ABC Technology and Steel Bridges

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Examples of PBES and Modular structures

- Modular steel superstructure element installation
  James River Bridge, Richmond, VA

(Pre-fabricated Bridge Elements and systems)
Superstructure replacement construction.

Modular Steel Systems used in ABC

- **Topped Multi-beam units:**
  These are modular elements that have two or three steel beams that are topped with a pre-cast reinforced concrete deck.

Folded plate modular bridge element.

The above element consists of a modular steel inverted tub girder. Elements topped with a precast concrete deck. The beams are made of a single folded plate and are limited to spans < 60 feet due to limits on plate bending equipment.

Alternate: Corrugated steel web plate girder.
Modular Orthotropic Steel Deck Systems

Modular OSD systems consist of a flat, thin steel plate stiffened by a series of closely spaced longitudinal ribs with support by orthogonal transverse floor beams.

Modular OSD T-Beam details (plate girder bridge).

Box Girder OSD Bridge.

Erection of an Orthotropic Box Girder segment for the Alfred Zampa Memorial Bridge.
Field bolted splice.

Simple for Dead Load--Continuous for Live Load
Steel Bridge Systems

- In a SDCL steel bridge system, continuity for live loads can be provided by providing a steel or concrete diaphragm as shown figures.

Simple for Dead Load--Continuous for Live Load
Steel Bridge Systems

- Concrete Diaphragm detail

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- Concrete Diaphragm with connected bottom flanges
Concrete Diaphragm is preferable and offers the following advantages.

1. Creep and shrinkage is not an issue
2. It protects the ends of the girders and enhances service life.

Typical concrete diaphragm detail with bottom flange connected.

**Test results for 3 types of concrete diaphragms**

- The diaphragm with end plates and the bottom flanges connected have a higher moment capacity than the ones with end plates only and the one without endplates and connected bottom flanges.

**Replacement of Old Truss Bridge (Video)**

The $244.6 million replacement of the temporary Fore River Bridge in Quincy, MA, part of MassDOT's Accelerated Bridge Program.
Demolition and Slide-in (Video)

I-84 Accelerated Bridge Construction timelapse

Following the demolition of the existing bridge, engineers and crews "slide" the previously built bridge span in place, dramatically limiting the closure time to one weekend.

Demolition and Slide-in (Video)

Milton-Madison Bridge Construction Overview

At nearly a half-mile, it is the longest bridge in North America, perhaps the world, to be slide laterally into place. The slide occurred in April 2014. This bridge goes over the Ohio River connecting Madison, Indiana with Milton, Kentucky.

Self-propelled Modular Transporter (Video)

• Sam White Bridge Accelerated Bridge Construction (ABC) Bridge Move (video)

Utah County I-15 Corridor Expansion (I-15 CORE) design-build project, UDOT, used self-propelled modular transporter (SPMT) to move the Sam White Bridge in American Fork, Utah.

Q & A