



# Steibrua



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Norwegian Public Roads  
Administration



Mona Østgårdstrøen, Norwegian Public Roads Administration



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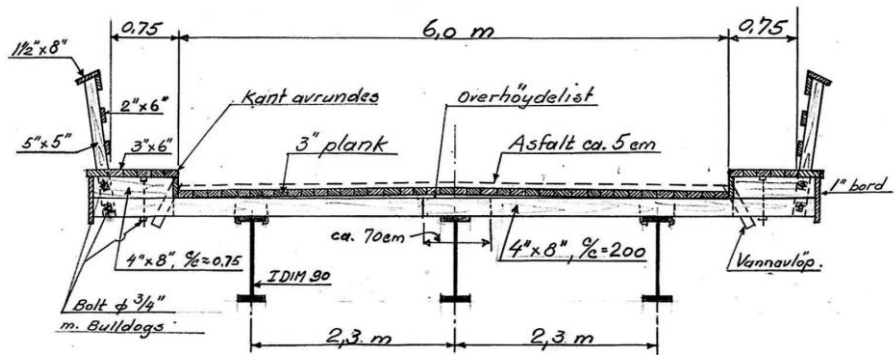




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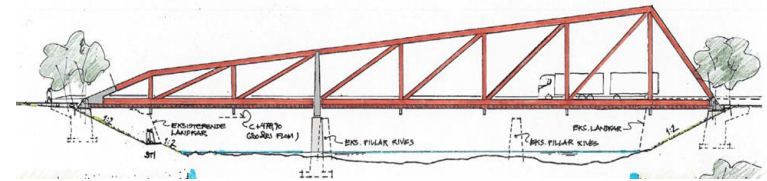
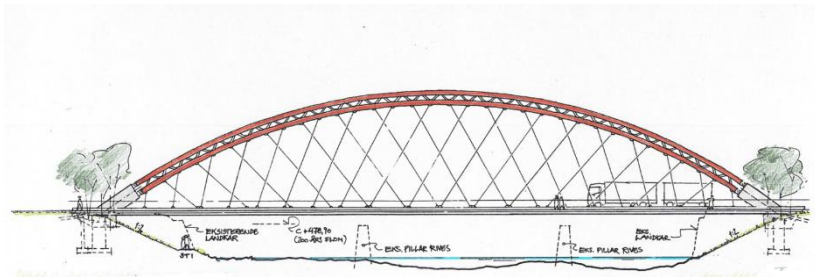
## The Old Steien Bridge

