pennsylvania
DEPARTMENT OF TRANSPORTATION

VIRTUAL INNOVATION WEEK

Bridge Flex Beams

An update on Pennsylvania's implementation of Bridge Flex Beams

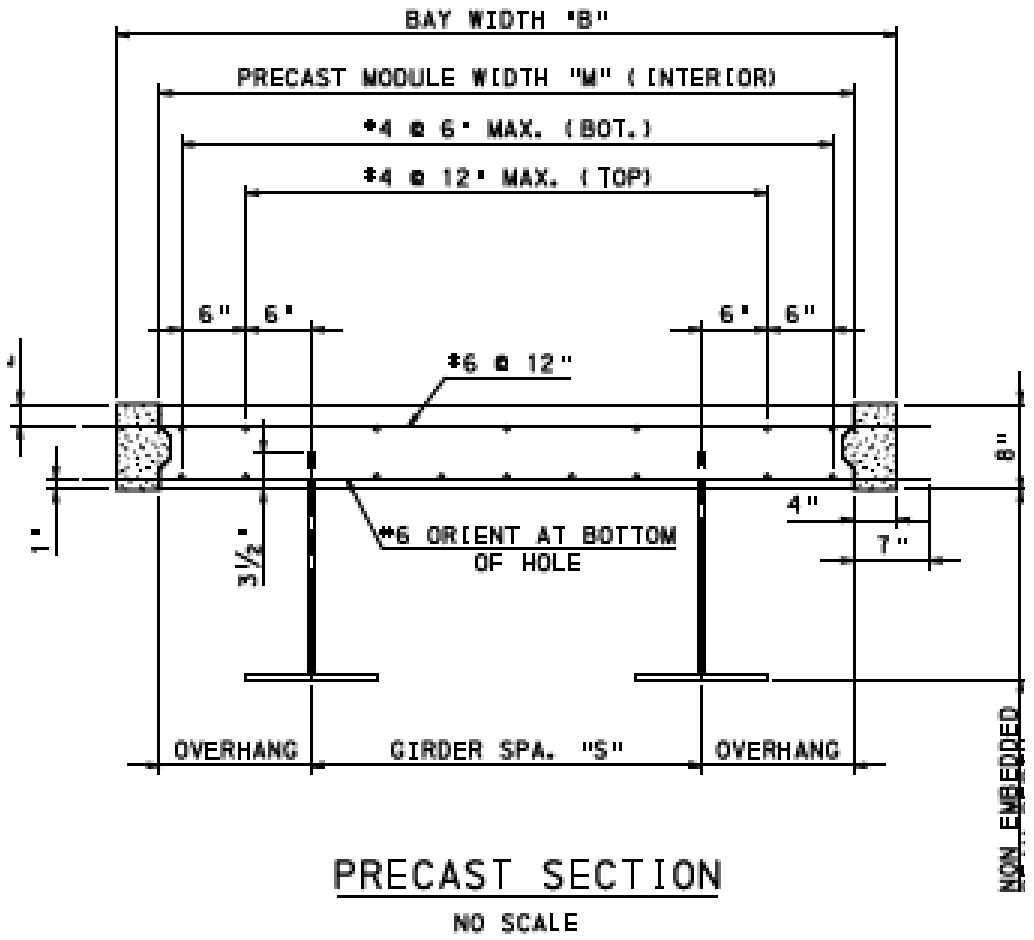
Mark A. Nicholson, P.E.

PennDOT District 1-0 Bridge Engineer

PRESENTATION OUTLINE

- **FLEX BEAM OVERVIEW**
- **STATUS OF PILOT PROJECT IN PENNDOT DISTRICT 1**
- **SUMMARY AND CLOSING**

FLEX BEAM OVERVIEW



What is a "Flex Beam"?

- A modular superstructure system composed of a reinforced concrete bridge deck and steel stringers.
- The flex beam "panel" is constructed in a fabrication shop and transported to the bridge location.
- Uses composite construction/design through steel stringer/reinforced deck interface.

