

# TP49, Køge Nord Station

(a part of Copenhagen-Ringsted high speed rail)

"There is more to life than box shaped structures"



Jens Thorup Laursen, Bridges Scandinavia

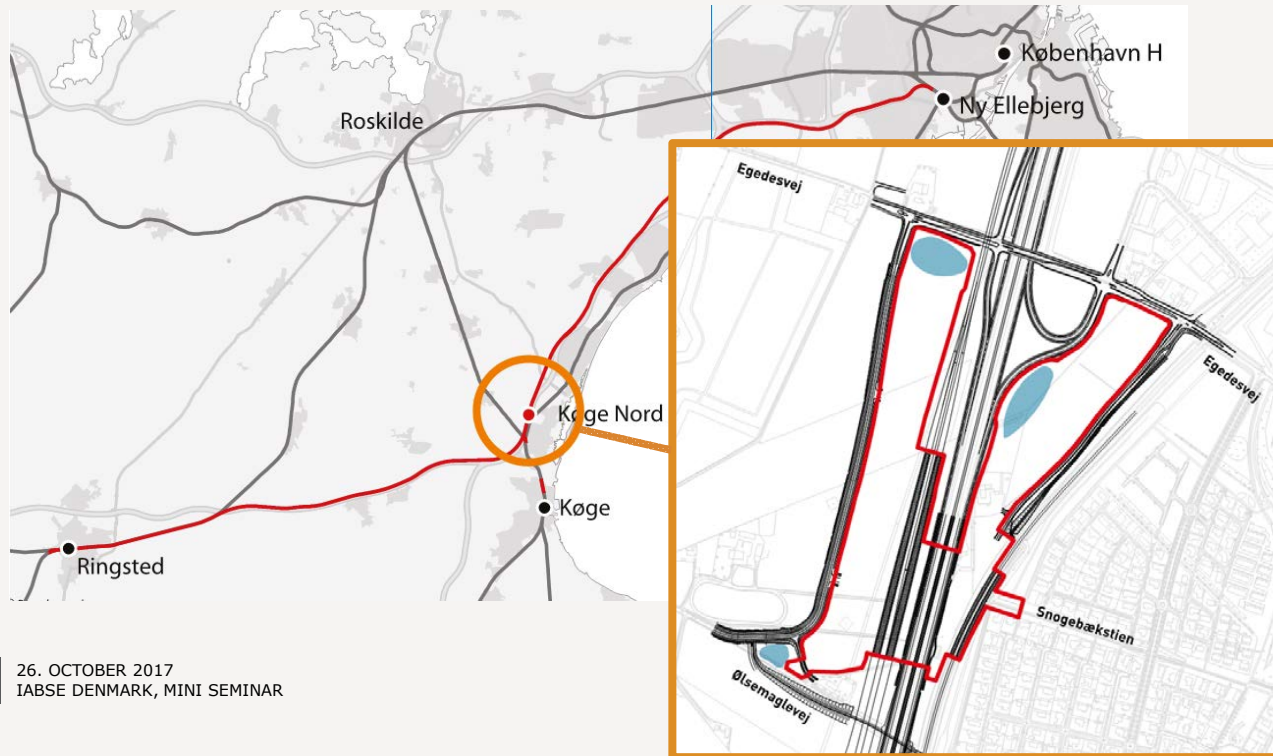
## Agenda:

TP49 Køge Nord station, architect, engineer and client working together

- Design Competition, conceptual design
- Detailed Design, shared 3D model
- Construction, status at present time
- > Lessons learned
- > Acknowledgement

# Introduction TP49, Køge Nord Station

> Where are we?



