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M E M O R A N D U M

DATE: October 3, 2016

TO: Specification Review Distribution List

FROM: Dan Hurtado, P.E., State Specifications Engineer

SUBJECT: Proposed Specification: **4600501 Structural Steel and Miscellaneous Metals.**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Steve Duke of the State Materials Office to update an Industry reference. ASTM A325 and ASTM A490 have been withdrawn and consolidated into new ASTM F3125.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or online at http://www2.dot.state.fl.us/ProgramManagement/Development/IndustryReview.aspx . Comments received after **October 31, 2016,** may not be considered. Your input is encouraged.

DH/dt
Attachment

STRUCTURAL STEEL AND MISCELLANEOUS METALS.
(REV 9-~~20~~26-16)

SUBARTICLE 460-5.1 is deleted and the following substituted:

460-5.1 General: High strength bolts are described as follows:
1. ASTM F3125 Grade A325 or as Grade A325
2. ASTM F3125 Grade A490 or as Grade A490

Use bolts as follows:

1. Use galvanized ~~ASTM~~Grade A325 Type 1 bolts in all field installed bolted structural steel connections for painted steel.

2. Use either black or galvanized ~~ASTM~~Grade A325 Type 1 bolts in all shop installed bolted structural steel connections that will be shop painted.

3. Use black ~~ASTM~~Grade A325 Type 3 bolts in all bolted structural steel connections for weathering steel that is to remain unpainted.

4. Use the bolts as specified for connected assemblies or parts that are designated as miscellaneous components where the fastener type is specified elsewhere in the Contract Documents.

Tighten ~~ASTM~~Grade A325 bolts in accordance with the procedures specified below for turn-of-nut or direct-tension-indicator (DTI) tightening.

Lubricate and maintain consistency in lubrication of fastener assembly during Rotational Capacity (RC) testing and installation. Assemblies that exhibit a loss of lubrication, as determined by the Engineer, may be re-lubricated and retested prior to installation.

Use ~~ASTM~~Grade A490 bolts only with the approval of the Engineer. Submit procedures in accordance with ~~ASTM~~Grade A490 for the handling, lubrication, installation, tightening and testing of such bolts. Do not install ~~ASTM~~Grade A490 bolts without prior approval of the procedures by the Engineer.

When the Engineer approves ASTM A307 bolts for use in miscellaneous components, tighten them such that the plies of the joint are in firm contact. Use three to five impacts of an impact wrench or the full effort of a person using an ordinary spud wrench to obtain a snug connection.

Fasten aluminum, other materials or assemblies of dissimilar materials in accordance with the Contract Documents.

Install ordinary rough or machine bolts and nuts in accordance with the Contract Documents.

SUBARTICLE 460-5.3 is deleted and the following substituted:

460-5.3 Reuse and Retightening: Do not reuse ~~ASTM~~Grade A490 bolts or galvanized ~~ASTM~~Grade A325 bolts. Black ~~ASTM~~Grade A325 bolts with free spinning nuts may be reused one time with the Engineer's approval. Previously tightened bolts that may have been loosened by the tightening of adjacent bolts can be further tightened from the original position. Ensure proper lubrication prior to retightening. Discard and replace fractured or damaged bolts.

SUBARTICLE 460-5.4.6 is deleted and the following substituted:

460-5.4.6 Installation of Fastener Assemblies: Unless shown otherwise in the Erection Plan, install the bolts of the connection by progressing systematically from the most rigid part of the connection to the free edges. Install bolts in all holes of the connection and bring them to a "snug tight" condition. Following the sequence indicated in the Erection Plan, further tighten all the bolts in the connection.

For ~~ASTM~~Grade A325 bolts, obtain the required bolt tension as shown in Table 460-6, Minimum Required Fastener Tension in accordance with the turn-of-nut method specified in 460-5.4.8, or when DTIs are used, the DTI tightening method specified in 460-5.4.9.

For connections (such as large main load-carrying members or truss joints) in which previously tightened high strength bolts become loose and require retightening upon the tensioning of others, install into a minimum of ten percent of the holes fully tensioned bolts prior to final tensioning of the permanent bolts. Distribute these first bolts randomly throughout the connection. If directed by the Engineer, remove the initial bolts and install permanent bolts at each location, otherwise retighten in accordance with 460-5.3.

Table 460-6
Minimum Required Fastener Tension

Bolt Size, inch	Tension ~~ASTM~~Grade A 325 bolts, kips
5/8	19
3/4	28
7/8	39
1	51
1 1/8	~~5~~64
1 1/4	~~7~~81
1 3/8	~~85~~97
1 1/2	1~~03~~18

SUBARTICLE 460-5.4.10.1 is deleted and the following substituted:

460-5.4.10.1 General: Provide ASTM F436 hardened steel washers as follows:

1. For connections (and all associated testing) using ~~ASTM~~Grade A490 bolts, use a hardened washer under each element.
2. For connections using ~~ASTM~~Grade A325 bolts, use hardened washers under the turned element.
3. Use hardened steel washers as part of the Rotational Capacity tests.
4. Where the outer face of the bolted parts has a slope of greater than 20:1 with respect to a plane normal to the bolt axis, use a hardened, beveled washer to compensate for the lack of parallelism.

5. Where bolts are to be installed in a oversized or slotted hole in an outer ply, provide a single washer satisfying ASTM F436, or continuous bar satisfying ASTM A709: for ~~ASTM~~Grade A325 bolts, provide a thickness of at least 5/16 inch; and for ~~ASTM~~Grade A490 bolts, provide a thickness of 3/8 inch. Provide these washers or bars to completely cover the slot after installation. Provide a finish consistent with the bolt specified.

6. In non-Direct-Tension-Indicator (DTI) applications, clip washers on one side to a point not closer than 7/8 of the bolt diameter from the center of the washer, if necessary.