Office of Bridge Design
Technical Memorandum

Date: January 12, 2015

To: All Bridge Engineering Staff

From: Hadly Eisenbeisz, PE
Bridge Construction Engineer

Subject: Technical Memorandum BTM15.1
Bridge Construction Quality Assurance/Quality Control (QA/QC) practice

This Technical Memorandum is intended to formally document the SDDOT Office of Bridge Design QA/QC practice for Bridge (structure) Construction. This practice applies to all highway related structures built in the state where the project is administered by the Department.

The purpose of the QA/QC practice in Bridge Construction is to ensure that quality structures are safely built according to plans and specifications. The Bridge Construction area of the Office of Bridge Design is involved with both the QA and QC process for several different products and services.

Temporary Works (falsework plans, cofferdam plans, jacking plans, shoring)

Contractor's temporary works are required by plan note or specification to be designed and stamped by a SD Registered Professional Engineer (PE) in accordance with the AASHTO Guide Design Specifications for Bridge Temporary Works. The Bridge Construction Engineer (BCE) and/or Assistant Bridge Construction Engineer (ABCE) will then review these calculations and plans to make sure they are stamped by a SD PE and that they conform to the required specifications and loadings. This independent review of plans and calculations ensures the quality of temporary works.

Pre-pour inspections (bridge deck pre-pours and drilled shaft preconstruction meetings)

Bridge deck pours and drilled shafts are two major bridge components where the Bridge Construction area is directly involved with quality assurance. The specifications require that a pre-pour inspection and meeting be conducted by the BCE prior to both deck pours and drilled shaft pours. This is our way of making sure these two major bridge components are constructed according to the plans and specifications. Checklists have been created for the contractor to use prior to the meetings and for SDDOT to review during the pre-pour to assure every aspect of the plan and specification requirements are covered. A drilled shaft installation plan is also required to be submitted prior to that meeting to make sure the contractor has everything accounted for in his equipment and plan. This plan is reviewed by both the BCE and the Foundations Engineer

with comments returned to the Contractor and Area Engineer. All of these reviews are part of the quality assurance activity to ensure a quality product. It is also common for the BCE, ABCE or the Foundations Engineer (on drilled shafts only) to stay for the deck pour or drilled shaft construction and assist Area personnel with inspection of these critical items on bridges.

Shop plans

Shop plans are specified detailed drawings required for all (shop) fabricated items. The contractor and the fabricator are required to provide shop plans according to the requirements in the specifications. These shop plans are then reviewed by the BCE, ABCE, or the Engineer of Record when plans are prepared by consultants. This quality control review ensures that shop plans conform to design plans and specifications. Incorrect or missing information is red-lined on the shop plans and returned for corrections. When there are no corrections or only minor corrections remaining, the BCE or ABCE stamps the shop plans and releases them for fabrication. The stamped plans are then used by the fabricator, shop inspectors, field inspectors, and the SDDOT Materials and Certifications office to ensure the fabrication process and construction of the item conforms to the plans and specifications.

Certifications

The Bridge Construction Engineer is responsible for welder certifications and structures construction inspection certifications. These certifications are part of the overall quality assurance process involved with structure construction inspection to assure that we have qualified people inspecting our structures.

Welders are required to qualify by submitting a Welder and Welding Operator Qualification Test Record in accordance with the American Welding Society (AWS) Bridge Welding Code (D1.5). Welders with passing test records are sent a SDDOT Certification of Welder Qualifications and Welding Record (green) card issued by the BCE or ABCE that allows them to weld on SDDOT projects. The welder must maintain his welding record according to the AWS Bridge Welding Code. If the welder's ability to weld or his welding does not meet AWS requirements, the BCE or ABCE can revoke the welder certification card.

The Structures Inspection Certification course is a four-day course conducted by the BCE and ABCE to train and certify field inspectors on the many aspects of structures construction inspection. This course is part of the SDDOT certification program designed to provide our inspectors the training they need to make sure we get quality construction and materials on all projects. The training comes with a manual that can be used for reference in the field during construction inspections. Trainees must also pass an exam at the end of the course to become certified. The certification is required for individuals who inspect any structure project that SDDOT is administering.

Addendums and Construction Change Orders

Addendums are used in the plans production process to clarify or correct problems with plans prior to letting to contract. The changes for addendums are completed by the Engineer of Record

and sent to the Bid Letting office to be included in the advertisement for the project. The Bridge Construction Engineer will often coordinate these changes and review them for any structures project prior to sending to Bid Letting. In this case the Engineer is in charge of the quality assurance for the addendum and Bridge Construction would be the quality check.

Construction Change Orders (CCO's) are similar to addendums but they occur after the letting has taken place and may also be used to deal with unforeseen changes in the field that have to be dealt with during construction. The plans for CCO's involving highway structures are produced by the Engineer of Record and sent to Bridge Construction. Bridge Construction will then perform a review of the plans to make sure they are correct and will then send them to the Project Engineer. The Project Engineer will then present the CCO to the contractor and file it for the record. A copy of the CCO plan is also sent to Bridge Maintenance to file with the original plans as an as-built record.

Reviewed by: Steve A K Date: 1/13/2015

Approved by: Kevin M Goodwin, Chief Bridge Engineer, Date: 1-13-2015

cc: File