# TP49 – A Design Competition

Background:

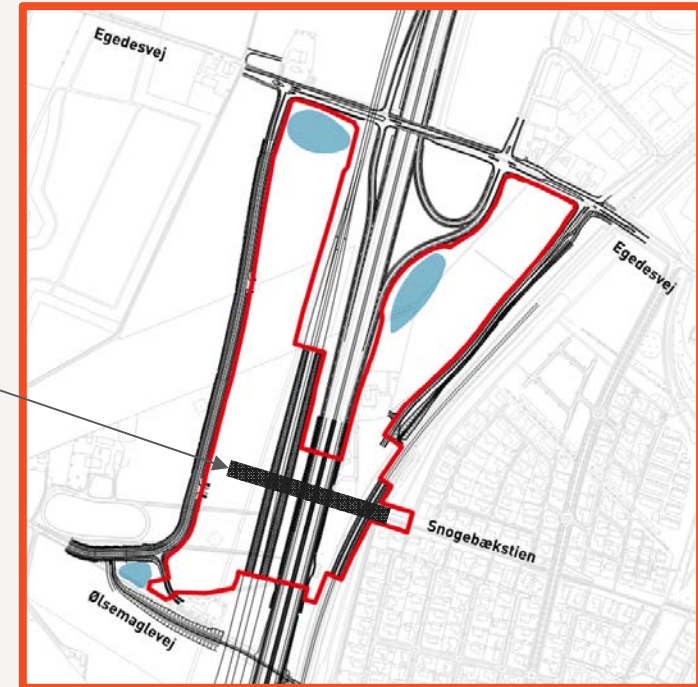
Banedanmark, client statement:

"Køge Nord Station will be the only new station to be completed as a part of the new Copenhagen-Ringsted High Speed Rail connection. It will foremost provide a much-needed boost to efficient public transport to and from Copenhagen. Secondly it will connect two important railway lines and be built above the busiest motorway in Denmark."

The project comprises both a station / pedestrian bridge and a Park & Ride facility – both to be completed in 2018.

## TP49 – A Design Competition

- > **The Pedestrian Bridge Design should:**
- > Span the S-tracks, the new High Speed Rail and the motorway, Køge Bugt
- > 200 m long and approx. 5 m wide
- > Distinctive design and a landmark
- > Low Operation and Maintenance Costs
- > Budget 85 mio. kr.  
(financed by Banedanmark)



## TP49 – A Design Competition

### The Park and Ride facility Design should:

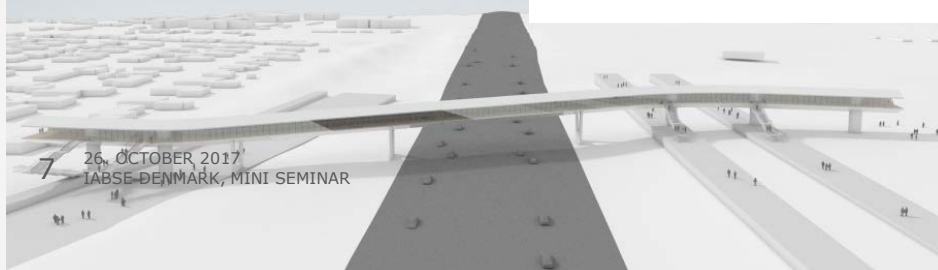
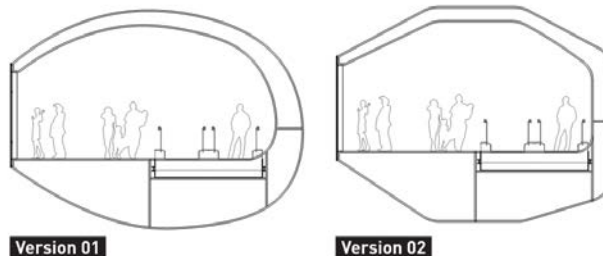
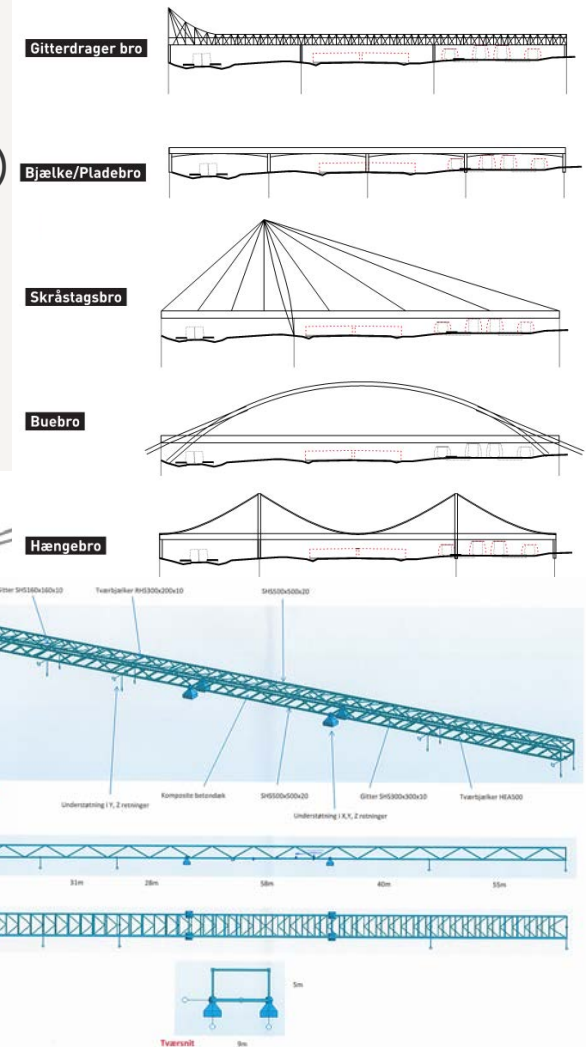
- > Enable a new traffic HUB
- > Provide efficient rerouting of traffic
  - between Pedestrians, cars and public transport
- > Parking and Ride facilities to support this
  - including 900 parking spaces
- > Enable future business development in Køge
- > Attract new enterprises
- > Budget 30 mio. kr.  
(financed by the municipality of Køge)



