

# *Steel Industry Perspective*

## *SHRP2 ABC Toolkit*



*PreFabricated Steel Bridge Elements  
& Systems (PsBES)  
aka decked steel girder system*

Peer 2 Peer Workshop  
Minneapolis, MN  
September 17, 2015



William McEleney  
NSBA, Managing Director

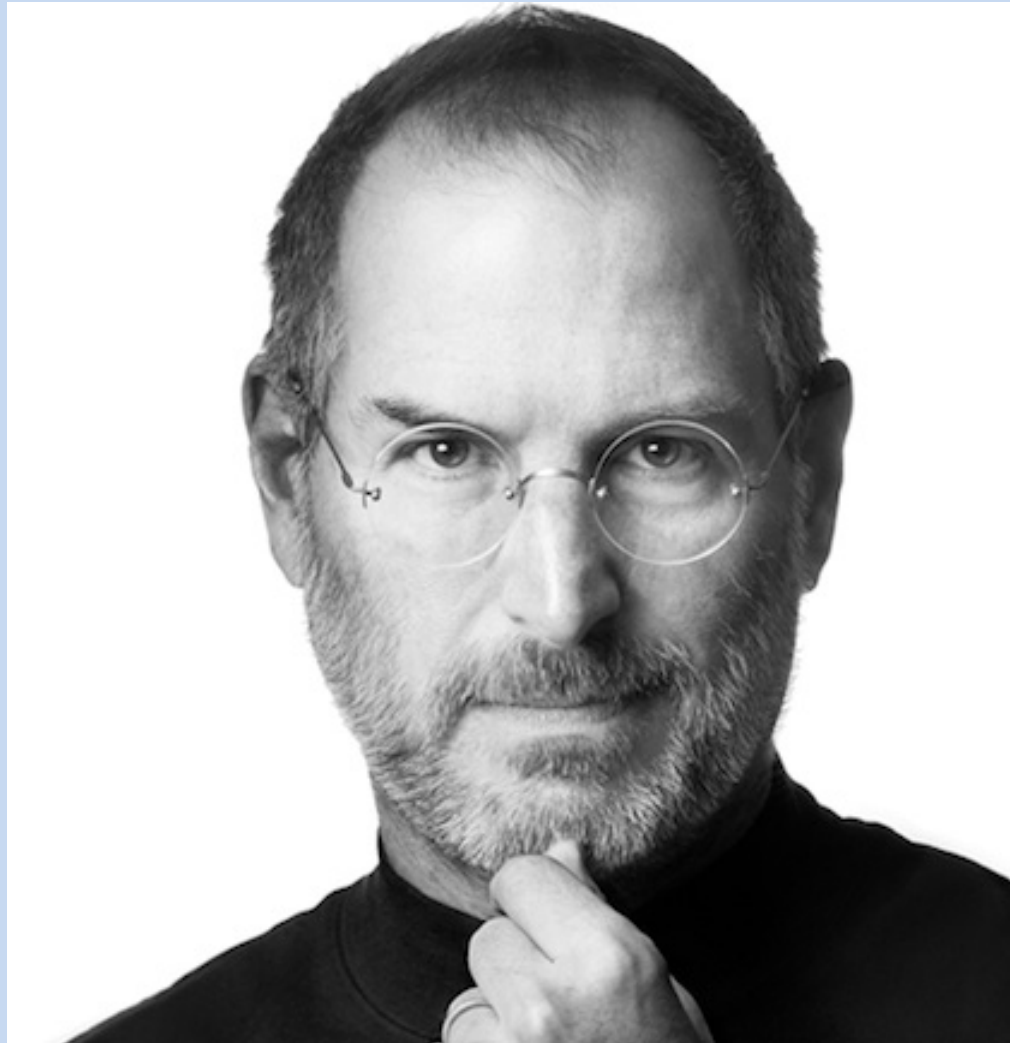
# *Why Are We Here ?*



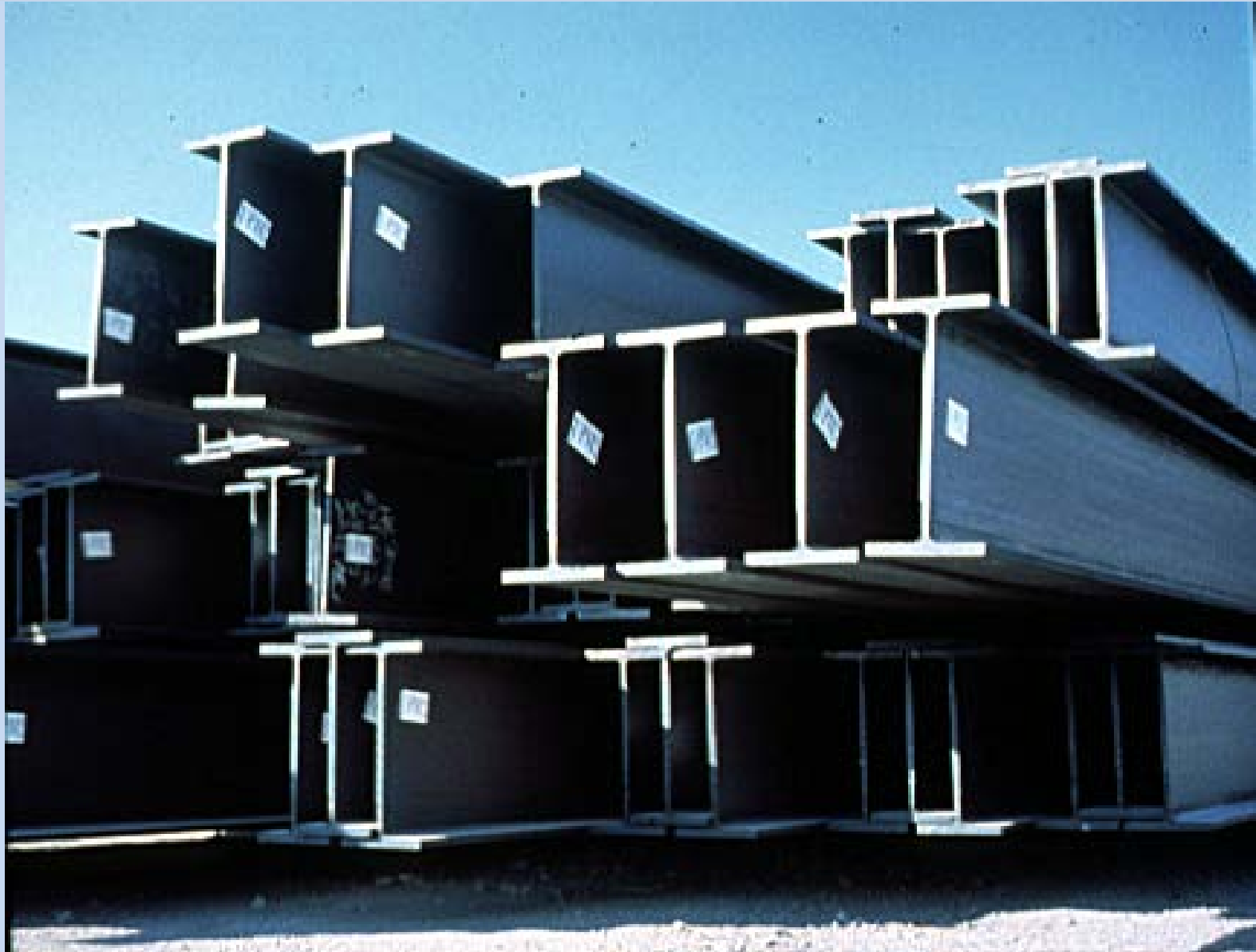
- It's not about just building a bridge
- It's about providing transportation infrastructure that facilitates travel and commerce
- “I don't have warehouses anymore”
- Time is Money

National Prefabricated Bridge Elements & Systems Conference  
St. Louis, February 2003

# *How Did We Get Here ?*



# *P(s)BES History*





# *PreFabricated Steel Bridge*



Coleman Bridge  
1995



3750' – 9 days

# *Where Does Industry Fit ?*



- Support role to DOTs to satisfy the customer's demand
  - Committee work; specs & standards development
  - New products / details
  - Technology transfer (P2P)
  - Marketing - visibility / credibility



