STANDARD SPECIFICATIONS
FOR
ROAD AND BRIDGE CONSTRUCTION

2014 EDITION

Adopted by
the
Montana Department of Transportation
and the
Montana Transportation Commission

MONTANA
MDT
DEPARTMENT OF TRANSPORTATION

SECTION 553
PRESTRESSED CONCRETE MEMBERS

553.01 DESCRIPTION

This work is the furnishing and placing of precast, prestressed concrete beams, slabs, piling, and other structural members.

553.02 MATERIALS

553.02.1 Concrete

Furnish concrete in accordance with Section 551.

553.02.2 Reinforcing Steel

Furnish reinforcing steel in accordance with Subsection 711.01.1. Obtain the Project Manager's written approval for reinforcing steel substitutions.

State on the fabrication drawings showing reinforcing steel details the following or similar words: "All dimensions are out-to-out".

553.02.3 Steel Rods and Bolts

Furnish rods used as dowels and bolts in accordance with Subsection 711.07.

553.02.4 Prestress Steel

Furnish high tensile strength steel wire in accordance with Subsection 711.11.

Furnish the typical load-elongation curves for all shipments of prestress steel to the fabrication plant.

Ensure all prestress steel used in the work is free of rust, corrosion, dirt, oil, spatter from welding or flame cutting, kinks, bends, nicks, broken wires, or other defects.

Prestress steel is sampled in accordance with MT 111.

553.02.5 Enclosures

Use metallic enclosures, excluding aluminum, or forms using removable cores or ducts made of rubber or other approved material. Remove cores and ducts before installing the prestress steel.

Use enclosures that are mortar tight and maintain their shape when subjected to loading.

Use enclosures that are ¼-inch (6 mm) larger in internal diameter than the bar, cable, strand, or group of wires being enclosed.

Equip cores or ducts with pipes or other connections for grout injection when pressure grouting is specified.

553.02.6 Structural Steel

Furnish structural steel in accordance with Subsection 711.02.

553.02.7 Elastomeric Bearing Devices

Furnish elastomeric bearing devices in accordance with Subsection 711.14.

553.02.8 Fiber Reinforced Pads for Bearing Plates

Furnish fiber reinforced pads in accordance with Subsection 711.16.

553.02.9 Deck Sealer

Furnish deck sealer for precast prestressed deck sections which is listed on the QPL and in accordance with Subsection 717.02.

Do not exceed a maximum offset of $\frac{1}{16}$-inch (2 mm) where form sections are joined.

Treat the form facing with a bond breaker before each casting. Form treating materials that stain or react with concrete are not permitted. Apply form oil or other bond breaker materials without contaminating the prestress strand and reinforcing steel. Clean soiled strand or reinforcing with a non-contaminating solvent.

Chamfer all exposed concrete edges, excluding the beam top, with an enclosed angle of less than 120°. Use chamfer strips having no irregularities, and maintain smooth joints with the chamfer tightly fitted against abutting forms.

Fit forms with a grade strip or other positive control to establish the nominal depth of the beam.

Use forms that can be removed from the member without damaging the concrete.

Identify production form dimensions that vary from the contract beam dimensions on the fabrication drawings.

553.03.5 Placing Reinforcing Steel

Place and secure all reinforcing steel as shown in the contract before placing concrete.

Fasten all bars at all intersections with adjacent bars.

Do not tack weld reinforcing steel if the reinforcing bar is a stress-carrying member. Welding non-stress reinforcing bars may be permitted with the Engineer's approval. Reinforcing steel welds not shown on the approved tacking detail or fabrication drawings are prohibited.

For convenience, additional reinforcing steel may be tied in for securing inserts, void ducts, etc., or may be secured by tack welding.

Protect the tensioning strand from weld spatter using wet burlap or other protective covering. Replace all strands with weld spatter at Contractor expense.

Provide the distance between the reinforcing and side forms using approved stays, ties, or chairs. Do not use precast mortar blocks, pebbles, pieces of broken stone or brick, metal pipe, or wooden blocks.

Provide clearance between the beam stirrups and the beam bed using metal chair supports with stainless steel or other approved, corrosion-resistant legs.

Use reinforcing steel in the ends of prestressed beams to provide clearance for the paving notch block out, void ducts, embed plates and anchorages, and inserts without interfering with the reinforcement spacing.

Reinforcement in the prestressed member will be inspected in place and approved by the Inspector before the concrete is placed. Concrete placed before inspection may be rejected.

553.03.6 Prestressing Equipment

Use approved jacking equipment for prestressing.

Equip hydraulic jacks with pressure gauges. Have a certified testing laboratory calibrate each jack and gauge combination as a unit with the cylinder extension in the approximate position that it will be in at the final jacking force. Have a certified calibration chart for each jack.

Other types of jacks may be used with proving rings or other approved devices calibrated by a qualified testing laboratory.

Calibrate jacking equipment once each year and after each repair. Re-calibration may be required if any jack or gauge gives erratic results or if the difference between the gauge reading and elongations exceed allowable limits.

Equip tensioning systems with hydraulic gauges that prevent the gauge pointer from fluctuating until the jacking load is released from the tendon. The gauge must read loads directly in pounds (Newtons) or have a chart to convert the dial reading into pounds (Newtons). Ensure the gauge readings are accurate to within ± 2%.