

TO:		<b>ENGINEERING INSTRUCTION</b>	
<b>SUPERSEDED BY EI 82-011 EFFECTIVE 3/1/82</b>		NEW YORK STATE DEPARTMENT OF TRANSPORTATION	
		SUBJECT: Revision to Standard Details for Highway Bridges	
		Subject Code: 7.35-11	
Distribution:		Code: <u>EI 79-28</u>	
<input type="checkbox"/> Main Office <input type="checkbox"/> Regions <input checked="" type="checkbox"/> Special		Date: <u>6-15-79</u>	
APPROVED: <u><i>E. J. Harrigan</i></u>		Supersedes:	

The attached pages replace pages in the Standard Details for Highway Bridges. These pages and their changes are listed below.

Page 27	Art. 21.11 revised	Reinforced Concrete Approach Slabs:
Page 47	Note 2a Note 2b Note 5 Note 6	Added for preliminary plan. Changed because of date Date changed Reworded
Page 48	Note 14	Fracture Critical note added
Page 49	Note 32	Deleted - conflict with specifications
Page 50	Note 38 Note 39	Deleted - are in Foundation Design Report " " " " " "
Page 52	Note 71	Reworded
Page 52A Page 52B Page 52C Page 52D	These pages contain additional notes that are available on Dulseal.	

21.10.3- CLEARANCES OVER NAVIGABLE WATERWAYS

1. Horizontal and vertical clearances as shown on the Coast Guard Permit Application shall be shown in plan and elevation as noted in 21.9.1, Layout Drawings.
2. Vertical clearances will be shown above maximum navigable water surface for bridges over the Barge Canal, and over mean (ordinary) high water elevation for others.

21.10.4 - WATER ELEVATIONS

Except for the table described in Article 21.10.1, only the following water elevations are to be shown on the plans:

1. Design High Water Elevation for all waterway crossings except where the waterway elevations are completely controlled.
2. Normal pool elevation and maximum navigable water surface for all canal crossings.
3. All water elevations indicated on the Coast Guard Permit. (All elevations are to be shown and identified on the "Elevation A-A" detail of the preliminary plan.)

21.11. -REINFORCED CONCRETE APPROACH SLABS

- A. Bridges on new location and bridges being replaced on existing location shall generally have a 40 foot Reinforced Concrete Approach Slab. The primary function of a Reinforced Concrete Approach Slab is to prevent pavement failure adjacent to the bridge by spanning any settlement of abutment backfill which may occur. In some cases modification of the 40 foot approach slab length may be

justified. Such justification should be brought to the attention of the Deputy Chief Engineer (Structures) for approval. Uncoated bars shall be used in the top mat. The cover to the top of steel shall be 3 1/2 inches, which includes a 1/2 inch construction tolerance.

B. Bridges being reconstructed, including removal of a portion or all of the backwall, shall be treated on an individual basis using the following guidelines:

1. No Existing Approach Slab

The minimum length of approach slab shall be 1 1/2 times the depth of abutment backfill plus 5 feet, or the length of U Type wingwalls, whichever is greater.

2. Existing Approach Slab

A determination of the condition of the existing approach slab shall be made by the bridge inspection team. Core samples may be ordered if deemed necessary by the inspectors.

- a. Approach slab in good condition-remove and replace that portion of the slab closest to the bridge in a length sufficient to span the new backfill and provide at least 5 feet of bearing on undisturbed subgrade. Wingwall configurations and other geometric features of the bridge may override the above basic criterion.
- b. Approach slab in poor condition-remove and replace the entire slab. In some cases, when approach highway reconstruction will be included in the same contract, it may be economical to replace a length of approach slab shorter than that removed in accordance with foregoing criteria.

4. The top of backwall shall be steel trowel finished. Elevations of top of backwall should be adjusted for cross-slope and grade.

5. With this method of construction, the Pressure (stress) Relief Joint at the end of the slab shall be as shown in the Highway Design Manual, Volume 1, Section 5.05.09, Stress Relief Joints.

6. Asbestos Sheet Packing (Treated Both Sides) in accordance with material specification 728-06.01 shall be placed on the top of the backwalls. The cost of the sheet packing shall be included in the price bid for the Structural Approach Slab Item. (The sheet packing will provide for both thermal movement and rotation under Live Load.)

7. Additional reinforcement shall be provided over the backwall. Refer to Standard Specifications for Highway Bridges, Article Stresses, 1.7.48D.

