

BEHIND THE CONSTRUCTION FENCE

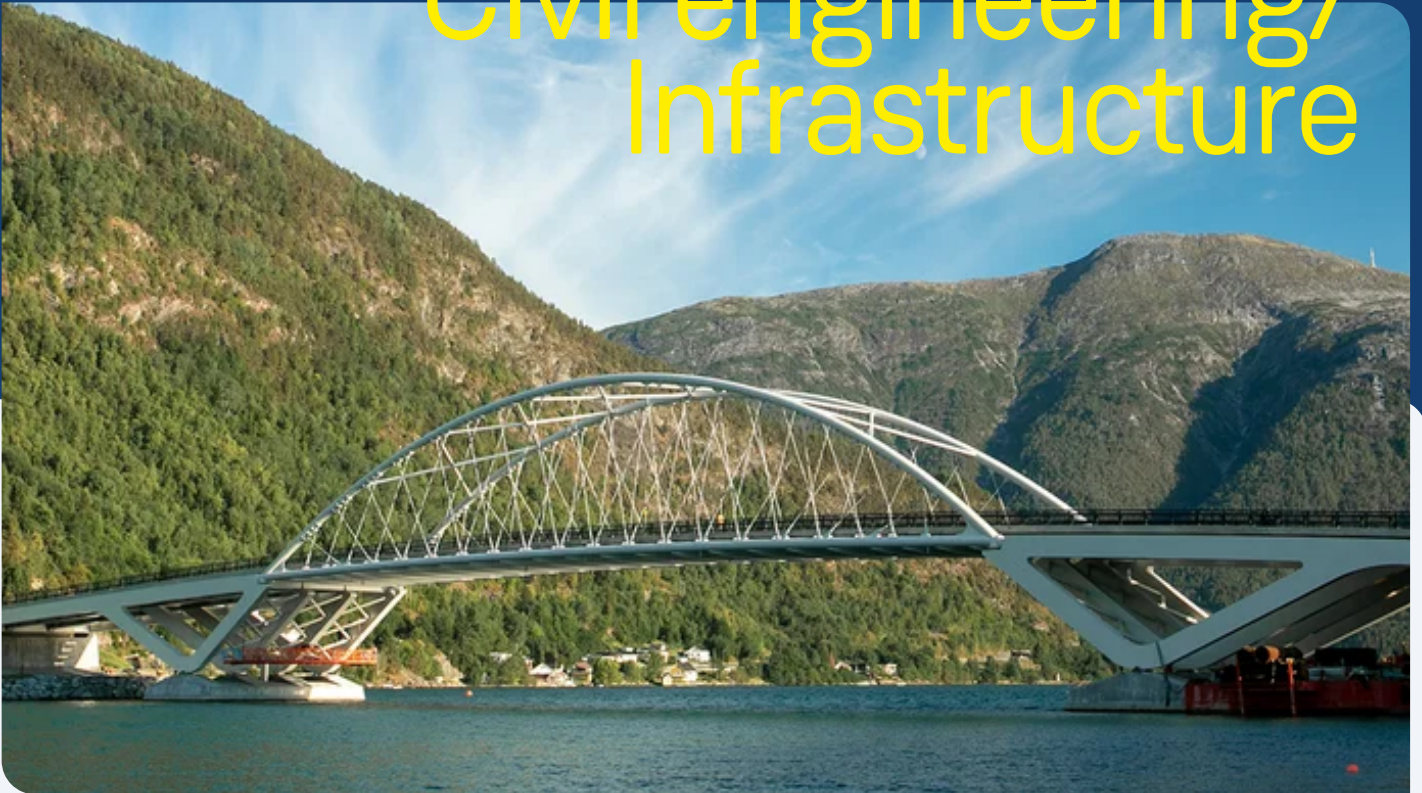
CONSTRUCTION DETAILS

TECHNOLOGY

The Loftesnes Bridge

21.01.2019 / Norge / Mariusz Urbanski

Civil engineering/ Infrastructure



Factbox

Client: Statens Vegvesen Region Vest

Contractor: Joint Venture: PNC Norge AS und K.A. Aurstad AS

Architect: ÅF Consult

Contract Type: Generalunternehmer

Project Type: Civil engineering/infrastructure, Bridge construction

Scope: New construction of bridge, roundabout and retaining wall, as well as removal of the old bridge

