jacking lugs. Pull pole down onto bottom section, keeping marks aligned. Ensure minimum overlap per drawing.

Note: This instruction only applies to the standard products, installation procedures may vary for different products and please follow site engineer's guidance.