

## ORIGINATION FORM

**THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR**

Modify Specification \_\_\_\_\_ 5 \_\_\_\_\_.  
Section/File number

New Section \_\_\_\_\_.  
Section number

**Subject:** Control of the Work

**Origination date:** July 17, 2007

**Originator:** Rafiq Darji  
**Office/Phone:** State Construction Office/850-414-4195  
**Email address/** rafiq.darji@dot.state.fl.us  
**Userid:** CN982RD

**Problem statement:** The temporary bracing and erection requirements are needed to be added or modified in the specification to enhance the public safety during construction activities.

The shop drawing review time for invalid original submittals has been clarified.

**Information source:** The responsible personnel from both the State Construction Office and State Structures Design Office were involved in the discussion and recommendation on the proposed specification changes. Input from these individuals was taken and incorporated into the final draft material.

**Background data:** The National Transportation Safety Board (NTSB) was involved in the investigation of the girder collapse on I-70 in Golden, Colorado, during highway bridge widening project. The Safety Board determines that the probable cause of the May 15, 2004, girder collapse was the failure of the girder's temporary bracing system due to insufficient planning by the Contractor and lack of uniform, consistent DOT specification requirements regarding lateral bracing.

**Recommended Usage Note:** None

**Estimated fiscal  
impact, if  
implemented:**

It will add additional cost to the project by requiring additional inspection and certification during erection but the cost will offset by providing additional safety measures that will protect the traveling public during construction activities. Also, these requirements will be in compliance with the NTSB safety recommendations to the Federal Highway Administration, OSHA and AASHTO.

**Implementation of these changes, if and when approved, will begin with the July 2008 letting.**



# Florida Department of Transportation

**CHARLIE CRIST**  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

**STEPHANIE KOPELOUSOS**  
SECRETARY

## MEMORANDUM

**DATE:** October 15, 2007

**TO:** Specification Review Distribution List

**FROM:** Duane F. Brautigam, P.E., State Specifications Engineer

**SUBJECT:** Proposed Specifications Change: 0050104 Control of the Work – Shop Drawings

In accordance with Specification Development Procedures, we are sending you a copy of a proposed new specification change for Control of the Work – Shop Drawings.

This change was proposed by Rafiq Darji of the State Office of Construction to provide requirements for temporary beam and girder bracing during bridge construction.

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 to my attention via e-mail at SP965DB or duane.brautigam@dot.state.fl.us. Comments received after November 12, 2007 may not be considered. Your input is encouraged.

DFB/ft

Attachment

COMMENTS:

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Submitted by:

Phone #:

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**CONTROL OF THE WORK – SHOP DRAWINGS.****(REV 9-24-07)**

SUBARTICLE 5-1.4.1 (Pages 32 – 33) is deleted and the following substituted:

**5-1.4.1. Definitions:**

(a) Shop Drawings: All working, shop and erection drawings, associated trade literature, calculations, schedules, manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.

(b) Permanent Works: All the permanent structures and parts thereof required of the completed Contract.

(c) Temporary Works: Any temporary construction work necessary for the construction of the permanent works. This includes *but is not limited to bracing, falsework, formwork, scaffolding, shoring, temporary earthworks, sheeting, cofferdams, and special erection equipment. and the like.*

(d) Construction Affecting Public Safety: Construction that may jeopardize public safety such as structures spanning functioning vehicular roadways, pedestrian walkways, railroads, navigation channels of navigable waterways and walls or other structure foundations located in embankments immediately adjacent to functioning roadways. It does not apply to those areas of the site under the Contractor's control and outside the limits of normal public access.

(e) Major and Unusual Structures: Bridges of complex geometry and/or complex design. Generally, this includes the following types of structures:

1. Bridges with an individual span longer than 300 feet.
2. Structurally continuous superstructures with spans over 150 feet.
3. Steel box and plate girder bridges.
4. Steel truss bridges.
5. Concrete segmental and longitudinally post-tensioned continuous girder bridges.
6. Cable stayed or suspension bridges.
7. Arch bridges.
8. Tunnels.
9. Movable bridges (specifically electrical and mechanical components).
10. Rehabilitation, widening, or lengthening of any of the above.

(f) Special Erection Equipment includes launching gantries, beam and winch equipment, form travelers, stability towers, strong-backs, erection trusses, launching noses or similar items made purposely for construction of the structure. It does not apply to commonly available proprietary construction equipment such as cranes.

(g) Falsework includes any temporary construction work used to support the permanent structure until it becomes self-supporting. Falsework includes steel or timber beams, girders, columns, piles and foundations, and any proprietary equipment including modular shoring frames, post shores, and adjustable horizontal shoring.

