

Introduction

In 2018, the NH DOT is going to demonstrate two Accelerated Bridge Constructions, ABC, Projects during cold weather. This project investigates grouting materials and joint designs appropriate for cold weather projects.

- High strength Joint grouting material that will cure in temperatures to 40° F
- Deck slab reinforced, post tensioned joint connection details transverse to the direction of travel

Testing Procedures

Grouting samples were prepared using various mixing equipment and cured at various temperatures. The Ductal grouting material requires a specific mixer which was supplied by the company. Cylinder samples were cured at three different temperatures: 15 °F, 35 °F, 70 °F.



Freezer - 15°F
70°F



Box with heating system - 35°F



Curing room -



Ductal Manufacturer Supplied Mixer



ASTM Tests

Tests:

- Compression
- Tensile
- Shrinkage
- Shear
- Modulus of elasticity



Cylinder Ductal samples

Selected Product

Ductal – UHPC (Ultra-High Performance Concrete)

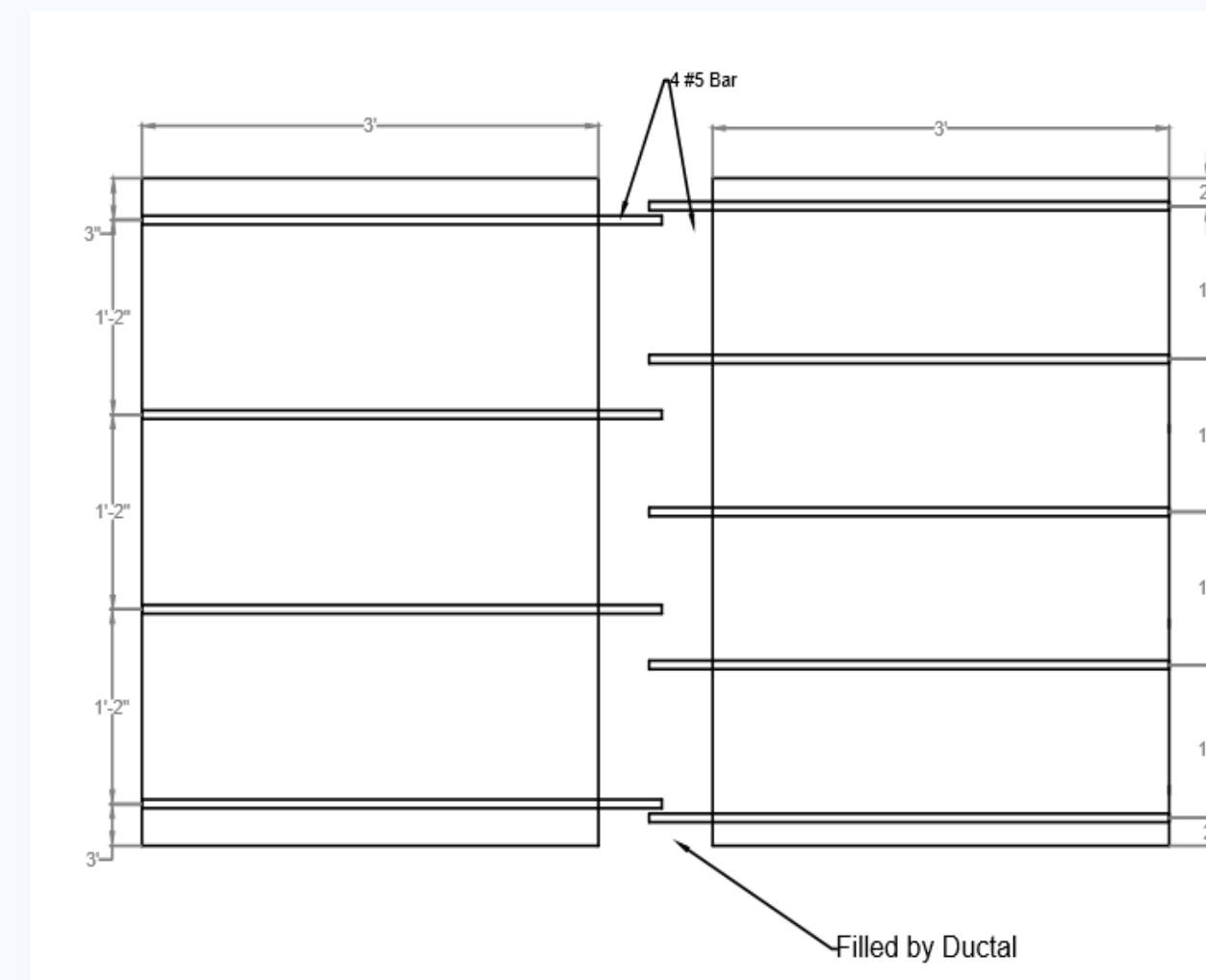


- Setup rapidly
- High strength
- Cast on precast sample surfaces with exposed aggregate

