**Doka Formwork Follows the Curve**

The Portland-Milwaukie Light Rail Bridge, located in Portland, Ore., is part of a light rail project that will extend 7.3 miles and connect the campus of Portland State University to north Clackamas County, south of the city. The area in the immediate vicinity of the rail line is expected to add one million new residents by 2030, and the new infrastructure is a critical component in managing that urban growth. The 1,720-foot (525 meter) bridge spans the Willamette River and will serve light rail trains, pedestrians, and cyclists. It is being built by the Kiewit Infrastructure Group.

The structure is a four-pier cable-stayed bridge, with two piers on land and two in the water at the towers. Cables are attached to four diamond-shaped pylons, each standing 180’ tall (55 meters). The pylons reduce in size with each lift, being 16’ wide at their footings and 9’-2” at their tops, so formwork solutions utilized on the project had to be adaptable with each lift. Kiewit worked with Doka to engineer these solutions; in all, Doka provided 1,880 square feet of steel formwork and 1,420 square feet of Top50 formwork.

For the lower lifts Doka provided steel plate girder combined with custom fabricated steel panels. The custom panels were utilized on the challenging and non-standard areas. Custom steel panels were fabricated for elliptical footing and 30’ tall custom “V” panels were used for the pylon front face. Doka’s MF240 climbing platformd were utilized to access the formwork on the second 30’ tall steel girder lift. These same MF240 platforms were then reused on the subsequence Top50 upper lifts

For the upper lifts, Top50 formwork was used. Due to the changing geometry of the pylons at each lift, Doka provided drawings detailing where and when to cut the gangs to accommodate the constantly changing shape. The amount of rebar used in the concrete resulted in a decision to use tieless Top50 formwork; this reduced the amount of labor required to patch tie holes and prevented any inference between the ties and rebar. Using a C15 Vertical Waler as strong back enabled the pours to be completely tieless.

The pylons also required a slight angle change at elevation 141’-6”. Various formwork options were explored using MF240, with the final solution being full platforms that could be cut back each lift as the geometry changed. Doka’s MF240 climbing formwork was used as an access platform. This crane-lifted formwork permits controlled, regular working cycles on all tall structures. It is extremely easy to set up, and can be tailored to meet a wide range of different requirements. This highly flexible option provided optimum adaptation with only a few individual components for the project.

Another challenge was that Kiewit required a cut-out in the forms to accommodate the connections for the cables.

"From 30-foot tall lifts with steel and custom formwork on the lower levels to tieless Top 50 with constantly varying shapes on the upper levels, Doka faced many challenges on this project. We were able to combine a European technology for the upper lifts with American methodology for the lower lifts. In this way, Doka was able to offer a complete package that could not be surpassed,” said Chris Lewis, Engineering Manager at Doka USA, Ltd.

The bridge has a projected opening date of fall 2015.

**About Doka**

With innovations and more than 50 years’ experience in formwork engineering, Doka is one of the world’s leading single-source suppliers of complete formwork solutions. Doka has a comprehensive range of products and services with which it can offer economical formwork solutions in practically all areas of casting concrete construction, ranging from multifamily residential buildings and high-rises to complex infrastructure projects such as bridges, water treatment plants, and power stations. For more information, please visit [www.doka.com](http://www.doka.com).

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**Facts:**

Location: Portland, Oregon

Project Size: 1,720-foot (525 meter) bridge

Products: Girder; Custom steel; Top50 and MF240; Custom “V” shaped steel bull-nose formwork

General Contractor: Kiewit Infrastructure Group

Project Start Date and Scheduled End Date: June 2011 – Fall 2015