2010 INDOT Structures Conference

REINFORCED CONCRETE SLAB BRIDGES

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REINFORCED CONCRETE SLAB BRIDGES

- Best Locations for Use
  - Short Spans (less than 50')
  - Where shallow structure depths are required
  - When roadway overtopping is required
  - Horizontal Curves
  - Unique Geometric Considerations

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Span Configurations
  - Slab Thickness
  - Concrete Strength
  - Haunched Slabs
  - Skew
  - Edge Beams
  - Post Tensioning
  - Constructability

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Span Configurations
    - Ratio interior to end span 1.25 – 1.33
    - Can be designer driven by unique site requirements

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Slab Thickness
    - Simple Spans – 1.2(S+10)/30
    - Continuous Spans – (S+10)/30

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Concrete Strength
    - Typically Class C

REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Haunched Slabs
    - Straight haunches preferred in lieu of parabolic
    - Depth at pier should be 2 – 2.5 the thickness in the span
    - Length should be limited to 0.25L for straight haunches, 0.3L for parabolic haunches, & 0.2L for drop panel haunches.
    - Parabolic may be considered if aesthetic requirements warrant their use.

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Skew
    - Reinforcing Steel
      - Less than 45 degrees – placed parallel to skew
      - Greater than 45 degrees – placed perpendicular to longitudinal reinforcement.

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Edge Beams
    - Discontinuous slab edges must be strengthened
    - **Required by the IDM**
    - Structurally-continuous barriers may only be considered effective for the service limit state, and not the strength or extreme-event limit state.

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Post Tensioning
    - Can be used to extend span ranges for RC Slabs
    - Can be used to eliminate the need for haunched sections
    - Can be used to reduce the required reinforcing steel

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REINFORCED CONCRETE SLAB BRIDGES

- Design Considerations
  - Constructability
    - The maximum reinforcing-bar size should be #11.
    - The minimum spacing of reinforcing bars should preferably be 6 in.
    - Longitudinal steel should be detailed in a 2-bar alternating pattern, with one of the bars continuous through the slab. The maximum size difference should be two standard bar sizes.

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REINFORCED CONCRETE SLAB BRIDGES

- Design Manual Revisions Proposed
  - Provide Department specific guidance for AASHTO code
  - Provide Department preferred details

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