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E. For details and reinforcement, regardless of length or width, refer to the current BDD Sheet.

3. If the highway pavement is concrete and no pressure relief joint exists within 40 feet of the bridge, one shall be installed at the end of the newly placed approach slab.
- C. The width of Reinforced Concrete Approach Slabs shall include any future lanes provided for on the structure.
- D. Reinforced Concrete Approach Slabs poured continuously with Superstructure Slab.(Based on the following criteria, this method of construction will generally not be compatible with U Type wingwalls. Each structure, however, may be judged on an individual basis).
1. The approach slab shall be approximately the same width as the superstructure. The horizontal limit of the slab shall be the face of the guide rail posts. (This limit will allow guide-rail posts to be driven into the embankment).
  2. Epoxy-coated bars shall be used in the top mat. The cover to the top steel shall be 2 1/2 inches. (The 2 1/2 inch cover includes a 1/2 inch construction tolerance.)
  3. Polyethylene curing covers (White Opaque) in accordance with material specification 711-04 shall be placed on the finished Sub-Base Course prior to placement of approach slab reinforcement. The cost of the curing covers shall be included in the price bid for the Structural Approach Slab Item. (The curing covers will provide a bond breaker between the concrete and the Sub-Base Course. The purpose of a bond breaker is to reduce frictional resistance to thermal movement.)

21.12 - Not Used

21.13 - GRANITE CURBS

Granite curbs shall be used on all bridges where curbs are required and should be so shown on the plans.

Granite curbs shall not be used with safety-shape concrete parapets or barriers.

21.14 - SIDEWALKS ON BRIDGES

When required, raised sidewalks shall have a minimum clear width of 5 feet. Sidewalks on or adjacent to walls may be jointly supported on the embankment and walls.

21.15 - DETAILS OF RAILINGS

Complete plan or elevation of railing shall be detailed. These views may be schematic. The location of the railing shall be set by tying in one or more posts to the end of slab or end of wingwall. Location of special posts and rail expansion joints shall be shown.

NOTES TO BE PLACED ON PLANS (DULSEAL)1. GENERAL NOTES:

Note 2a is to be placed on preliminary plan.

- 2a. Design Specifications: New York State Department of Transportation. Standard Specifications for Highway Bridges.

Note 2b is to be placed on final plans. Insert date of latest specifications modifications upon which design is based.

- 2b. Design Specification: New York State Department of Transportation Standard Specifications for Highway Bridges with all provisions in effect as of (date).

Note No. 3 is to be used only for the bridges carrying either the main line of Interstate highways or the Southern Tier Expressway. Otherwise, use Note No. 4.

3. Live Load: HS20-44 or two 24,000 lb. axles spaced 4'-0" on centers.

4. Live Load: HS20-44.

5. Material and Construction Specifications: Standard Specifications, Construction and Materials, New York State Department of Transportation, Design and Construction Division, dated January 3, 1978, with current additions and modifications.

6. The cost of water used for compaction of select fill items shall be paid for under Item \_\_\_\_\_, Applying Water.

(included in the Highway Estimate)

Note No. 7 is to be used when the aggregate amount of the Bridge share and the Highway share exceeds 500 square yards of SODDING, as defined in Section 612 of the Standard Specifications. The sod area shall be watered at a rate of 5 gallons per yard per application. (Contact Region for number of applications.)

7. The cost of furnishing and placing water used for Sod Gutters will be paid for under Item \_\_\_\_\_ (included in Bridge Estimate).

Note No. 8 is to be used when the quantity of SOD is less than 500 square yards.

8. The cost of furnishing and placing water used for Sod Gutters shall be included in the Sodding Item.

9. The cost of all joint material will be included in the price bid for the various items of the Contract, unless otherwise specified on the Plans.

10. The Contractor's attention is directed to Subsection 105-09, Work Affecting

NOTES 11, 12 and 13 shall be used when the new structure is replacing an existing structure. The preliminary bridge plans must indicate location on plan or Location Plan.

11. Existing Substructures shall be removed to within the limit shown on the plans under Item \_\_\_\_\_ in the Bridge Estimate.
12. The existing substructure shall be completely removed within a lateral limit of 3 feet of the new substructure. The portion of the existing substructure which is outside this lateral limit shall be removed to one foot below the finished ground line; unless under a highway where the depth of removal shall be 2 feet.
13. Existing Superstructure shall be removed under Item \_\_\_\_\_, in the Bridge Estimate.
14. This structure contains Fracture Critical Members. These members are identified on the plans. The Contractor shall comply with the provisions of the Special Notes for Fracture Critical Members which appear in the proposal.