*Riksgveg 129 i Alvdal herred.*



## Steibrua

- Feasibility study in 2009/2010
- Zoning plan with pilot project in 2013

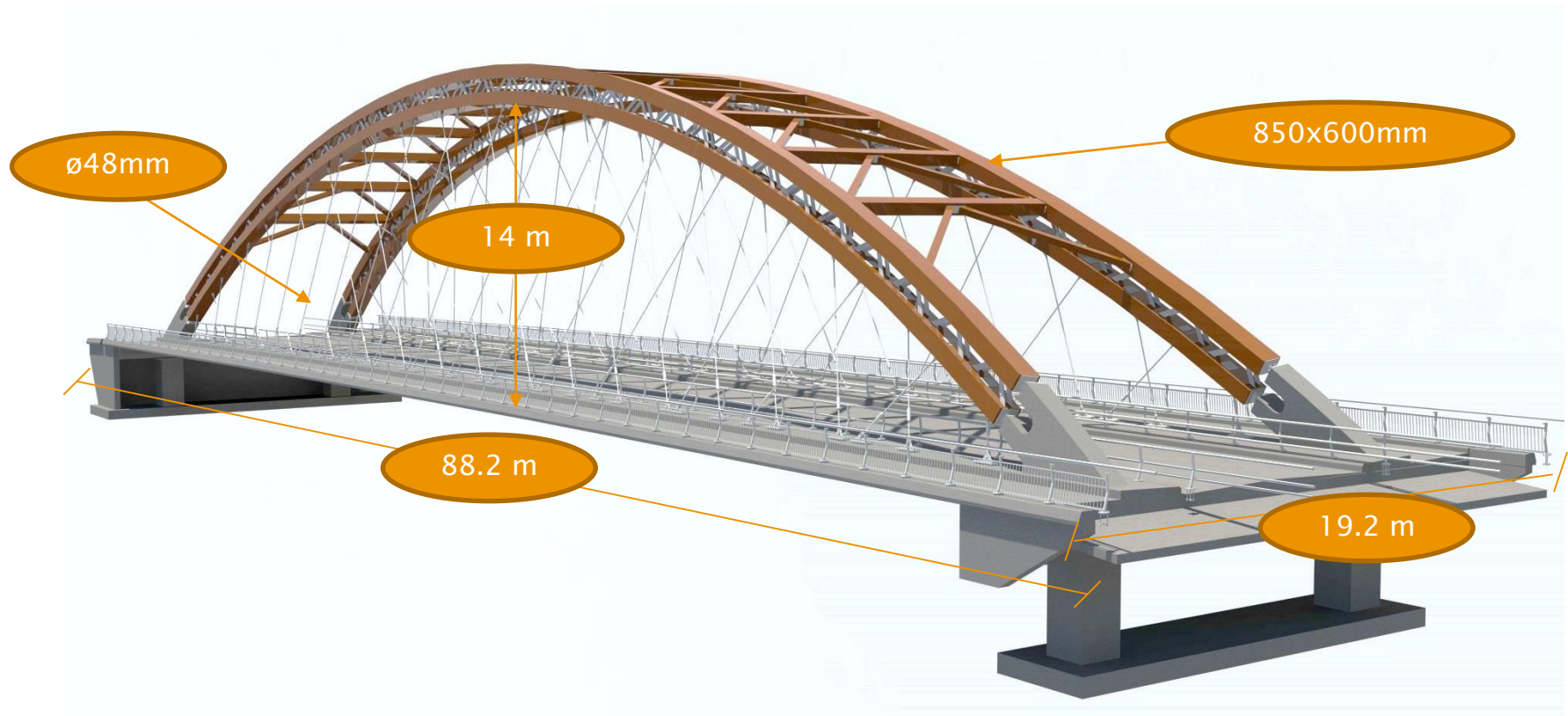


- Building plan and call for tender in 2014
- Construction 2015/2016



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**Engineering design:**  
Bridges Section, NPRA Eastern Region

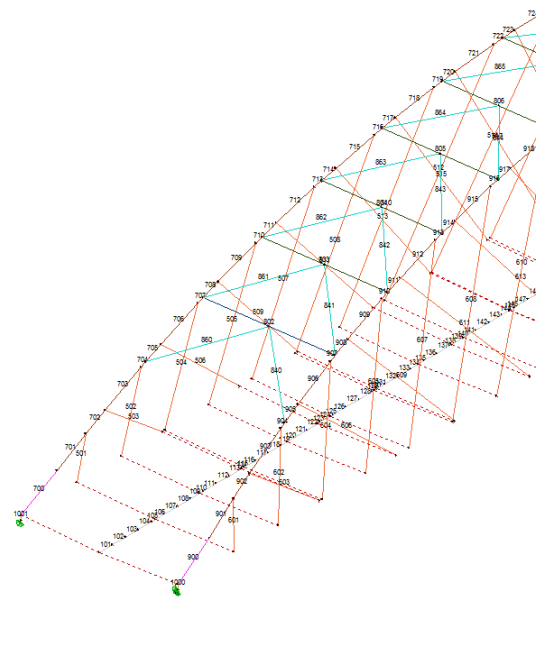
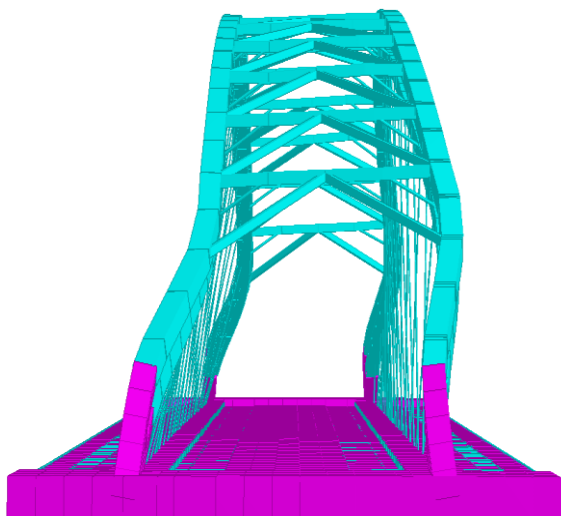


