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5.8.6 Approach Slabs

5.8.6.1 General

5.8.6.1.1 Policy overview

Approach slabs are intended to provide a smooth transition between the roadway pavement and the bridge. The approach slab spans the embankment directly behind the abutment which is difficult to compact and therefore prone to settlement. Additionally, the approach slab eases the transition between a rigid abutment with negligible settlement and a well-compacted or even undisturbed embankment which may still experience some degree of global or local settlement. Global settlement refers to consolidation of the natural foundation soils which underlie the embankment. Local settlement is caused by compression of fill materials directly beneath the approach pavement.

Standard approach slab details are maintained by the Design Bureau as part of their standard road plans [DB DM 1E-6 and 7D-1; DB SRP BR series]. In most cases, approach slab details will be included in plan sets as part of the road design sheets. On rare occasions bridge designers may need to modify the approach slab details and include them with the bridge plan sheets. In such cases it is necessary to coordinate with the Design Bureau to ensure the bridge and road plan sheets are compatible with respect to the approach slab details and the bid items for it.

Tabulation 112-6 [DB RDD 112-6] in the road design sheets will designate whether an abutment is fixed or movable. This designation determines the type of approach slab details that apply for a project.

- Stub abutments are fixed abutments. The abutment backwall remains stationary since it is isolated from thermal movements of the bridge superstructure. Approach slab pavement lugs are not required since the approach is kept in place by tying it to the stationary abutment backwall using dowels. Type ‘E’ Joints are used at the interface between the backwall and approach slab.
- Integral and semi-integral abutments are movable abutments. These abutments displace with the superstructure as it expands and contracts due to temperature changes. The approach slab is usually (see next bullet for exceptions) held stationary with pavement lugs while Type ‘BE’ joints are used at the interface between the abutment and approach slab to accommodate the abutment displacement.
- In some cases, approach slabs are also tied to integral and semi-integral abutments using dowels. The three-span standard CCS bridges contained in the J40-25 and J44-~~14~~ 25 standards which are to be used for interstate and primary bridges include integral abutments with tied approaches. In these cases, the approach slab displaces with the abutment and superstructure as it expands and contracts due to temperature changes. Type ‘E’ Joints should be used at the interface between the abutment and approach slab. A sleeper slab is typically placed at the other end of the approach slab with a Type ‘BE’ joint to accommodate the relative displacements between the approach slab and the sleeper slab. Standard road plan BR-205 contains approach slab details that are specific to the J40-25 and J44-~~14~~ 25 standards.

Bridge designers should review the road design sheets to ensure the approach slab details are compatible with the bridge and abutment type (see BDM 1.14.2).

5.8.6.1.2 Design information

The Design Bureau will typically contact the Bridges and Structures Bureau to find out whether an abutment is fixed or movable and what type of approach should be used.

Double reinforced bridge approaches (BR-200s) are used for interstate and primary bridges. A 12-inch approach should be used for new construction. A 10-inch approach should be used only if replacing an existing 10-inch approach. Use of double reinforced bridge approaches is encouraged for secondary road bridges.

Use of single reinforced bridge approaches (BR-100s) should be limited to secondary road bridges. Single reinforced bridge approaches may be used as replacement-in-kind for primary bridges on lower volume roads.

Removal of existing bridge approaches is not incidental to the placement of new bridge approaches. The Design Bureau will calculate and bid the removal quantity as a separate item.

The J40-25 and J44-~~14~~ 25 CCS standard bridges use approach slabs based on standard road plan BR-205. The sleeper slab in BR-205 is added into the quantities for the double reinforced section by the Design Bureau. This is done by adding 8 feet (1.75 feet (width of top portion of sleeper slab) + 6.25 feet (width of portion of sleeper slab under the pavement)) to the double reinforced section to calculate square yards.

For double reinforced approaches on gravel roads for secondary road bridges over the interstate and primary road systems, standard road plan BR-241 is typically used. BR-241 uses a 20 foot long approach to minimize gravel on the bridge and drain water further away from the bridge. BR-241 uses special backfill instead of modified subbase.

5.8.6.1.3 Definitions

Fixed Abutment is a term used by the Design Bureau to refer to stationary abutments (e.g. stub abutments).
Movable Abutment is a term used by the Design Bureau to refer to abutments (e.g integral and semi-integral abutments) which displace longitudinally due to expansion and contraction of the bridge superstructure.
Primary Highway System: "Primary roads" or "primary road system" means those roads and streets both inside and outside the boundaries of municipalities which are under department (defined as state department of transportation) jurisdiction [Iowa Code 306.3.6].
Tied Approaches refer to bridge approaches that are connected to the abutment by dowels. Tied approaches are always used with stub abutments and are sometimes used with integral and semi-integral abutments.

5.8.6.1.4 Abbreviations and notation

CCS, continuous concrete slab
DB DM, Design Bureau Design Manual
DB RDD, Design Bureau Road Design Details
DB SRP, Design Bureau Standard Road Plan

5.8.6.1.5 References

Reserved.