# TP49 – A Design Competition

Design process within CDC group (architect and engineer)

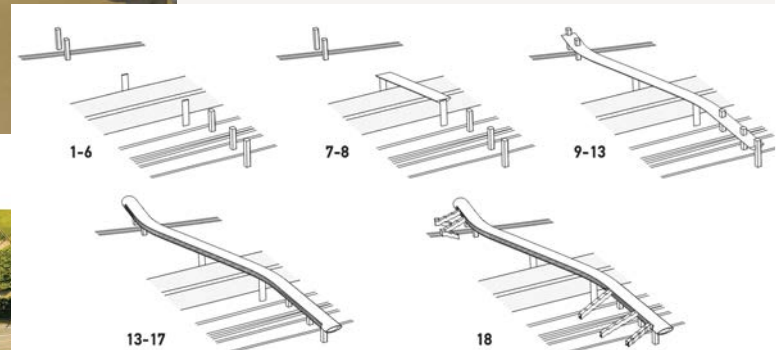
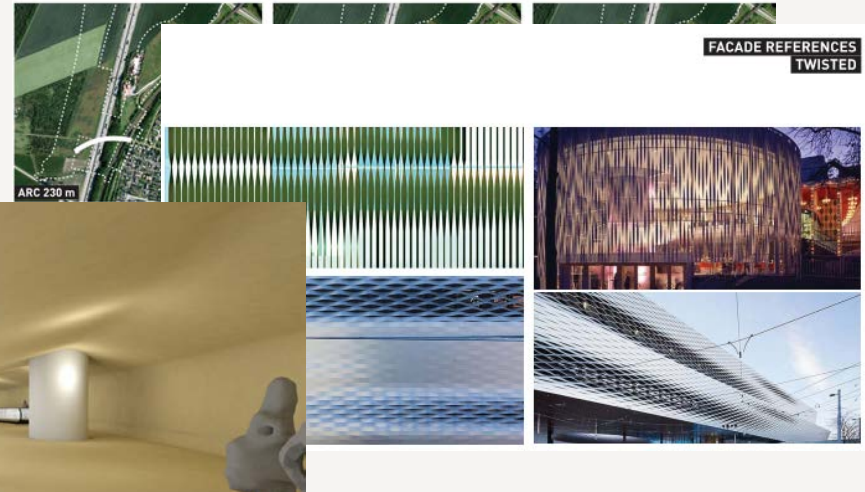
- > Brain storming w/ several solutions / bridgetypes
- > Go with one or two solutions (truss and box girder)
- > Choose "winner" in time to finish before deadline