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Analyses



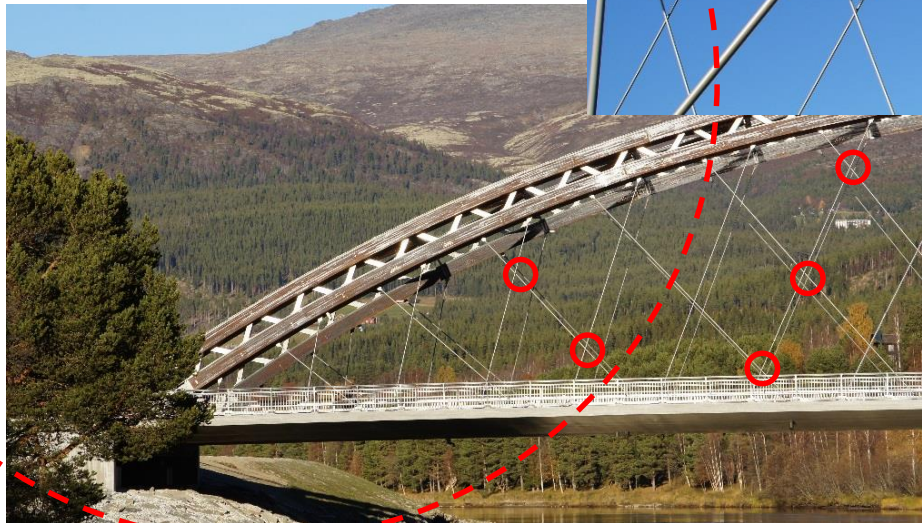
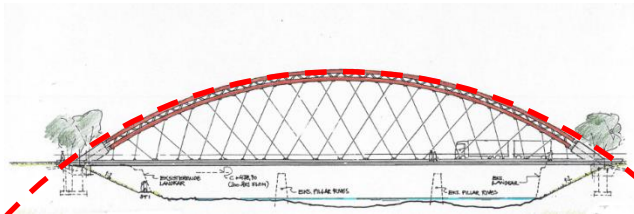
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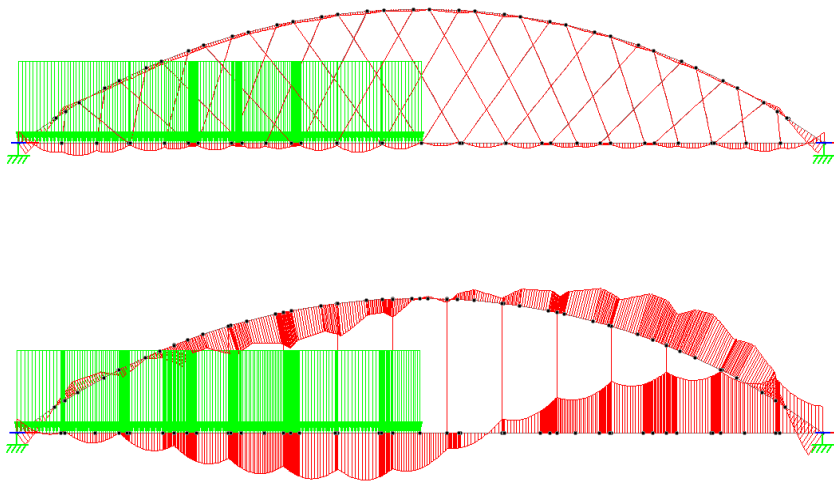
# Characteristics of a good network arch bridge



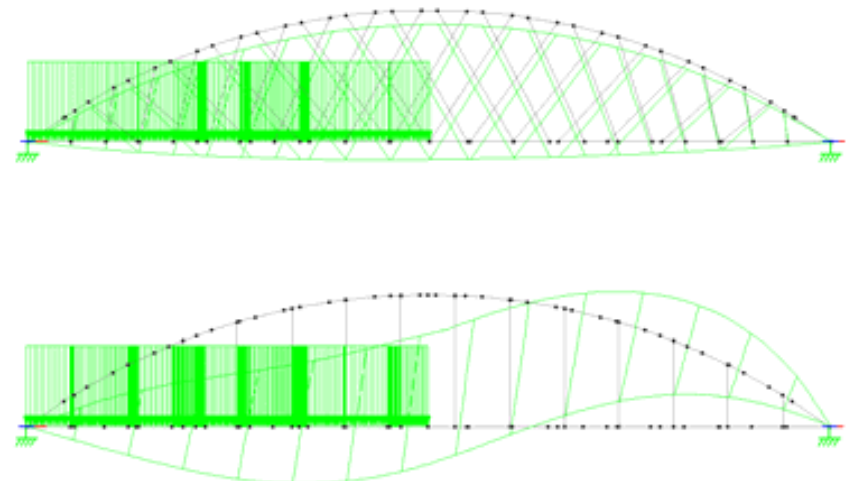
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# Structural behaviour of a network arch bridge compared to a conventional arch bridge

