

4600000 INDUSTRY REVIEW COMMENTS

460-4.1.4 includes a reference to section 971. Does 'Traffic Marking Materials' apply to this work?

460-4.7 The first sentence is confusing. As a minimum suggest delting 'shall be made'. Should 'shipment or erection' be an 'and or' situation? Or are there 2 inspections required, one at the manufaturer and 1 prior to erection?

Jeff Pouliotte

1. There have been several provisions of Section 460 that pertain to structural bolting for slip critical connections that have been removed and placed into the FDOT Materials Manual. It is generally recommended that all the specification provisions needed to successfully complete critical field operations (like structural bolting) be included in the body of FDOT Standard Specifications, with the possible exception that some national specifications like ASTM can be referenced in the text of the Standard Specifications. In general, it doesn't make sense to remove the specification provisions that deal with critical field operations (like bolting) from Section 460 and place these provisions in the FDOT Materials Manual (which deals primarily with fabrication issues), and retain the provisions of this specification that deal almost exclusively with fabrication issues (like welding) or issues that do not occur on every project (like heat-straightening damaged structural steel). Specific specification provisions that should be in Section 460 are:

- a. Rotational Capacity Test, which is a required field test for every project that has slip critical field bolting, whether the method used is turn-of-nut or direct tension indicators (DTI).
- b. Snug tightening criteria for DTI connections.
- c. Maximum bolt tightening criteria for DTI connections..
- d. A table showing the number of spaces on DTI for specific bolt sizes.

2. Based on our recent conversation, it is my understanding that Section 460 may be removed from the Standard Specifications and put into contracts by the State Contracts Office on a project by project basis. Please be aware, that adding Section 460 to contracts on a project by project basis is not recommended, because many non-bridge projects include structures governed by Sections 649 and 700. Proposed revisions to Sections 649 and 700 (currently under statewide review), reference Section 460 for slip critical bolting for ASTM A325 bolts.

3. Additional recommendations in regards to the bolting portion of the specification are:
 - a. The fourth paragraph under sub-article 460-5.1 should be eliminated, and reference should be made to Section 700 (see new specification currently undergoing statewide review) for bolt tightening criteria for ASTM A 307 bolts.
 - b. In sub-article 460-5.4.8.1, the clause in the second sentence should be changed from "produces at least the minimum bolt tension in accordance with Table 460-6" to "produces at least 1.05 times the minimum bolt tension in accordance with Table 460-6". Also, in the last sentence of sub-article 460-5.4.8.1, the reference to sub-article 460-5.4.10.1 appears to be incorrect.
 - c. A reference should be made requiring that bolts tightened by the DTI method achieve a minimum bolt tension of 1.05 times the tension values shown in Table 460-6.
 - d. The test set-up descriptions in Item No. 5 and 6 in sub-article 460-5.4.10.1 are difficult to understand..
 - e. In first sentence of paragraph no. 1 of sub-article 460-5.4.11.1, the clause "[two (2) for two bolt connections]" can be removed, because it is obvious that if you have three (3) bolts or less in a connection, all the bolts in the connection need to be verified.
 - f. In the last sentence of paragraph no. 3 of sub-article 460-5.4.11.1, I know of no method to verify the "tension required in Table 460-6" for an installed connection in the field. Also as mentioned earlier, the required "snug-tight" tension should be 1.05 times the tension shown in Table 460-6..
 - g. Also, in the third sentence of the first paragraph in sub-article 460-5.4.11.2, I know of no method to verify the "tension required in Table 460-6" for an installed connection in the field. Also as mentioned earlier, the required "snug-tight" tension should be 1.05 times the tension shown in Table 460-6.
 - h. Sub-article 460-5.4.11.3 is ambiguous and of questionable value..
4. The reference to Section 649 in sub-article 460-7.6.3 could be expanded to include a reference to Section 700, which covers slip critical connections using ASTM A 325 bolts at alternate field splice locations for highway signs. However, I think it would be better to remove sub-article 460-7.6.3 in its entirety, since Sections 649 and 700 (as proposed in the previously mentioned Sections 649 and 700, which are currently undergoing statewide review) reference Section 460.
5. The reference in last sentence of sub-article 460-8.5 is incorrect.

