

## APPENDIX II - TECHNICAL SPECIFICATIONS FOR TRANSMISSION EQUIPMENT

### 1. HELICAL ACNCHORS

- 1.1. The main purpose of a helical anchor shall be to transfer structural loads to soil. Typical tension applications of helical anchors include guy anchors for poles and towers.

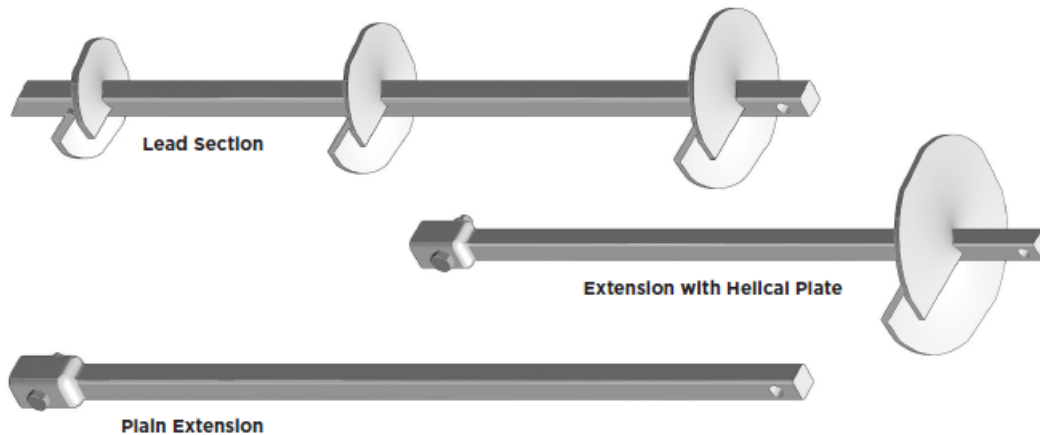
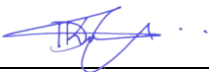


Figure 1: Helical anchor set

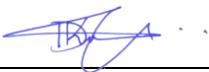
- 1.2. Helical anchors shall be screwed into the ground making sure they penetrate at a rate of about one pitch length (3 inches) per revolution by use of a hand-held helical installer machine.
- 1.3. Each set of helical anchors shall comprise of one lead section, one plain extension, one extension with a 14-inch helix and an attachment device for the guy wires.
- 1.4. The lead section and the extensions shall not be less than 4ft long.
- 1.5. Design drawings shall be provided to illustrate the design of the helical anchor.
- 1.6. The central shaft shall be fabricated from seamless Grade 80 steel and helical plates from Grade 50 steel.
- 1.7. The lead section shall contain 3 helical plates of 8, 10 & 12 inches.
- 1.8. Extensions shall be added until the lead section penetrates into the bearing strata.
- 1.9. The anchor shall have seamless square shafts with high tensile strength for higher torsion to penetrate stronger soil strata for better load capacity.
- 1.10. The anchors shall be hot dip galvanized for enhanced underground corrosion resistance.
- 1.11. The helical installer shall be used to drive helical screw anchors deep into the ground using rotational torque.

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- 1.12. The helical installer shall be calibrated for installation of 8-10-12 helix and it must have proven cheat relating torque to holding capacity.
- 1.13. The helical installer shall comprise of the following:
- 1.13.1. a rotating drive head powered by hydraulic pressure and consists of a rotating element that connects to the shaft of the anchor.
  - 1.13.2. hydraulic powering unit that is mounted on a wheeled cart for easy transport to the work site.
  - 1.13.3. hydraulic hoses with flash mount fittings to keep the hose terminations clean and prevent dirt/debris.
  - 1.13.4. torque bar to provide resistance to the drive head by preventing it from rotating in the opposite direction.
  - 1.13.5. a controller that provides a mechanism to regulate hydraulic pressure and the rotation of the drive head in either direction.
  - 1.13.6. steel stakes to provide a stable and secure anchor point for the helical anchor machine during installation by resisting counter-torque generated during the rotation of the hydraulic drive head.

