To: New York State Department of Transportation

ENGINEERING BULLETIN

Title: REVISED DETAILS FOR INTEGRAL ABUTMENTS

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Approved:
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ADMINISTRATIVE INFORMATION:
- This EB is effective beginning with projects submitted for a letting of January 12, 2006.
- Bridge Detail Sheets IA1 – IA5 are superseded.
- No EIs or EBs are superseded.

PURPOSE: To issue revised and new BD sheets (BD-ID1 – BD-ID7).

TECHNICAL INFORMATION:
- These changes reflect change in NYSDOT policy.
  - Cost Impact: There is no appreciable cost impact.
  - BD-ID1: The adjacent prestressed units are now shown as supported on 100 mm thick, rubber-impregnated, cotton-duck bearing pads instead of a concrete bearing pad. An arrangement is shown that details a triangulated layout of the cotton-duck bearing pads. The anchor rod which passed from the prestressed units into the abutment stem has been eliminated.
  - BD-ID2: The temporary steel girder support integral detail is essentially unchanged but the designer notes now state when the detail is to be used. The designer notes now state that this detail shall be used when the skew is less than or equal to 30° or shall also be used when the skew is greater than 30° and the girder depth is less than 1.25 m. An intermediate-type diaphragm is now required along the centerline of bearings in all interior bays of steel integral abutments. The steel integral construction procedure for girders supported on the temporary girder support has been modified. It now has a statement regarding girder erection which states that the girders shall be erected plumb and the diaphragms fabricated for the steel dead load position.
  - BD-ID3: Construction joints have been detailed for an integral abutment with U-walls. Previously, none were shown. The stone fill requirement has been modified. When the integral abutment is over a waterway, the hydraulics engineer shall determine the type of stone fill to be used. Previously, heavy stone fill was specified for all situations.
  - BD-ID4: This is a new sheet that lists a construction procedure and shows integral details for integral abutments with steel girders when the skew is greater than 30° and the girder depths are greater than 1.25 m. In this situation, the steel girders sit on a rubber-impregnated, cotton-duck pad at each support and the majority of the deck is poured and cured before the final backwall/deck pour.
• BD-ID5: This is a new sheet that lists a construction procedure and shows integral details for use with New England Bulb Tees or AASHTO I-beams. Note that the majority of the deck is poured and cured before the final backwall/deck pour. This alleviates any tension crack issues with the beams at the abutments.

• BD-ID6: Prefabricated, composite integral abutment drain is now shown on both the backwall and the stem. The designer notes now require that an intermediate-type diaphragm be installed along the centerline of bearings in each bay.

• BD-ID7: Offsets are now shown in the plan view between reinforcement and the girder flanges.

**TRANSMITTED MATERIALS:** No materials are attached to this issuance. The BD sheets are available at the Department's web site (http://www.dot.state.ny.us/caddinfo/structures/bd.html) and on the IntraDOT.

**BACKGROUND:**

Integral abutments continue to be the preferred type of abutment when conditions permit. Semi-integral abutments should be considered when site conditions do not allow the use of full integral abutments. Consult the Bridge Manual for selection criteria and details associated with integral and semi-integral abutments.

In recent years, the Metals Unit has been directing steel fabricators to fabricate girders and diaphragms for the full dead load condition. This type of fabrication results in the girder ends being built “leaned over” (rotated about the vertical axis) in their erected position when there is a large skew. The girders then rotate to a vertical position when the deck concrete is poured. However, if the steel is encased in the backwall, this movement becomes restricted. In order to alleviate this issue, several details have been modified in the new BD sheets. First, for bridges with skews less than 30º or with skews greater than 30º and girder depths less than 1.25 m, a new requirement has been placed in the construction procedure. This requirement states that in this situation, girders shall be erected plumb (fully vertical) and diaphragms shall be fabricated for the steel dead load position. If the design requires a girder depth greater than 1.25 m and a skew greater than 30º, the details in BD-ID4 shall be used. This alternate detail does not require the girders to be fabricated plumb. Instead, the girders are fabricated in a “leaned over” position and the deck is poured prior to the backwall. This sequence will allow the “tilted” girders to freely rotate into a vertical position. Also note that all steel integral abutments now require full depth intermediate type diaphragms along the centerline of bearings in order to stabilize the girders.

Another new integral abutment detail is shown on BD-ID5 which details construction utilizing New England Bulb-Tee (NEBT) or AASHTO I-beam superstructures. In recent years, NEBTs and AASHTO I-beams have been frequently utilized as an alternate to steel. This necessitated a need for the new integral details. The new details specify a steel inverted K-shape as a diaphragm along the centerline of bearings when the beams are 1.6 m deep or greater or a rolled section when beams are less than 1.6 m deep. Also, the new detail requires that the deck be poured prior to the backwall. Recent experience has indicated that pouring the backwall last will prevent excess negative moments from developing in the ends of the beams.

**CONTACT:** Direct questions regarding this Engineering Bulletin to Jim Flynn of the Structures Design and Construction Division Standards and Policies Unit at 518-485-1148 or via e-mail at jhflynn@dot.state.ny.us.