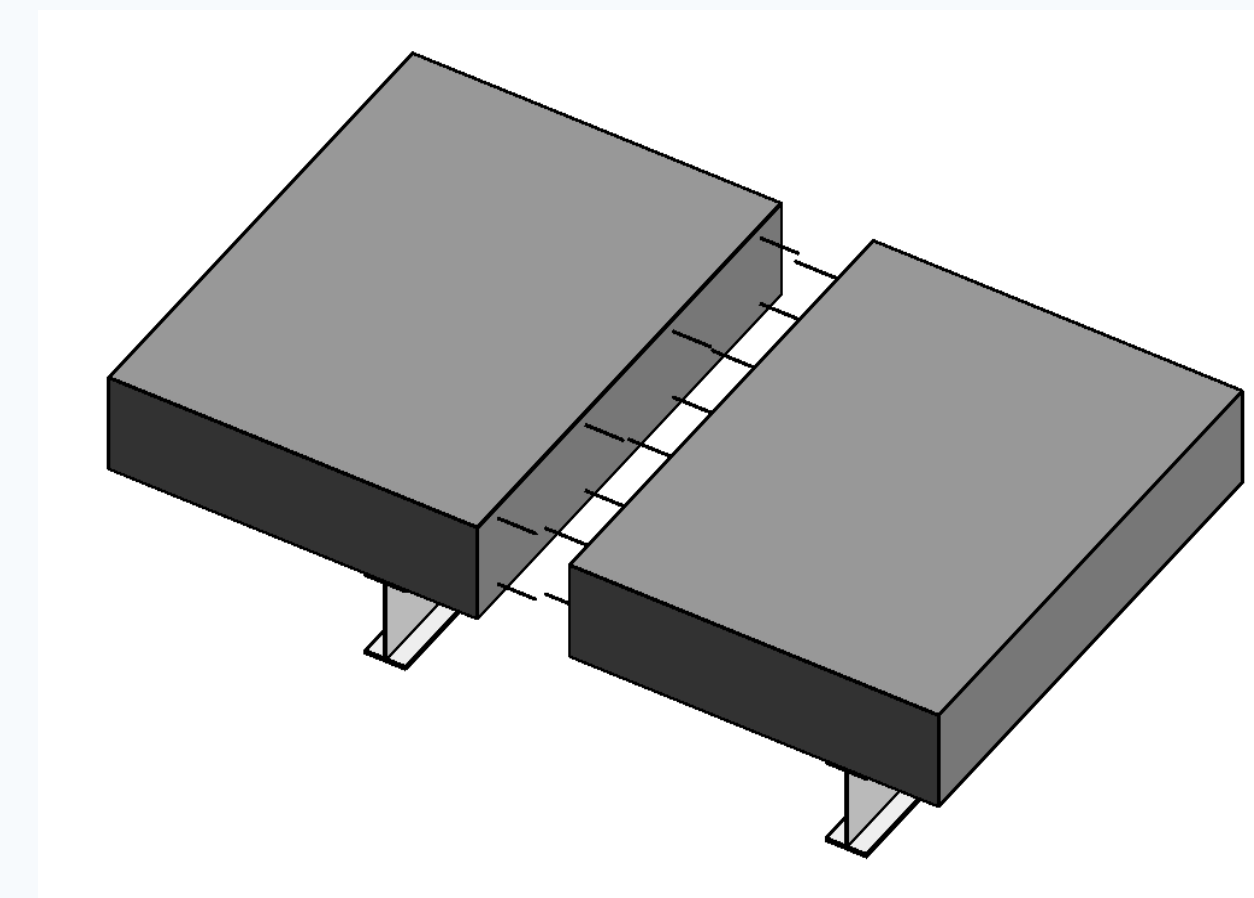
Joint Design

Gilford Bridge is a reference for joint design in this project. There are four different joints will be tested. Spacing between slabs will be filled by Ductal.