## **2. GIN POLE**

- 2.1. The gin-pole shall be used for raising and lowering tower sections, insulators and other components up and down the tower.
- 2.2. The gin-pole shall be made from Aluminum Alloy 6061-T6 with a rating of at least 200kg.
- 2.3. The gin-pole shall be lockable into position at any point along the tower by securing a fixing device on its base into any of the cutout holes along the tower section.
- 2.4. The gin-pole pipe shall be not less than 15ft in length comprising of the following accessories: sliding boot, pole head with a pulley, pole stiffener, lifting hook, lifter, locking device and bottom pulley housing.

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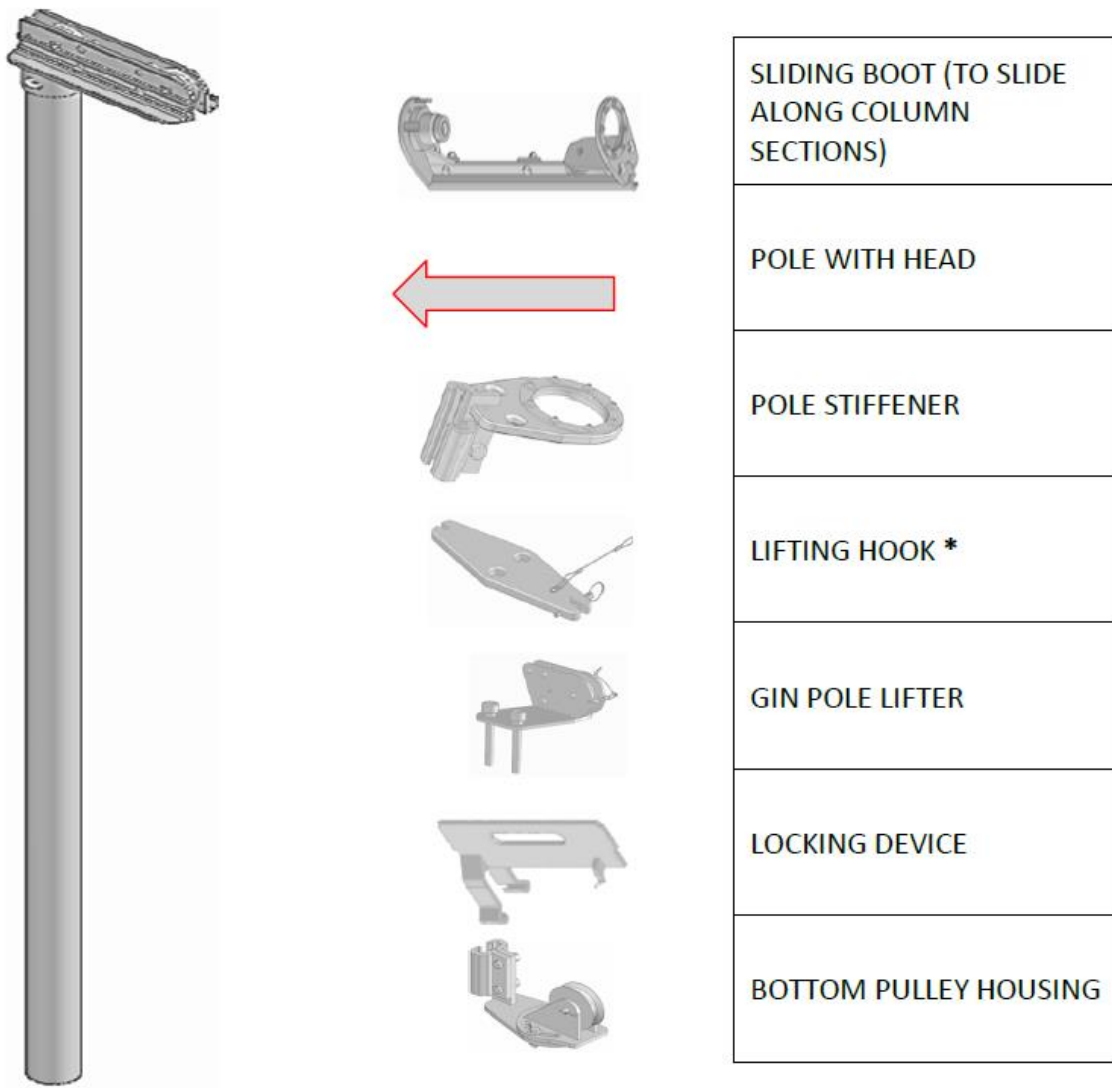