MOMENT, ASYMMETRIC LOADING



DEFLECTION, ASYMMETRIC LOADING





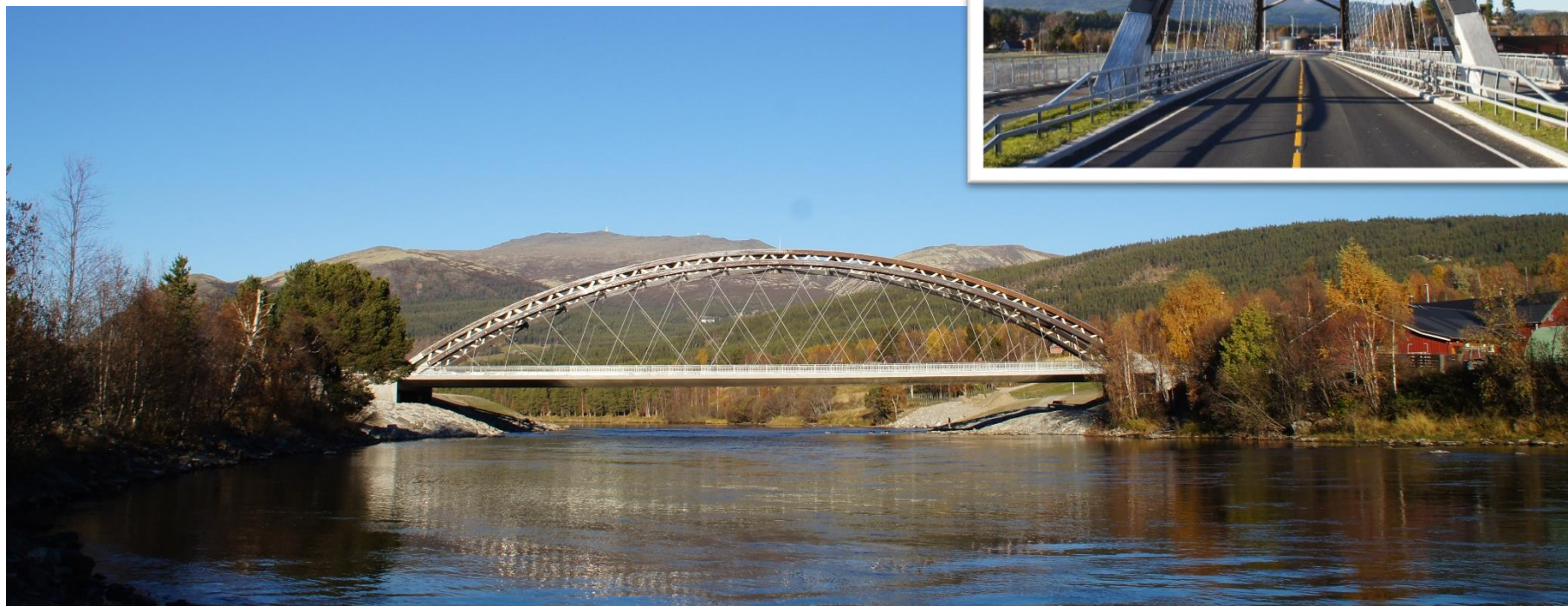


# Details

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# Lining

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14 June 2017

Timber Construction Conference in Oslo June 13-14 2017