# TP49 – A Design Competition

Special considerations:

- Horz/vertical alignment
- Exterior
- Interior
- Surroundings / experience
- Constructability
- Functionality

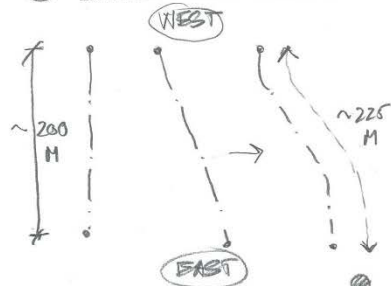




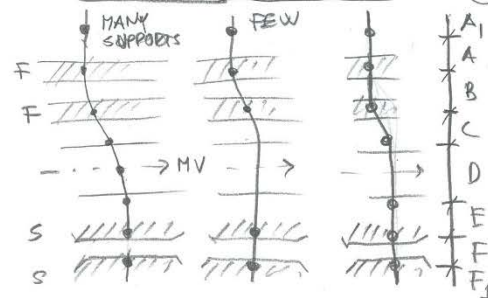
# Conceptual Design - seen from an engineering point of view

## TP403 DESIGN PROCEDURE

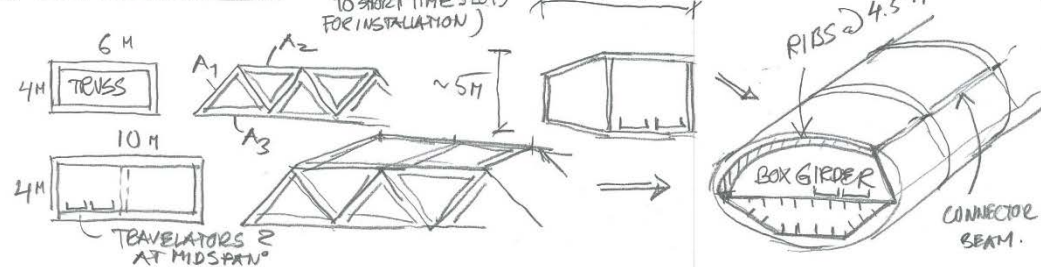
### ① HORIZONTAL ALIGNMENT



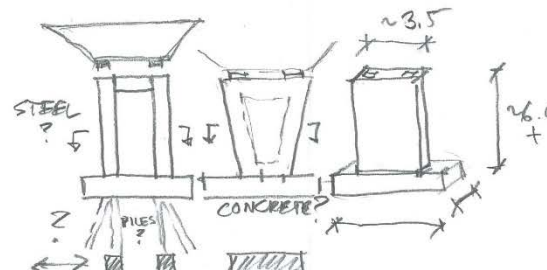
### ② NO. OF SPANS / SPAN LENGTH



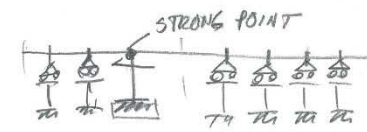
### ③ BRIDGE GIRDER TYPE (STEEL PARTS DUE TO SHORT TIME SLOTS FOR INSTALLATION)



