



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 08-06 Technical Advisory

April 18, 2008

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

FROM: /s/ Anthony L. Uremovich
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Production Management Division

SUBJECT: Temporary Pavement Markings

REVISES: *Indiana Design Manual Section 83-4.0*

EFFECTIVE: September 4, 2008, Letting

The INDOT *Standard Drawings* and the *MUTCD* provide the Department's criteria for the selection, application, and placement of pavement markings in a construction zone. The INDOT *Standard Specifications* provides additional information on temporary-pavement-marking material usage. *Indiana Design Manual* Chapter Seventy-six should also be reviewed for applicable information. The following provides supplemental guidelines to these sources.

I. Types

A. Paint

Quick-drying traffic paint is a low-cost, temporary pavement marking. To improve reflectivity, glass beads are required. Temporary paint is a non-removable type of temporary pavement marking. The Department does not desire the use of temporary paint markings on a final pavement surface. However, temporary paint may be the most suitable choice under certain conditions, particularly if temporary markings are anticipated to be in place through the winter months.

B. Temporary Raised Pavement Markers

In a high-traffic-volume location, raised temporary pavement markers should be considered as a supplemental device to improve delineation through the construction zone. Typical locations include center line, lane line, gore area, or where there are changes in the alignment (e.g., lane closure, lane shift). For a center line or lane line, temporary raised pavement markers are placed at the mid-point in the each gap, i.e., every 40 ft (12 m). For a taper, gore, etc., the raised markers should be spaced at 20 ft (6 m). Temporary raised pavement markers must be removed prior to the placing of the next pavement course.

C. Temporary Pavement Marking Tape

Temporary pavement marking tape is an excellent material choice where there is a change to the traffic pattern during construction (e.g., crossover switch). Temporary tape can be easily and quickly installed and, if necessary, easily removed. Disadvantages of temporary tape are that it tends to move or break up under heavy traffic volume, and that it is not suitable for usage during the winter months. Temporary pavement marking tape requires significant maintenance in comparison to temporary paint. The following describes the temporary pavement marking tapes used by the Department.

1. Type I. Type I tape may be used as a temporary center line, lane line, or no-passing-zone line that is placed parallel to the normal pavement marking pattern, or as a temporary transverse marking or pavement-message marking. It should also be used where pavement markings are placed at an angle to the normal pavement-marking pattern (e.g., taper for lane closure, lane shift). Type I tape is a removable type of temporary pavement marking.
2. Type II. Type II tape is used on a pavement which is expected to be removed or covered by additional pavement courses. It may be used as a center line, lane line, or edge line that is parallel to the normal pavement markings. It also may be used as a center line or lane line on a resurfacing overlay course. Type II tape is a non-removable type of temporary pavement marking.

D. Thermoplastic or Epoxy Markings

Thermoplastic or epoxy markings are used in a construction zone only if the traffic volume is high, and the temporary traffic pattern will be in place for over one year. Thermoplastic or epoxy markings are non-removable types of pavement markings.

E. Buzz Strips

Buzz strips are used on a high-speed facility of 4 lanes or more in advance of a lane closure, alignment change, or stop condition to warn the motorist of the impending change. They are made with extruded material or repeated passes of pavement-marking tape to reach a ¼-in. (6-mm) height. *Indiana Design Manual* Figure 83-4A illustrates the typical layout for buzz strips with a lane closure. The spacing criteria are also applicable to the other conditions listed above.

II. Application

The application of temporary pavement markings in a construction zone depends on facility type, project duration, project length, and anticipated traffic volume. The phasing of temporary traffic control during construction should be considered. The temporary pavement markings should be selected that are best suited to the anticipated conditions and are most economical for the project. The removal of a removable temporary pavement marking is included in the removable-temporary-pavement-marking quantity. If non-removable markings that must be removed are selected as part of the planned traffic-maintenance plan, a quantity for removal of the non-removable markings is required, as this is a separate pay item. If non-removable temporary pavement markings are necessary on a final surface, placement of the temporary markings should be indicated to be as near as possible to the location of the final permanent pavement markings. The *INDOT Standard Specifications* provide additional criteria for the use of temporary pavement markings in a construction zone.

III. Pay Items and Recurring Special Provision

The pay items and pay units required for this work are unchanged. Recurring Special Provision 801-T-165 is attached hereto. The provision is required through the August 2010, letting, for a contract that includes pay items regarding temporary pavement markings. After that time, the provision will be incorporated into the *INDOT Standard Specifications*.