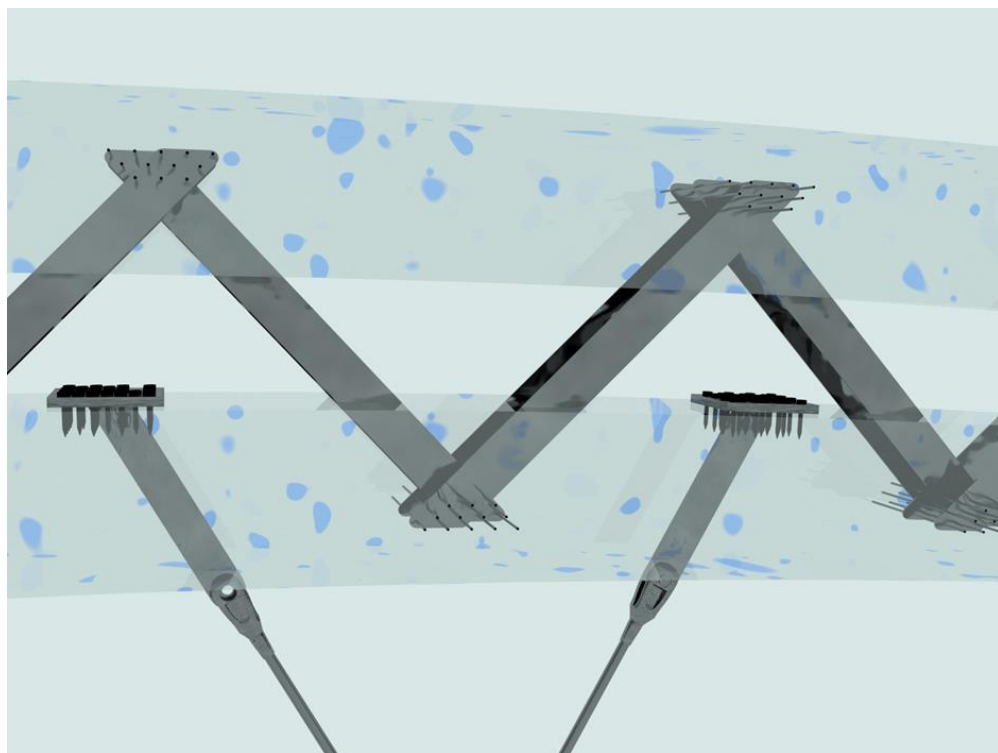


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# Steel details



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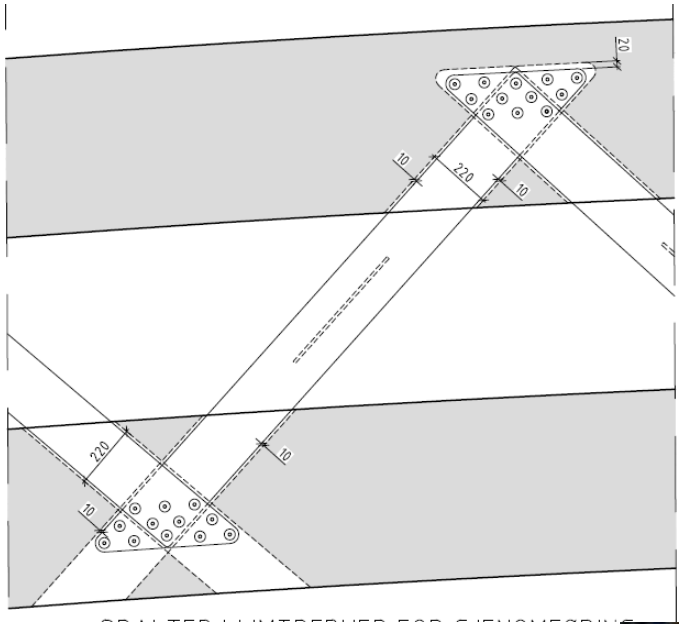




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# Details. Laminated timber (Glulam)

