SECTION 707 -- REINFORCEMENT

707.01 -- Description

This work shall consist of furnishing and placing reinforcing steel as required by these *Specifications* and as shown in the plans.

707.02 -- Material Requirements

1. Reinforcing steel shall conform to the requirements as prescribed in Sections 1020, 1021, 1023, and 1024.

2. Two samples of all reinforcing steel (coated and uncoated) shall be submitted to the Department's Materials and Tests Division for testing. The length of each sample shall be 2 m.

707.03 -- Construction Methods

1. Protection of Material:

a. The Contractor shall protect reinforcing steel from damage at all times. When placed in the work, the reinforcing steel shall be free from dirt, paint, grease, oil, rust, or other foreign substances. Tightly adhering, powdery rust on steel is not harmful to concrete bond and will not normally require removal. However, the Engineer shall be the final judge as to acceptability of the reinforcing material's condition.

b. Reinforcement with any appreciable reduction in section dimensions caused by corrosion will be rejected.

2. Fabrication:

a. The Contractor shall bend reinforcing bars without the use of heat to the dimensions and shapes shown in the plans, and bars having cracks or splits at the bends shall be rejected.

b. (1) The Contractor may repair epoxy coated reinforcing bars that show any visible evidence of cracking or disbonding of the coating in the bend area with approval of the Engineer.

(2) Epoxy coatings cut, broken, or abraded shall be repaired before rusting of the bar occurs.

(3) All patching shall be done as provided in Section 1021.

(4) Epoxy coated bars shall not be welded or flame cut.

c. Plain reinforcing bars shall be shipped in standard bundles, tagged and marked in accordance with the Code of Standard Practice of the Concrete Reinforcing Steel Institute. When reinforcing bars are not shipped from tested and approved stock, the

identification of all reinforcing bars (manufacturer, heat number, and size) shall be maintained by the fabricator throughout the fabrication process to assure that the fabricated bars are identified with proper tags for final shipment to the job site.

d. All reinforcing steel shall be identified and tagged as required in Subsection 1021.03, Paragraph 9.

3. Placing and Fastening:

a. The Contractor shall place all reinforcement in the position shown in the plans, and it shall be held securely in position with plastic clips and blocking. Reinforcing bars shall be tied at all intersections, except when the spacing is less than 300 mm in each direction, in which case alternate intersections shall be tied. Welds at all points of intersection of the wire in welded steel wire fabric shall be of sufficient strength that they will not be broken during handling and placing.

b. (1) The Contractor shall position steel reinforcement in concrete walls at the proper clearance from forms by approved chairs, stays, or hangers.

(2) Reinforcing steel in concrete slabs shall be positioned on plastic coated supports or chairs to accurately maintain the specified clearance to the surface of the concrete. Supports shall not be spaced at distances greater than 1.25 m. See details A, B, & C as shown in Figure 707.01.

(3) When wire bar support units are placed in continuous lines, they shall be so placed that the ends of the supporting wires are lapped to lock the last legs of adjoining units. No reinforcing shall be placed more than 50 mm beyond the last leg at the end of any continuous support run.

(4) Reinforcing steel on bar supports shall not be used to support runways for construction equipment. If such runways are used, they shall be supported independently.

(5) Bar support units shall be standard products from a reputable manufacturer of such items. Properly sized supports shall be furnished in sufficient numbers, manufactured to serve their intended purpose, and capable of carrying imposed loads without measurable deflection or displacement of the reinforcing steel. The type and adequacy of supporting units shall be at least equal to that recommended by the Concrete Reinforcing Steel Institute's *Manual of Standard Practice*.

(6) Tie wire for epoxy coated bars shall be plastic coated. Plastic clips suitable for the purpose may be used.

(7) Bar supports which are at exposed concrete surfaces shall be corrosion resistant as prescribed in the Concrete Reinforcing Steel Institute's *Manual of Standard Practice*.

c. The Contractor shall position all vertical steel reinforcement used in the construction of sidewalls or wingwalls of reinforced concrete culverts as shown in the plans.