Ghulam Mujtaba

1. 460-2 Materials, Paragraph 3
Change "...“List of Qualified Fabrication Facilities”, and..." to "...”List of Qualified Steel and Miscellaneous Fabrication Facilities” and..." (Delete the comma.)
2. 460-2 Materials, Paragraph 4
The intent of "...required for miscellaneous components..." is not clear. Which components?.
3. 460-3 Pre-Assembly Requirements, 460-3.2 Welding Procedures, Sentence 1
Expand to read, "...to the Engineer, meeting the requirements of Section 11.2 of the Materials Manual, which may be viewed as...."
4. 460-3 Pre-Assembly Requirements, 460-3.2 Welding Procedures, Sentence 2
Change "Certified Welding Inspector" to "Certified Welding Engineer". disagree, the Engineer works for the DOT
5. 460-3 Pre-Assembly Requirements, 460-3.3 Quality Control Plan
After Sentence 2 add, "Meet the requirements of Section 5.6 and 11.1 of the Materials Manual."
6. 460-3 Pre-Assembly Requirements, 460-3.3 Quality Control Plan, 3.-g.
"DTI" describe acronym when it is used the first time.
7. 460-3 Pre-Assembly Requirements, 460-3.3 Quality Control Plan, 3.-l.
Use the acronym DTI. Change to read, "Reuse of DTI devices."
8. 460-3 Pre-Assembly Requirements, 460-3.3 Quality Control Plan
Delete Item No. 4. The QC Plan is not job specific. It is plant specific and shall be applicable to all projects. The Contractor's signature should be required on the Contractor's QC Plan. This is fabricator's QC Plan.
9. 460-3 Pre-Assembly Requirements, 460-3.4 Pre-Assembly Meeting, Item 11
"...QA and QC..." Define the acronym when it is used for the first time in a document.
10. 460-3 Pre-Assembly Requirements, 460-3.5 Access to Facilities
Change Title to, "Access to Fabrication Facilities"
11. 460-3 Pre-Assembly Requirements, 460-3.5, Access to Facilities, Paragraph 2. Sentence 1
Change to read, "Provide and maintain office facilities at fabrication facilities and at the project site for the Department's inspectors...".
12. 460-4 Shop Workmanship and Assembly, 460-4.1.4 Coatings

It is not clear if change is allowed. This indicates that manufacturer's variation is allowed..

13. 460-4 Shop Workmanship and Assembly, 460-4.2.1 General, Paragraph 2, Sentence 1
Change to read, "At the fabrication facility, maintain the records..."
14. 460-4 Shop Workmanship and Assembly, 460-4.2.2 Marking of Members and Assemblies, Paragraph 2, Sentence 2
"...0.030..." Change the print style or the italic and conventional style. They are mixed styles of 0.030.
15. 460-4 Shop Workmanship and Assembly, 460-4.2.2 Marking of Members and Assemblies, Paragraph 3, Sentence 1
Change "...the mark on the splice plate..." to "...the mark on the splice plate..."
16. 460-4 Shop Workmanship and Assembly, 460-4.3.4.2.2 timing of
Delete end of sentence, "...unless approved otherwise by the Engineer." The Engineer can make changes. The Contractor has to follow the required procedure for the proposed change. This is applicable to all Contract Documents. There is no need to repeat it in every Section.
17. 460-4 Shop Workmanship and Assembly, 460-4.3.4.4 Minimum Radius for Heat-Curving, Paragraph 1, Last Sentence
Change, "... greater than 50.0 ksi , other than..." to "...greater than 50.0 ksi, other than..." Editorial: Delete the space between ksi and comma.
18. 460-4 Shop Workmanship and Assembly, 460-4.3.4.6.2 Cracking, Items 4 & 5
Editorial: Adjust numbers 4 and 5 to the left.
19. 460-4 Shop Workmanship and Assembly, 460-4.3.4.7 Hot Bending, Sentence 1
"...460-4.4.2..." This Subarticle does not exist.
20. 460-4 Shop Workmanship and Assembly, 460-4.3.4.8.1 General
"...Contract Documents..." The specification is part of the Contract Documents. Mention that it will be in the plan, supplemental specifications, or special provision.
21. 460-4 Shop Workmanship and Assembly, 460-4.3.4.8.3 Normalizing and Annealing, Sentence 1
"...Contract Documents..." This indicates that this specification is not part of Contract Documents.
22. 460-4 Shop Workmanship and Assembly, 460-4.3.4.9.1, Table Note
"...unless approved by the Engineer." This will make the job of project administrator difficult to approve or disapprove.

