Pavement Edge Drop-Offs: Treatments for Overlays in Work Zones

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Outline

- Background
- Edge Drop-off Guidance
- Construction
- Project Examples
Work Zone Safety – HMA Overlays
Worksheet for Edge Condition Treatment Types

DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

**Edge Condition I**
- Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet
- 

**Edge Condition II**
- 

**Edge Condition III**
- 

**Figure 1-14 Conditions Indicating Use of Positive Barrier for Zone S**

**Factors Considered in the Guidelines**
1. The Edge Condition is the slope (S) of the drop-off.
2. Distance Y is the vertical clearance from the edge of the road to the edge of the drop-off.
3. In practice, the factors considered in this guideline are given a 60% weight in the design of a construction zone.
4. The construction zone edge or work zones should be delayed to the point where the use is limited to a work zone.
5. Edge Condition I is the slope (S) of the drop-off.
6. Edge Condition II is the slope (S) of the drop-off.
7. Edge Condition III is the slope (S) of the drop-off.

**Edge Condition Notes**
1. Edge Condition I: When vehicles are able to traverse on edge condition with a slope of (1:1) or flatter, the slope must be designed to a minimum of (3:1) or flatter.
2. Edge Condition II: When vehicles are able to traverse on edge condition with a slope of (1:1) or flatter, the slope must be designed to a minimum of (3:1) or flatter.
3. Edge Condition III: When vehicles are able to traverse on edge condition with a slope of (1:1) or flatter, the slope must be designed to a minimum of (3:1) or flatter.

**Engineer's Seal**

These guidelines apply to temporary traffic control areas or work zones near continuous pavement edges or changes in the alignment of the roadway, where temporary pavement edges may be used by motorists. The edge conditions may be present between shoulders and intersect lines, between adjacent or opposing traffic lanes, or in immediate adjacent or opposing traffic lanes. These guidelines do not constitute a complete set of guidelines, and they are intended to be used in conjunction with engineering judgment. These guidelines may be updated on the design criteria on the manuals.
## Table 10

**Compacted Lift Thickness and Required Core Height**

<table>
<thead>
<tr>
<th>Mixture Type</th>
<th><strong>Compacted Lift Thickness</strong></th>
<th><strong>Minimum (in.)</strong></th>
<th><strong>Maximum (in.)</strong></th>
<th><strong>Minimum Untrimmed Core Height 9in.) Eligible for Testing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>2.5</td>
<td>5</td>
<td>1.75</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>2</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>1.5</td>
<td>3</td>
<td>1.25</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>1.25</td>
<td>2.5</td>
<td>1.25</td>
</tr>
</tbody>
</table>
Edge Condition with Notched Wedge Joint

Notched Wedge Joint
HMA Overlay
Typically in Condition 2

Edge Condition I
\[ S = (3:1) \] (or flatter)

Edge Condition II
\[ S = ((2.99):1) \] to \((1:1)\)
Treatment Type Guidelines

<table>
<thead>
<tr>
<th>Zone</th>
<th>Treatment Types Guidelines</th>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>No treatment.</td>
<td>Notched Wedge Joint</td>
</tr>
<tr>
<td>2</td>
<td>CW 8-11 &quot;Uneven Lanes&quot; signs.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CW 8-9a &quot;Shoulder Drop-Off&quot; or CW 8-11 signs plus vertical panels.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.</td>
<td>Vertical Joint</td>
</tr>
<tr>
<td>5</td>
<td>Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.</td>
<td></td>
</tr>
</tbody>
</table>
Typical Edge condition
Vertical Longitudinal Joint

Vertical Joint
HMA Overlay
Typically in Condition
③ or ④

Edge Condition II
$S = ((2 : 99) : 1)$ to $(1 : 1)$

Edge Condition III
$S$ is steeper than $(1 : 1)$
Work Zone

Buffer/Barrier Required

Notched Wedge Joint

No Treatment or Uneven Lane Sign
LONGITUDINAL JOINTS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREEDE. TACK COAT SHALL BE APPLIED TO THE IN-PLACE TAPER BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED. COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED AS NEAR TO FINAL DENSITY AS POSSIBLE.

NOTCH DEPTHS ARE APPROXIMATE AND MAY BE ADJUSTED WHEN APPROVED BY THE ENGINEER, HOWEVER THE NOTCH DEPTH SHALL NOT EXCEED 2 INCHES.

NOTCH DEPTH = largest aggregate in mix
Example Notched Wedge Joint Maker

Vertical Joint Density Comparison

<table>
<thead>
<tr>
<th>COUNTRY/STATE</th>
<th>PAVING CONTRACTOR</th>
<th>PAVEMENT TYPE</th>
<th>AVERAGE DENSITY</th>
<th>DIFFERENCE</th>
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<td></td>
<td>MAT</td>
<td>JOINT</td>
</tr>
<tr>
<td>Maine</td>
<td>Lane Construction</td>
<td>Highway</td>
<td>92.0%</td>
<td>93.8%</td>
</tr>
<tr>
<td>Indiana</td>
<td>Milestone Contractors</td>
<td>Highway</td>
<td>94.1%</td>
<td>94.1%</td>
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<tr>
<td>Manitoba, CAN.</td>
<td>Nelson River Contraction</td>
<td>Highway</td>
<td>94.8%</td>
<td>94.1%</td>
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<tr>
<td>Pennsylvania</td>
<td>Quaker Sales Corp.</td>
<td>Airport</td>
<td>97.4%</td>
<td>96.6%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>McMinn’s Asphalt</td>
<td>Highway</td>
<td>94.0%</td>
<td>93.0%</td>
</tr>
<tr>
<td>Florida</td>
<td>Better Roads, Inc.</td>
<td>Airport</td>
<td>98.1%</td>
<td>96.9%</td>
</tr>
<tr>
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<td>Milestone Contractors</td>
<td>Airport</td>
<td>97.6%</td>
<td>96.4%</td>
</tr>
<tr>
<td>Indiana</td>
<td>Milestone Contractors</td>
<td>Airport</td>
<td>97.4%</td>
<td>95.8%</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>Betteroads Inc.</td>
<td>Airport</td>
<td>100.0%</td>
<td>98.3%</td>
</tr>
<tr>
<td>New York</td>
<td>Janik Paving &amp; Construction</td>
<td>Airport</td>
<td>99.2%</td>
<td>97.3%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>TL. James and Company</td>
<td>Airport</td>
<td>99.3%</td>
<td>97.0%</td>
</tr>
</tbody>
</table>
Example attachment
Equipment
Notched Wedge Joint
SH 30 - Brazos County

Constructed with Notched Wedge Joint in 2002
Questions