# *Where Does Industry Fit ?*



- Develop new products/details to facilitate ABC

Lake Placid 2002



# *New Products / Details*



I93fast14, 2011





# *New Products / Details*





# *New Products / Details*





# *New Products / Details*

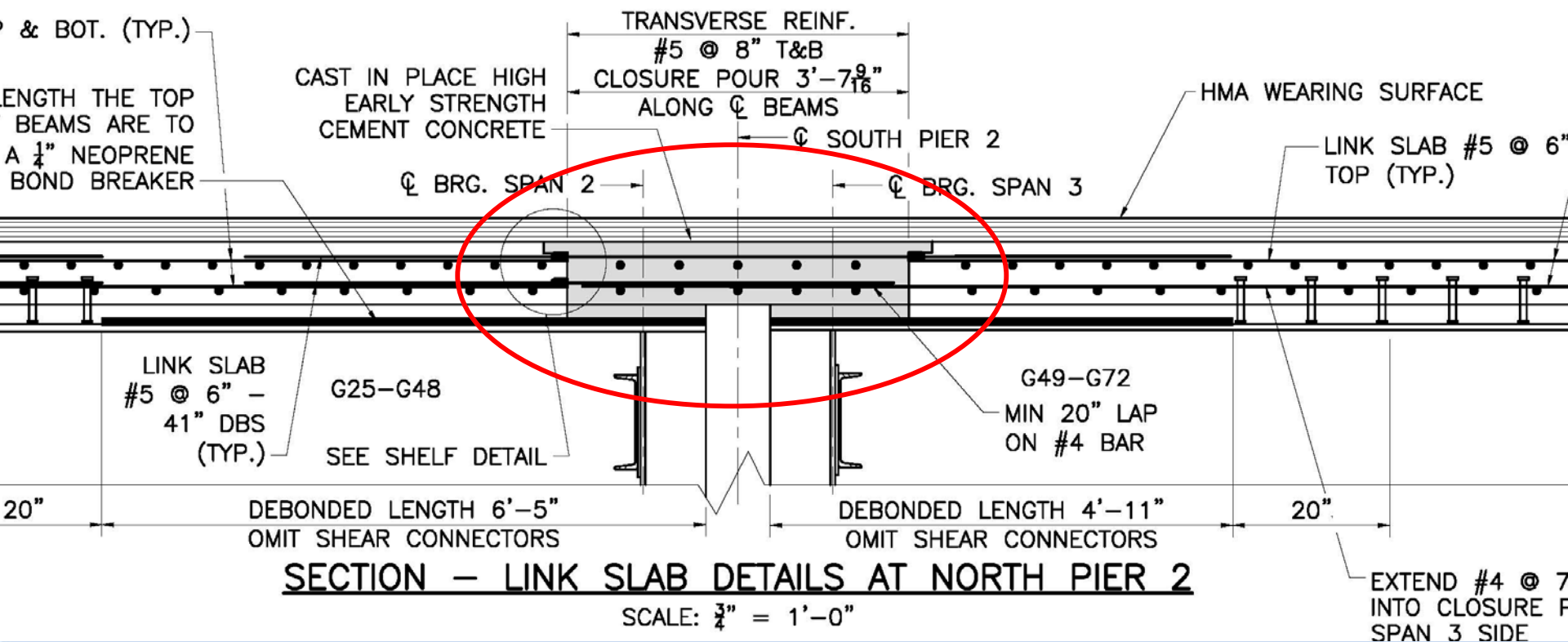




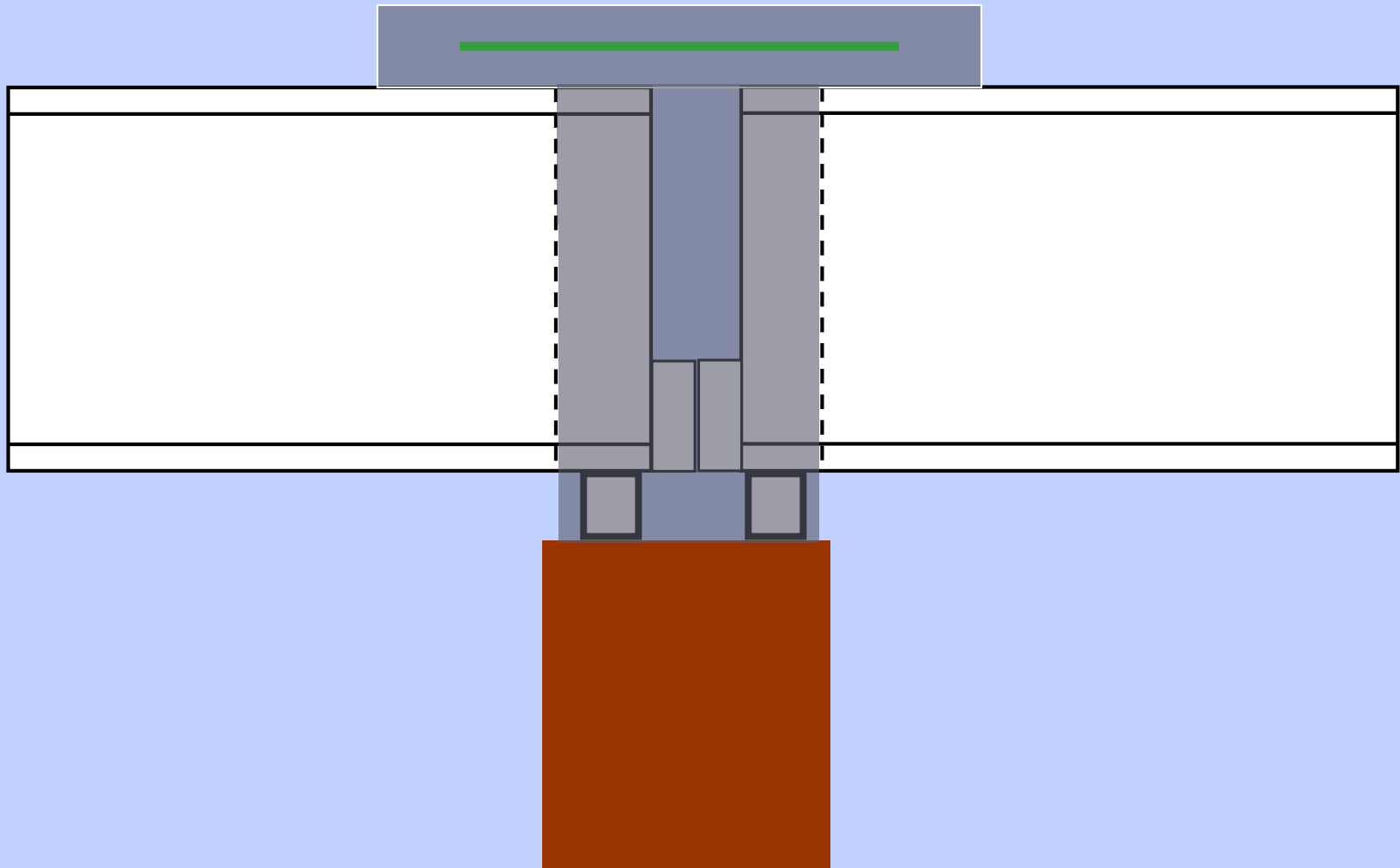
# *Multiple Spans – Simple Support*



# Link Slab – Simple Support



# *Creating Continuity*





# *Creating Continuity*



# *New Products / Details*





# *New Products / Details*





# *New Products / Details*



# *New Products / Details*

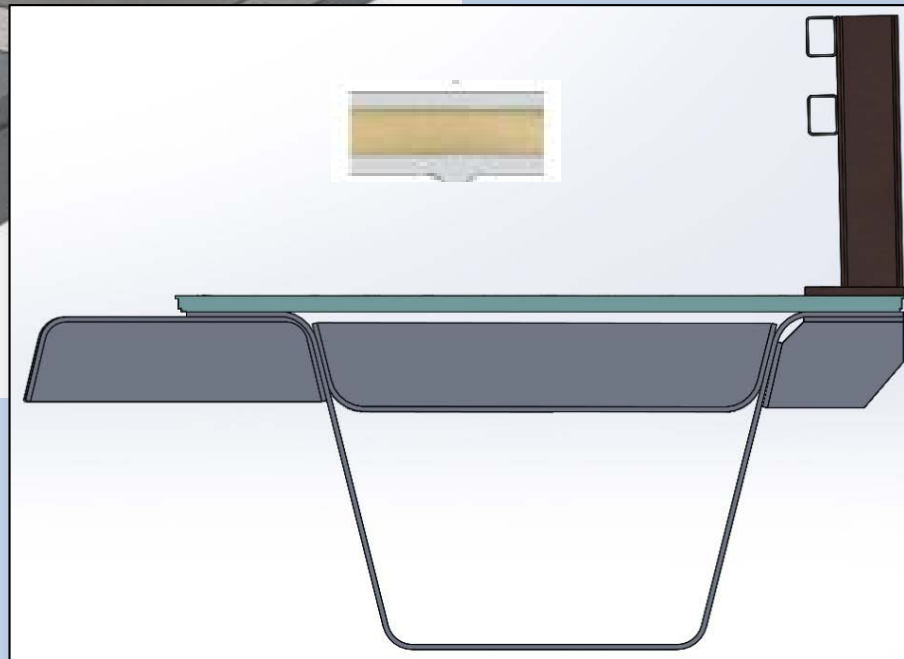
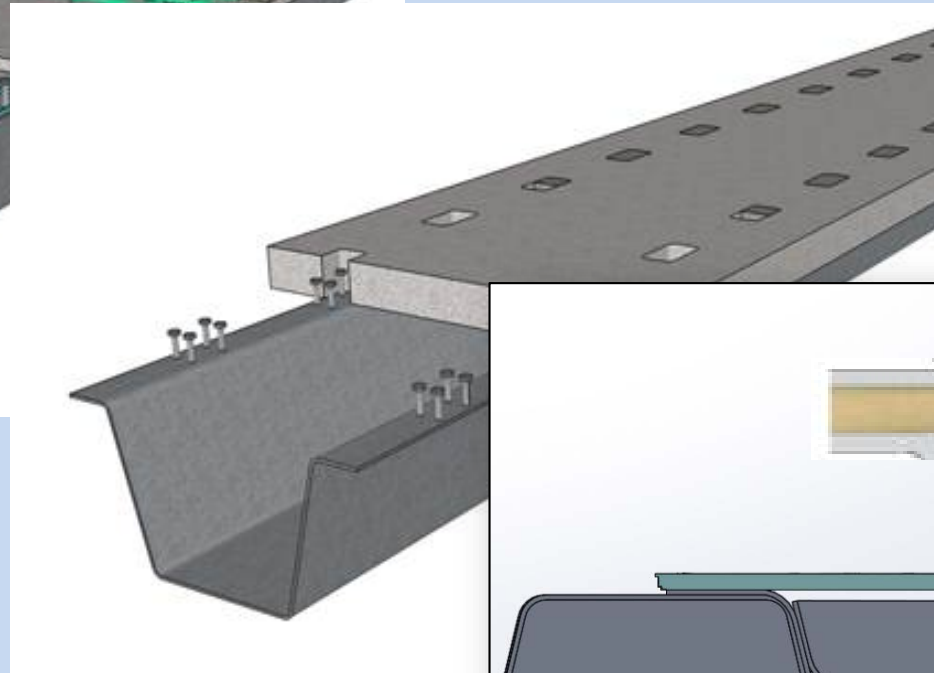
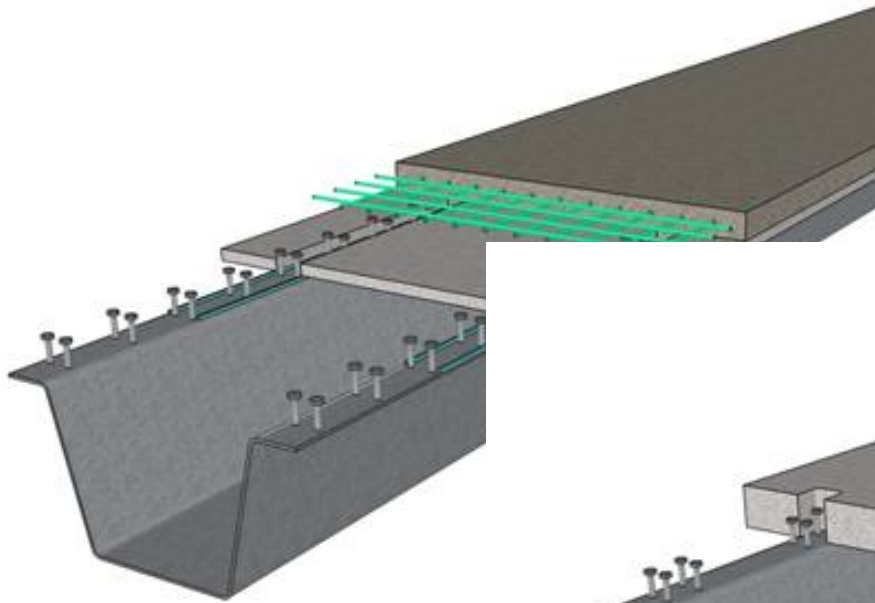