FLEX BEAM OVERVIEW (continued)

Flex Beam components:

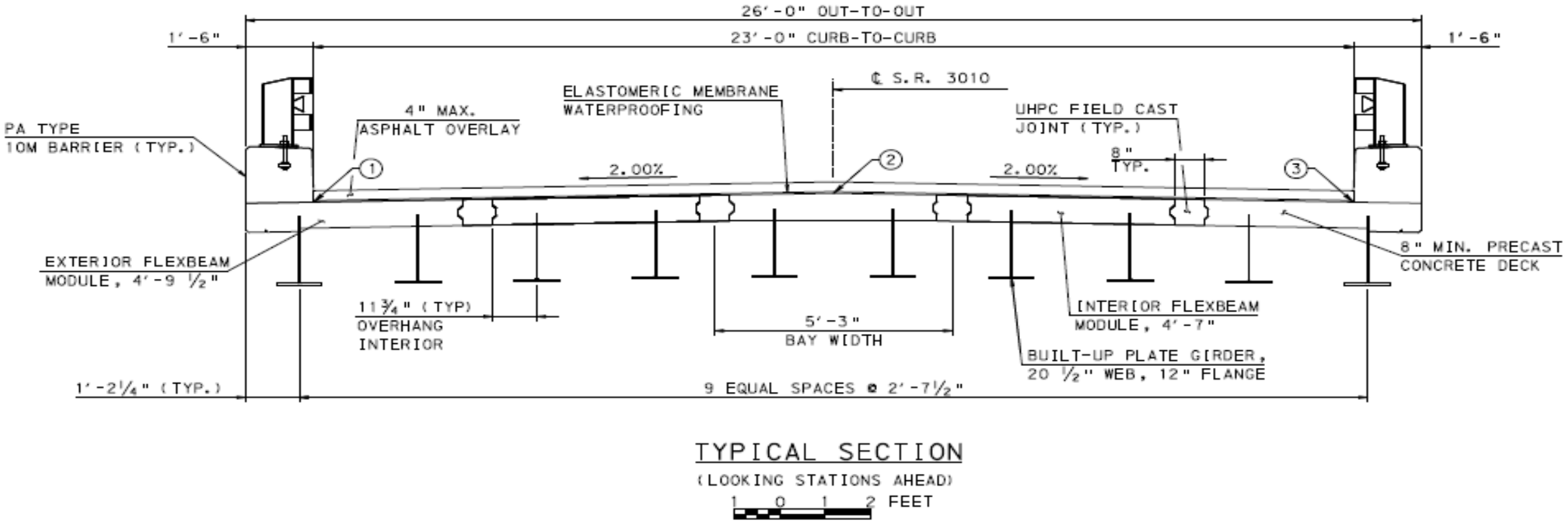
- The reinforced concrete deck is poured composite with the steel beams.
- Bottom mat of transverse reinforcement bars are placed through the web holes.

PILOT PROJECT IN DISTRICT 1-0

Erie County SR 3010

- District 1-0 Bridge Unit prepared the design and bid package for superstructure replacement.
- ECMS#: 97126
- Let on 6/18/20
- Construction to occur summer 2021
- Span 32’, 23’ c-c (26’ o-o)

PILOT PROJECT IN DISTRICT 1-0 (Continued)



TYPICAL SECTION

(LOOKING STATIONS AHEAD)

1 0 1 2 FEET

PILOT PROJECT IN DISTRICT 1-0 (Continued)

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STANDARD SPECIAL PROVISION

Detail

Index or Category:	Non-Pay Item Related	**Status:**	Active
Sequence ID:	10303	**District:**	CO
Version:	B		
Provision Name:	a10303 ULTRA HIGH PERFORMANCE CONCRETE		

Usage Information

Measurement:	English-IP		
Edit Body:	No	**Include on all projects:**	No
Edit Header:	No	**Include on all federally funded projects:**	No
Edit Project Specific Details:	No	**Include on all 100% State funded projects:**	No

Instructions for Usage: For use as a component of "Bridge Structure (As Designed)". When using this an Item Number for Latex Modified Concrete Overlay or an Item Number for Diamond Grinding is needed.

For use on projects let after September 10, 2016.