Contract Volume: 238 million Norwegian kroner (25 million euros)

Construction Start: 12/2015

Construction End: 07/2018

Location: Sogndal

New landmark in the heart of the Norwegian fjords

With the construction of the Loftesnes Bridge, which won a European Steel Bridge Award, the PORR subsidiary PNC has realised an important project in Norway.

The contract also included the construction of a roundabout, several footpaths and cycle lanes, and the demolition of the old bridge. In order to ensure a continuous flow of traffic, the dismantling and new construction had to be precisely coordinated.

”

The award criterion for the contract was the lowest price. We were able to deliver the best quality.

Mariusz Urbanski
Project Manager, PNC Norge AS



In addition to the construction of the new bridge, the contract also included the construction of a roundabout and the demolition of the old bridge. Source: PNC Norge AS Until

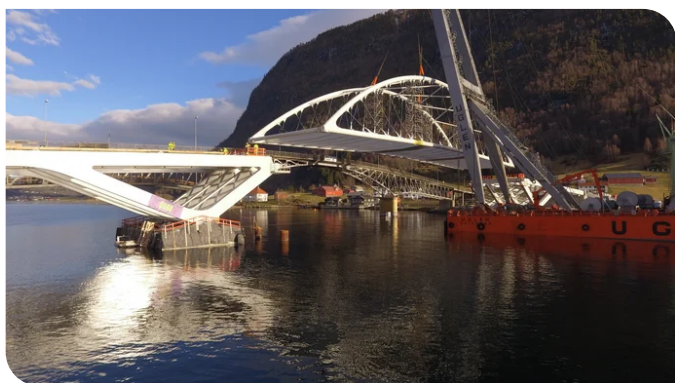
Old next to new

The new bridge was built in a runtime of just under two and a half years directly next to the old Loftesnes Bridge, which had to be kept open to traffic until completion. The close proximity of the two structures combined with difficult ground conditions made laying the bridge's foundations a real challenge. The ground movements and earth tremors had to be closely monitored when driving the 28 Tubular steel piles, which serve as support for the main foundations, in order to avoid any negative impact on the old bridge.

By August 2016, two main foundations with 14 piles each had been constructed. The piles were driven into the ground from a large barge using a piling machine. In total, piles with a total length of almost 1,500 metres were sunk into the sea, reinforced and cast on site. The longest pile was over 70 metres long. After the piling work, construction of the pile caps as well as two abutments at both ends of the bridge could begin. At the same time, the steel structure for the bridge, consisting of three sections and weighing almost 1,300 tonnes, was manufactured in Poland. At the end of January, after completion of the pile caps and abutments, all three steel construction sections were loaded onto two barges, secured and shipped to Norway, where they arrived five days and 765 nautical miles later.



The first barge transported two bridge sections to the local quay near the construction site. The 800 tonne floating crane was also already on site at this time. Source: PNC Norge AS



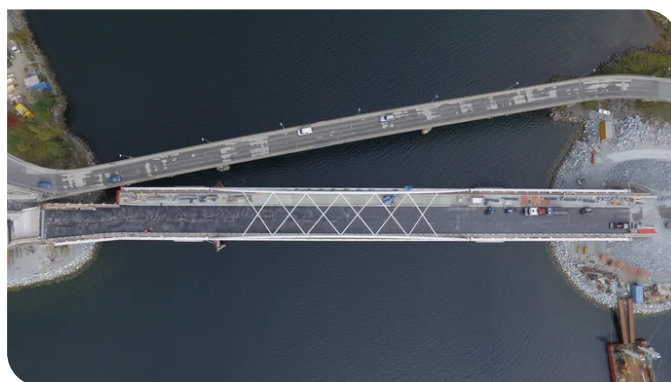
Assembly of the steel structure. The first section shortly before reaching its final position. Source: PNC Norge AS