# *New Products / Details*





# *New Products / Details*



# *New Products / Details*



# *New Products / Details*





# *New Products / Details*



- Fabrication of the steel girder directly in the plant

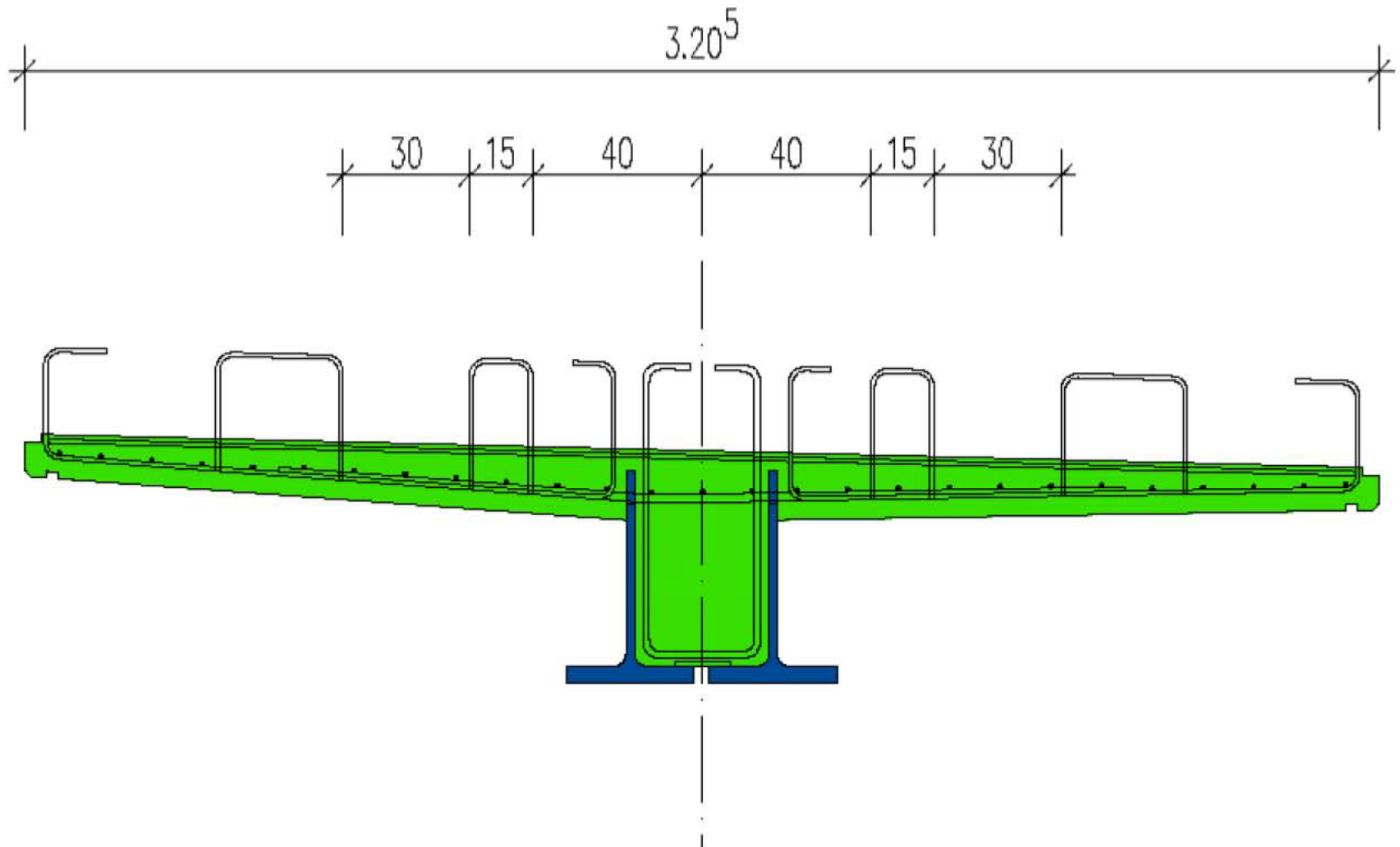




# *New Products / Details*



# *New Products / Details*





# *New Products / Details*





# *New Specifications*



# Technology Transfer



## With experience and education – cost premium will come down

### Engineering Journal



American Institute of Steel Construction

Fourth Quarter 2012 Volume 49, No. 4

- 129 Message from the Editor
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Reidar Bjorhovde

[www.aisc.org](http://www.aisc.org)

## Piece BY Piece

BY MICHAEL F. CULMO, P.E.

Span-by-span bridge construction, using modular steel bridge elements, can serve as a viable and economical bridge-building alternative.

ACCELERATED BRIDGE CONSTRUCTION (ABC) has come a long way in the last 10 years.

And prefabricated, modular elements made with steel beams have been a big factor in making this happen, as they can be used to reduce the weight of the assemblies, thereby making crane installations more cost effective and viable.

Modular steel beam/deck elements generally consist of two or three steel beams with a composite concrete deck cast in the fabrication plant. They are erected quickly and joined with reinforced concrete closure pours made with high-early-strength concrete; a bridge superstructure can be built in as little as two days using this technique.

One of the more successful examples of this method was the 93Fast14 project in Melford, Mass. (a 2012 NSBA Prize Bridge Awards winner) which involved replacing 41 spans on 14 bridges along Interstate 93. The 14 bridge superstructures were replaced during ten 55-hour weekend work periods. The use of structural steel for the beam elements made the project possible since crane capacities controlled many of the sites.