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801-T-165 TEMPORARY PAVEMENT MARKINGS

(Adopted 7-19-07)

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 25, INSERT AS FOLLOWS:

<i>Temporary Pavement Marking Tape</i>	<i>923.01</i>
<i>Temporary Raised Pavement Markers.....</i>	<i>923.02</i>

SECTION 801, BEGIN LINE 547, DELETE AND INSERT AS FOLLOWS:

801.12 Temporary Pavement Marking

Temporary pavement markings shall be *new materials placed* in accordance with 808.04 and 808.05. However, *when temporary markings are to be in place for 14 calendar days or less* the dashed line pattern used on center line and lane lines may be 4 ft (1.2 m) line segments on 40 ft (12 m) centers; *and gore Gore* areas shall be marked by outline only and may be 5 in. (125 mm) wide lines. *No-passing zones on all undivided two-way roadways shall be identified with signs and centerline markings. However, the dashed line pattern used on center line and lane lines may be 4 ft (1.2 m) line segments on 40 ft (12 m) centers. Gore areas shall be marked by outline only and may be 5 in. (125 mm) wide lines.* All temporary markings shall be maintained and replaced until they are no longer applicable.

~~Temporary markings placed on the final surface course shall be temporary marking tape type 1. Where possible, where non-removable temporary markings are used on a final surface, such markings shall be placed at the same location where permanent markings will later be affixed or parallel to and within 12 in. (300 mm) of the permanent marking pattern.~~

Where temporary pavement markings are to be placed on a pavement which has existing markings, the existing markings which conflict with the temporary markings shall be removed in accordance with 808.10.

When working under traffic, the temporary pavement markings shall be placed before opening the lane to traffic. This shall include, but not be limited to, the marking patterns of gore areas, outside edge line of deceleration and acceleration lanes, narrow bridge markings, lane reduction transitions, lane lines, centerlines, and transverse markings as appropriate.

~~If a pavement course is to be in place for a period greater than 14 calendar days, all temporary pavement markings shall be placed in accordance with 808.04 and stop lines shall be placed in accordance with 808.05. No passing zones on all undivided two-way roadways shall be identified with signs and centerline markings.~~

~~If the temporary~~ Temporary pavement markings which are to be in service from December 1 through the following March 31 shall be painted markings; ~~such~~ Such markings shall be placed in the standard pavement marking pattern and applied prior to the suspension of the work, or within seven work days after the Contractor is directed to place the markings. *Adjustments to these dates to accommodate actual seasonal*

suspension and continuance of work are subject to approval by the Engineer upon written request.

SECTION 801, BEGIN LINE 589, DELETE AND INSERT AS FOLLOWS:

1. Paint

Painted ~~lines markings on new HMA courses~~ shall require a second application of paint *and beads* as soon as practical after the first application is dry.

2. Temporary Pavement Marking Tape

Temporary pavement marking tape shall be applied in accordance with the manufacturer's recommendations. Temporary marking tape shall be new type I or type II material.

All temporary pavement marking tape shall be removed prior to ~~placement of an HMA overlay or final pavement markings~~ *to placing the next pavement course, prior to placing an overlay, prior to recycling the pavement, or prior to placing the final pavement markings, except as otherwise described herein.*

a. Type I

Type I tape is a removable material. It may be used for longitudinal and transverse markings. ~~It shall be used for longitudinal and transverse markings on the final surface.~~

Type I tape shall be removed without the use of solvents, grinding, abrasive blasting, or other methods which may damage the pavement. All visible adhesive residue shall be removed without use of solvents or grinding.

b. Type II

Type II tape is a non-removable material. It may be used on PCCP to be removed or *on PCCP to be overlaid with an HMA course greater than 140 165 lb/sq yd (60 90 kg/m²).* ~~If it is Type II tape placed on HMA pavement, the tape shall be removed prior to the recycling of the HMA material~~ *placing the next pavement course.*

If it is necessary to remove type II tape, it shall be removed without the use of solvents. All damage to the pavement shall be repaired.

3. Temporary Raised Pavement Marker

The temporary raised pavement marker shall be grade 1 or grade 2. When used, it shall be a supplement to other temporary pavement markings. The color of the reflector shall be in accordance with the other temporary pavement marking. The color of the shell of the grade 1 marker shall be in accordance with the color of the other temporary pavement marking.

Temporary raised pavement markers shall be removed before the next layer of pavement is placed and before the final pavement markings are applied. All damage to the pavement shall be repaired.

4. Temporary Buzz Strips

Temporary buzz strips shall be a set of transverse markings *constructed of removable or durable marking material*. Durable marking material shall be used in accordance with 808.07(b). ~~Temporary buzz strips shall be removed in accordance with 808.10 when no longer required or as directed.~~

SECTION 801, BEGIN LINE 860, INSERT AS FOLLOWS:

with 621.13. Removal and subsequent replacement of permanent pavement markings and snowplowable raised pavement markers *for temporary crossovers* will be measured in accordance with 808.12. Removal and resetting of guardrail, if required for temporary crossovers, will be measured in accordance with 601.13.

SECTION 801, BEGIN LINE 872, INSERT AS FOLLOWS:

Temporary *pavement message markings* will be measured by the number of each type placed. Longitudinal and transverse temporary pavement markings will be measured by the linear foot (meter) of material actually placed. Temporary buzz strips will be measured by the linear foot (meter) for each 8 in. (200 mm) strip placed, without regard to the number of passes required to attain the specified height.

