CONSTRUCTION SPECIFICATION FOR
POLE ERECTION

TABLE OF CONTENTS

615.01 SCOPE
615.02 REFERENCES
615.03 DEFINITIONS - Not Used
615.04 SUBMISSION AND DESIGN REQUIREMENTS - Not Used
615.05 MATERIALS
615.06 EQUIPMENT - Not Used
615.07 CONSTRUCTION
615.08 QUALITY ASSURANCE - Not Used
615.09 MEASUREMENT FOR PAYMENT
615.10 BASIS OF PAYMENT

APPENDICES

615-A Commentary

615.01 SCOPE

This specification covers the requirements for the erection of poles used for the mounting of lighting equipment, traffic signals and control equipment, low voltage aerial cables, and extra low voltage aerial cables.

615.01.01 Significance and Use of Appendices

Appendices are not a mandatory part of the specification unless invoked by the Owner.

Appendix 615-A is a commentary appendix to provide designers with information on the use of the specification in a Contract.
615.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

- OPSS 501 Compacting
- OPSS 507 Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures
- OPSS 510 Removal
- OPSS 603 Installation of Ducts
- OPSS 610 Removal of Electrical Equipment
- OPSS 904 Concrete Structures

Ontario Provincial Standard Specifications, Material

- OPSS 1350 Concrete - Material and Production
- OPSS 1442 Epoxy Coated Steel Reinforcement for Concrete
- OPSS 2420 Wood Poles
- OPSS 2421 Spun Concrete Poles Class D
- OPSS 2423 Steel Poles, Base Mounting
- OPSS 2452 Aluminum Poles, Base Mounting
- OPSS 2453 Sectional Steel Poles

Canadian Standards Association

- C83-96 (R2005) Communication and Power Line Hardware
- G12-92 (R2003) Zinc Coated Steel Wire Strand

Others

- Ontario Electrical Safety Code

615.05 MATERIALS

615.05.01 Concrete

Concrete shall be according to OPSS 1350 with a nominal minimum 28-Day compressive strength of 30 MPa.

615.05.02 Reinforcing Steel

Reinforcing steel shall be fusion-bonded epoxy coated according to OPSS 1442.

615.05.03 Poles

Concrete poles shall be according to OPSS 2421.

Steel poles for base mounting shall be according to OPSS 2423.

Aluminum poles for base mounting shall be according to OPSS 2452.
Sectional steel poles for direct burial or base mounting shall be according to OPSS 2453.

Wood poles shall be according to OPSS 2420.

615.05.04 Frangible Bases

Frangible bases shall be as specified in the Contract Documents.

615.05.05 Pole Hardware and Accessories

Pole line hardware shall be according to CSA C83.

Steel guy cable shall be according to CAN/CSA G12.

Guy anchors shall be of the helical power driven or direct buried expandable type with a minimum diameter of 250 mm and a minimum anchor rod ultimate strength of 50 kN.

615.07 CONSTRUCTION

615.07.01 General

Concrete and metal poles shall be installed at locations specified in the Contract Documents.

615.07.01.01 Pole Orientation

Concrete and metal poles shall be installed with the handhole location on the pole as specified in the Contract Documents and such that the top wiring aperture is at right angles to the centreline of the road being served.

615.07.01.02 Pole Handling

Poles shall be handled using suitable non-abrasive slings at the pole pick up points as specified by the pole manufacturer.

615.07.01.03 Removals

Removals of electrical equipment shall be according to OPSS 610.

Other removals shall be according to OPSS 510.

615.07.02 Sectional Steel Poles

615.07.02.01 Assembly

Sectional steel poles shall be assembled in order of section number, taper, and diameter. Sections with wiring apertures shall be set with consideration given to the handhole location.

