



Ergon Energy Corporation Limited

Specification for Transport and Erection of Pole Structures

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1. Purpose and Scope

This Section covers the transport, handling, storage, site assembly and erection of pole structures. All costs associated with work under this Section of the Specification shall be included in the schedule rates for "Structure Erection".

2. References

2.1 Ergon Energy controlled documents

BS001404R106 – Pole Handling Management (Standard)

BS001404R121 – Handling Concrete Poles

2.2 Other Sources

AS/NZS 4680:2006 Hot-dip galvanized coatings on fabricated ferrous articles

Rocla : Poles and Piles Handling and Installation Guide

Ingal 8.6.09 Horizontal Manual Pole Assembly and Installation for In-ground Utility Poles

Ingal 8.6.10 Horizontal Manual Pole Assembly and Installation for Base Plate Mounted Poles

3. Definitions, Acronyms, and Abbreviations

Nil

4. Security

Nil

5. Safety, Environmental and Ergonomic Considerations

As per Ergon Energy's Safety, Environmental & Ergonomic Policies.

6. Handling, Transport and Storage

The delivery to site of all components and materials shall be the responsibility of the Contractor.

All transport, handling and erection of structures shall be in accordance with this specification and the manufacturers recommendations.

All poles shall be lifted, transported and stored in such a manner as to not over-stress or cause damage to them. It is the contractor's responsibility to ensure the weights and correct lifting methods are confirmed with the pole manufacturer to ensure poles are lifted in such a manner.

Poles shall be stored so that they are clear of grass or brush likely to allow the spread of fires and so that no part of the pole is in contact with the ground.

6.1 Handling of Poles

All poles shall be handled, stored and delivered in such a manner that the product is not damaged by chains or tackle or impact.

Poles shall be lifted on and off transporters with spreader bars (or two cranes) so as to minimise bending movements in the poles.

Snigging and bobtailing of poles is not permitted unless otherwise approved by the Superintendent.

Poles shall not be dropped or slid off rail or road trucks but shall be lifted and placed with a suitably spread two point lift in a manner that will not overstress or crack the poles.

Any concrete pole showing hair line cracks on its surface shall be rejected if an approved test crack measuring gauge of greater than 0.1 mm thickness can be inserted to a depth of 3 mm over a length of at least 150 mm at intervals not exceeding 25 mm.

6.2 Transporting of Poles

Poles shall not be damaged or cracked during transport. Concrete poles shall not be transported until they have been cured for 14 days or more. Transport may be either road truck or rail. During transport the poles shall be supported by suitably shaped timber bolsters or resilient packers and they shall be separated by shaped bolsters or packers.

Care shall be taken to ensure that concrete poles are transported with their strong direction aligned in the vertical plane and appropriate fixings and restraints shall be used to ensure that the poles do not shift or rotate away from this alignment during transport.

The load of poles shall be securely tied down near each end, and shall be effectively tied together near the centre of the pole length. All tie-downs and bolsters shall be effectively padded with thick rubber conveyor belt or similar to prevent pole chafing or damage. Rubber tyres or similar spacers shall be placed vertically between poles near both ends and near the centre of the pole length in sufficient numbers to prevent clashing of the poles during transport.

Where transportation is by ship, poles shall be securely loaded into an enclosed container prior to delivery to the shipping terminal. The container shall be loaded such that it is out of the splash zone of the ship. Poles shall only be unloaded from containers once away from the terminal at the arrival port.

6.3 Storage of Poles

The storage area for poles shall be a prepared hard standing area with the poles supported on timber bearers.

Poles may be stacked up to 3 units high with timber spacers between each layer and timber chocks placed to prevent the poles from rolling. Supports for multiple layer stacking of concrete poles must be maintained, one vertically above the other.

Poles of different lengths or diameter shall not be mixed in the one stack and poles shall be supported to ensure deflections do not exceed 50 mm.

7. Site Assembly of Pole Structures

Prior to erection of concrete poles all crossarm components, climbing aids, miscellaneous steelwork and earthing shall be assembled with the pole suitably supported just above ground level by hurdles to minimise deflections.

7.1 Jointing

Where multi pieced poles are used, the contact surfaces of joints shall be cleaned and free of dirt, grease and foreign matter before assembly.

Slip jointed steel poles shall be jacked to the manufacturers specification.

7.2 Tightening of Bolts

The pole splice nuts shall be tightened to the specified torque by torque wrenches.

Similarly, high strength nuts and bolts shall be tightened using turn of the nut methods.

All other nuts shall be tightened to a torque over 30 Nm and all spring washers shall be fully compressed.

All bolts shall be fitted with heavy duty galvanised spring washers and nuts.

Bolts in tension shall be fitted with lock nuts.

