

# MEMORANDUM

DEPARTMENT OF TRANSPORTATION  
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Date: March 30, 1999

To: All Bridge Worksheet Users

From: S. W. Horton

Subject: CDOT Bridge Worksheet Revisions

The CDOT Bridge Worksheets have recently been updated. This update involves all of the worksheets, 95 in English units (35 revised, 8 deleted, 8 new, and the remaining 44 converted to ACAD version 14) and 94 in metric units (39 revised, 8 deleted, 14 new, and the remaining 33 converted to version 14).

The sheets in metric units will be maintained through this year to service existing metric projects. We currently plan on deleting these sheets in January of next year.

We are in the process of changing the borders on the English sheets to the same as used on the metric sheets, and deleting the bar list information throughout. When this is completed, another set of revisions will be issued.

The following is a summary of the revisions.

**B-INDEX-1 & 2:** Updated indexes.

**B-000-0:** Added shoring note. Where there is substantial excavation shoring, the approximate location should be indicated on the General Layout and the 206 Temporary Excavation Support pay item provided. Deleted Class 5 Finish notes. If a colored concrete coating is desired, Structural Concrete Coating should be used as defined by the 601 Standard Special Provision of the same name. Added Class 1 and 2 Finish note. If a colored concrete coating is not desired, then Class 1 and 2 finishes may be used as specified by this note. Added leveling pad note. This note defines "leveling pads" which are not subject to all of the same specifications as bearing pads, and instead of being paid for separately, are included in the girder costs. Revised the utility notification center phone numbers. The previous number was in error.

**B-100-3, 4 & 5:** B-100-3 was revised, and B-100-4 & 5 were deleted, for the current policy to provide the complete Bridge Geometry output in the plans.

**B-206-3:** Removed “B-206-4” reference in Section G-G, because the worksheet numbers are not used in the construction set of plans.

**B-504-A1, A2 & A3:** The MSE Block Retaining Wall with bridge rail was revised to replace the design table with a graph for required LTDS values. Design values for steel reinforcing were added. Requirements for wall batter were added. Miscellaneous revisions were made to facilitate using these sheets. Changes were also made to accommodate paying for the wall by parts instead of by square foot. The 504 Project Special Revision, MSE Block Retaining Walls, has also been revised and should be used with these sheets.

**B-504-B1, B2 & B3:** New MSE Block Retaining Wall sheets for wall with guardrail or sidewalk.

**B-504-C1, C2 & C3:** New MSE Block Retaining Wall sheets for wall with up to 2:1 fill slope.

**B-507-1 & 2:** Corrected the amount of fibers from 0.1 pounds per cubic foot to 2.5 pounds per cubic yard. Revisions to C-507-1 & 2 were not needed.

**B-512-1:** Added provisions to allow variable elastomer thickness per layer.

**B-512-2:** Added provision to allow use of thicker reinforced pad.

**B-512-4C, 4S, 5C & 5S:** Minor miscellaneous clean up of details, primarily weld call-outs.

**B-518-1, 1A & 1B:** Added alternate edge beam. Added the Hydrozo compression seal as an alternate to the strip seal. Updated approved manufacturer’s list. Changed shop drawing references to working drawings. Added reference to special provisions for venting instructions. Recessed joint 0.25” below riding surface, and recessed curb cover plates 0.25”. Improved weld call-outs. Increased 15” curb to 18”. Improved range of applicable skew angles due to wider curb. Added 8” rise and 2” concrete cover as minimum requirements for the portion of the joint projecting into the curb. Deleted the 45-degree slope requirement for this projection. Revised Type 4 Rail to Type 7. Added instructions on how to establish joint opening dimensions when used at the end of approach slab.

**B-518-M1C & M1S:** Recessed joint 0.25” below riding surface, and recessed curb cover plates 0.25”. Added approved manufacture’s list. This list will now be given on the drawing, instead of in the specifications. Revised Type 4 Rail to Type 7. Added reference for approach slab rebar details. Made miscellaneous improvements to wording of notes and call-outs.

**B-518-PA & PC:** New worksheets for 0” to 2” plug expansion devices. These sheets are to be used for rehabilitation work, and not new construction, see CDOT Bridge Design Manual subsection 15.1.

**B-601-1A:** This worksheet was deleted because of the policy to not use 0" to 2" plug joints for new construction, as per subsection 15.1 in the CDOT Bridge Design Manual.

**B-601-1, 1EA & 1EC:** On 1EA & 1EC, revised minimum approach slab length to 20'. On B-601-1, added note to designer and detailer regarding applicability. Revised all sheets for placement of bridge rail on approach slab instead of wingwalls, and for the wingwalls to be placed outside of the approach slab. The #4@18" top transverse bars were changed to #5@12" to mitigate the longitudinal cracking that has occasionally occurred. On 1EA & 1EC, replaced the expansion device details with references to the expansion device worksheets. The appropriate expansion device worksheets will now need to be added to the plans set in addition to the approach slab sheet.