(Contact the Metal Engineering Unit for the appropriate notes that shall be incorporated in the Special Notes. Refer to Engineering Instruction 78-28 for guidance.)

20. SUBSTRUCTURE NOTES

21. Unsuitable material, including topsoil, shall be removed from beneath substructures placed on fills less than 20 feet in height. The height of fill shall be measured from the original ground surface to the theoretical grade line. Replacement of the removed material shall be done with the item indicated on the Contract Plans.
22. All embankments of Select Structure Fill, Item \_\_\_\_\_ shall be compacted to 100 percent of standard Proctor maximum density as defined under Subsection 203-3.12 - Compaction.
23. Where piles are to be placed through the embankment, the embankment shall be compacted to 95 percent of standard Proctor maximum density as defined under Subsection 203-3.12 - Compaction.
24. Embankment in Place, Item \_\_\_\_\_, and Select Structure Fill, Item \_\_\_\_\_, shall be placed simultaneously, in contact, on both sides of the vertical payment line. Sheeting or other means shall not be used to separate the two materials.
25. The installation of Select Structure Fill, Item \_\_\_\_\_, as shown on the Structural Plans, shall be completed immediately following the completion of abutments or walls.

26. Footing elevations may have to be adjusted slightly depending on the elevation of bedrock. Where sound rock is found 2 feet or less below the planned elevations of the bottom of footing, backfill of Class B concrete shall be installed to the bottom of footing elevation shown on the Plans. Backfill concrete may be poured monolithically with the footing concrete. Where sound rock is found more than 2 feet below planned elevations of the bottom of footing, the Deputy Chief Engineer (Structures) shall be so advised and a redesign of the substructure may be made.
27. Excavation below planned footing elevation will not be allowed without written permission from the Engineer. Backfill of unauthorized excavations below or beyond payment lines will be at the Contractor's expense. Backfill material will be Class B Concrete unless otherwise directed by the Engineer.
28. Rock shall be presplit along the lower roadway in front of and for 50 feet to either side of the abutment footing. This lower roadway excavation work shall be performed prior to any work on the abutment footing excavation proper. In addition, when the bottom of the abutment footing is more than 5 feet below the rock surface, the rock shall be presplit adjacent to the footing as shown on the plans to the required depth. The cost of such presplitting shall be included in the excavation item.
33. The Contractor's attention is directed to the very compact nature of the soil described on the subsurface profile drawing in the area to be excavated or retained during construction. The Contractor shall govern his operations and procedures accordingly, within the appropriate specification items, including the selection and possible use of sheeting with sufficient size and section to withstand the expected hard driving.
34. Top of backwalls on which Asbestos Sheet Backing (Subsection 728-06) is to be placed shall be steel-trowel finished.
35. Bituminous Material, Item \_\_\_\_\_, shall be applied to the backs of all abutments and wingwalls above top of footings where fill is in contact with the walls.
36. Epoxy Protective Coating for Concrete, Item \_\_\_\_\_, shall be applied to the following surfaces:

ABUTMENTS: All exposed pedestal surfaces, bridge seats, including the area under the bearings, exposed vertical surfaces of backwall, and curtainwalls facing the superstructure.

SOLID PIERS: All pedestal surfaces, including the area under the bearings, and top surface of pier between pedestals, including the edge chamfer at top edge of pier.

PIERS WITH COLUMNS:

Piers under Deck Joints

The entire pier beam and pedestals, including the surfaces under the bearings.

Piers Not under Deck Joints:

All pedestal surfaces, including the area under the bearings and the top surface of pier between pedestals including the edge chamfer at top edge of pier.

37. The Contractor, with the permission of the Deputy Chief Engineer (Structures) may elect to introduce construction joints in the abutments at locations not shown on the Plans. These construction joints shall be provided with shear keys and waterstops. Vertical construction joints introduced in the backwall should preferably be placed midway between the pedestals.
50. SUPERSTRUCTURE NOTES
51. The structural slab for this structure shall be formed using permanent corrugated metal forms for concrete decks. (See details in Proposal.)
52. The structural slab for this structure shall be formed using removable forms.

Note No. 53 is to be used when unpainted self weathering steel is called for over highways and other locations where staining would be objectionable.

53. All exposed concrete shall be covered with polyethylene sheeting or other material approved by the Engineer. The covering shall remain until the completion of the Contract or A. O. B. E. The cost of the covering shall be included in the Structural Concrete Item.

