

Memo

Date: 1/30/2019

To: Bridge Design Engineers

From: Arielle Ehrlich 
State Bridge Design Engineer

RE: Memo to Designers #2019-01: Temporary Portable Precast Concrete Barrier on Bridges

Introduction

This guidance supersedes the guidance given in Memo to Designers #2011-03. With the release of this memo, Memo to Designers #2011-03 is officially rescinded.

This memo applies to MnDOT Standard Plate 8337, Temporary Portable Precast Concrete Barrier Type "F". Barrier segments are connected together end-to-end with connection pins and are either anchored or unanchored.

Temporary portable precast concrete barrier can be used to protect vehicles from severe hazards (e.g. - large vertical drop-offs, fixed objects), provide a positive separation between traffic and work zones, or to separate opposing lanes of traffic. The *Temporary Barrier Guidance Manual* (TBGM) has been created to provide requirements for use of temporary barrier on MnDOT projects. The manual can be downloaded at:

<http://www.dot.state.mn.us/trafficeng/workzone/wzmanual.html>

It includes guidance on work zone clear zones, temporary barrier length of need, deflection distance, anchorage types, etc. This Memo to Designers #2019-01 provides guidance specific to temporary barrier located on bridges.

Deflection Distance Requirements

Good barrier performance is dependent on the provision of adequate deflection distance. Deflection distance is defined as the distance the barrier travels laterally during impact. It is dependent on the speed at impact and whether the barrier is anchored or unanchored. For barrier on bridges, the distance from the edge of deck to the edge of the temporary barrier on its non-traffic side must be at least equal to the deflection distance. Refer to the tables in Article 3.4 and notes in Article 3.4.1 of the TBGM for all of the deflection distance requirements for bridges. Note that the deflection distances given in Tables 3-2 and 3-3 are minimum values required for the safety of vehicle occupants. If additional deflection distance is required by the roadway designer, carry that distance across the bridge.

Anchor Requirements

The decision to use anchored or unanchored barrier is dependent on the bridge width and staging requirements. The following anchor requirements must be met when anchoring temporary barrier to a bridge deck (refer to Bridge Details Manual Part I, B920 for additional information and requirements):

- For each barrier segment, install three, 1½” diameter anchor rods (MnDOT Spec. 3385 Type A) on the traffic side only.
- For bridge decks with top mat reinforcement and sound concrete, specify adhesive anchors with 5½” minimum embedment. Specify a maximum hole depth equal to 1½ inches less than the slab depth to help ensure that the bottom of the slab does not spall or fracture during hole drilling.
- For adhesive anchors, specify a minimum characteristic bond strength in uncracked concrete of 1.0 ksi and a proof load of 7.0 kips. See the standard special provision SB2018-2433.8 D for additional testing requirements.
- Utilize through-deck anchoring when any of the following is true:
 - Deck concrete is in poor condition. (Deck concrete is in Condition State 3 or 4 in areas where anchors are to be located.)
 - Deck does not have a top mat of reinforcement.
 - Deck has a bituminous overlay.

The Regional Bridge Construction Engineer will confirm adequacy for installations on existing bridges.

Refer to the notes in Article 3.4.1 of the TBGM for additional anchoring requirements.

Bridge Plan and Special Provision Requirements

For bridges with unanchored temporary barrier, the pay item for temporary portable precast concrete barrier is included in the roadway plan. Coordinate with the roadway designer to confirm that the assumed layout of the temporary barrier on the bridge agrees with the final layout shown in traffic control plans.

For bridges with anchored temporary barrier, the pay item for temporary portable precast concrete barrier is included in the roadway plan, and all work associated with anchorages is incidental to that pay item. In the bridge plan, include standard detail B920 (Bridge Details Manual Part I), which shows anchorage details for the temporary barriers. Also include standard special provision SB2018-2433.8 D in the special provisions for the bridge, which covers: anchorage installation, anchorage testing, anchorage removal, and repair of the bridge deck. Coordinate with roadway designer to confirm that the assumed layout of the temporary barrier on the bridge agrees with the final layout shown in traffic control plans.

Deployment length and anchorage requirements past the ends of the bridge are determined by the roadway designer and shown in the traffic control plans. When temporary or permanent sheet piling (or other type of wall) is included in the bridge plan, alert the roadway designer that there is a vertical drop-off hazard located off the bridge that must be considered when determining the temporary barrier requirements, including the deflection distance (refer to Article 3.4.1 of the TBGM).

For questions about this policy, please contact Dave Dahlberg (dave.dahlberg@state.mn.us or 651-366-4491) or Arielle Ehrlich (arielle.ehrlich@state.mn.us or 651-366-4506).

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