All sections shall be assembled by compression according to the manufacturer's instructions such that each section meets the normal overlap limits marked on the pole or to refusal. Seam welds shall be slightly offset during assembly. The finished length of the pole shall be less than or equal to the nominal pole length.
Pole lengths of 5.64 m or more shall be assembled using three self-tapping screws or impact inserted pins. Screws and pins shall be installed in the overlap of all sections below the signal bracket so that they are spaced equally around the pole.

615.07.03 Direct Buried Poles

615.07.03.01 Installation in Earth

Excavation shall be by auger or by other suitable means to obtain a hole large enough to accommodate concrete encasement and backfill. Where the excavation extends beyond the neat limits specified in the Contract Documents and where concrete encasement is specified in the Contract Documents, concrete may be placed to the undisturbed earth or the encasement may be formed with the remainder of the backfill made up of native material. Backfill shall be native material and placed and compacted according to OPSS 501.

615.07.03.02 Installation in Rock

Where rock is encountered, the method of installation shall be chosen from those specified in the Contract Documents and based on the depth of rock below finished grade. Each method of installation in rock shall be approved by the Contract Administrator prior to construction.

Rock anchors, bolts for rock mounts, and steel dowel bars shall be installed in drilled holes and grouted in place with non-shrink grout. Poles shall be cut off at the top end to provide the correct top of pole elevation. Wood poles that have been cut off shall have the ends treated with preservative according to manufacturer’s specifications.

Concrete levelling pads, concrete backfill up to the top of the rock grade, and formed concrete encasement shall be installed according to OPSS 904.

Native or imported earth material shall be used as backfill above or around the concrete encasement.

Backfill shall be compacted according to OPSS 501.

Rock excavation shall be according to OPSS 603.

615.07.03.03 Pole Alignment

Direct buried poles shall be held plumb by using a suitable temporary support assembly during concrete setting time or during backfilling operations.

615.07.04 Base Mounted Poles

615.07.04.01 Preparation

Anchorages templates shall be removed prior to installation of poles and frangible bases.

All studs, bolts, and nuts shall be cleaned and coated with white lithium-based grease.

615.07.04.02 Installation of Frangible Bases

Frangible bases shall be installed according to manufacturer’s specifications.
615.07.04.03 Pole Erection

Poles shall be secured to the anchorage assembly for frangible bases according to manufacturer’s specifications. Poles shall then be set plumb by adjustment of combinations of levelling nuts and holding nuts.

615.07.05 Apertures

Drilled apertures shall be accurately aligned to suit pole attachments or equipment. Apertures in metal poles shall be deburred. Apertures in galvanized steel poles shall be coated with grey zinc-rich paint and allowed to dry.

Wiring apertures in metal poles shall be provided with rubber grommets.

Unused pole apertures shall be plugged with rubber, neoprene, or plastic plugs.

615.07.06 Guy Anchors

Guy anchors and associated hardware shall be installed as specified in the Contract Documents and the Ontario Electrical Safety Code. Anchorage plates shall be installed at the specified guy lead distance and adjusted to remain clear of any existing guy anchors or by a minimum distance of 600 mm. Native backfill shall be placed and compacted according to OPSS 501.

Guy anchors shall be installed with single or double guy cable sets as specified in the Contract Documents.

All guy cables shall be installed to a snug condition prior to aerial cable stringing and readjusted upon completion to maintain poles in a plumb position.

Guy cables shall be tightened to maintain pole alignment and aerial cable clearances.

615.07.07 Site Restorations

Site restorations shall be according to OPSS 507.

615.09 MEASUREMENT FOR PAYMENT

615.09.01 Actual Measurement

615.09.01.01 Poles

For measurement purposes, a count shall be made of the number of poles installed regardless of the type and size of the poles.

615.09.01.02 Sectional Steel Poles, Direct Buried in Earth

For measurement purposes, a count shall be made of the number of sectional steel poles directly buried in earth.