Milling of glulam. CNC machine



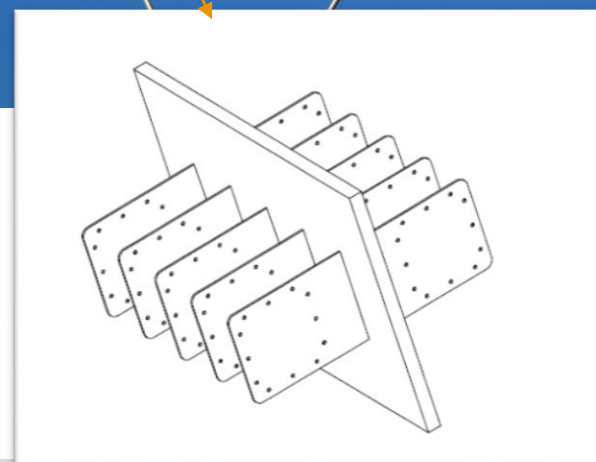
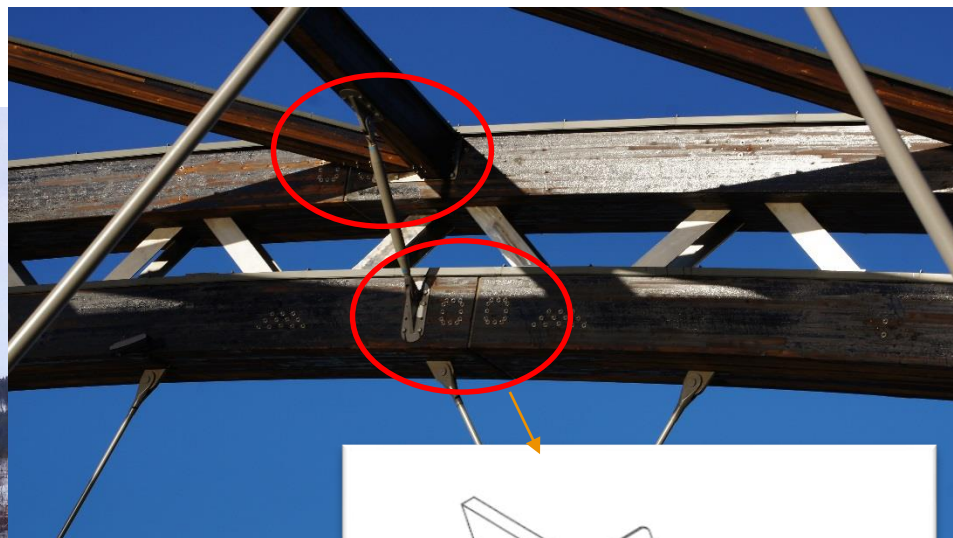


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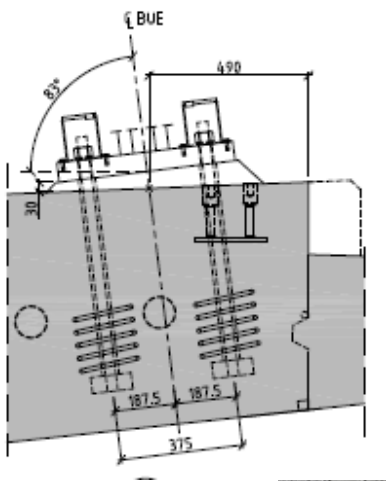
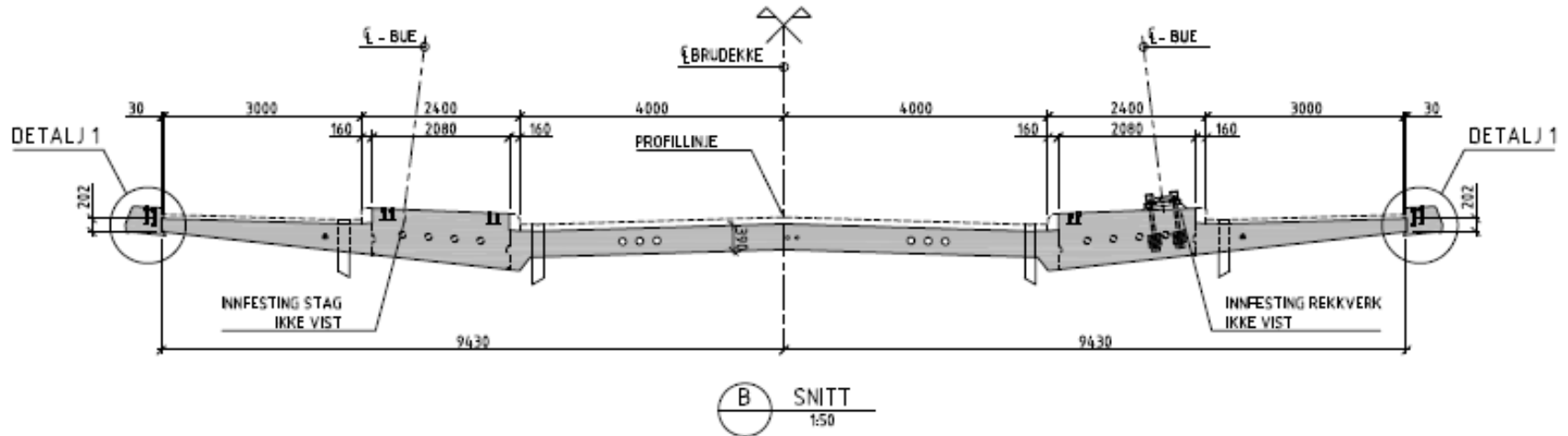
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# Pressure joints