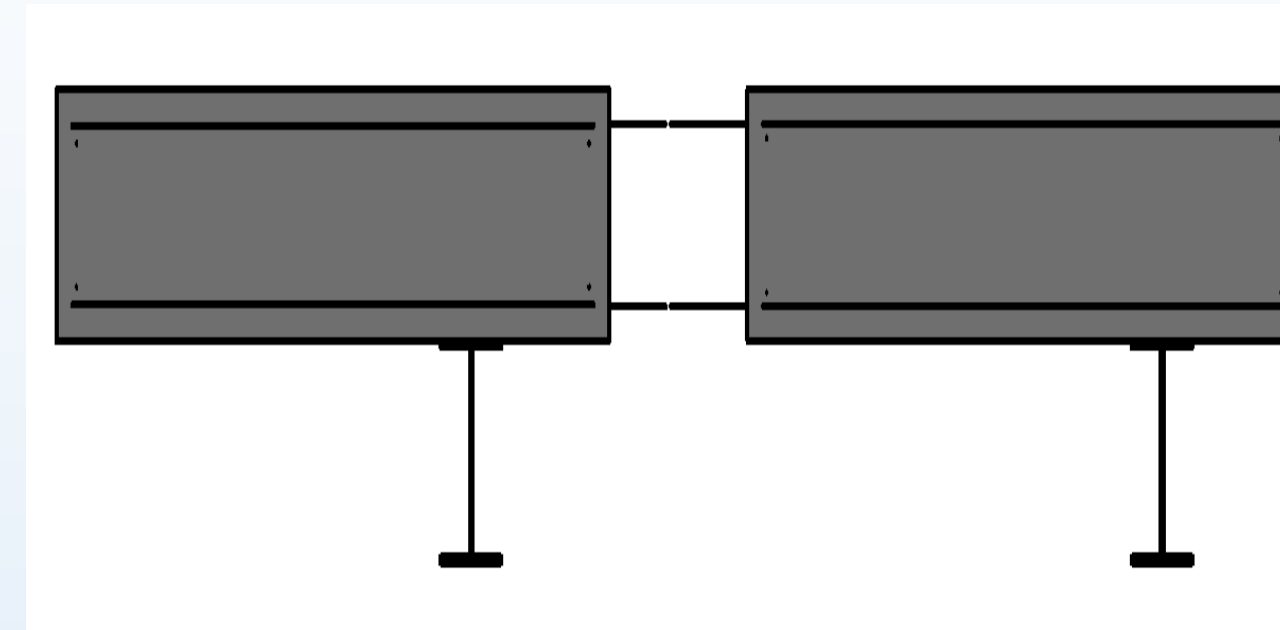
- Test 1



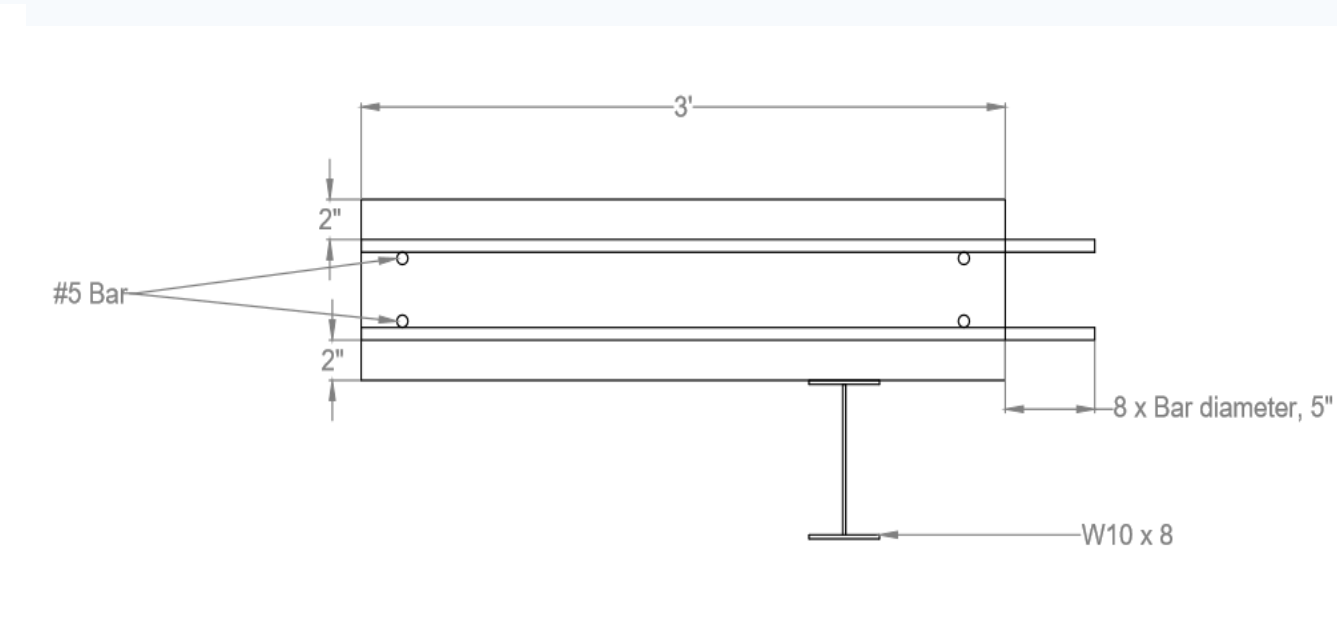
Top view



3D view

