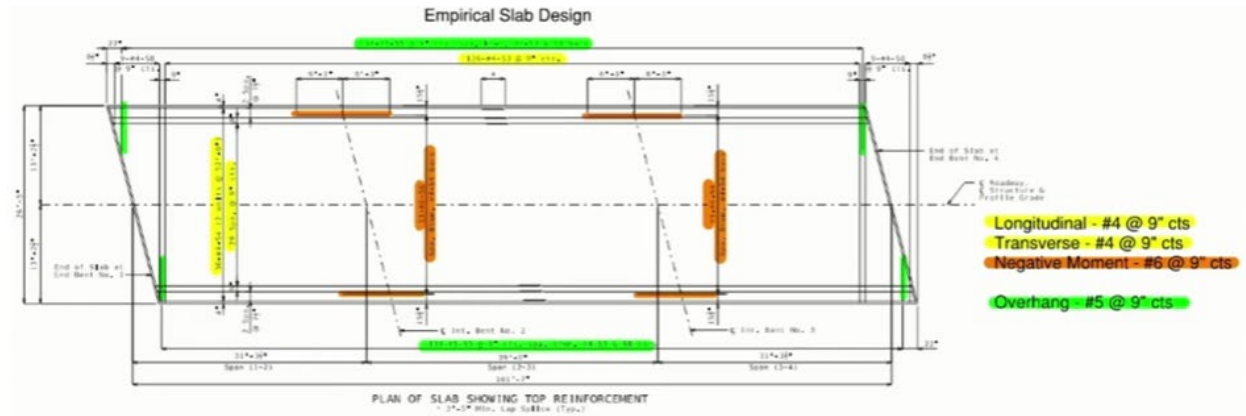


## Projects

**April 2025**

Prepared by Transportation Planning  
Missouri Department of Transportation

## Empirical Slab Design



### Description and Benefit

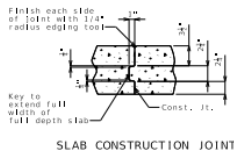
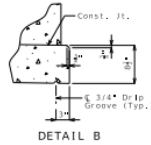
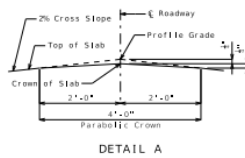
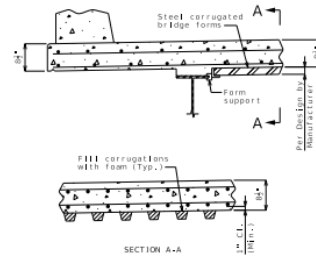
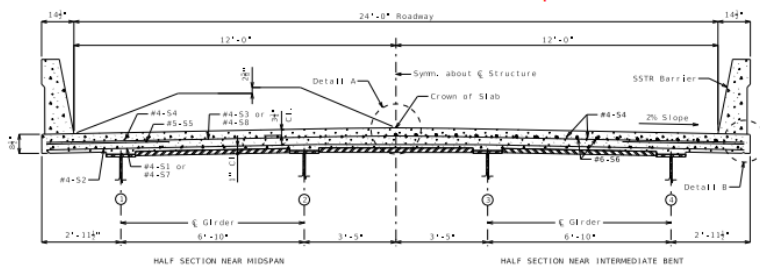
The empirical slab design is an AASHTO-LRFD specification that reduces the amount of reinforcing steel in bridge decks. Laboratory testing revealed that deck loads are transferred mostly through arching action in the deck and not shears and moments as traditionally designed. Once geometric specifications for the deck are met, a specified reinforcement ratio is used to determine the amount of longitudinal and transverse steel. No other design calculations are required for the interior of the deck. Additional transverse bars are placed in the overhang to support the barrier sitting on the cantilevered edge of the deck. Because of the size of MoDOT's standard bridge barrier compared to this slab design, a Texas DOT barrier that is smaller and lighter than MoDOT's type D barrier but has the same AASHTO test level can be used. The TxDOT barrier is 36 inches tall, TL-4 rated, and 1.5 inches narrower than MoDOT's Type D or Type H barrier. The empirical slab design and TxDOT SSTR barrier combination is being used on 19 bridge replacements in the Northwest Bridge Bundle Design-Build Project. All completed, empirical slab design bridges will be 180 feet or less and 18 of them will be three spans or less. The AADT of each roadway is less than 600.

### For More Information Contact

Northwest District – Maintenance

Michael Marriott at [Michael.Marriott@modot.mo.gov](mailto:Michael.Marriott@modot.mo.gov) or 816-262-1797.

## Empirical Slab Details



### Stay-in-Place Forms

Corrugated steel forms, supports, closure elements and accessories shall be in accordance with grade requirement and casting designation G355 of ASTM A653. Complete shop drawings of the permanent steel deck forms shall be required in accordance with Sec. 1080.

Corrugations of stay-in-place forms shall be filled with an expanded polystyrene material. The polystyrene material shall be placed in the forms with an adhesive in accordance with the manufacturer's recommendations.

Form sheets shall not rest directly on the top of beam flanges. Sheets shall be securely fastened to form supports with a minimum bearing length of one inch on each end. Form supports shall be placed in direct contact with the flange. Drilling holes in the beam flanges shall not be permitted. All steel fabrication and construction shall be in accordance with Sec. 1080 and 712. Certified field welders will not be required for welding of the form supports.