### ④ SUPPORTS / COLUMNS / FOUNDATIONS



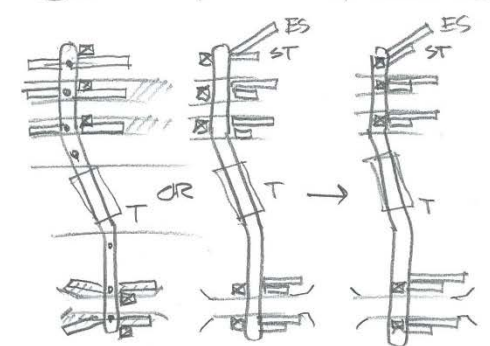
### ⑤ STATICALLY SYSTEM



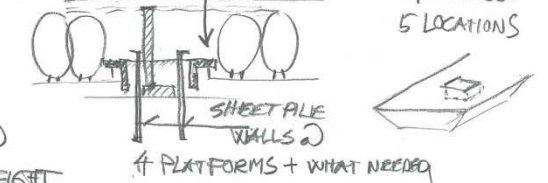
### ⑥ LONGITUDINAL ALIGNMENT



### ⑦ ELEVATORS / ESCALATORS / TRAVELATORS



### ⑧ SECURING EXISTING PLATFORMS



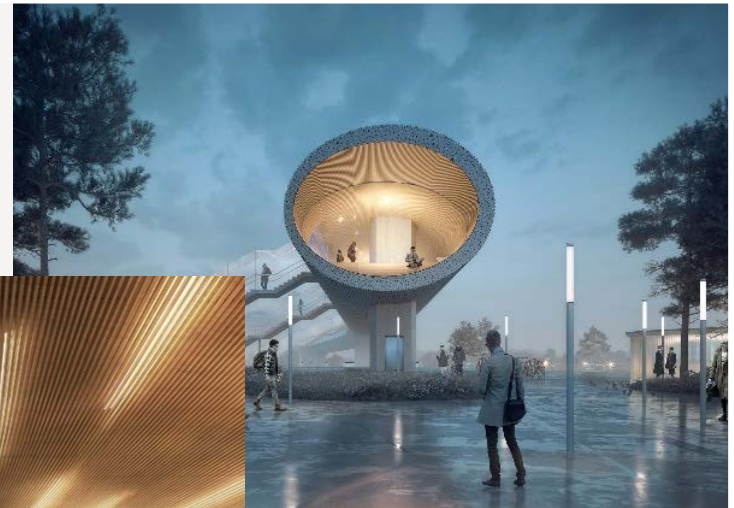
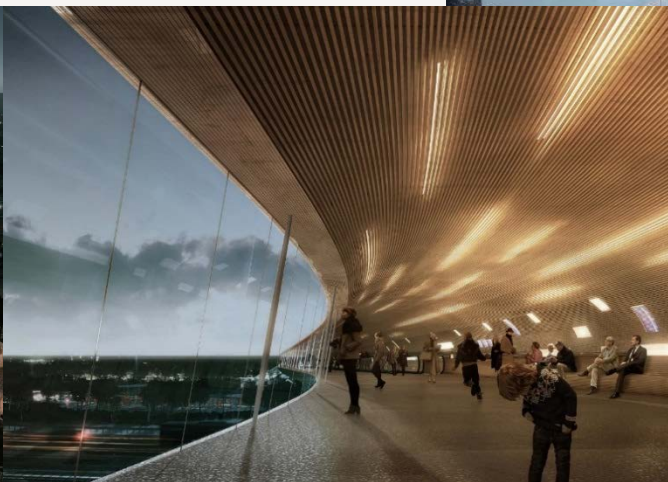
### ⑨ BILL OF QUANTITY & BUDGET

A1	-
A2	+
A3	+
A4	+
A5	-

← 85 MIO KE. !

# TP49 – A Design Competition

Final Rendering (by architects)



## And the winner is:

# Dansk team skal designe Køge Nord Station

Opdateret 14. november 2014 kl. 16:15  
Køge - 14. november 2014 kl. 16:02  
Af Trine Møller Pedersen  
Kontakt [redaktionen@sndk@sn.dk](mailto:redaktionen@sndk@sn.dk)

Byrådssalen var stuvende fuld, da vinderen af den internationale arkitektkonkurrence om den nye Køge Nord Station i går eftermiddag blev offentliggjort.