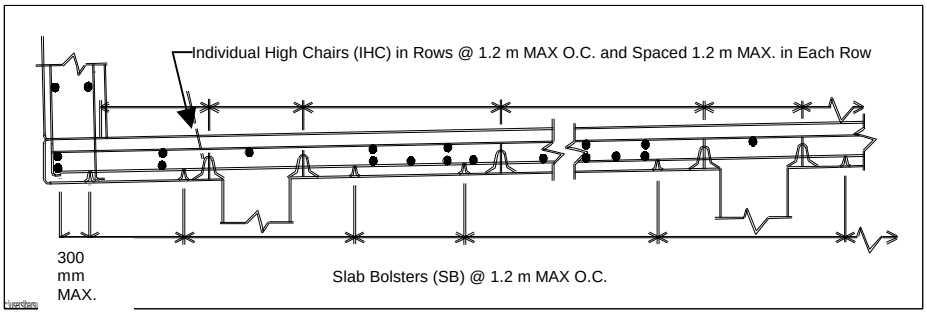
d. Welding on reinforcing steel is prohibited unless specifically authorized by the Engineer.

e. Fiber reinforced concrete support spacers must have at least 4 percent Polyamid fiber. The flexural strength shall be at least 4 MPa and the compressive strength not less than 62 MPa. The coefficient of expansion must be the same as for the cast-in-place concrete. Acceptance of the support spacers will be based on a certificate of compliance furnished by the supplier.

Figure 707.01

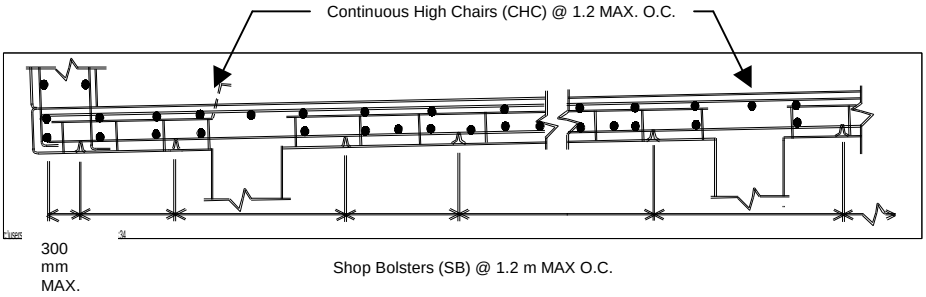
BAR SUPPORTS FOR STRUCTURAL SLAB REINFORCEMENT

SLABS ON FLAT FORMWORK

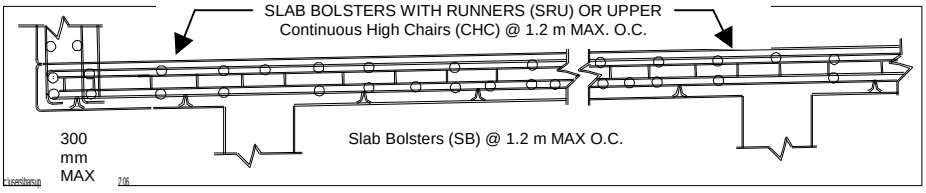


I

DETAIL A
SHOWING INDIVIDUAL HIGH CHAIRS (IHC)



DETAIL B
SHOWING CONTINUOUS HIGH CHAIRS (CHC)



DETAIL C
SHOWING SLAB BOLSTERS WITH RUNNERS (SRU)
OR CONTINUOUS HIGH CHAIRS (CHCU)

4. Splicing:

a. The Contractor shall furnish all reinforcing steel in full lengths, except where splices are indicated in the plan. Splices in adjacent bars shall be staggered.

b. The Contractor shall splice bars by lapping the ends. The overlap length shall be as shown in the plans. Lapped splices shall be made by securely wiring the bars in contact, maintaining alignment and clearances.

c. Spiral reinforcement shall be held in place by wiring to the main reinforcing. Pitch shall be maintained by adequate spacers. Splices shall be made by lapping 1.5 turns.

d. The Contractor shall overlap sheets of welded steel wire fabric reinforcement to maintain uniform strength and fasten them securely at the ends and edges. The edge lap shall not be less than one mesh opening in width, and the end lap shall be not less than 300 mm.

707.04 -- Method of Measurement

All reinforcing steel used in concrete for bridges, box culverts, culvert headwalls, retaining walls, and all other reinforced concrete structures is measured in kilograms. Payments will be based on the plan quantities when the structure is built according to the plans.

707.05 -- Basis of Payment

1.

Pay Item	Pay Unit
Reinforcing Steel for _____	Kilogram (kg)
Epoxy Coated Reinforcing Steel	Kilogram (kg)

2. Welded steel wire fabric (wire mesh) is subsidiary to the relevant concrete pay item.

3. Payment is full compensation for all work prescribed in this Section.