

### **9.7.2 EMPIRICAL DESIGN**

Empirical deck design is the Bridge Section preference for the reinforcement of concrete decks. All the requirements of Article 9.7.2.4, Design Conditions, shall be satisfied.

The reinforcement requirements for the top mat shall be epoxy coated #5 rebar at 12" in both transverse and longitudinal mats. The reinforcement requirements for the bottom mat shall be uncoated #5 rebar at 12" in both transverse and longitudinal mats.

The Class B lap length required is 18" for the top mat epoxy coated #5 bars and 15" for the uncoated bottom mat #5 bars. Use a 21" lap for both the top and bottom mats to be conservative.

Negative moment reinforcement over the pier shall be designed in accordance with ITD Bridge Design Manual Article 5.12.3.3.

### **Commentary**

Article 9.7.2.5 for Reinforcement Requirements specifies a minimum top mat reinforcement of 0.18 in<sup>2</sup>/ft for each layer or #4 bars at 12" spacing (0.20 in<sup>2</sup>/ft). The bar size was increased to a #5 due to construction concerns, i.e. workers walking on the rebar mat during placement.

The lap splice length for the #5 epoxy-coated bar utilizes the excess reinforcement factor of 0.645 (0.20/0.31).

$L_d = 21.6 * 0.645 = 13.9"$

Class B splice length =  $1.3 * 13.9 = 18"$

### **Revisions:**

Mar 2015	Added new article.
March 2018	Revised the reference to 5.14.1.4 to 5.12.3.3 to agree with the 8th Edition of the AASHTO LRFD Bridge Design Specifications.
Oct 2023	Added minimum lap splice length equals 18" to agree with AASHTO Articles 5.10.8.4.2a and 5.10.8.4.3a for a Class B splice but use 21" to be conservative. Added commentary to document the use of the excess reinforcement factor.