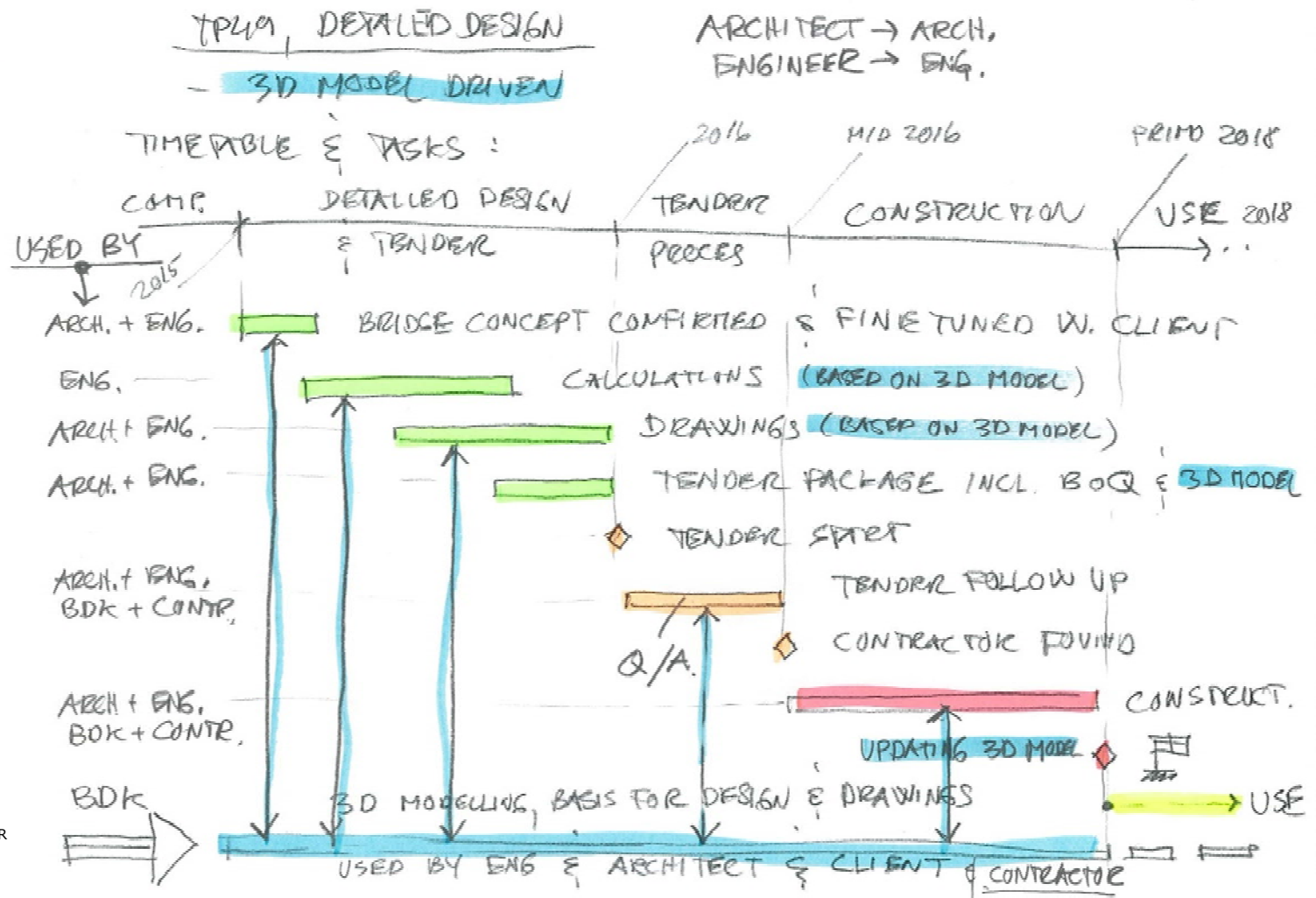
På opstillede placher med billeder af de fire forslag, som var med i opløbet, kunne man se de fire endelige forslag i billeder, ligesom de enkeltvis blev gennemgået for de fremmødte.

Og der var ingen tvivl om, at borgmester Flemming Christensen (K) er stolt over, at Køge Kommune danner rammen om en international arkitektkonkurrence.