23. 460-4 Shop Workmanship and Assembly, 460-4.3.4.9.2 Holes, Tolerances and Quality, Paragraph 2, Last Sentence
There is no need for this statement if coating is not required or it is allowed.
24. 460-4 Shop Workmanship and Assembly, 460-4.3.4.9.7 Bolted Splice Gaps. Sentence 1
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence.
25. 460-4 Shop Workmanship and Assembly, 460-4.3.4.9.8, Sentence 1
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence.
26. 460-4.3 first line of the page, Insert the word “Table” between “given in “ and 460-5” to read Part I, given in Table 460-5, ANSI
27. 460-4 Shop Workmanship and Assembly, 460-4.3.4.11.1 General
“...Section 560, and 562, 460-2 and/or 460-7.2.” Change the order of the documents. First mention 460 and then 560 and 562.
28. 460-4 Shop Workmanship and Assembly, 460-4.4.1.3 Alternate Sections, Last Sentence
Change, “...significantly affected...” to “...significantly affected splice...”
29. 460-4 Shop Workmanship and Assembly, 460-4.4.2.1.1 Tolerances, Sentence 1
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence.
30. 460-4 Shop Workmanship and Assembly, 460-4.4.2.1.2 Bearings, Sentence 1
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence.
31. 460-4 Shop Workmanship and Assembly, 460-4.4.2.1.3 Beam Trueness, Sentence 1
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence.
32. 460-4 Shop Workmanship and Assembly, 460-4.4.2.6 Horizontally Curved Beams and/or Skewed Steel Girders, Sentence 2
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence. The standard specification is part of the Contract Document. Any changes shall be mentioned in Special Provisions or Plans. There is no need for this phrase.
33. 460-4 Shop Workmanship and Assembly, 460-4.5.1 General, Sentence 2
“Unless shown elsewhere in the Contract Documents...” Delete this portion of the sentence. It makes it all too confusing.
34. 460-4 Shop Workmanship and Assembly, 460-4.5.1.1 Progressive Girder or Truss Assembly, Paragraph 2

Delete these phrases, “is designated elsewhere in the Contract Document”, “as designated elsewhere in the Contract Documents”, “unless directed so elsewhere in the Contract Documents”. They are redundant.

35. 460-4 Shop Workmanship and Assembly, 460-4.5.1.1 Progressive Girder or Truss Assembly, Paragraph 2, Sentence 1
Between Sentence 1 and 2, leave a space between sentences.
36. 460-4 Shop Workmanship and Assembly, 460-4.5.1.2 Progressive Chord Assembly, Paragraph 1, Sentence 1
Delete “When specified elsewhere in the Contract Documents”
37. 460-4 Shop Workmanship and Assembly, 460-4.5.1.3 Special Complete Structure Assembly, Paragraph 1, Sentence 1
Delete “When specified elsewhere in the Contract Documents”
38. 460-4 Shop Workmanship and Assembly, 460-4.5.1.3 Special Complete Structure Assembly, Paragraph 1, Sentence 2
Delete “unless directed elsewhere in the Contract Documents or by the Engineer” "
39. 460-4 Shop Workmanship and Assembly, 460-4.5.1.4 Computer Numerically Controlled (CNC) ..., Paragraph 3, Sentences 2 and 3
Delete the phrases, “as prescribed elsewhere in the Contract Documents” and “indicated elsewhere in Contract Documents”.
40. 460-4 Shop Workmanship and Assembly, 460-4.6 Evaluation of Work, Paragraph 5, Sentence 2
“...submittal and forward to the Engineer.” It should be the Contractor’s obligation to submit the signed copy of the non-conformance to the Project Administrator.
41. 460-4 Shop Workmanship and Assembly, 460-4.6 Evaluation of Work, Paragraph 6, Sentence 2
“... is only necessary when space on i the Department.” Something is missing.
42. 460-4.6, give reference to Section 10.9 of CPAM.
43. 460-4 Shop Workmanship and Assembly, 460-4.7 Member or Component Certification, Paragraph 1, Sentence 1
This is a fragmented sentence.
44. 460-4 Shop Workmanship and Assembly, 460-4.7 Member or Component Certification, Paragraph 1, Sentence 2
“...the Quality Control Manager...” Which Quality Control Manager? Plant or Contractor’s?

