

B905 - STEEL REINFORCEMENT FOR CONCRETE - OPSS 905**905.1 GENERAL**

The work under these items consists of the placing of steel reinforcement. The following design guidelines should be read in conjunction with CDED B904.

905.2 REFERENCES

- Canadian Highway Bridge Design Code (CHBDC), CSA-S6
- Designated Sources for Materials (DSM)
- Concrete Culvert Design and Detailing Manual
- Memorandum SCB-SO-2021-01, Design process for precast concrete box culverts of span greater than 3.0 m
- Structural Manual

905.3 TENDER ITEMS

Item Code	Title	Col Type	U.O.M.	PQP
0905-0002	Carbon Steel Reinforcing Steel Bar, Grade 400W	Normal	LS/t	No
0905-0005	Carbon Steel Reinforcing Steel Bar, Grade 500W	Normal	LS/t	No
0905-0025	Stainless Steel Reinforcing Bar	Normal	LS/t	No
0905-0035	Carbon Steel Mechanical Connectors	Normal	Each	Yes
0905-0045	Stainless Steel Mechanical Connectors	Normal	Each	Yes

905.4 SPECIFICATIONS

The requirements for the work of placing reinforcing steel and mechanical connectors are contained in OPSS 905.

905.5 SPECIAL PROVISIONS

Special Provision No. 109S62

905.6 STANDARD DRAWINGS

Drawings for reinforcing steel bar are contained in Ontario Provincial Standard Drawings (OPSD), Ministry of Transportation Ontario Drawings (MTOD), and Structural Standard Drawings (SSD).

905.7 DESIGN

Refer to the Structural Manual, Precast Culvert Manual and Structural Standard Drawings for standard details and exceptions to the Canadian Highway Bridge Design Code (CHBDC), CSA S6.

Refer to the Designated Sources for Materials (DSM) list for mechanical connectors. Mechanical splices of reinforcing steel shall not mix stainless steel and mild steel (carbon steel), or different grades of reinforcing steel bars and couplers. Lap splices should be considered before mechanical splices.

Design requirements for reinforcing steel are contained in the CHBDC. Additional requirements for type and grade of reinforcing steel bars are found in the Structural Manual.

905.8 COMPUTATION**905.8.1 Item Payment Basis**

Reinforcing steel bars are Lump Sum items.

Mechanical connectors are Plan Quantity Payment items and are measured in Each.

905.8.2 Sources of Information

MTO uses approved suppliers of the Designated Sources for Material (DSM) for reinforcing steel bar and mechanical connectors.

Further information on the requirements for reinforcing steel bar and mechanical connectors can be found in OPSS 1440, Steel Reinforcement for Concrete.

The main source of information for the tender items above is the Regional Structural Section.

905.8.3 Method of Calculation

The unit of measurement for the reinforcing steel bar items is LS/t. The tonne quantity is calculated for cost estimating only. The steel tonnages shall be provided by the Structural Office/Section for use by the Estimating Office. These quantities will not form part of the Tender Documents. In the tender, the item is Lump Sum (LS) with a quantity of 100%.

The unit of measure for mechanical connectors items is Each. Mechanical connectors are Plan Quantity Payment items.

905.9 DOCUMENTATION**905.9.1 Contract Drawings**

The designer includes the pertinent drawings provided by the Structure Office/Section into the contract. Please refer to the Structural Manual for additional requirements.

905.9.2 Quantity Sheets

Reinforcing steel bars and mechanical connectors are recorded on Quantities Structure Q-Sheet. For multiple structures on the same contract, separate tender items are used for each applicable structure.

For reinforcing steel bars, the notations "100%" and "L.S." must also be shown in the "Totals" and "Unit" lines respectively for the appropriate rebar items against each component requiring steel reinforcement (i.e., concrete culvert, headwall, appurtenance, etc.).

For precast elements the reinforcing steel bar shall be included in the precast item.

When the sum of the quantity of reinforcing steel required for cast in place culverts on a project is less than 5 tonnes then the reinforcing steel will be included in the tender item "Concrete in Culverts", and there will not be a separate rebar tender item. In this case OPSS 905 shall be shown against the item "Concrete in Culverts" on the Form of Tender.

The Structural Office/Section shall supply separate estimated quantities for stainless and uncoated reinforcing steel, for the Estimating Office, in the "Notes to Planning and Design." These notes are for information purposes only, and form part of the structural package sent to Project Delivery. Project Delivery will forward these quantities to the Estimating Office.

905.9.3 Documentation Accuracy

Stations are recorded in whole numbers.
100% checking is required.