

# Moving The Vernon Bridge

RON VUCKSON

District Construction Engineer  
Seymour District, IDOH

This was a unique case where, due to land acquisition and road closure restrictions, the state decided: (1) to build a temporary substructure for a new superstructure, (2) build the new permanent superstructure on the temporary position, (3) route traffic onto the new superstructure in its temporary location while demolishing the old bridge, (4) build a new permanent substructure in the old bridge location, and then (5) slide the new superstructure onto its permanent position on the new substructure.

Following is a brief background of the project. The bridge replaced was located over the Vernon Fork Muscatatuck River on SR 3 and SR 7. The bridge carried an average daily traffic of 7,966 vehicles per day (1984 figures). Just north of the bridge, was the Town of Vernon, which in 1976 was included in the U.S. Register of Historical Places. This meant the state had to try to avoid disturbing any of the property north of the bridge — as it was located within this historical district. This omitted the use of a temporary crossing which would have required additional right-of-way. Due to the routes of the adjoining state roads, and the wildly meandering Muscatatuck River, a road closure would have required a state approved detour of approximately 60 miles. Thus, with the right-of-way restrictions, and the desire to keep the road open, the state decided to use a different type of bridge design to replace the existing structure which would allow traffic to be maintained during construction.

The construction was as follows: (1) a self-contained superstructure was built, (2) stainless steel plates were affixed to the pier caps and end bent diaphragms, and (3) the new structure was slid from the temporary location to the permanent one. To do this, the temporary end bents and piers were topped with a series of teflon-coated pads which provided a sliding surface. After the permanent substructure was built, temporary blocks (with teflon-coated pads on top) were attached to the pier caps and end bents. These were removed when the deck was in its final position, and the rockers and bearing pads were put in place. The two end bents and three piers were all built on the same line (temporary and permanent substructures) to provide a common sliding slot.

The deck was pulled from its temporary location to its permanent place by the use of two hydraulic jacks which pull steel rods. The hydraulic jacks were attached to the leading edge of the permanent pier and pulled

the rods which were attached to a steel beam connected to the underneath side of the superstructure. These jacking assemblies were located on piers 2 and 4. In the original design, a friction coefficient between the stainless steel plates and the teflon pads was assumed to be no more than 0.07. In actuality, the forces required to move the deck indicated a coefficient of 0.15 was actually present.

On the first attempt to move the deck, the hydraulic jacks pulled to the maximum allowable strain of the rods—but the deck did not budge. The apparent solution was to use bigger rods, however, these did not move the deck either. Next, the use of three hydraulic jacks pushing the deck from the trailing edge of the temporary piers, in conjunction with the jacking assemblies, finally started the bridge moving. Once the initial bond was broken, the deck pulled at the designed tension.

Once we started moving the bridge, the road was closed, but even with the two false starts, only 12 days of road closure was required to move the deck.

In summary, this alternative design allowed the state to replace an aging structure without disturbing any of the historical area and with a minimum of interference with the travelling public.