# New Terminal Joint Details

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## Introduction

Education:

Southern Illinois University – BS, MS

Bridge Design Experience:

2000 to 2015 – Provided bridge design and construction engineering consulting services

Asset Management Experience:

2015 to 2018 – INDOT Greenfield District Bridge Asset Engineer / Asset Manager

Standards and Policy Experience:

2018 to 2020 – INDOT Standards and Policy

Current Role:

INDOT Bridge Engineering – Design Manager

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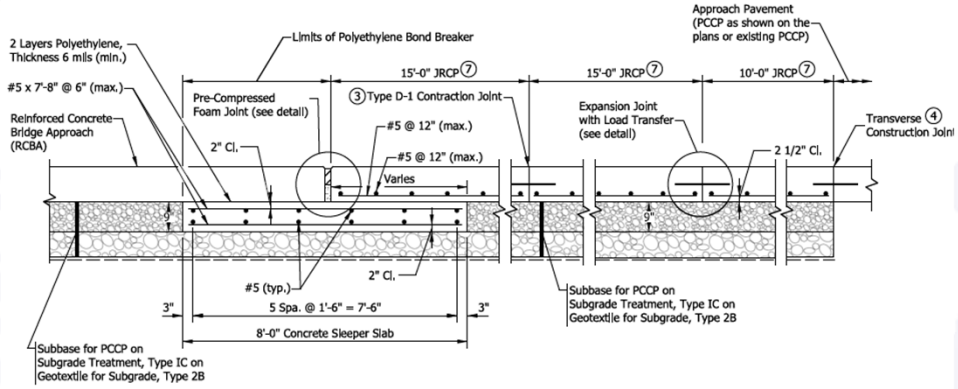
# Background

- New terminal joint details were introduced in September 2019 with Design Memo 19-10, RSP 503-R-692, and RPD 503-R-692d (now E 503-BATJ series)
- INDOT has received some questions since introduction, and we'll address some of the main questions in this presentation

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# Why did we need new details?

- The previous detail for PCCP used 2 ft of asphalt to accommodate thermal movements of integral and semi-integral end bents, which hasn't performed well.
- The previous detail required significant maintenance efforts

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# Why did we need new details?

- No previous detail for HMA pavement adjacent to bridge approach slabs with integral or semi-integral end bents
- Distress to HMA is common at these locations

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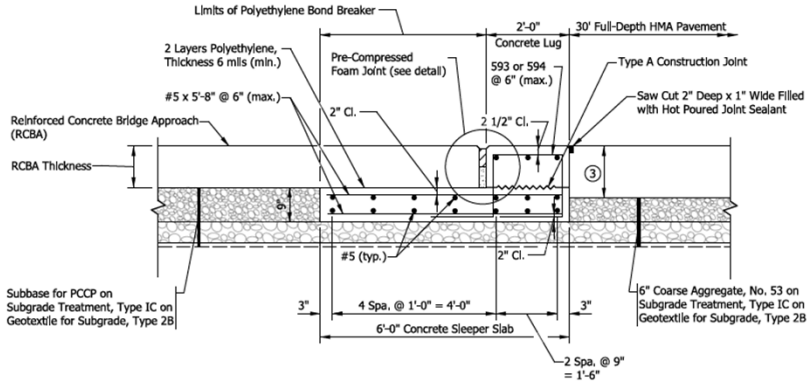
# When did the new details become effective?

- Design Memo 19-10 required the new details be implemented for lettings on or after 3/1/20 for projects that include a terminal joint
- In general, if the scope includes RCBA replacement the new details should be implemented

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# Where are terminal joints required?