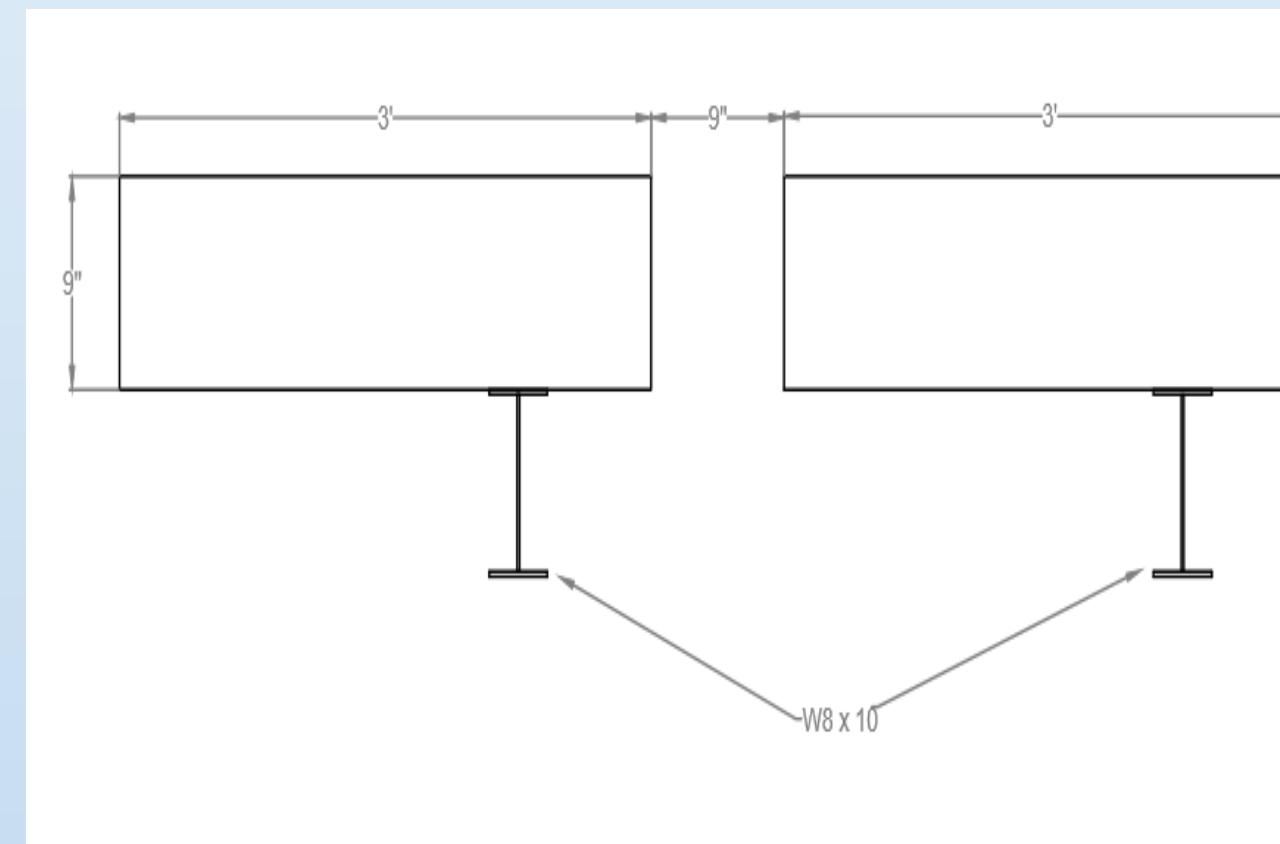


Section View(3D)

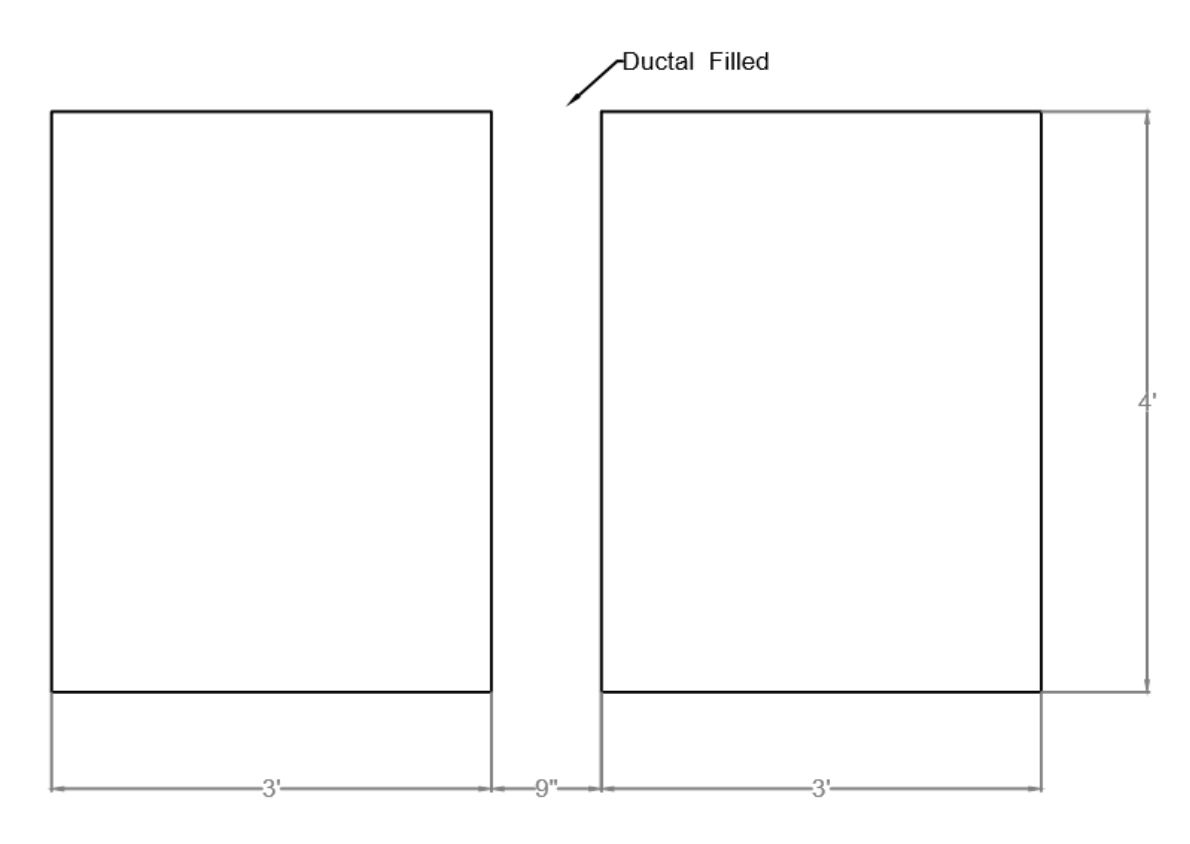


Section view(2D)

