



MINNESOTA DEPARTMENT OF TRANSPORTATION
Engineering Services Division
Technical Memorandum No. 16-01-T-01
February 15, 2016

To: Electronic Distribution Recipients

From: Nancy T. Daubenberger, P.E. *NTD*
Division Director, Engineering Services

Subject: Pavement Edge Treatment – Safety Edge

Expiration and Purpose

This Technical Memorandum extends the expiration date of Technical Memorandum 11-01-T-01 to February 15, 2021 unless superseded prior this date or incorporated into the MnDOT Road Design and/or Standard Plans.

Guidelines

See Attachment: TM 11-01-T-01 Pavement Edge Treatment – Safety Edge.

Questions

Any questions regarding the technical provisions of this Technical Memorandum can be addressed to the following:

- **Bradley Estoche**, State Traffic Safety Engineer, at **(651) 234-7011**

Any questions regarding publication of this Technical Memorandum should be referred to the Design Standards Unit, DesignStandards.DOT@state.mn.us. A link to all active and historical Technical Memoranda can be found at <http://techmemos.dot.state.mn.us/techmemo.aspx>.

To add, remove, or change your name on the Technical Memoranda mailing list, please visit the web page <http://techmemos.dot.state.mn.us/subscribe.aspx>

Attachments:

TM 11-01-T-01 Pavement Edge Treatment – Safety Edge



MINNESOTA DEPARTMENT OF TRANSPORTATION
Engineering Services Division
Technical Memorandum No. 11-01-T-01
January 19, 2011

To: Electronic Distribution Recipients
From: Bernard J. Arseneau, P.E.
Deputy Commissioner/Chief Engineer
Subject: Pavement Edge Treatment – Safety Edge

Expiration

This is a new Technical Memorandum, and will remain in effect until January 19, 2016 unless superseded or incorporated into Mn/DOT Standard Plans or the Mn/DOT Road Design Manual prior to that date.

Implementation

This Technical Memorandum applies to all Mn/DOT projects let on or after July 1, 2011.

The design guidance contained in this Technical Memorandum must be incorporated into the scoping process for all pavement/shoulder project types, including maintenance, preservation, re-construction, and new construction projects. Refer to the Guidelines section below for further clarification.

Local Road authorities are encouraged to adopt these or similar guidelines.

Introduction

This is a new Technical Memorandum outlining the requirements and design details for the implementation of a pavement edge treatment called the Safety Edge.

Lane departures are the most common type of rural fatal and serious injury crash in Minnesota. Effective low cost strategies designed to keep vehicles on the roadway are currently being pursued by various jurisdictions throughout the state and include: the use of rumble strips and stripes, wider pavement markings, chevrons at curves, and the Safety Edge.

The presence of a drop-off at the edge of the paved surface has been directly linked to some types of lane departure crashes. Recent studies have demonstrated a relationship between drop-offs exceeding 2 inches and lane departure crashes. When a driver leaves the pavement surface and tries to steer back onto the roadway, the vertical edge of the drop-off can cause “tire scrubbing” and tends to make the driver over-steer and lose control of the vehicle.

Construction of a Safety Edge at the edge of the paved surface significantly reduces the potential of “tire scrubbing”, minimizing the consequences of drifting off the pavement surface. The additional cost associated with construction of the Safety Edge is considered to be minimal.

Purpose

The purpose of this Technical Memorandum is to incorporate the safety edge as a standard design and construction practice for most bituminous pavement edges six feet in width or narrower as well as to provide guidance and technical information for safety edge construction on both bituminous and concrete pavements.

Guidelines

The safety edge construction is done by shaping the edge of the pavement material with a 30-degree slope during the paving process (measured from the pavement/shoulder cross slope plane). The following Safety Edge criteria shall apply:

1. Safety Edge is required along bituminous pavement edges on projects where all of the following are true:
 - a. New bituminous pavement/shoulder or bituminous overlay is being constructed with at least 2 (two) inches of paving depth.
 - b. Paved shoulders are 6 (six) feet or less in width. (Safety Edge is optional on wider shoulders.)
 - c. Pavement/shoulders do not have curbing.
2. For divided highways, the safety edge must be added to both median and outside bituminous shoulders when the paved shoulder width is 6 feet or narrower and the travel lanes are also bituminous. On concrete divided highways with bituminous shoulders, the median shoulder safety edge will be optional.
3. Safety edge will be optional for concrete shoulders.
4. Safety Edge is required on Maintenance/Repair projects where it has previously been incorporated into the pavement/shoulders.
5. Safety Edge requirements will not apply to preventive maintenance type projects; chip seals, crack sealing, slurry sealing, etc., with less than 2 inches of thickness.
6. The safety edge must be constructed as an integral operation of the roadway pavement placement process.
7. Bituminous pavement safety edges are easily constructed with the use of a manufactured shoe device, which attaches to the screed of the paving machine. The device uses a spring-loaded shoe that constrains the asphalt head, thus increasing the density of the extruded edge profile. The shoe is capable of applying variable pressure to ensure some compaction of the edge during paving operation. Currently, there are at least two manufacturers producing equipment that can create a Safety Edge (listed below). An approved equivalent is permitted.

Transtech Systems, Inc. 1594 State Street Schenectady, NY 12304 1-800-724-6306 518-370-5558 www.transtechsys.com	Advant-Edge Paving Equipment LLC 1197 Hillside Avenue, Suite B47 Niskayuna, NY 12309 518-280-6090 www.advantedgepaving.com
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8. A single-plate strike-off method is not allowed for bituminous paving, as the single-plate strike-off method has been found to produce a non-durable edge.
9. Short sections of handwork are allowed, when necessary, for transitions and turnouts.
10. The installation of the safety edge in limited clear zone areas or in front of guardrails is optional if the designer concludes that it interferes with operational aspects or is too onerous to construct. The decision must be documented in the permanent project file.

11. During construction, a 2-4 inch depth of non-bituminous shoulder material adjacent to the pavement edge may be removed prior to installing the safety edge to allow for a thicker edge section.
12. District Materials input must be solicited on each project where safety edges are to be installed. In certain cases, additional subgrade support may be needed to support the installation of the safety edge.
13. Concrete construction of the safety edge requires adequate base support for the paver track.
14. Labor and/or equipment necessary to construct the Safety Edge will be considered incidental.
15. Material quantity changes need to be computed, noted, and included in the pavement/shoulder quantity tabulations.
16. It is the best practice to pull the adjacent material flush with height of the final pavement surface. The purpose of the Safety Edge in this practice is to provide short-term mitigation to edge drop-offs and a longer window for practical maintenance scheduling. For those jurisdictions that do not typically bring shoulders back up following an overlay, use of the Safety Edge would significantly lower the safety risk.

Additional information about the safety edge is detailed in the FHWA brochure titled "[The Safety Edge](#)" (FHWA Publication Number FHWA-SA-09-023).

Please see the attached figures for further Mn/DOT specific guidance.

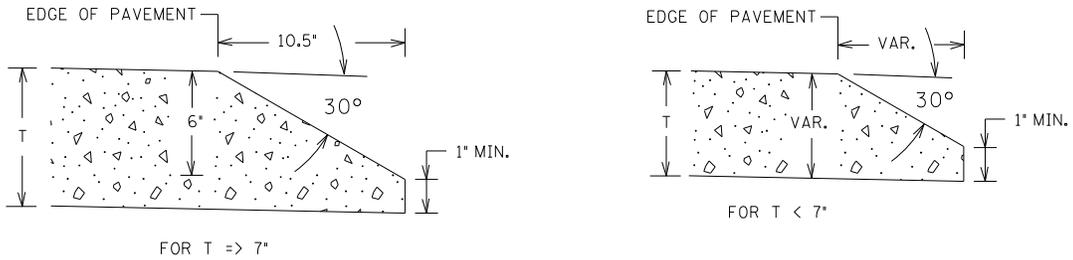
Questions

For information on the technical content of this Technical Memorandum, please contact **Bradley Estochen, State Traffic Safety Engineer, at 651-234-7011.**

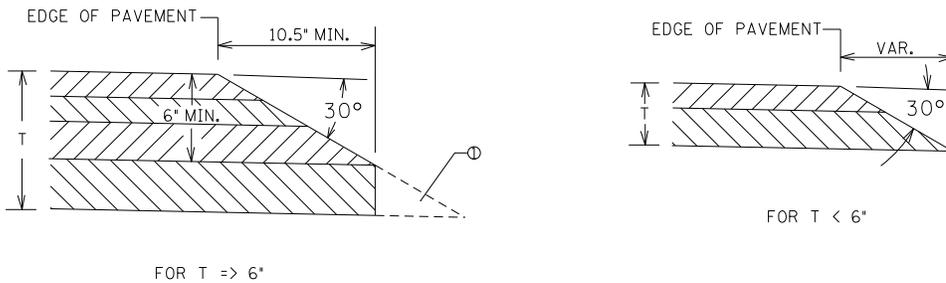
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Attachments: Safety Edge Figures 1 and 2