(h) Formwork includes any structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Formwork comprises common materials such as wood or metal sheets, battens, soldiers and walers, ties, proprietary forming systems such as stay-in-place metal forms, and proprietary supporting bolts, hangers and brackets. Formwork may be either permanent formwork requiring a shop drawing submittal such as stay-in-place metal or concrete forms, or may be temporary formwork which requires certification by the Specialty Engineer for Construction Affecting Public Safety and for Major and Unusual Structures.

(i) Scaffolding is an elevated work platform used to support workmen, materials and equipment, but not intended to support the structure.

(j) Shoring is a component of falsework such as horizontal, vertical or inclined support members. In this Section, this term is interchangeable with falsework.

*(k) Bracing is a temporary member(s) provided between beams, girders, piles, etc. to provide stability.*

(k) Contractor Originated Designs: Items which the Contract Documents require the Contractor to design, detail and incorporate into the permanent works.

SUBARTICLE 5-1.4.5 (Pages 35 – 36) is deleted and the following substituted:

#### **5-1.4.5 Submittal Paths and Copies:**

**5-1.4.5.1 General:** Shop drawings are not required for prequalified items. For non-prequalified items, determine the submittal path to be followed based upon the identity of the Engineer of Record as shown adjacent to the title block on the structural plan sheets, and on the key sheets of roadway plans, signing, and pavement marking plans, and/or lighting plans. At the preconstruction conference, the Department will notify the Contractor of any changes in the submittal path and whether the Department's or the Consultant's red-ink review stamp will signify an officially reviewed shop drawing.

(a) When the Florida Department of Transportation is the Engineer of Record, submit shop drawings to the appropriate Department Shop Drawing Review Office with a copy of the letter of transmittal sent to the Resident Engineer. For work requiring other information (e.g., catalog data, procedure manuals, fabrication/welding procedures, and maintenance and operating procedures), submit the required number of copies to the appropriate Department Shop Drawing Review Office. If not shown on the plans, the Department will furnish the mailing address of the appropriate Department Shop Drawing Review Office. Provide copies of material certifications and material tests to the Resident Engineer.

(b) When the Engineer of Record is a consultant hired by the Department, submit shop drawings to the consultant with a copy of the letter of transmittal sent to the Resident Engineer and, when requested, to the appropriate Department Shop Drawing Review Office. For work requiring other documentation (e.g., catalog data, procedure manuals, fabrication/welding procedures, and maintenance and operating manuals), submit the required number of copies with the prints. If not shown on the plans, the Department will furnish the mailing address of the Consulting Engineer of

Record. Provide copies of material certifications and material tests to the Resident Engineer.

**5-1.4.5.2 Building Structures:** Submit working, shop and erection drawings, and all correspondence related to building structures, such as Rest Area Pavilions, Office Buildings, and Maintenance Warehouses, to the Architect of Record for review and approval. Send a copy of the transmittal to the Resident Engineer.

**5-1.4.5.3 Contractor-Originated Design:** Submit shop drawings and applicable calculations to the Engineer of Record for review. Ensure that each sheet of the shop drawings and the cover sheet of the calculations are signed and sealed by the Specialty Engineer or the Contractor's Engineer of Record. Transmit the submittal and copies of the transmittal letters in accordance with the requirements of 5-1.4.5.1 through 5-1.4.5.3, as appropriate.

**5-1.4.5.4 Temporary Works:** For Construction Affecting Public Safety, submit to the Engineer of Record shop drawings and the applicable calculations for the design of special erection equipment, *bracing*, falsework, scaffolding, etc. Ensure that each sheet of the shop drawings and the cover sheet of the applicable calculations is signed and sealed by the Specialty Engineer. Transmit the submittal and copies of the transmittal letters in accordance with the requirements of 5-1.4.5.1 through 5-1.4.5.3, as appropriate.

**5-1.4.5.5 Formwork and Scaffolding:** The Contractor is solely responsible for the safe installation and use of all formwork and scaffolding. The Department does not require any formwork or scaffolding submittals unless such work would be classified as Construction Affecting Public Safety.

