Cast Bearing Assemblies

The Bridge Office in conjunction with the Metal Casting Industry has developed new curved cast bearing assembly details. These details provide an alternate to the traditional welded curved plate bearing assemblies. These new cast assemblies are to be used with the 12"X24" bearing pads only. A copy of the standard can be downloaded from the bridge web site. Go to http://www.dot.state.mn.us/bridge/ , click on Bridge Cadd Standards, B details (English) and download B317.exe & B318.exe.

Our smallest bearing pad is now 12"x24", the 8"x's and 10"x's should no longer be used unless approved by the State Bridge Engineer. It's our hope that this effort will economize the fabrication process, and enhance product availability during peak times of bridge construction.

This memo serves as authorization to incorporate the new cast bearing assemblies B317 & B318 into future bridge projects that call for a 12"x24" pad only. The designer should check the fit up of the cast assemblies at all bridge seats.

To incorporate the cast bearing assemblies into the PCB bridge plan, the following steps should be taken.

1. Pay item "Bearing Assembly" remains unchanged on the plan. However, we advise that a reference symbol be placed adjacent to pay item "Bearing Assembly". The reference symbol will indicate that payment for curved plate bearing assembly or at the contractor's discretion, curved cast bearing assembly alternate will be made under pay item "Bearing Assembly".

2. The bridge special provisions should include the special provision write up for cast bearing assemblies. All special provisions can be downloaded from the MnDOT Bridge Office web site (see above), click on Bridge Special Provisions, Special Provisions 2000 Edition (Metric-English). The provision for the assemblies is **BS2ME-2402.8**.

3. Insert detail no. B317 (PCB Fixed Curved Cast Bearing Assembly) & B318 (PCB Expansion Curved Cast Bearing Assembly) into plan along with detail no. B310 & B311 (PCB Fixed & Expansion Curved Plate Bearing Assembly).

Integral Abutment Update

ABUTMENT FEATURE	CURRENT Mn/DOT PRACTICE	APPROVED NEW Mn/DOT STANDARD	COMMENTS
MAX. BRIDGE LENGTH	150' (with appr. slab) 200' (without appr. slab)	300'	Current Mn/DOT limits are conservative compared to other DOTs. Positive results have been reported on many longer integral abutment bridges.
MAX. SKEW ANGLE	20°	20°	20° is a commonly used limit for skew angle on integral bridges.
MAX. BEAM DEPTH	48"	NO LIMIT	Limits on wingwall length will control maximum allowable superstructure depth.
WINGWALL CONFIG.	Parallel to the axis of the bridge.	Preferred configuration is parallel to axis of bridge. If required, can be flared to minimize wingwall length.	Flared wingwalls have been successfully used with integral abutments on State Aid bridges. They help to reduce wingwall length, and direct streamflow through the bridge opening.
MAX. WINGWALL LENGTH	8'	12'	Wingwalls longer than 8' have been successfully used with integral abutments on State Aid and Trunk Highway bridges.
PILE TYPE	H-pile or C.I.P. pile	H-pile (150' or longer) H-pile or C.I.P. (150' or less)	With the smaller thermal movements of shorter bridges, flexibility of a C.I.P. pile is adequate. H-piles are required to ensure that the thermal movement of a longer bridge is accommodated.
PILE ORIENTATION	Weak-axis bending.	Weak-axis bending.	Standard detail for integral abutment bridges.
PILE DESIGN	No special analysis of soil-pile system.	No special analysis of soil-pile system.	Limits on bridge length should ensure that pile stresses are within allowable limits.
MIN. PILE PENETRATION (INTO CAP)	None specified.	2'-6"	2'-6" penetration offers sufficient rotational restraint for assumed "fixed-head" condition.
MIN. ABUT. DEPTH (BELOW GRADE)	4'-6"	3'-0"	A shallower pile cap reduces passive pressure in the backfill and assures abutment flexibility. Penetration below the frost line is not critical with a pile-supported abutment.
BACKFILL	No special backfill details.	Perforated drain pipe with a geotextile wrap at the base of the abutment on the rear face.	A new backfill detail is being developed, including provisions for drainage. Our goal is to eventually include a backfill detail with our bridge plans.
APPROACH PANEL DETAILS	Tied to abutment. Shear lugs removed.	Tied to abutment. Shear lugs removed.	Approach panel tied to the abutment by a reinforcing bar through the ledge, not the end of the slab. Our goal is to eventually include approach slab detail in our integral abutment bridge plans.
ABUTMENT DESIGN	No guidelines.	Design horizontal steel for passive pressure; consider the abutment supported at the beam locations. Design for ½ the fixed-end moment.	Research indicates that the longitudinal moment at the abutment/slab connection is about 1/3 of the computed fixed-end moment.