**B-602-BL:** In accordance with Bridge Technical Memorandum #25, 2/2/99, the bar list worksheet has been deleted.

**B-606-3 & 3W:** Modified for placement of bridge rail on approach slab. Changed shop drawing reference to working drawings. Deleted note which disallowed flame and arc cutting of drain holes.

**B-606-4 & 4A:** Deleted. Replaced with Bridge Rail Type 7.

**B-606-7 & 7A:** Corrected reference to the M-Standards. Updated details for transition to guardrail at end of approach slab. Updated note regarding construction tolerances.

**B-606-10, 10A, 10H & 10R:** Changed shop drawing reference to working drawings on 10, 10H & 10R. Removed top of wingwall slope call-out on 10A. This should be given with the wingwall details. Deleted note which disallowed flame and arc cutting of drain holes. Improved the note regarding extending the tubes at the bridge rail to guardrail transition for the 10R rail. On C-606-10H, corrected the anchor bolt projection and anchorage bolthole size.

**B-606-10P & 10T:** New worksheets for replacing the bridge rails on timber bridges. One sheet is for asphalt filled plank decks, and the other for timber decks.

**B-607-1:** Changed description of "alternate anchorage". On C-607-1, provided miscellaneous clean up of details.

**B-618-BT:** Added a variable in the table for the location of the harping point. Added notes providing for the use of welded wire fabric for the reinforcing cage. Changed strand extension notes to provide for strand extended at abutments in accordance with the recent revision of subsection 7.2 of the CDOT Bridge Design Manual. Moved the bracing and stability notes to the diaphragm worksheet, B-618-DF. Specified that the girder length given in the table is the actual length of the girder and not the distance determined from the horizontal projection of plan geometry that we typically use for dimensions. The difference between the two is usually small, but can be significant for long spans on steep grades.

**B-613-C & S:** Deleted the interior lighting for box girders. This was done at the direction of our bridge inspection unit. They have found that using these systems is generally impractical due to the difficulties of providing a power source.

**B-618-DF:** Moved the bracing and stability notes to these worksheets from the girder worksheet, B-618-BT.

**B-618-BX:** To allow more design flexibility and allow for sleeving and harping information, added variables to the table, elevation view, and section, for the location of the harping point, flange and web thickness', and strand position. Added notes providing for the use of welded wire fabric for the reinforcing cage. Changed strand extension notes to provide for strand extended at abutments in accordance with the recent revision to subsection 7.2 of the CDOT Bridge Design manual. Removed the 0.5" diameter strand size requirement. Added note controlling allowed camber differentials for side-by-side boxes over roads and pedestrian facilities. Changed stirrup extensions and hooks to reflect current practices. Changed sleeving note to provide for design of sleeving and harping requirements in the plans. As discussed above for BT-girders, specified that the girder length given in the table is the actual length of the girder. Modified fabrication tolerance of the girder depth to +0.5" and -0.25".

**B-618-SL:** Added notes providing for the use of welded wire fabric for the reinforcing cage. Changed strand extension notes to provide for strand extended at abutments in accordance with the recent revision to the Bridge Design Manual Subsection 7.2. Added note controlling camber differentials between side-by-side slabs over roads and pedestrian facilities. Changed camber tolerance numbers to a variable. Removed the 0.5" diameter strand size requirement. As discussed above for BT-girders, specified that the slab length given in the table is the actual length of the slab. Modified fabrication tolerance of the slab depth to +0.5" and -0.25".

**All Other Sheets:** All remaining sheets, not discussed above, have been converted to ACAD version 14.

**Metric Worksheets:** Revisions discussed above for English worksheets also made on the corresponding metric worksheets. In addition, the following changes were made to the metric sheets.

**C-000-0:** As above for B-000-0, and simplified note on metric to English rebar equivalencies.

**C-514-PR:** New worksheet providing a pedestrian pipe railing. Using this rail is not required. It is provided here as a design aid. We hope to provide additional pedestrian rails as design aids in the future.

**C-601-3:** Corrected quantity of filter material, and minor miscellaneous detailing clean up.

**C-601-4C & 4S:** Changed strand location, and fabrication tolerances for strand location, to more nearly match soft conversions of the requirements in English units.

**C-607-3 & 5:** Corrected loaded area for deflection test.

**C-607-6B, 6S & 8B:** Corrected scaling of view at expansion device, and updated from Type 4 to Type 7 bridge rail.

Copies of the worksheets, and other bridge standards, can be obtained at  
<http://www.dot.state.co.us/business, design, bridge>.

Please review and become familiar with these new standards. If you have any questions or recommendations for improvement please contact Mark Leonard, Staff Bridge, 757-9486.

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