### Span by Span

Let's take a look at the two common ABC methods to design and construct multi-span bridge. The first is to install multiple simple spans between supports, sometimes referred to as "span-by-span" construction. Conventional simple-span bridges require expansion joints at each pier—historically a problematic feature of many bridges—as leaking joints, considered by many to be the most common cause of premature bridge deterioration, lead to the corrosion of beam ends and deterioration of the substructures under the joints.

The second method for designing multi-span bridges is to use continuous-span beams, which do not require deck expansion joints at the interior supports, and require less structural steel for a given span arrangement.

Span-by-span beams are simply erected on the substructures without the need for splicing and shoring towers. The problem with leaking deck joints has been addressed by designing these bridges to be either joint less or continuous for live load by using simple concrete pours at interior supports to eliminate the need for deck expansion joints. Using span-by-span techniques for the superstructure can accelerate the process by eliminating the need for welded or boxed field splices in continuous girders. Beam erection can progress very rapidly as the modular units are inherently stable. Once set, the crane can release the beam without the need for any external bracing.

One method that has been developed to eliminate deck joints on simple-span bridges is "link slab" technology. A link slab is built by simply casting the slab continuously across the pier linking the two spans. The link slab is designed to accommodate the live load rotation of the girders without significant cracking. This is accomplished by debonding a portion of the deck near the support to form the link slab, which acts as a flexible beam. The recommended