- Test 2 – comparison test for test 1

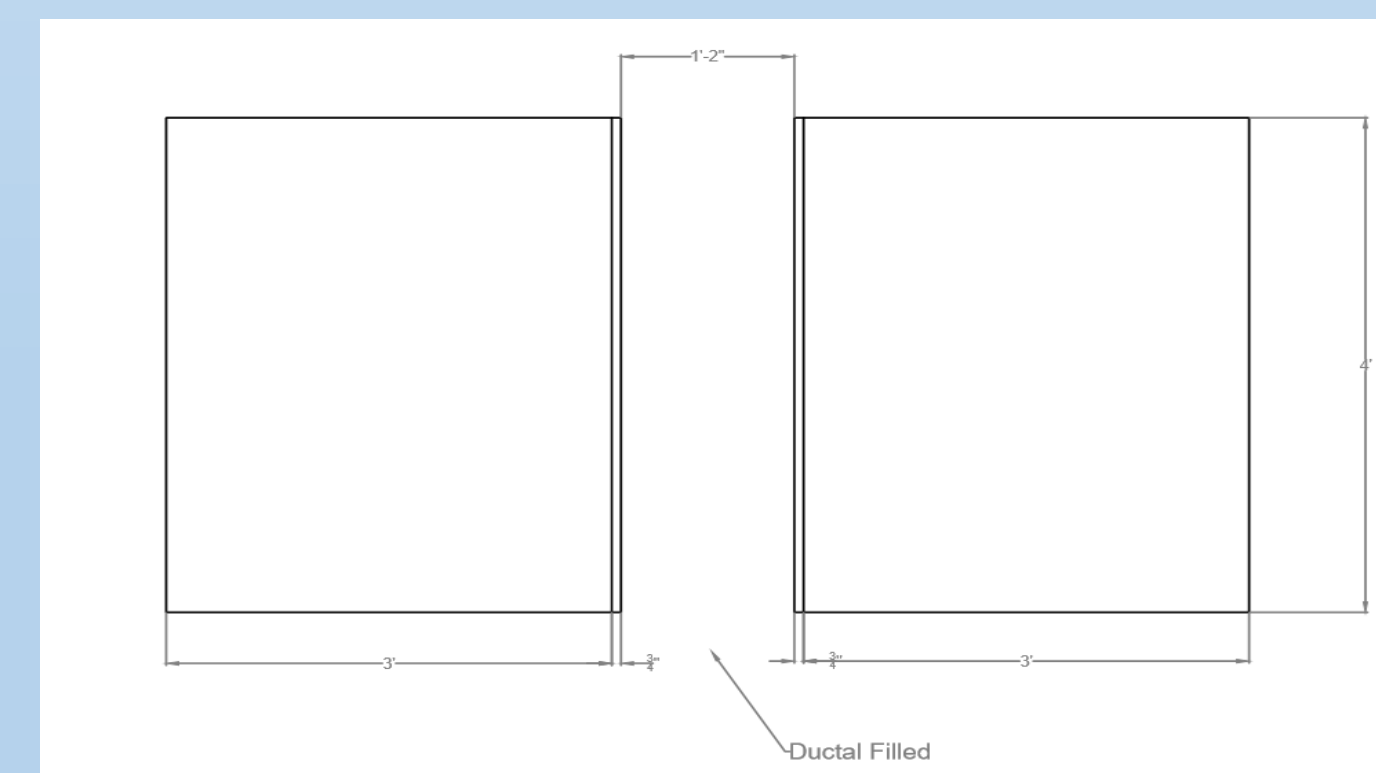


Section View

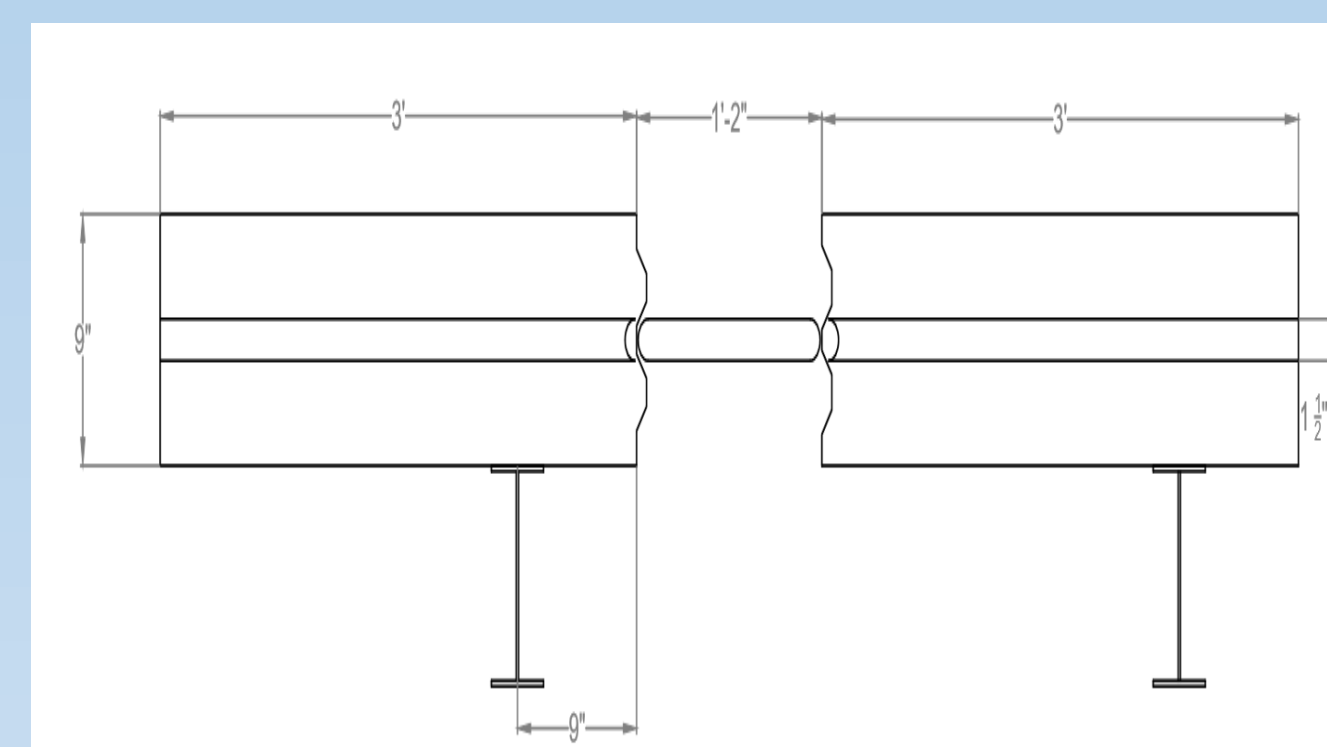