408 Section:

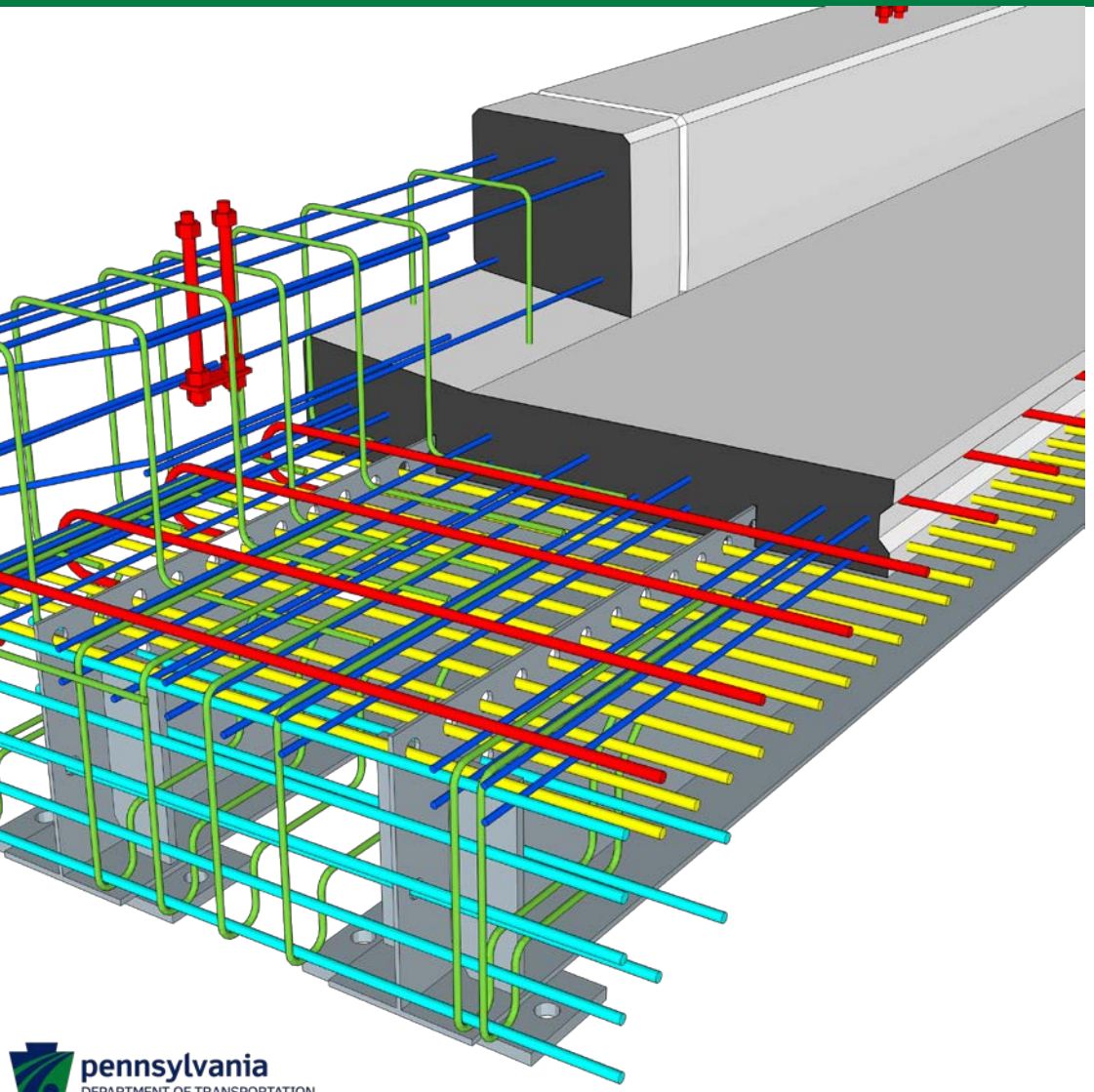
Effective From: 09/10/2016

To: 01/01/2199

What is "UHPC"?