Removal, when necessary, of any type of non-removable temporary pavement markings will be measured in accordance with 808.12. Removal of removable temporary pavement markings will not be measured for payment.

Where temporary pavement markings are to be placed on a pavement which has existing markings, removal of existing markings which conflict with the temporary markings will be measured in accordance with 808.12.

~~If, due to a Department initiated change or an approved expedited construction schedule, it is necessary to remove temporary non removable pavement markings, such removal will be measured in accordance with 808.12. The removal of existing pavement markings which are in conflict with temporary markings, will be measured in accordance with 808.11.~~

The removal and replacement of *prismatic* reflectors on existing snowplowable raised pavement markers will be measured in accordance with 808.12.

SECTION 801, BEGIN LINE 896, INSERT AS FOLLOWS:

801.18 Basis of Payment

The accepted quantities of construction signs, detour route marker assemblies, detour route marker assemblies-multiple routes, temporary worksite speed limit sign assemblies, road closure sign assemblies, *permanent road closure sign assemblies* and temporary raised pavement markers will be paid for at the contract unit price per each. Payment for temporary worksite speed limit assemblies and temporary changeable message signs will be made for the maximum number of such assemblies in place at any one time during the life of the contract. Type III-A, type III-B, and permanent type III barricades will be paid for at the contract unit price per linear foot (meter).

SECTION 801, BEGIN LINE 933, INSERT AS FOLLOWS:

Removal and subsequent replacement of permanent pavement markings and snowplowable raised pavement markers *for temporary crossovers* will be paid for in accordance with 808.13. Removal and resetting of guardrail, if required for temporary crossovers, will be paid for in accordance with 601.14.

SECTION 801, BEGIN LINE 950, DELETE AND INSERT AS FOLLOWS:

Temporary pavement message markings placed will be paid for at the contract unit price per each, for the message specified. Longitudinal and transverse temporary ~~Temporary~~ pavement markings and temporary buzz strips, will be paid for at the contract unit price per linear foot (meter) of material, complete in place, ~~except as set out below.~~

Removal, when necessary, of non-removable temporary pavement lines and message markings will be paid for in accordance with 808.13. The cost of removal of removable temporary pavement markings shall be included in the cost of the pay item for placement of the markings.

Where temporary pavement markings are to be placed on a pavement which has existing markings, removal of the existing markings which conflict with the temporary markings will be paid for in accordance with 808.13.

Permanent tubular markers *and permanent drums* will be paid for at the contract unit price per each.

~~The removal of temporary non-removable pavement markings caused by a Department initiated change or an approved expedited construction schedule, and the removal of existing pavement markings which are in conflict with temporary markings will be paid for in accordance with 808.13.~~

SECTION 801, BEGIN LINE 1056, INSERT AS FOLLOWS:

The cost of furnishing, installing, maintaining, and subsequent removal *of temporary raised pavement marker* shall be included in the cost of temporary raised pavement marker.

The cost of placement, maintenance and replacement of temporary pavement markings shall be included in the cost of the markings.

SECTION 801, BEGIN LINE 1071, DELETE AND INSERT AS FOLLOWS:

The cost of the second application of *paint and beads for painted* temporary markings ~~painted lines on new HMA courses~~ shall be included in the cost of *the first application of painted* temporary pavement markings.

SECTION 801, BEGIN LINE 1103, DELETE AS FOLLOWS:

The cost of necessary flaggers; protection of traffic at structure foundations; and furnishing, erecting, placing, maintaining, relocating, and removing lights, cones, flexible channelizers, tubular markers, drums, delineators, ~~temporary pavement markings~~, or other devices as directed shall be included in the cost of maintaining traffic.

SECTION 808, BEGIN LINE 348, DELETE AS FOLLOWS:

~~On Federal aid contracts, the 180 day warranty shall apply only to thermoplastic pavement marking material.~~

SECTION 808, BEGIN LINE 351, DELETE AND INSERT AS FOLLOWS:

808.10 Removal of Pavement Markings

Pavement markings which conflict with revised traffic patterns and may confuse motorists shall be removed immediately before, or immediately following, any change in traffic patterns as directed or approved.

Removal of pavement markings shall be to the fullest extent possible without materially damaging the pavement surface. Pavement marking removal methods shall be sandblasting, steel shot blasting, waterblasting, grinding or other approved mechanical means. Grooving will not be permitted. Grinding will only be permitted ~~when removing thermoplastic or epoxy pavement markings.~~ *under the following conditions:*

- (a) when removing durable pavement markings, or*
- (b) when removing non-durable markings where another course of material is to be placed on the existing course.*

Painting over existing pavement markings to obliterate them will not be permitted.

SECTION 808, BEGIN LINE 544, INSERT AS FOLLOWS:

No additional payment will be made for the second application of traffic paint and glass beads as required in 808.07(a)1.

No additional payment will be made for the replacement of markings that fail to meet the warranty conditions of 808.09.