Installation with floating crane

The arrival of the steel structure and the subsequent bridge installation marked the start of the most exciting phase of the project, which was also met with great interest by the local population. Local residents and onlookers gathered on the quay where the steel structure was placed to watch the construction process. For the installation itself, PNC had precisely defined each work step in advance and drawn up a detailed schedule. A floating crane with a lifting capacity of 800 tonnes was used to assemble the three bridge sections. The first steel structure, weighing 470 tonnes, was suspended from the crane and installed in its final position on 31 January. Just four days later, the other two sections were also in place. As one section was assembled very close to the old bridge, traffic had to be closed for a short time for safety reasons.

Parallel dismantling and new construction

Before the dismantling of the old Loftesnes bridge could begin, traffic had to be rerouted to the new bridge within a deadline set by the client. This also required the roundabout to be constructed and all surfacing work to be completed. PNC focussed all work on meeting this deadline, as each day of delay would have resulted in a considerable penalty. During the summer months of 2017, intensive work was carried out to complete the bridge deck so that good weather conditions could be utilised for insulation and asphalt work. The insulating layer was applied to the bridge deck and roundabout at the end of September 2017, followed by the asphalt two weeks later. The bridge was opened to traffic on 29 November, one day before the deadline.

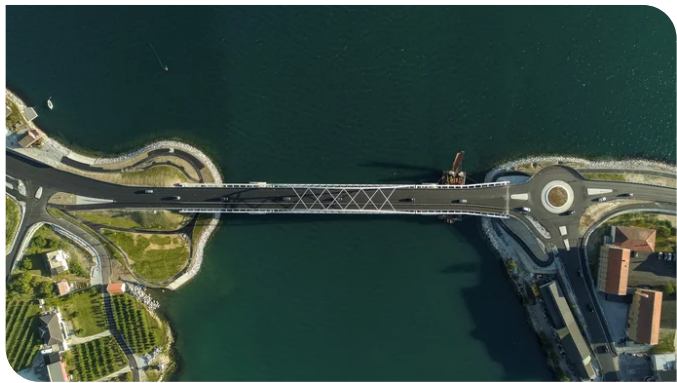


Once the insulating layer had been laid, the asphalt pavers got to work. Source: PNC Norge AS

”

The new bridges consist of a three-part steel structure that was assembled using an 800-tonne floating crane.

Mariusz Urbanski
Project Manager, PNC Norge AS



A bird's eye view of the bridge after completion of the work. Source: PNC Norge AS

Immediately afterwards, the dismantling of the old bridge began using heavy lifting equipment, which was divided into three sections and brought ashore on a barge. There, the construction materials were separated and prepared for recycling. The piles sunk in the fjord were cut through by a team of divers. The entire dismantling process took around 1.5 months.

194 m

Bridge lengths

1.000 t

Reinforced concrete

Technical data

Piles driven	28 piles, ø 1220mm, max. length 70m
Steel incorporated	1.250 t
Concrete incorporated	6.600 m3
Tie cables	72 fully locked cables, ø 45mm



To make the shore accessible, the town of Sogndal has invested in a fjord hiking trail with play equipment, seating, fitness equipment and sculptures. Source: PNC Norge AS

Successful handover and award

The final phase of the project began once the old bridge had been dismantled. The missing parts of the abutment as well as the steel structure and the bridge deck could now be completed. The steel structure was welded on site and corrosion-protected on site. While PNC finalised the work on the bridge, the joint venture partner K.A. Aurstad took care of the planting, the completion of footpaths and cycle paths and the electrical installations. Following the successful inspection, the bridge was handed over to the client in July 2018. As the crowning glory of the project, it was honoured with the "European Award for Steel Structures" with the ECCS Public Award.

Gallery