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# *NSBA ABC Recognition*



# *The Challenge*



- Speed costs Money
- Public will Support
- Public awareness programs

**1. Quality**

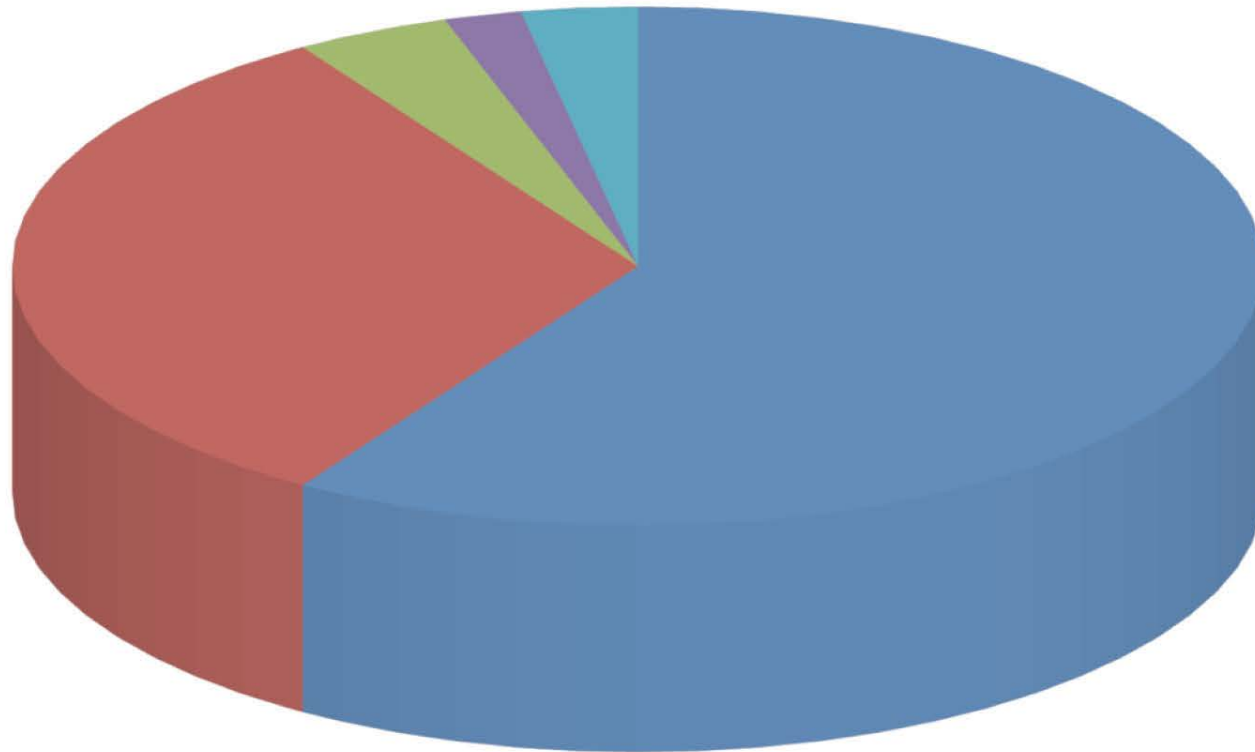
**2. Speed**

**3. Price**

**Pick any two**



# The Challenge



Knowing that ABC reduces traffic congestion and road closures, but increases costs, do you favor or oppose UDOT continuing to use ABC to build bridges on its major highways?

- 59%** Strongly favor
- 32%** Somewhat favor
- 4%** Somewhat oppose
- 2%** Strongly oppose
- 3%** Don't know

Source: 2011 UDOT Annual Survey

# *The Challenge*



With experience and education – cost premium will come down





# The Future



- “The design is inappropriate, but mostly we are concerned about the fact that *it will take so long to build.*
- While *a simpler bridge that is built off-site could just be brought in by barge and probably be finished in less than a year, they are saying that this will take three years.*”
  - City Island Civic Association vice president

# *The Future*



- When do we take the A out of ABC?





# *Another Kind of ABC*



- Bridges 2 Prosperity





# *Thank you*



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- National Steel Bridge Alliance
  - [www.steelbridges.org](http://www.steelbridges.org)





# *Who's Buyin'*



- Departments of Transportation; on behalf of their customers – tax paying motorists  
...who didn't know they needed it, until they saw it could be done





# *Where Does Industry Fit ?*



- Develop new suppliers



# *Creating the Continuity*