**5-1.4.5.6 Beam and Girder Temporary Bracing:** *For construction affecting public safety, submit calculations for stability for all beams and girders. The Contractor is solely responsible for ensuring stability of beams and girders during all handling, storage, shipping and erection. Adequately brace beams and girders to resist wind or other weather related forces and weight of forms and other temporary loads, especially those eccentric to the vertical axis of the products, considering actual beam geometry and support conditions during all stages of erection and deck construction. Develop the required designs following the AASHTO Guide Design Specifications for Bridge Temporary Works and Construction Handbook for Bridge Temporary Works and the Contract Documents.*

**5-1.4.5.7 Erection Plan:** *Submit, for the Engineer's review, an Erection Plan that meets the specific requirements of Sections 450, 452 and 460 and this section. The following construction activities are not allowed over the active traffic:*

- (a) Beam, girder and segment placement.*
- (b) Deck form placement and removal.*
- (c) Concrete deck placement.*
- (d) Railing construction when railing is located at edge of deck.*
- (e) Structure demolition.*

**5-1.4.5.6 8 Other Miscellaneous Design and Structural Details Furnished by the Contractor in Compliance with the Contract:** Submit to the Engineer of Record shop drawings and the applicable calculations. Ensure that each sheet of the shop drawings and the cover sheet of the applicable calculations is signed and

sealed by the Specialty Engineer. Transmit the submittal and copies of the transmittal letters in accordance with the requirements of 5-1.4.5.1 through 5-1.4.5.3, as appropriate.

SUBARTICLE 5-1.4.6 (Pages 36 – 37) is deleted and the following substituted:

#### **5-1.4.6 Processing of Shop Drawings:**

##### **5-1.4.6.1 Contractor Responsibility for Accuracy and**

**Coordination of Shop Drawings:** Coordinate, schedule, and control all submittals, with a regard for the required priority, including those of the various subcontractors, suppliers, and engineers, to provide for an orderly and balanced distribution of the work.

Coordinate, review, date, stamp, approve and sign all shop drawings prepared by the Contractor or agents (subcontractor, fabricator, supplier, etc.) prior to submitting them to the Engineer of Record for review. Submittal of the drawings confirms verification of the work requirements, units of measurement, field measurements, construction criteria, sequence of assembly and erection, access and clearances, catalog numbers, and other similar data. Indicate on each series of drawings the specification section and page or drawing number of the Contract plans to which the submission applies. Indicate on the shop drawings all deviations from the Contract drawings and itemize all deviations in the letter of transmittal. Likewise, whenever a submittal does not deviate from the Contract plans, clearly state so in the transmittal letter.

Schedule the submission of shop drawings to allow for a 45 day review period. The review period commences upon the Engineer of Record's receipt of the valid submittal or *valid* re-submittal and terminates upon the transmittal of the submittal back to the Contractor. A valid submittal includes all the minimum requirements outlined in 5-1.4.4. [Allow 30-day review time for resubmittals.](#)

Submit shop drawings to facilitate expeditious review. The Contractor is discouraged from transmitting voluminous submittals of shop drawings at one time. For submittals transmitted in this manner, allow for the additional review time that may result.

Only shop drawings distributed with the "red ink" stamps are valid and all work that the Contractor performs in advance of approval will be at the Contractor's risk.

**5-1.4.6.2 Scope of Review by Engineer:** The Engineer of Record's review of the shop drawings is for conformity to the requirements of the Contract Documents and to the intent of the design. The Engineer of Record's review of shop drawings which include means, methods, techniques, sequences, and construction procedures are limited to the effects on the permanent works. The Engineer of Record's review of submittals which include means, methods, techniques, sequences, and construction procedures does not include an *indepth in-depth* check for the ability to perform the work in a safe or efficient manner. Review by the Engineer of Record does not relieve the Contractor of responsibility for dimensional accuracy to ensure field fit and for conformity of the various components and details.

**5-1.4.6.3 Special Review by Engineer of Shop Drawings for Construction Affecting Public Safety:** For Construction Affecting Public Safety, the Engineer of Record, or other Engineer as the Department appoints for this purpose, will

make an independent review of all relevant shop drawings and similar documents. Do not proceed with construction of the permanent works until receiving the Engineer of Record's approval. The review of these shop drawings is for overall structural adequacy of the item to support the imposed loads and does not include a check for economy, efficiency or ease of construction.

SUBARTICLE 5-1.5 (Page 39) is expanded by the following new subarticle:

***5-1.5.4 Erection:*** *For Structures affecting public safety, submit an erection plan signed and sealed by the Specialty Engineer to the Engineer at least four (4) weeks prior to erection commencing. Include as part of this submittal signed and sealed calculations and details for any falsework, bracing or other connection(s) supporting the structural elements shown in the erection plan.*

*At least two (2) weeks prior to beginning erection, conduct a Pre-erection meeting with the Specialty Engineer and Engineer to review details of the plan.*

*After erection of the elements but prior to allowing the public below the structure, ensure that the Specialty Engineer has personally inspected the erected member(s) and certified to the Engineer that the structure has been erected and constructed in accordance with its signed and sealed erection plan.*

*Perform daily inspections of the erected structural members until completion of the deck concrete placement. Provide written documentation of the inspections to the Engineer within 24 hours of the inspection.*