



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 19-03

May 6, 2019

TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/Elizabeth W. Phillips
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SUBJECT: Tooth Joint at Terminal Joints

REVISES: *Indiana Design Manual (IDM) Section 409-2.04(01), Figure 409-2F*
(deleted)

EFFECTIVE: Immediately

IDM Section 409-2.04(01) has been revised to require a steel finger plate joint be designed and detailed for terminal joints on integral and semi-integral structures with an expansion length greater than 500 ft. (to the respective terminal joint). Figure 209-2F, Tooth Joint has been deleted accordingly.

The revised section has been incorporated into the IDM on-line and are included for reference on the following pages.

409-2.04 Design Requirements [Rev. Sep. 2016, May 2019]

409-2.04(01) General Requirements [Rev. Oct. 2012, Apr. 2016, May 2019]

The following requirements must be satisfied.

1. Backfill. Each integral end bent for a beam- or girder-type superstructure should be backfilled with aggregate for end bent backfill. Each end bent for a reinforced concrete slab bridge should be backfilled with removable flowable backfill. The INDOT *Standard Drawings* series E 211-BFIL provides backfill details for both concrete slab, beam, and girder structures.
2. Reinforced Concrete Bridge Approach (RCBA). A reinforced concrete bridge approach is utilized to span over the backfill placed behind a newly constructed end bent or mudwall. The RCBA should be anchored to the end bent with epoxy coated #5 threaded tie bar assemblies, spaced at 2'-0" centers. Two layers of polyethylene sheeting shall be placed between the reinforced-concrete bridge approach and the subgrade. INDOT *Standard Drawings* series E 609-RBCA provides additional details.

Where an expansion joint or mudwall is used, the threaded tie bar anchoring system may not be practical and an alternate connection may be considered.

3. Terminal Joint. A bridge approach joint should be included where the approach pavement is PCCP. For a structure with an expansion length less than 300 ft, a terminal joint of 2 ft width, as shown on the INDOT *Standard Drawings* series E 503-BATJ should be placed at the end of the reinforced concrete bridge approach. An expansion joint should be considered for an integral structure having an expansion length from 300 ft to 500 ft. to the terminal joint. A steel finger plate expansion joint is required for an integral structure with an expansion length greater than 500 ft. to the terminal joint. The expansion joint shall be designed in accordance with the *LRFD*.
4. Wingwalls Configuration. Wingwalls shall extend parallel to the centerline of roadway. This configuration reduces the loads imposed upon the bridge structure due to passive earth pressure from the end-bent backfill. See Figure [409-5A](#) for suggested wingwall dimensioning details. The minimum thickness of a wingwall used with an integral end bent shall be 1 ft. The wingwall length shall not be greater than 10 ft. A longer wingwall will require additional analysis.

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[remaining items are unchanged]