- Only required for integral or semi-integral bridges
- HMA pavement, when expansion length > 50 ft for steel superstructures or > 100 ft for concrete superstructures
- For PCCP pavement, required for all expansion lengths
- Standard Drawings don't apply to CRCP pavement or expansion lengths greater than 400 ft

| The Bridge has an... | Approach Pavement is... | Terminal Joint Requirement |
|---|---|---|
| integral or semi integral end bent AND expansion ≤ 1/4 in. * <br> * *≤ 1/4 in. expansion approximately equates to an expansion length ≤ 100 ft for concrete and ≤ 50 ft for steel.* | HMA | Not Required |
| | PCCP | Terminal Joint, Type PCCP |
| integral or semi integral end bent AND has an expansion length > 100 ft ≤ 400. (concrete) or expansion length > 50 ft ≤ 400. (steel) | HMA | Terminal Joint, Type HMA |
| | PCCP | Terminal Joint, Type PCCP |
| integral or semi integral end bent AND has an expansion length > 400 ft. | HMA or PCCP | Special Detail Required |
| integral or semi integral end bent AND any expansion length | CRCP or HMA over CRCP | Special Detail Required |

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# How to incorporate into contracts?

- Standard Drawings became effective September 1, 2020
- Recurring Special Provision 503-R-692 is required until the 2022 Standard Specifications become effective on or after September 1, 2021

| | | |
|---|---|---|
| E 503-BATJ | Terminal Joint | 09/01/20 |
| E 503-BATJ-01 | Terminal Joint Index and General Notes (**rev. 09/01/20**) | Revision Notes |
| E 503-BATJ-02 | Terminal Joint, Type PCCP (**new 09/01/20**) | |
| E 503-BATJ-03 | Terminal Joint, Type HMA (**new 09/01/20**) | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 503-R-516d | **PCCP Stitching Plan Details** | R | 09-01-13 | 09-01-13 | As determined necessary by the Pavement Engineering Section. Must be included with **RSP 503-R-516.** |
| | | 503-R-692 | **Joints** | R | 11-19-20 | 06-01-21 | Required for all contracts with any **503** pay items. |
| | | 504-R-714 | **PCCP Finishing and Curing** | A | 02-20-20 | 09-01-20 | Required for all contracts with any **501, 502, 506, 604,** or **706** pay items. |

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# Common Questions

- What if pavement design recommendations contradict the IDM?
  - If existing pavement is CRCP or HMA on CRCP, defer to the pavement design recommendations
  - If the IDM covers the situation, defer to the IDM. Terminal joint determinations were previously part of the pavement design process, but that no longer applies

| The Bridge has an... | Approach Pavement is... | Terminal Joint Requirement |
|---|---|---|
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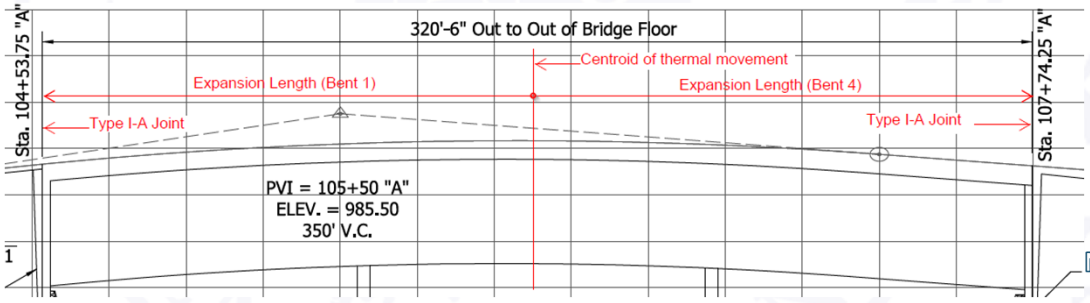
# Common Questions

- How is expansion length measured?
  - This is the distance from the center of thermal movement to the Type I-A joint

The application of the terminal joint details as follows. The approach pavement is based on pavement visible on the surface, except HMA over CRCP. The expansion length is measured from the centroid of thermal movement to the Type I-A joint between the bridge deck and RCBA.