Figure 2: Gin pole components

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### 3. LINEMAN'S TOOL BOX

3.1. The tool box shall comprise of the following made from chrome vanadium steel, chrome plated finish:

3.1.1. 18 PCS - 1/2" SOCKET:

✓ 10, 11, 12, 13, 14, 15, 16, 17, 18 19, 20, 21, 22, 23, 24, 27, 30, 32 MM

3.1.2. 2 PCS - 1/2" LOCK SOCKET: 34, 36 MM

3.1.3. 21 PCS - COMBINATION WRENCH:

✓ 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 27, 30, 32 MM

3.1.4. 6 PCS - SCREWDRIVER:

✓ PH1 × 75 MML, PH2 × 100 MML, PH3 × 125 MML,

✓ SL5.5 × 100 MML, SL6.5 × 125 MML, SL8 × 150 MML

3.1.5. Ratchet spanner accessories:

✓ 2 PCS - 1/2" EXTENSION BAR: 5" 10"

✓ 1 PC - 1/2" 72T RATCHET HANDLE

✓ 1 PC - 1/2" UNIVERSAL JOINT

✓ 1 PC - 1/2" 18" FLEXIBLE HANDLE

✓ 1 PC - 1/2" WOBBLE EXTENSION BAR 2"

✓ 1 PC - 1/2" SLIDING T-BAR 300 MM

3.1.6. 1 PC - 180 MM COMBINATION PLIERS

3.1.7. 1 PC - 200 MM LONG NOSE PLIERS

3.1.8. 1 PC - 180 MM DIAGONAL CUTTING PLIERS

3.1.9. 1 PC - 300 MM ADJUSTABLE SPANNER

3.1.10. 1 PC - METAL BOX + TRAY: The trays spread out when open, giving a clear visibility and easy access to the contents.

### 4. WIRE ROPE

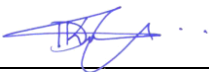
4.1. The wire rope shall be made of 19 steel strands.

4.2. The wire rope shall be galvanized for ability to withstand rust and other forms of corrosion.

4.3. The overall diameter of the wire rope shall be 10mm.

4.4. The length shall be 100m.

4.5. The minimum breaking load shall be 70kN for a Grade 120 daN/mm<sup>2</sup>.

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- 4.6. The average mass shall be less than 0.55kg/m.
- 4.7. The wire rope shall resist deformation from external forces, such as those from a drum or sheave.
- 4.8. The rope shall have a mechanically spliced thimble eye on both ends as illustrated on Figure 3.



*Figure 3: Thimble eye splicing*

## 5. INSULATED PLATFORM FOR LIVE WORK (SCAFFOLDS)

- 5.1. The insulated platform for live work shall provide a condition of access and positioning to the electrician at heights necessary for the most diverse types of bare-hand and hot-stick works.
- 5.2. The structure shall be made of fiber reinforced plastic with electrical and mechanical properties in accordance with the IEC-60855 and ASTM F 711 standards.
- 5.3. The insulated modular scaffold shall be provided with insulating connections and interchangeable modules with aluminum connection modules.
- 5.4. It shall be of lightweight, interchangeable, snap-on parts, assembly is easy, simple and quick.
- 5.5. It shall be used in energized installations up to 400kV, ensuring full electrical insulation and a rated working capacity of not less than 250kg.
- 5.6. The stepping platform shall be non-slip surface made from fiber glass.
- 5.7. It shall have a rail set at the base for easy horizontal mobility of the scaffolding in substations where paving/terrain is uneven.

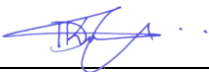
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Figure 4: Typical insulated scaffold on a rail system

## 6. MARKING & TESTING

6.1. The items shall be legibly and indelibly marked with the following info:

- 6.1.1. Manufacturer name or trademark
- 6.1.2. Year of manufacture
- 6.1.3. The words "PROPERTY OF KPLC"

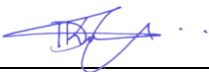
6.2. It shall be the responsibility of the supplier to have all the relevant tests performed.

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### GUARANTEED TECHNICAL PARTICULARS

To be filled and signed by manufacturer/authorized dealer in the following format ensuring compliance of clause by clause:

| CLAUSE NO | ITEM DESCRIPTION | KPLC REQUIREMENTS | BIDDER'S OFFER |
|-----------|------------------|-------------------|----------------|
|           |                  |                   |                |

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