615.09.01.03 Concrete Poles, Direct Buried in Earth

For measurement purposes, a count shall be made of the number of concrete poles directly buried in earth.
615.09.01.04   Wood Poles, Direct Buried in Earth
   For measurement purposes, a count shall be made of the number of wood poles directly buried in earth.

615.09.01.05   Sectional Steel Poles, Direct Buried in Rock
   For measurement purposes, a count shall be made of the number of sectional steel poles directly buried in rock.

615.09.01.06   Concrete Poles, Direct Buried in Rock
   For measurement purposes, a count shall be made of the number of concrete poles directly buried in rock.

615.09.01.07   Wood Poles, Direct Buried in Rock
   For measurement purposes, a count shall be made of the number of wood poles directly buried in rock.

615.09.01.08   Sectional Steel Poles, Base Mounted
   For measurement purposes, a count shall be made of the number of base mounted sectional steel poles installed.

615.09.01.09   Steel Poles, Base Mounted
   For measurement purposes, a count shall be made of the number of base mounted steel poles installed.

615.09.01.10   Aluminum Poles, Base Mounted
   For measurement purposes, a count shall be made of the number of base mounted aluminum poles installed.

615.09.01.11   Frangible Bases
   For measurement purposes, a count shall be made of the number of frangible bases installed.

615.09.01.12   Guy Anchors
   For measurement purposes, a count shall be made of the number of guy anchors installed, regardless of the size and type.

615.09.02   Plan Quantity Measurement
   When measurement is by Plan Quantity, such measurement shall be based on the units indicated in the clauses under Actual Measurement.

615.10   BASIS OF PAYMENT

615.10.01   Poles - Item
   Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Materials required to do the work of installing poles, including frangible bases and guy anchors.
When the Contract contains separate items for the work required by this specification, payment shall be at the Contract prices for such work.

615.10.02  
Sectional Steel Poles, Direct Buried in Earth - Item  
Concrete Poles, Direct Buried in Earth - Item  
Wood Poles, Direct Buried in Earth - Item  
Sectional Steel Poles, Direct Buried in Rock - Item  
Concrete Poles, Direct Buried in Rock - Item  
Wood Poles, Direct Buried in Rock - Item  
Sectional Steel Poles, Base Mounted - Item  
Steel Poles, Base Mounted - Item  
Aluminum Poles, Base Mounted - Item  
Frangible Bases - Item  
Guy Anchors - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material required to do the work.

615.10.04  
Rock Excavation

Payment for rock excavation shall be according to OPSS 603.

Rock excavation shall not include holes drilled in rock for the placement of steel dowel bars.
Appendix 615-A, Commentary for OPSS 615, November 2006

Note: This appendix does not form part of the standard specification. It is intended to provide information to the designer on the use of this specification in a contract.

Designer Action/Considerations

The designer should specify the following in the Contract Documents:

- Frangible bases requirements. (615.05.04)
- Pole locations. (615.07.01)
- Pole orientation. (615.07.01.01)
- Excavation beyond the neat limit. (615.07.03.01)
- Concrete encasement for direct buried poles. (615.07.03.01)
- Single or double guy cable sets. (615.07.06)

The designer should ensure that the Ontario Provincial Standards General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

2200 Series Electrical Drawings OPSD 2200.01 to OPSD 2260.01
OPSD 2410.01  Spun Concrete Pole - Class "D"
OPSD 2410.02  18.3 m Spun Concrete Pole - Class "D" for TV Camera Mounting
OPSD 2415.010 Steel Pole - Base Mounting
OPSD 2416.010 Steel Pole - Concrete Barrier Mounting
OPSD 2420.01  1.8 m or 2.4 m Aluminum Tapered Elliptical Bracket
OPSD 2421.010 Lamp Wattage Label for Luminaire
OPSD 2425.01  Sign Lighting Luminaire and Mounting Arrangement
OPSD 2428.01  Frangible Bases
OPSD 2432.010 Aluminum Pole - Base Mounting