(IDM 409-2.04(01)

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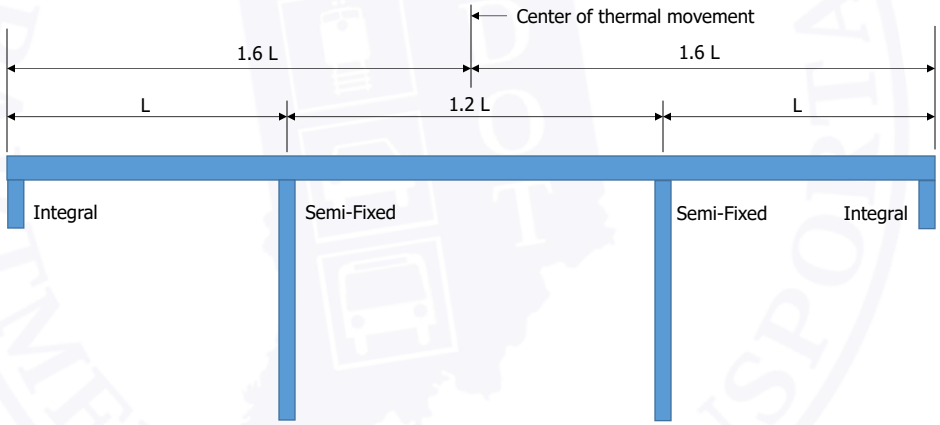
# Common Questions

- How is expansion length measured?
  - Simple span bridges or multi-span bridges with symmetric interior support fixities and stiffnesses will have the center of thermal movement at the midpoint of the bridge length

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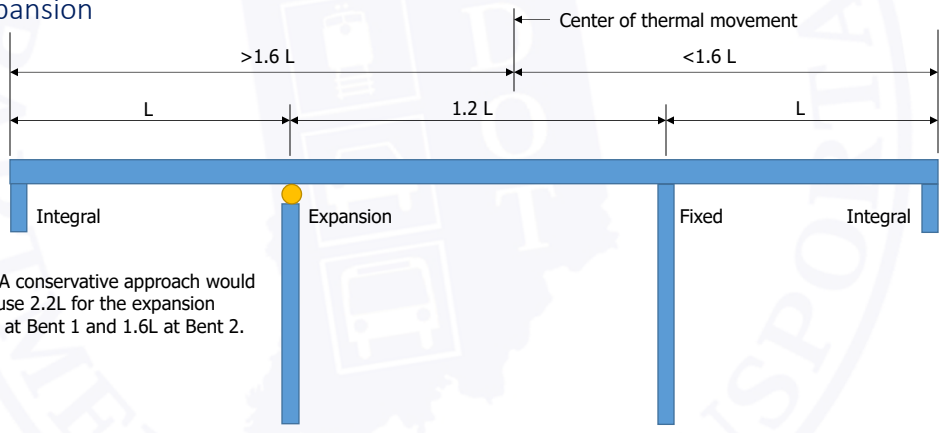
# Common Questions

- How is expansion length measured?
  - Multi-span bridges with nonsymmetric interior support fixities or significant variations in pier stiffness will require a project-specific calculation for the centroid of thermal expansion




Note: A conservative approach would be to use 2.2L for the expansion length at Bent 1 and 1.6L at Bent 2.

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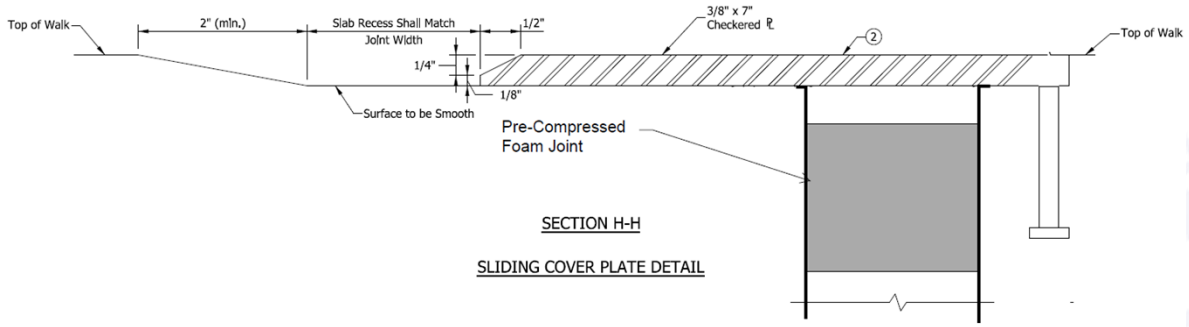
# Common Questions