NOTES TO BE PLACED ON PLANS (DULSEAL) - Continued

RECONSTRUCTION NOTES

- 61 The Contractor's attention is directed to the fact that, due to the nature of reconstruction projects, the exact extent of reconstruction work cannot always be accurately determined prior to the commencement of work. These Contract Documents have been prepared based on field inspection and other information available at the time. Actual field conditions may require modifications to construction details and work quantities. The Contractor shall perform the work in accordance with field conditions.
- 62 The Contractor shall perform all work with care so that any materials which are to remain in place, or which are to remain the property of the State, will not be damaged. If the Contractor damages any materials which are to remain in place, or which are to remain the property of the State, the damaged materials shall be repaired or replaced in a manner satisfactory to the Engineer at the expense of the Contractor.
- 63 Whenever items in the Contract require materials to be removed and disposed of, the cost of supplying a disposal area and transportation to that area shall be included in the unit price bid for those items.
- 64 During removal operations, the Contractor shall not be allowed to drop waste concrete, debris and other material to the area below the bridge except where the plans specifically permit the froping of material. Platforms, nets, screens or other protective devices shall be used to catch the material. If the Engineer determines that adequate protective devices are not being employed, the work shall be suspended until adequate protection is provided.
- 65 All material falling on the area below and adjacent to the bridge shall be removed and disposed of by the Contractor.
- 66 The cost of furnishing, installing, maintaining, removing and disposing of all platforms, nets, screens or other protective devices shall be included in the unit bid price of the appropriate items of the Contract.
- 67 The Details on Drawing No. \_\_\_\_\_ indicate the spalls, scales and cracks noted on a field inspection by STATE forces. All of the major areas of spalling, scaling and cracking, know to exist at the time of contract preparation have been shown to indicate the approximate extent of deterioration that will have to be repaired by the Contractor.

69. Areas of deterioration that are \_\_\_\_\_ inches or less in depth shall be repaired by Item "Shotcrete". Areas that are greater in depth than this shall be repaired with Item "Removal and Replacement of Structural Concrete". The indicated depth limitation is only an approximate guide and final determination of which item to use shall be the decision of the Engineer.
70. Except for structural slabs, all surfaces receiving new concrete shall be sandblasted. Just prior to the application of new concrete, the surfaces shall be air cleaned, wet down and coated with a thin coating of 1:1 mortar or neat cement paste thoroughly brushed into the surface. It will not be necessary to brush the mortar into surfaces made inaccessible by mesh or closely spaced reinforcement when so determined by the Engineer. There will be no separate payment for this work. The cost shall be included in the bid price for the various concrete items in the Contract.
71. A. Chipping hammers used to remove concrete from the following structural components shall not exceed twenty-five (25) pounds in weight with the bit removed:
- B. Chipping hammers used to remove concrete from the following structural components shall not exceed forty (40) pounds in weight with the bit removed:
- (Note "A" is to be used for partial removals when the concrete to be removed is unsound. Note "B" is to be used for partial removals when the concrete to be removed is sound.)
72. Shop drawings shall be submitted to the Deputy Chief Engineer (Structures) for approval for the following structural steel replacement items:
73. Shop drawings shall be submitted to the Engineer for approval for the following structural steel replacement items:

Additional Notes Available on Dulseal

CAMBER NOTES

1. The total camber as tabulated is assumed to be measured vertically to the top of full camber web from a straight line drawn from the intersection of top of web and centerline of bearings at one end of the girder to the intersection of top of web and centerline of bearings at the other end of the girder.
2. The camber labeled "Vertical Curve" in the table is the camber required in the girder to cause the girder to follow the vertical curve.
3. The camber labeled "Steel D.L." in the table is the camber required in the girder to offset the deflection due to the dead load weight of the steel in the girder.
4. The camber labeled "Concrete D.L." in the table is the camber required in the girder to offset the deflection due to the dead load weight of the concrete slab.
5. The camber labeled "Superimposed D.L." in the table is the camber required in the girder to offset the deflection due to the weight of the superimposed dead load, that is, the curb, sidewalk, railing and future wearing surface.
6. Cambers listed in the table as positive are upward cambers.
7. Cambers listed in the table as negative are downward cambers.
8. The cambers are tabulated in decimals of a foot.

