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.
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.

Box Girder OSD Bridge.

Erection of an Orthotopic 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

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

- 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.

Bottom flanges of the girders are joined together to provide a continuous load path for transferring the compression force from one flange to the next without the possibility of crushing the concrete in the diaphragm.

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.

Diaphragm with no end plates  Diaphragm with end plates

Replacement of Old Truss Bridge (Video)

Hood Canal Bridge Reconstruction - Removal of West Truss (video)

Removing the old east truss allows the WDOT to quickly reposition the derrick barges and begin operations to remove the west truss.
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.

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.

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.