Top View

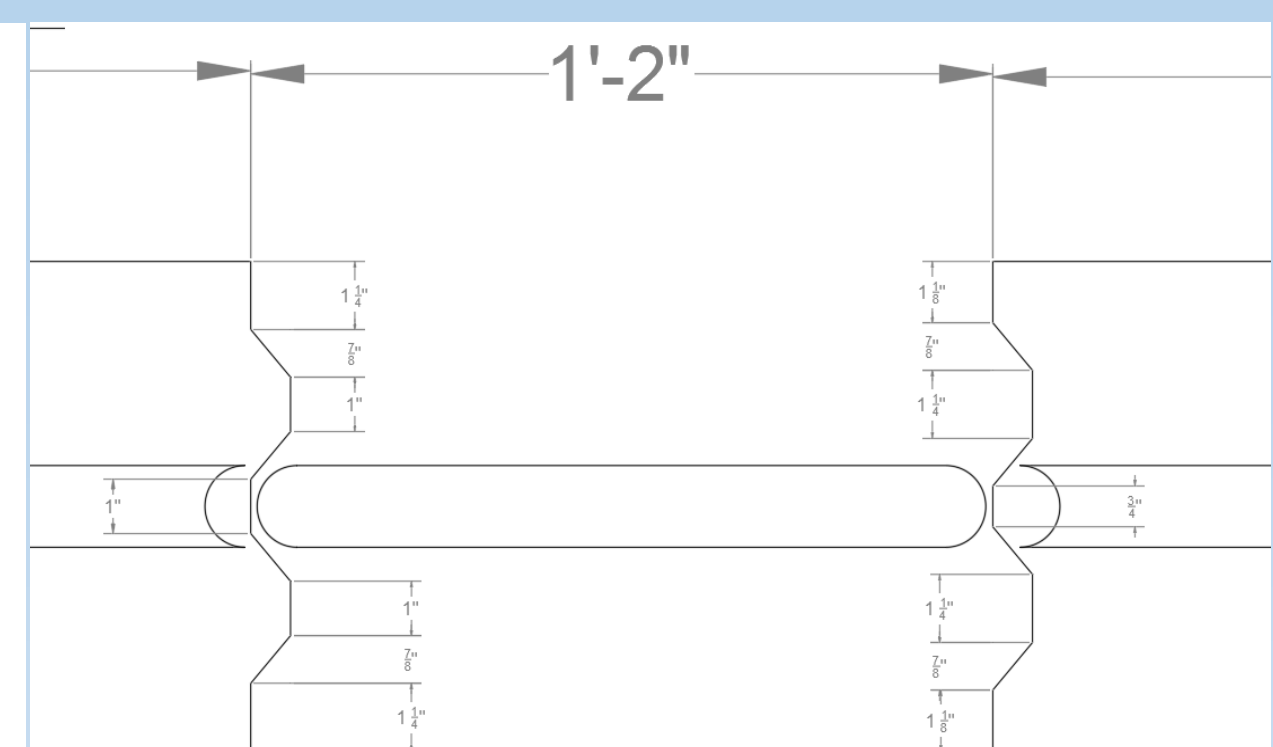
- Test 3- male and female connection & post tension tube



