# SCDOT S-90 PROJECT UPDATE

# DECK TEE BRIDGE GIRDERS FOR ACCELERATED CONSTRUCTION

**Department of Civil and Environmental Engineering**
**University of South Carolina**

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# Introduction

## Objectives

- Investigate feasibility of deck bulb tee girders for rapid bridge construction
- Design and test longitudinal joint between girders
- Perform optimization study
- Evaluate performance of the prototype bridge

## Selected Literature

- French, et al., (2011) "Cast in Place Concrete Connections for Precast Deck Systems" – University of Minnesota & University of Tennessee
- Gergely, et al., (2011) "Evaluation of Design and Construction of HPC Deck Girder Bridge in Stanly County, North Carolina – UNC Charlotte
- Oesterle, et al., (2009) "Design and Construction Guidelines for Long-Span Decked Precast, Prestressed Concrete Girder Bridges", UT Knoxville and others

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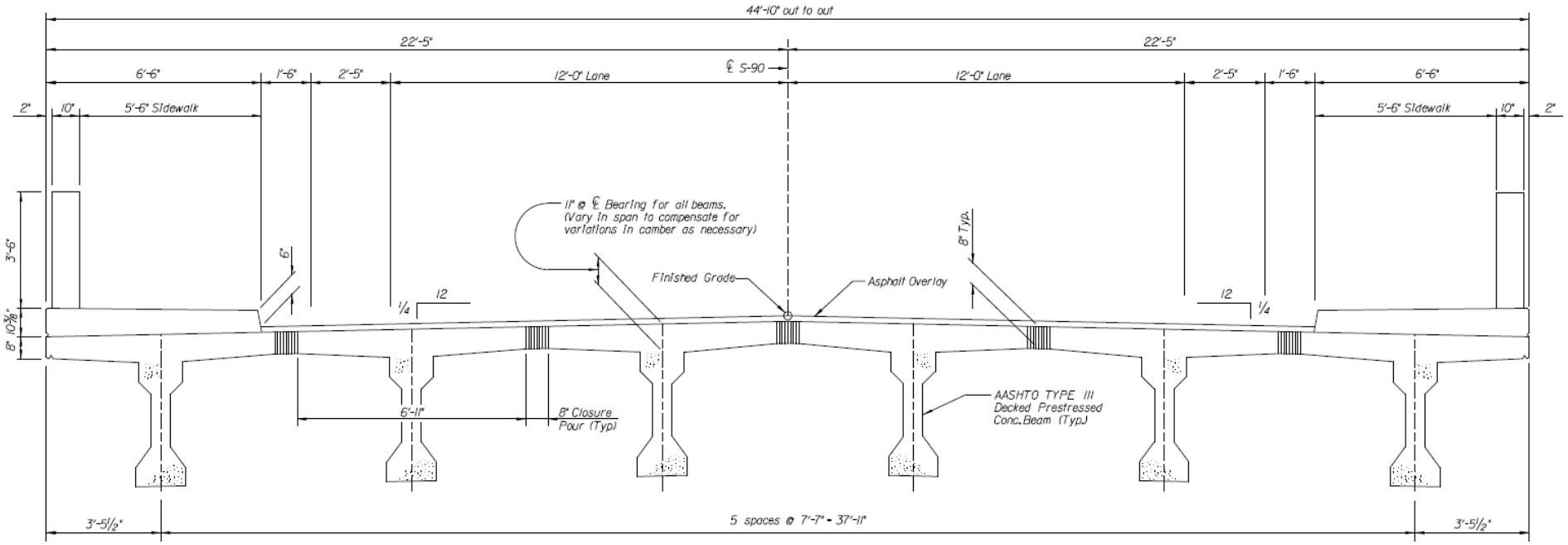
# Prototype Bridge




**Cross Section (proposed)**

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# Testing protocol

- Two 8 inch slab specimens were cast and joined with a closure joint.
- The joined specimen was then loaded in cyclic fatigue.
- Loading was divided into 4 fatigue cycles. Between fatigue cycles, the specimen was loaded with an overload condition.
- Fatigue loading totaled 2 million cycles.