7.3 Repair of Damaged Galvanising

After erection all steelwork shall be cleaned of all foreign matter, surplus paint, and inked temporary markings.

Special care shall be taken not to injure the skin of galvanising or specially treated surfaces during transport and erection. Care shall be taken to remove any rust streaks or foreign matter deposited on galvanised surfaces during storage, transport or after erection.

Grinding to remove excessive zinc, dags or imperfections in the galvanising shall only be permitted if the defects affect the 'fit' of the steel members or when sharp edges are unsafe.

Minor damage, minor non repetitive field revisions, and defects as defined in AS 4680 to galvanising may be repaired at site, subject to the approval of the Superintendent, by the application of at least two coats of approved quality zinc rich paint to rust free steel. Areas of larger damage, but not exceeding 100 mm² (equivalent to 10mmx10mm) may be repaired by the application of zinc metal spray or low melting point zinc alloy repair rods or by regalvanising. Damaged areas in excess of 100 mm² shall be regalvanised.

In areas of coastal exposure the Superintendent may require all damaged areas to be regalvanised.

For all such repairs, the mass of zinc coating per square metre of damaged surface area shall be not less than 600 grams.

7.4 Repair of Concrete Poles

On site pole modifications will not be permitted without the written approval of the Superintendent. If the Superintendent considers that the defect cannot be satisfactorily repaired, replacement poles shall be provided without additional cost to the Principal.

The Superintendent may direct that a mixture of approved epoxy resin and sand or silica flour be used for making good precast concrete sections where minor damage is sustained.

The Superintendent may direct the repair of cracks in poles using a crack penetrating epoxy resin.

8. Structure Erection

The Contractor shall erect structures in accordance with the detailed design information shown on the drawings and the manufacturers recommendations.

Poles shall not be modified, on site by the contractor without prior approval from the Superintendent. Any drilling of poles should be done under the direction of the Superintendent and the pole manufacturer.

Pole structures shall be erected so that the deviation from the vertical of the pole top shall not exceed 1/100th part of the overall height of the pole above ground except for the angle/termination poles without top stays and unstayed flying angle poles which shall be raked back by the calculated (or test) serviceability load deflection.

Care shall be taken to ensure that the suspension structure crossarms are correctly aligned within two degrees of transverse to the route centreline and that the strain structures are correctly aligned within two degrees of the bisect line for deviation structures and within two degrees of the route centreline for termination structures.

'H' Structure poles shall be located to within 50 mm of their design plan position. They shall be oriented such that the through bolts can be inserted without forcing.

Care shall be exercised in the lifting of and splicing of poles, by using the manufacturer's recommended lifting slings and lifting procedure to minimise any damage to the surface of the poles. Poles shall not be lifted from the pole tip unless the pole design Engineer so approves.

Poles shall be located to within 50 mm of the pegged pole position and centralised in holes with a minimum clearance of 150 mm between the pole and the edge of the hole for the total buried length.

Suspension type insulator strings that are supported by a crossarm may be attached to the crossarm before the structure is erected. These insulator strings shall be securely tied to the crossarms prior to pole erection to prevent insulator damage.

Ladders and ladder stiles shall be erected straight to within ± 10 mm of bow.

Stayed poles shall have all stays connected to them and anchored securely as soon as the poles are stood. Staywires on poles with counterbalancing (opposing) stays shall be pretensioned to 5 - 10 kN. Care shall be exercised in the application of load and sequence of loading of stays so that erection stresses are not built into the structure.

9. Installation of Staywires

Staywire anchorages and bollard poles shall be located to within ± 0.5 m of design position such that the angle the stay makes with the vertical centreline of the pole and the applied loads is in accordance with the relevant structure drawing. The stay wire and stay anchor inclinations shall not differ by more than 2 degrees except as otherwise directed by the Superintendent.

Ground stays from bollard poles shall be located such that the angle between the centreline of the bollard pole and the stay is a minimum of 45° unless otherwise directed or approved by the Superintendent.

White painted aluminium stay guards shall be fitted to stay wires as detailed on the drawings.

Concrete, where used for pole foundation construction, shall be allowed to set for a minimum of seven days before loads greater than 1 kN are placed on poles, stays or bollard poles.

Stringing shall not be permitted until the concrete has cured for 14 days.

Stay wires shall be installed to nominal initial tensions to minimise the slackness in the stay wire prior to the application of conductor and earthwire loadings and to maintain the specified

straightness of the poles before and after conductor erection. After stringing the Contractor shall check, and adjust where necessary, the load in every stay such that pole straightness within ± 50 mm of the vertical line from the pole vertical centreline at the top stay to the base of pole is maintained and stay loads are balanced. Tensions in stays shall not be permitted to exceed 40 percent of their limit state strength design load at any stage during the construction of the line.

The costs for installation and tensioning of staywires shall be included in the Structure Erection rates.

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