Top view

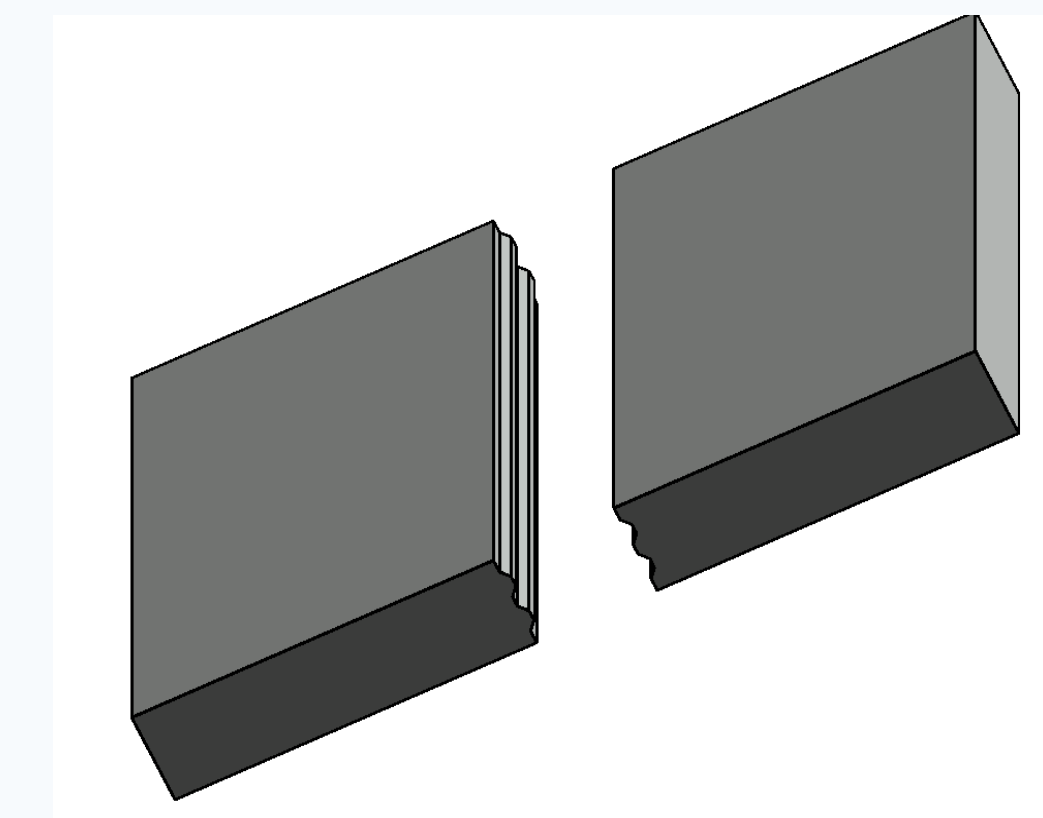


Section view

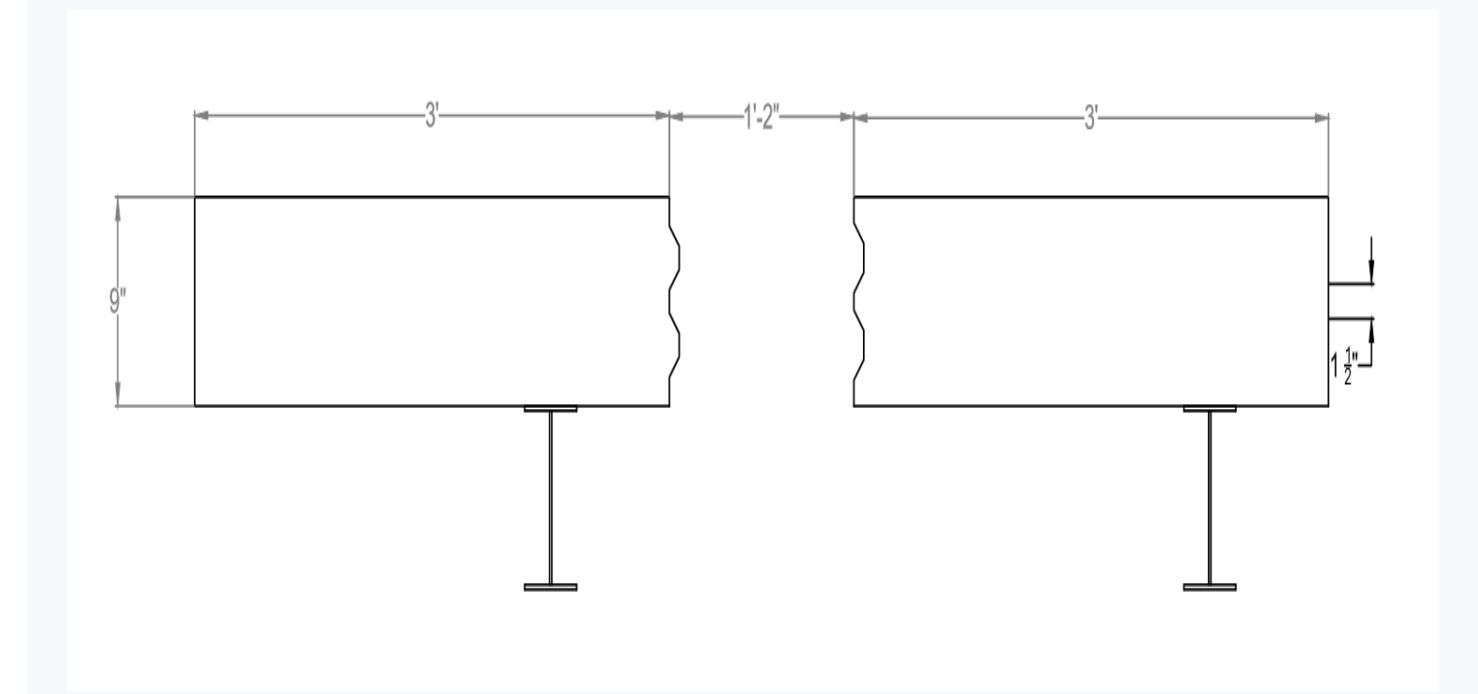


Connection details

- Test 4 – male and female connection without post tension



3D view



Cross Section (2D)

Precast Slab Sections

- Fabricate slab test sections