- What if the bridge includes sidewalks?
  - Details will need to be provided on the plans
  - The pre-compressed foam joint should extend up the curb and across the sidewalk, but a sliding plate will also be required for ADA requirements

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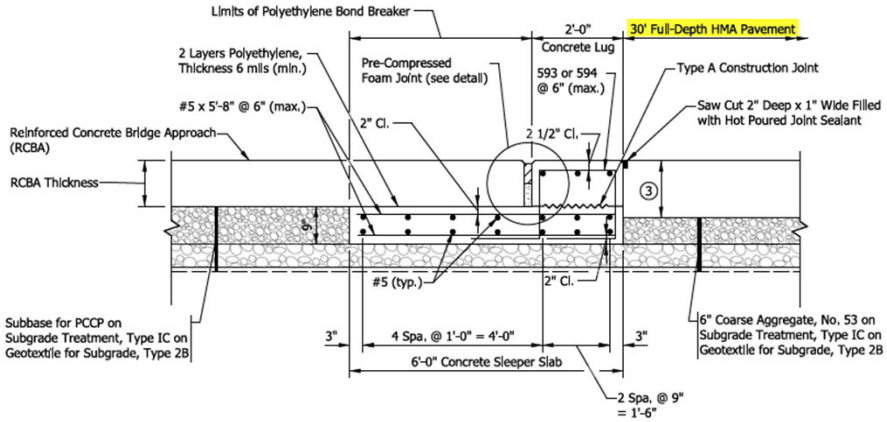
# Common Questions

- Why does 30 ft of HMA need to be replaced adjacent to the terminal joint?
  - Some amount of existing pavement needs to be replaced for construction of the new joint
  - 30 ft provides sufficient room for large compaction equipment, which is critical for the long-term performance of the pavement

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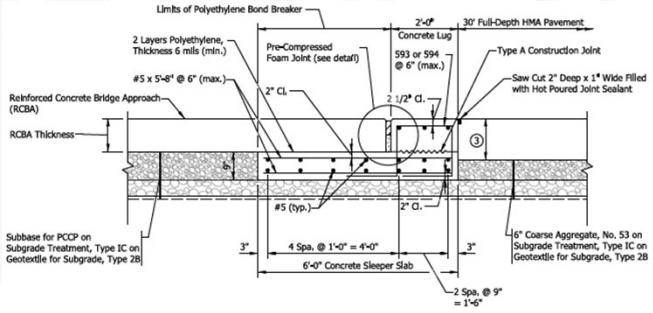
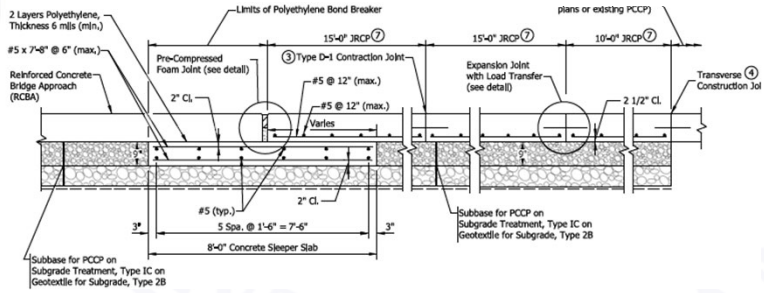
# Questions?

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