- Steel fibers, pozzolans, admixtures and cement matrix
- Fine aggregates <= 0.024"
- Ductility in bending and ultra-low permeability
- Compressive strength > 20,000 psi

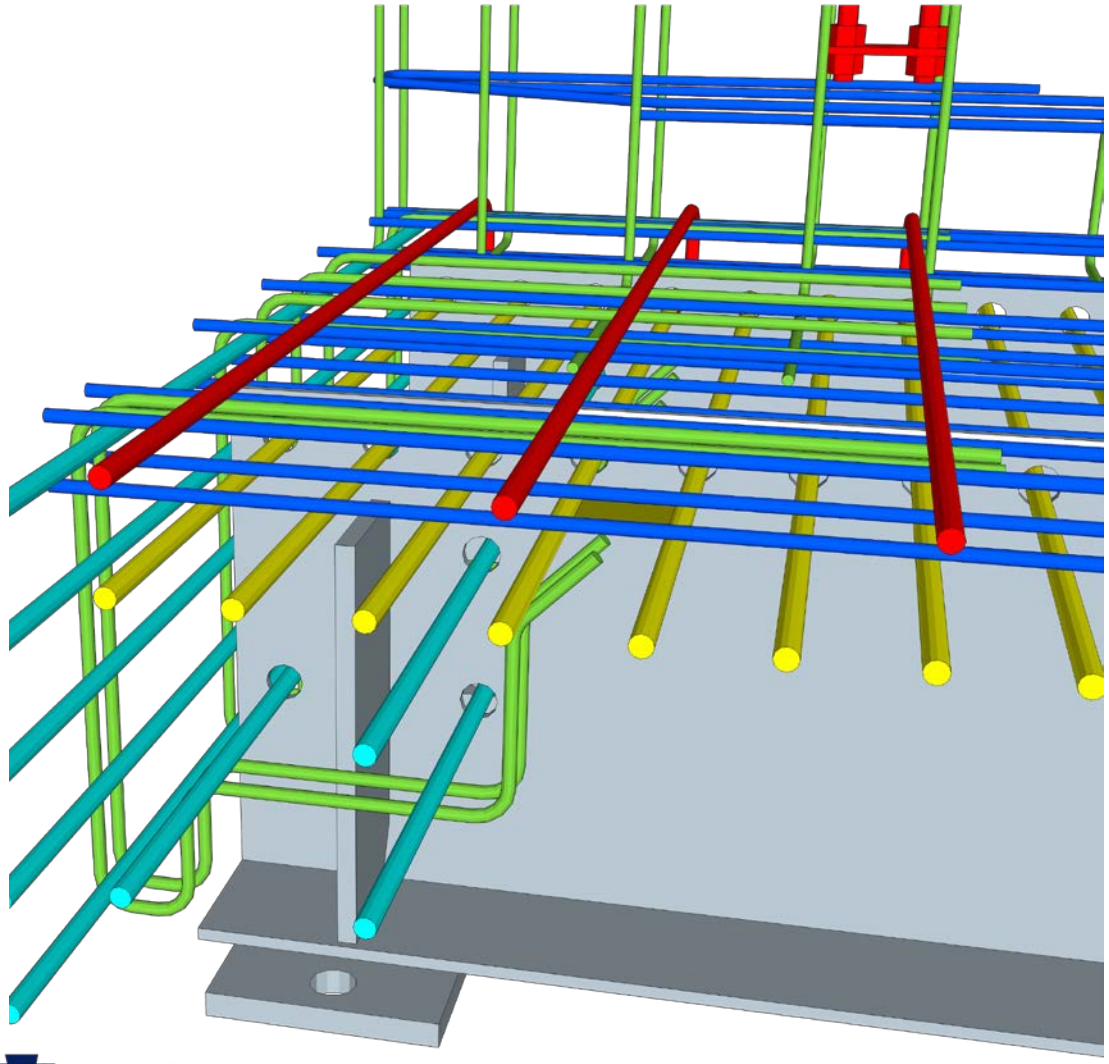
PILOT PROJECT IN DISTRICT 1-0 (Continued)