The design of stay-in-place corrugated steel forms is per manufacturer which shall be in accordance with Sec. 703 for false work and forms. Maximum actual weight of corrugated steel forms allowed shall be 4 psf assumed for beam loading.

The contractor shall provide a method of preventing the direct contact of the stay-in-place forms and connection components with uncoated weathering steel members that is approved by the engineer.

### Notes:

For reinforcement of barrier not shown, see Sheet No. 17.  
For shifting (or addition) of top longitudinal bars to tie #5-R1 bars in barrier, see Sheet No. 17.

For Theoretical Bottom of Slab Elevations and Theoretical Slab Haunching Diagram, see Sheet No. 14.  
For Plan of Slab Showing Reinforcement, see Sheet No. 16.

The contractor shall pour and satisfactorily finish the slab upgrade from end to end at not less than 25 cubic yards per hour. Retarder, if used, shall be an approved type and retard the set of concrete to 2.5 hours.

Alternate pour sequences may be submitted to the engineer for approval. Keyed Construction Joints shall be provided between pours.

Bridge deck may be finished with a vibratory screed.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders and remove the bracing after construction of the concrete slab and remove the bracing after the slab has reached 75% design strength. Contractor shall not weld on or drill holes in beams without Engineer's written approval.

## SLAB DETAILS

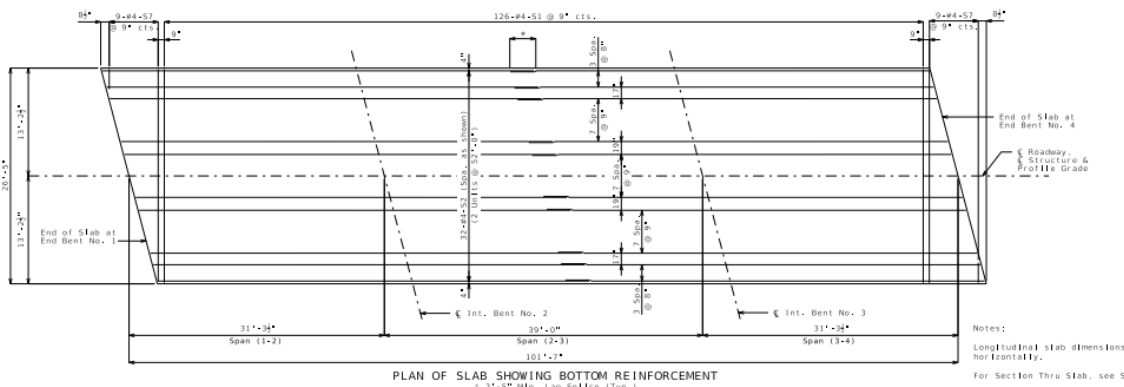
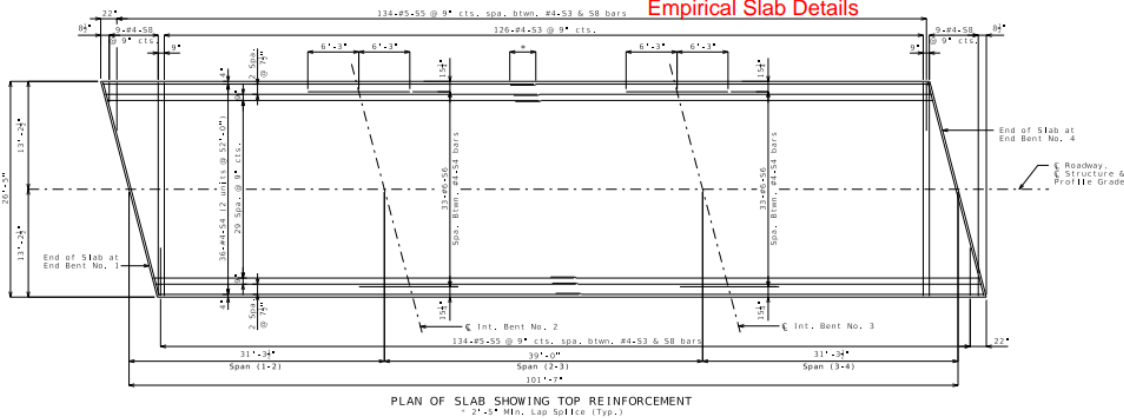
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 15 of 22

...IB\_A9510\_015\_INW0026\_Slab Section.dgn 10/10/2024

|               |            |
|---------------|------------|
|               |            |
| DATE          | 10/10/2024 |
| DATE REVISION | 10/10/2024 |
| DESIGN        | J MO       |
| CHECKED       | BR 15      |
| PROJECT       | CARROLL    |
| PROJECT NO.   | INW0026    |
| CONTRACT NO.  | 2335400    |
| SECTION       | A9510      |
|               |            |
|               |            |

## Empirical Slab Details



## SLAB DETAILS

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 16 of 22

...IB\_A9510\_016\_INW0026\_Slab Plans.dgn 10/10/2024

|               |            |
|---------------|------------|
|               |            |
| DATE          | 10/10/2024 |
| DATE REVISION | 10/10/2024 |
| DESIGN        | J MO       |
| CHECKED       | BR 16      |
| PROJECT       | CARROLL    |
| PROJECT NO.   | INW0026    |
| CONTRACT NO.  | 2335400    |
| SECTION       | A9510      |
|               |            |
|               |            |