- Install Ductal grouting between respective slab test sections
- Test data will be used to select joint designs and grouting material



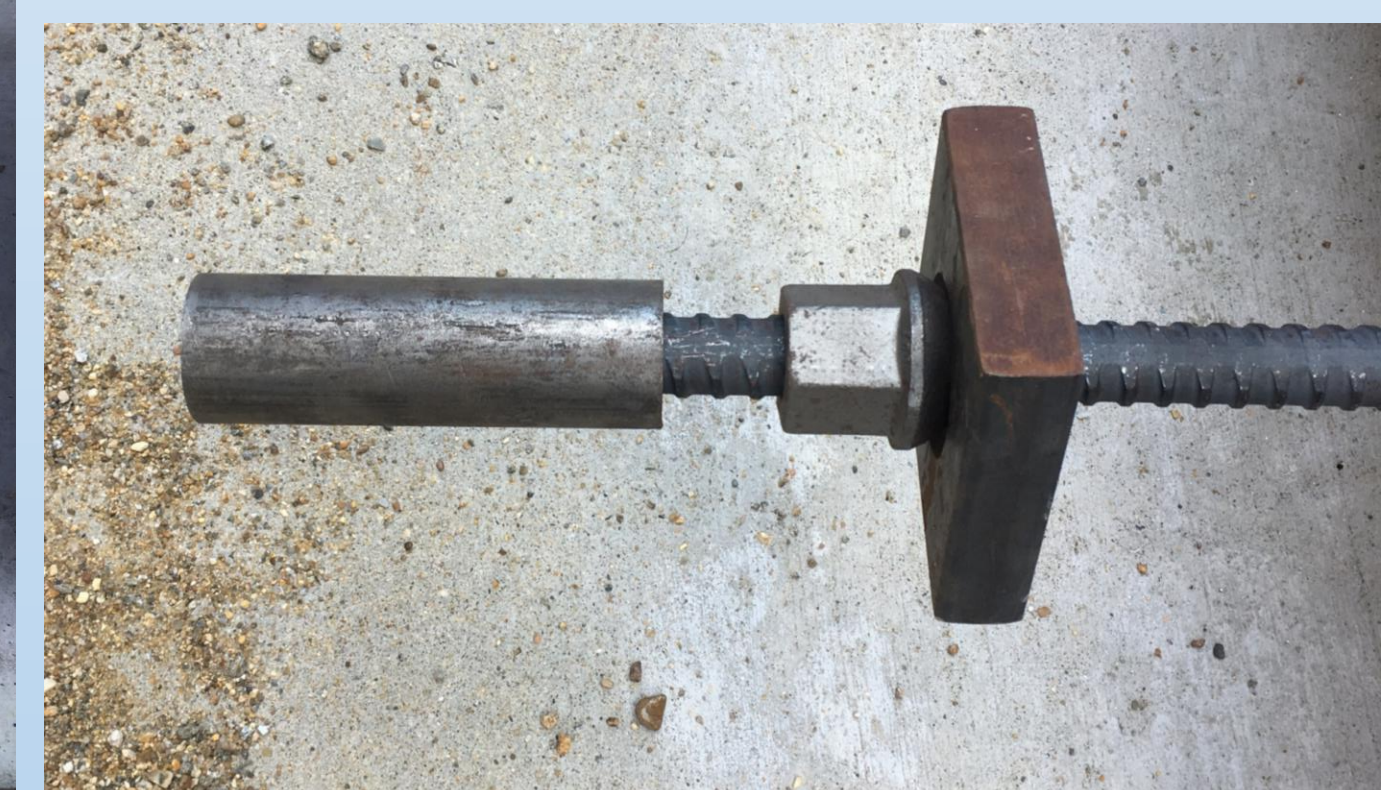
Test 1: Reinforced Joint Model Section



Test 2: Butt Joint Model Section



Test 3: T & G Post Tension Section



Post Tension Bar



Test 4: T&G Joint Section