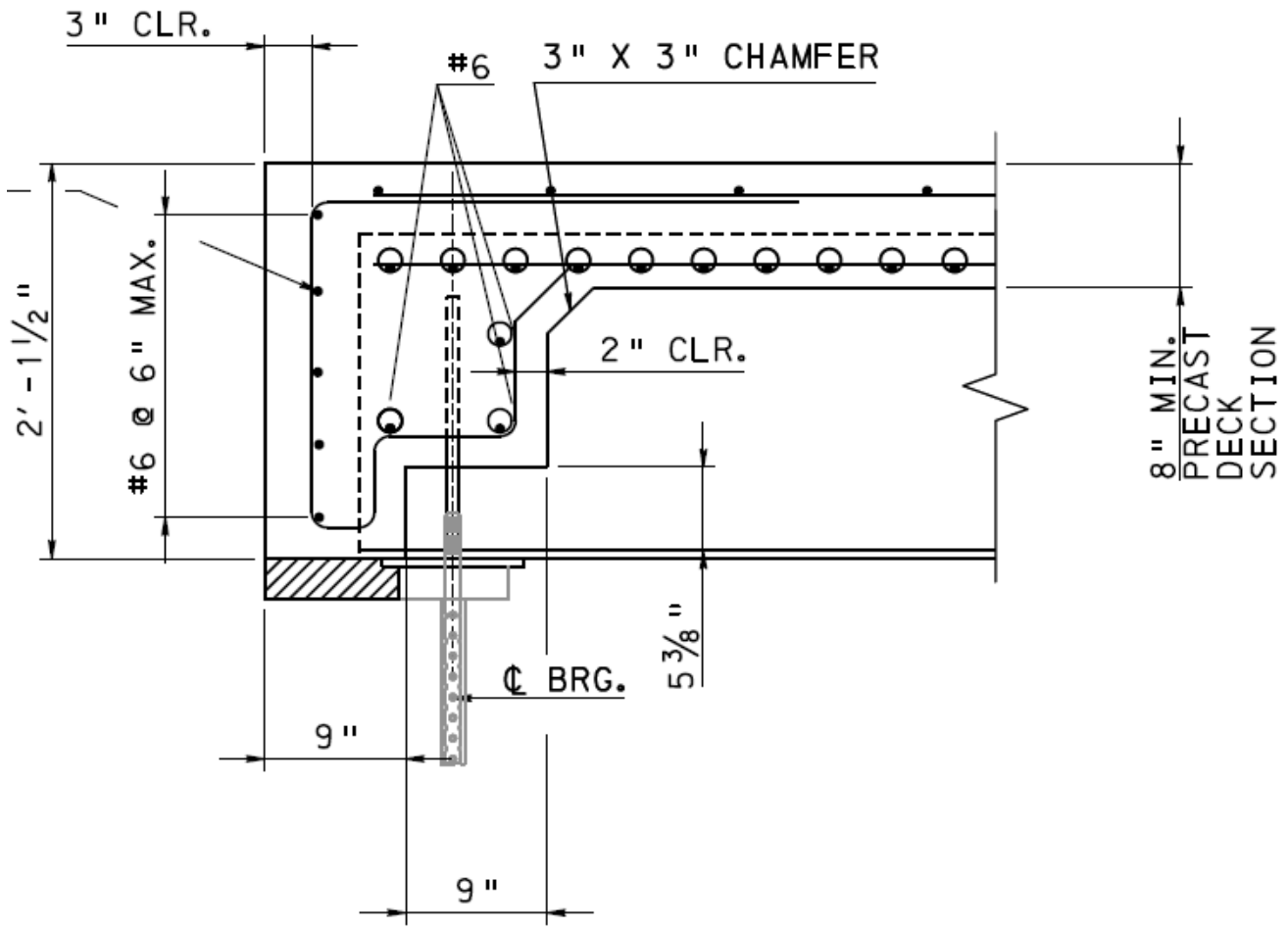


Beam Fabrication

- Recently reviewed and approved shop drawings.
- PennStress of Roaring Spring, PA is beam fabricator.
- 3D CADD renderings were provided to illustrate rebar layout and detailing

PILOT PROJECT IN DISTRICT 1-0 (Continued)





SUMMARY AND CLOSING

- Original Contract Value of $593K (all inclusive)
- Bridge Superstructure Item: $365K
- Approximately $670/SF (all inclusive)
- Next Steps:
  - Monitor fabrication and construction
  - Track issues and develop lessons learned
  - Apply to design standards
  - Strain gauges to be applied in future – better understanding loading and flex beam reactions to live loads.
- Questions?

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manicholso@pa.gov

(814) 678-7057