Technical Memorandum 11-01-T-01
 Pavement Edge – Safety Edge
 January 19, 2011
 Attachment Figure 1



CONCRETE PAVEMENT



BITUMINOUS PAVEMENT

⊕ OPTIONAL DESIGN EXTENDS SAFETY EDGE DEEPER THAN 6" AND WIDER THAN 10.5". SEE PLAN DESIGN DETAILS.

Safety Edge Details
Figure 1.

Technical Memorandum 11-01-T-01
Pavement Edge – Safety Edge
January 19, 2011
Attachment Figure 2

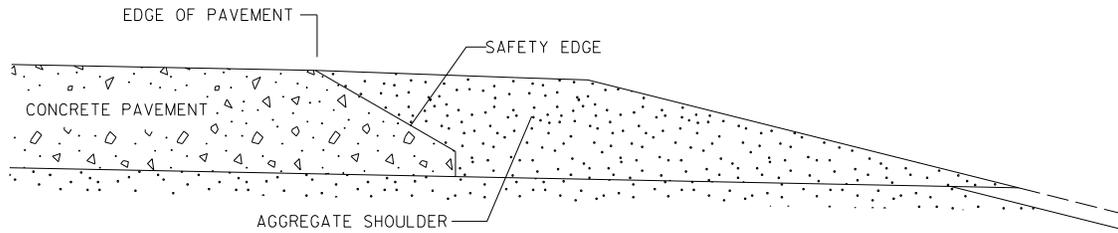


FIGURE A
CONCRETE PAVEMENT

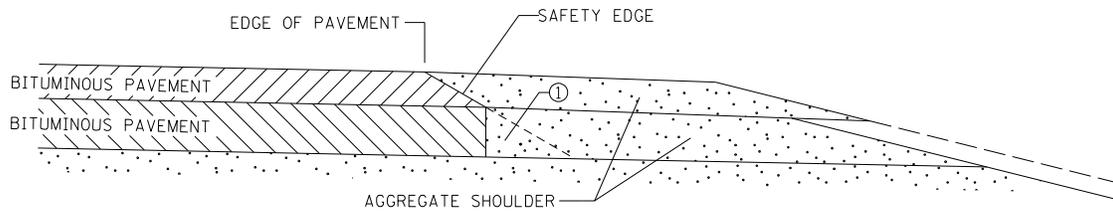


FIGURE B
BITUMINOUS PAVEMENT

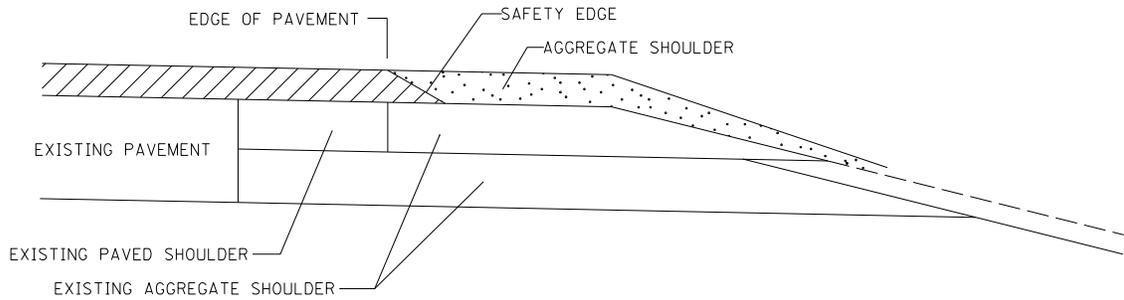


FIGURE C
BITUMINOUS OVERLAY

① OPTIONAL DESIGN EXTENDS SAFETY EDGE DEEPER THAN 6" AND WIDER THAN 10.5". SEE PLAN DESIGN DETAILS.

Safety Edge Construction Details
Figure 2.