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## Bridge deck





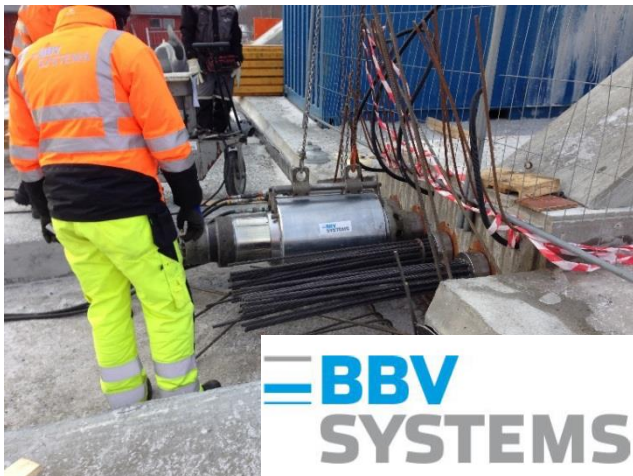


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Form of contract:  
Unit price contract

Main contractor:





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Opened for traffic 24 September 2016







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## Contract cost

(excl. rigging, VAT and contract management costs)

Feasibility study 2010:

Beskrivelse/forventet:

Bygging av ny Stelen bru  
- Trebru / nettverksbuebru  
- Ettspenns bru

Lengde: 80  
Bredde: 9 (Føringsbredde)

	Enh.	Mengde	Pris	Kostnad
Midlertidig anleggsfylling	RS	1	1 000 000	1 000 000
Grunnarbeider	RS	1	250 000	250 000
Landkar	STK	2	1 250 000	2 500 000
Brudekke i betong	m2	720	7 500	5 400 000
Buer, stag og sideavstivning	lm	80	85 000	6 800 000
Fuktisolering og slitelag	m2	720	720	518 400
Belysning, effektbelysning	RS	1	500 000	500 000
Gangbane, utenpåliggende	RS	1	2 500 000	2 500 000
Brurekkverk, levering og montering	lm	192	4 700	902 400
Rivingskostnader eksist. kjørebru+gangbru	RS	1	1 500 000	1 500 000
Omkjøringsveg (inkl. leie interimsbru)	RS	1	2 800 000	2 800 000
<b>Totalt eks. rigg</b>				<b>24 664 828</b>
Rigg og drift av bruarbeider	%	15	0	3 699 724
<b>Total entreprisekostnad eks mva</b>				<b>28 364 552</b>
Mva	%	10	0	2 836 455
Byggherrekostnader inkl prosjektering	%	20	0	5 672 910
<b>Totale byggekostnader</b>				<b>36 873 918</b>
Entreprisekostnad pr m <sup>2</sup> ny bru eks mva	m2	720	kr/m2:	32 527

28 000/m<sup>2</sup>

Contract cost bridge 2015/2016:

$$36\,000\,000 / (90 * 19) = 21\,000/m^2$$

$$21\,000 - 23\,000/m^2$$





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# Spin-off. Arch bridge without abutments





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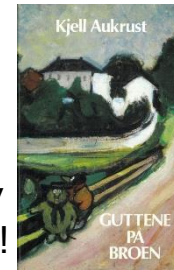




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This time, Solan Gundersen saw in his mind's eye an easily accessible Munch painting – the Girls on the Bridge could be replaced by Ludvig and Solan himself. Those women had been gossiping for long enough on that bridge. In the name of gender equality, away they go! Boys on the bridge! That would be something else! World famous they would be, both of them.



Thank you for your attention!