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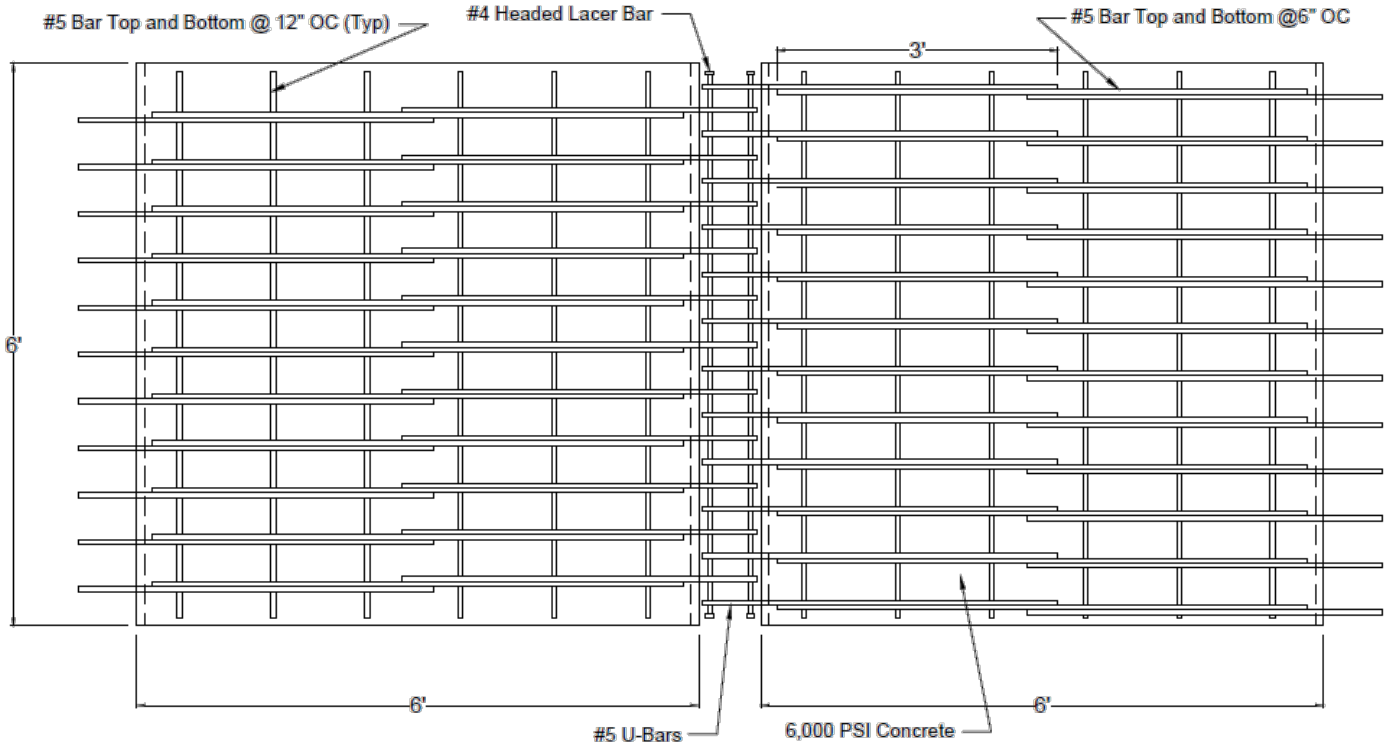
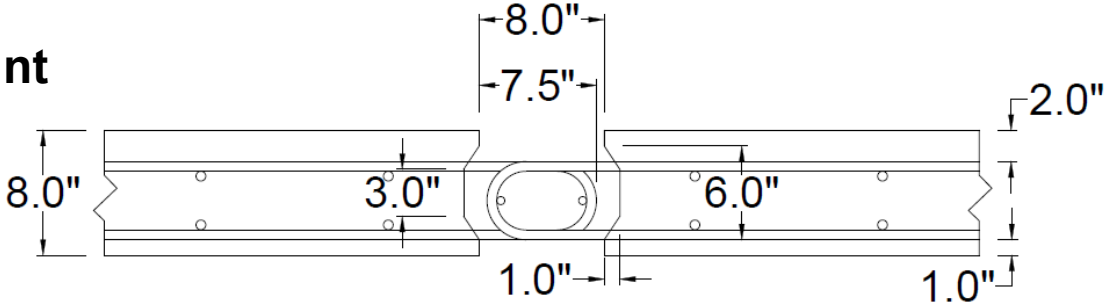
# Specimen Details

## Plan View of Test Specimen




## Detail of Longitudinal Joint



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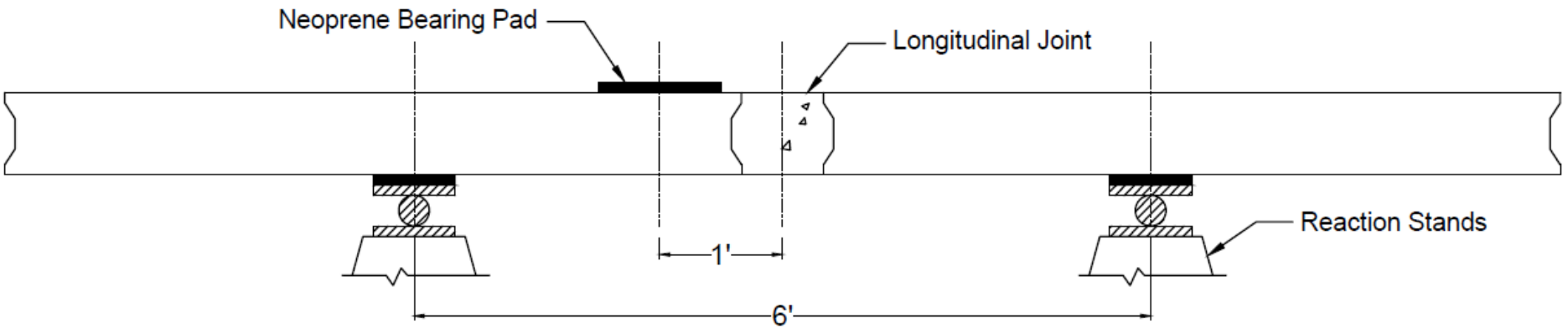
# Specimen Details

**Longitudinal Joint Prior to Closure Pour**

**Joint Following Closure Pour**




**Test Set Up**

# Test Set Up

# Results

- Cracking was not visually observed
- A ponding test was conducted following final fatigue cycle to check for through cracking - no leakage was detected
- The connection detail performed satisfactorily
- Testing to ultimate is scheduled to occur within the next two weeks

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# Acknowledgements:


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