45. 460-4 Shop Workmanship and Assembly, 460-4.7 Member or Component Certification, Paragraph 2, Sentence 1
“Submit a summary certification at least once a month...” Who’s Quality Control Plan? Contractor or Fabricator?
46. 460-4 Shop Workmanship and Assembly, 460-4.7 Member or Component Certification, Paragraph 2, Sentence 4
“The Quality Control Manager...” It is not clear whose Certification and which Quality Control Manager.
47. 460-5 Bolted Connections, 460-5.1 General, Paragraph 1, Sentence 1
“...unless the connected assemblies or parts are designated as miscellaneous components and the fastener assembly is specified elsewhere in the Contract Documents.” Delete this part of the sentence,
48. 460-5 Bolted Connections, 460-5.1 General, Paragraph 3, Sentence 1
Specify that under what condition the Engineer can approve ASTM A490 bolts.
49. 460-5 Bolted Connections, 460-5.1 General, Paragraph 5, Sentence 1
“...or as directed by the Engineer.” Write the conditions that the Engineer can direct such assembly of dissimilar metals. It makes the job of the Engineer difficult.
50. 460-5 Bolted Connections, 460-5.1 General, Paragraph 6, Sentence 1
“...or as directed by the Engineer.” Define that how and under what conditions the Engineer can direct such action.
51. 460-5 Bolted Connections, 460-5.2.1 Rotational Capacity (RC) Tests, Paragraph 2
“DTIs” Describe the acronym when used for the first time in a document.
52. 460-5 Bolted Connections, 460-5.2.1 Rotational Capacity (RC) Tests, Paragraph 4
“e.g.” Define e.g.
53. 460-5 Bolted Connections, 460-5.2.1 Rotational Capacity (RC) Tests, Paragraph 5
“...as directed by the Engineer.” Delete this part of the sentence.
54. 460-5 Bolted Connections, 460-5.3 Reuse and Retightening, Paragraph 1, Sentence 2
“...with the Engineer’s approval” Delete this part of the sentence. Instead mention that if they are in good condition
55. 460-5 Bolted Connections, 460-5.4.1 General, Paragraph 1
Change “...geometry of the bolt holes...” to “...spacing of the bolt holes...”
56. 460-5 Bolted Connections, 460-5.4.2 Preparation of Faying Surfaces, Paragraph 3, Sentence 1
Delete, “unless a different classification is required elsewhere in the Contract Documents”

57. 460-5 Bolted Connections, 460-5.4.5 Splice Plate Filler Material
Delete, "Unless otherwise specified in the Contract Documents"
58. 460-5 Bolted Connections, 460-5.4.6 Installation of Fastener Assemblies, Paragraph 1, Sentence 1
Delete, "Unless shown otherwise in the Erection Plan". The Plan has governing order.
59. 460-5 Bolted Connections, 460-5.4.7 Bolt Tension, Sentence 2
Delete, "or as directed by the Engineer."
60. 460-5 Bolted Connections, 460-5.4.8.1 Snug-Tight Condition, Last Sentence
"...specified in 460-5.4.10.1 below." Verify if this reference is correct.
61. 460-5 Bolted Connections, 460-5.4.11.1 Turn-of-Nut Tightening, Item 1, Last Sentence
Delete, "...or wrenches acceptable to the Engineer"
62. 460-6 Welding, 460-6.4 Welding of Hollow Structural Steel Sections (Pipe and Tubes)
Delete, "except as noted in the Contract Documents"
63. 460-6 Welding, 460-6.4.2 Bridge Structures, Item 2
Define TKY
64. 460-6 Welding, 460-6.4.2 Bridge Structures, Item 2
Define API
65. 460-6 Welding, 460-6.4.2 Bridge Structures, Item 2
Verify the reference 2X
66. 460-7 Erection, 460-7.4 Placing Anchor Rods, Paragraph 1, Sentence 2
Delete, "Unless shown otherwise in the Contract Documents"
67. 460-7 Erection, 460-7.4 Placing Anchor Rods, Item 3
Delete, "or as shown elsewhere in the Contract Documents"
68. 460-7 Erection, 460-7.5 Preparation of Bearing Areas and Setting of Bearings, Paragraph 4, Sentence 1
Delete, "Unless specified elsewhere in the Contract Documents and with the approval of the Engineer"
69. 460-7 Erection, 460-7.7 Final Position of the Girder, Paragraph 1, Sentence 1
Delete, "Unless shown elsewhere in the Contract Documents"
70. 460-7 Erection, 460-7.7 Final Position of the Girder, Paragraph 1, Sentence 3
Delete, "If not shown elsewhere in the Contract Documents and with the approval of the Engineer"

71. 460-7 Erection, 460-7.8.1 General, Sentence 2
Change to read, “The Contractor’s Quality Control Manager shall be responsible...”
72. 460-8 Methods of Measurement, 460-8.1 General, Sentence 2
Delete, “members and assemblies as allowed for elsewhere in the Contract Documents”
73. 460-8 Methods of Measurement, 460-8.5 High Strength Fastener Assemblies, Table 460-9, Column 1, Row 2
The intent of “Weight per 100, pounds” is not clear. Change to “Weight per 100 lbs.”