## NOTES FOR DIAPHRAGM DETAILS

1. Where holes are indicated, connections shall be 7/8" diameter high-strength bolts.
  2. Cross frames may be fabricated to fit the girders in their erected position and cambered shape, but deflected vertically under the dead load of the steel work only.
  3. The Contractor may place diaphragms on either side of the bearing stiffeners or stiffener connection plates as necessary to correct alignment provided there will be no interference with other structural details.
  4. Snipe the outstanding leg of all angles and plates 1" minimum.
  5. Tapered or flat shim plates may be used in the connection between skewed diaphragms and the bearing stiffeners or stiffener connection plates. Variable thicknesses of shim plates may be used. The minimum thickness of shim plate shall be 1/8" with a maximum number of three shim plates permitted at any connection. The total thickness of all shim plates used at any connection shall not exceed 1". Shim plates shall have the dimensions of the faying surface. The shim material shall conform to ASTM Designation A36, except that on unpainted structures, the shim material shall conform to ASTM Designation A588. No additional payment will be made for furnishing and placing the shim plates.
  6. Both the gusset plate and flange are to be same type of steel.
  7. Field welding to the gusset plate will not be permitted.
- Note:
- Notes 8, 9, and 10 to be used only if welding of gusset plates is allowed.
8. The gusset plate shall be prepared and welded as a single bevel groove weld as shown in Detail #1. It shall then be Air Carbon-Arc gouged from the second side into sound weld metal and then welded as detailed. All welding shall be in the flat or "downhand" position.
  9. The gusset plate may be of any shape that will provide after welding, cutting and finish grinding a smooth transition from the flange edge at a minimum radius of 12-inches.
  10. Care shall be taken when welding gusset plates to the flanges of plate girders, especially at the start and end of the fillet welds, to insure complete fusion at the root and that weld craters are properly filled. The materials to be welded shall be preheated to a minimum of 250°F.

NOTES FOR CONCRETE OVERLAYS FOR STRUTURAL CLASS II CONSTRUCTION PROJECTS

The finished overlay profile shown for this (insert contractor's) was calculated from the measured existing top existing surface cover (shown elsewhere in the Plans) using the following:

**SPECIAL CONSERVATION NOTES:**

1. **Stream Conservation:** During the course of construction, the Contractor shall conduct his operations in such a manner to prevent or reduce to a minimum any damage to any stream from pollution by debris, sediment or other foreign material, or from the manipulation of equipment and/or materials in or near such streams. He shall not return directly to a stream, or to a ditch immediately flowing into a stream, any water which has been used for wash purposes or other similar operations which cause this water to become polluted with sand, silt, cement, oil or other impurities. If he uses water from a stream, he shall construct any intake or temporary dam required to protect and maintain water rights and to sustain fish life downstream.
2. **Cofferdams and Discharge:** No discharge from a cofferdam or any other construction activity shall enter the stream directly unless the discharge is as clear as the flowing stream. If necessary, the Contractor shall construct a settlement basin to retain the discharge a sufficient period of time in order that the discharge entering the stream will be clear. Before starting such operations, the Contractor shall contact the Environmental Analysis Unit in order that the methods employed will have prior approval of the Department.

The finished overlay profile shown for this (these) structure(s) was calculated from the measured existing top reinforcing bar cover (shown elsewhere in the Plans) using the following criteria:

1. The minimum total cover (cover remaining over the reinforcing bars after concrete removal plus thickness of overlay material) shall be 2-1/4 inches.
2. The minimum thickness of the High Density Concrete Overlay shall be 2 inches.

If the Contractor has elected to bid on \_\_\_\_\_ - Latex Modified Concrete Overlay, then the Contractor may submit a proposed finished profile to the Regional Director for approval. The proposed finished profile shall be submitted to the Regional Director at least two weeks before placement of the overlay and shall be based on the following criteria:

1. The minimum total cover (cover remaining over the reinforcing bars after concrete removal plus thickness of overlay material) shall be 2-1/4 inches.
2. The minimum thickness of the Latex Modified Concrete Overlay shall be 1-1/2 inches.
3. The transition lengths between the existing profile and proposed finished profile shall be of the same lengths as shown on the Plans.
4. The Contractor's proposal may include additional grade transitions subject to the following:
  - a. The minimum length between grade transitions shall be \_\_\_\_\_ feet.
  - b. The slope of the grade transition shall not differ from the slope of the adjacent sections by more than \_\_\_\_\_% at the completion of the work.
  - c. The slope changes do not create drainage problems on the bridge deck.

No overlay material shall be placed until the Regional Director has approved a satisfactory proposed finished profile.