

## **1.0 GENERAL**

### **1.1 WORK SEQUENCE**

- .1 Clean and prepare existing reinforcement, where exposed in delamination repairs and where otherwise designated by the Departmental Representative.
- .2 Supplement corroded or damaged reinforcement with new, replacement reinforcing steel including accessories, including supply, fabrication, handling and placing.

### **1.2 REFERENCE STANDARDS**

- .1 CSA-A23.1-09 Concrete Materials and Methods of Concrete Construction
- .2 CSA G30.18-09 Carbon Steel Bars for Concrete Reinforcement
- .3 ASTM A775M-07b Standard Specification for Epoxy-Coated Reinforcing Steel Bars
- .4 ACI Manual of Standard Practice for Detailing – 28<sup>th</sup> Edition
- .5 CSA W186-M1990 (R2007) Welding of Reinforcing Bars in Reinforced Concrete Construction
- .6 Reinforcing Steel Institute of Ontario (RSIO) Manual of Standard Practice – June 2010.

### **1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Store and protect reinforcement in a manner to prevent excessive rusting and fouling with dirt, grease, form-oil and other bond-breaking coatings.
- .2 Reinforcement at the time concrete is placed shall be free from excessive rusting, mud, oil or other coatings that adversely affect its bonding capacity.

## **2.0 PRODUCTS**

### **2.1 CONCRETE REINFORCEMENT AND ACCESSORIES - NEW**

- .1 Reinforcing steel bars shall conform to CSA G30.18 (grade 400 MPa unless otherwise specified herein or on the drawings).
- .2 Reinforcing bars to be welded shall conform to CSA G30.18-09.
- .3 Welded wire fabric shall conform to CSA G30.18-09. Sizes and gauges as shown on the drawings.

- .4 Bar supports shall conform to SP-71 (08): ASTM Standards in 318-08 unless otherwise approved by the Departmental Representative.
- .5 Chairs, bolsters, bar supports, spacers shall be epoxy coated or plastic. The use of pebbles, pieces of broken stone or brick, pipe, or wooden blocks will not be permitted.
- .6 Tie wire for coated reinforcing shall be plastic-coated.
- .7 Welded wire fabric for slabs shall be delivered in sheets.
- .8 Mechanical splices, to Departmental Representative's approval.

### **3.0 EXECUTION**

#### **3.1 PREPARATION - REINFORCEMENT IN PLACE**

- .1 Exposed reinforcement and steel shall be completely cleaned of cement paste, rust, oil, and contaminants. Sandblast clean to near-white blast, completely cleaned of all grease, oil, dirt, mil scale, cement paste, old epoxy, etc. Additional cleaning shall be performed if subsequent corrosion occurs after initial cleaning. Wire brush, grinding or similar hand-cleaning methods shall not be permitted.
- .2 In lieu of cleaning existing exposed reinforcement, the Contractor may elect to cut, remove, and replace damaged or corroded reinforcement with new reinforcement providing tension lap splices with existing cleaned reinforcement, at no additional cost.

#### **3.2 INSTALLATION**

- .1 Replace and/or supplement damaged or severely corroded reinforcement, exposed in concrete delamination repair patches, with new reinforcement as directed by the Departmental Representative. Additional reinforcing shall be provided when the existing reinforcing has a sectional loss of 20% or greater.
- .2 The replacement reinforcing bars shall be of the same bar size or greater than the original bars. Additional concrete removal may be required (at unit price cost, except as noted in 3.1.2.) to allow for placement of supplemental reinforcing bars. The length of the supplemental bars shall be equal to the length of the deteriorated segment of the existing bars, plus the required lap splices at each end. Splicing requirements shall be in accordance with the Standards. Supplemental bars shall be placed parallel to and approximately 20-mm from the existing bars.

- .3 Fully exposed reinforcement for the entire bar length shall be removed and replaced with new reinforcement, of the same bar size or greater.
- .4 New, and existing reinforcement exposed in the delamination repair patches, shall be accurately placed in the positions shown on the drawings, firmly tied, and supported by bar supports and side form spacers to assure proper concrete cover and spacing within allowable tolerances before and during placing of concrete.
- .5 Bar supports shall be sufficient in number and strength to carry the reinforcement they support and prevent displacement by workers or equipment before and during concreting. Bars shall be tied at all intersections, except where spacing is less than 250-mm in each direction, when alternate intersections shall be tied.
- .6 Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits or embedded items. If bars are moved more than one bar diameter or enough to exceed the specified tolerances, the resulting arrangement of bars shall be subject to approval of the Departmental Representative.

### **3.3 WELDING**

- .1 Any welding of reinforcing steel shall be in accordance with CSA W186-M1990 (R2007).
- .2 Copies of the Canadian Welding Bureau approved welding procedure and certificate of current operator qualification shall be submitted to the Departmental Representative prior to commencement of welding.

### **3.4 INSPECTION AND TESTING**

- .1 No concrete shall be placed until the Departmental Representative has completed his review of reinforcing in place. The Contractor shall provide a minimum of 24 hours notice of the time when the reinforcement will be substantially in place and ready for the Departmental Representative's review.
- .2 Inspection and testing of factory coated reinforcement to be conducted by a testing agency designated by the Departmental Representative. The Departmental Representative will pay cost of inspection and testing described in this Section.
- .3 Inspection and testing of reinforcement coated in place shall include visual inspection with flashlight and mirror. This inspection shall be first made by the Contractor. When the Contractor is satisfied the epoxy coating is in conformance with the specifications, they shall notify the Departmental Representative to review the work.

**END OF SECTION**