- Køge Nord bliver genvejen til København, ikke bare for os, der bor i Køge Kommune, men for store dele af Sjælland. På det store Parker og Rejs-anlæg kan du stille bilen før du står på toget, og på kun 20 minutter er du fremme på Københavns Hovedbanegård. Samtidig er den nye station startskuddet til en



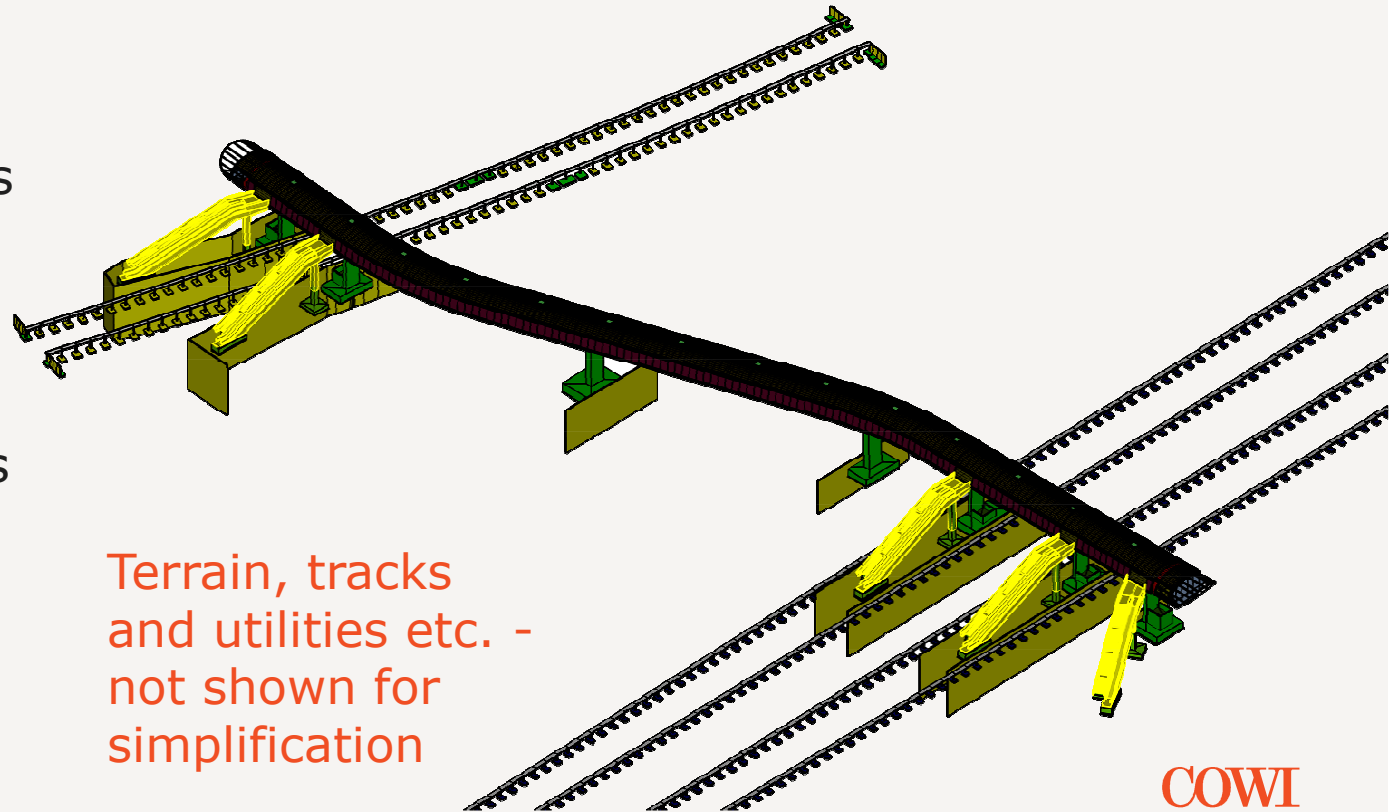
# After the Win



## The complete 3D model – used as a design tool

- Cladding
- Platforms
- Sheet pile walls
- Escalators
- S. supports
- Deck plates
- Ribs /ends
- Long. stiffeners
- Boxgirder

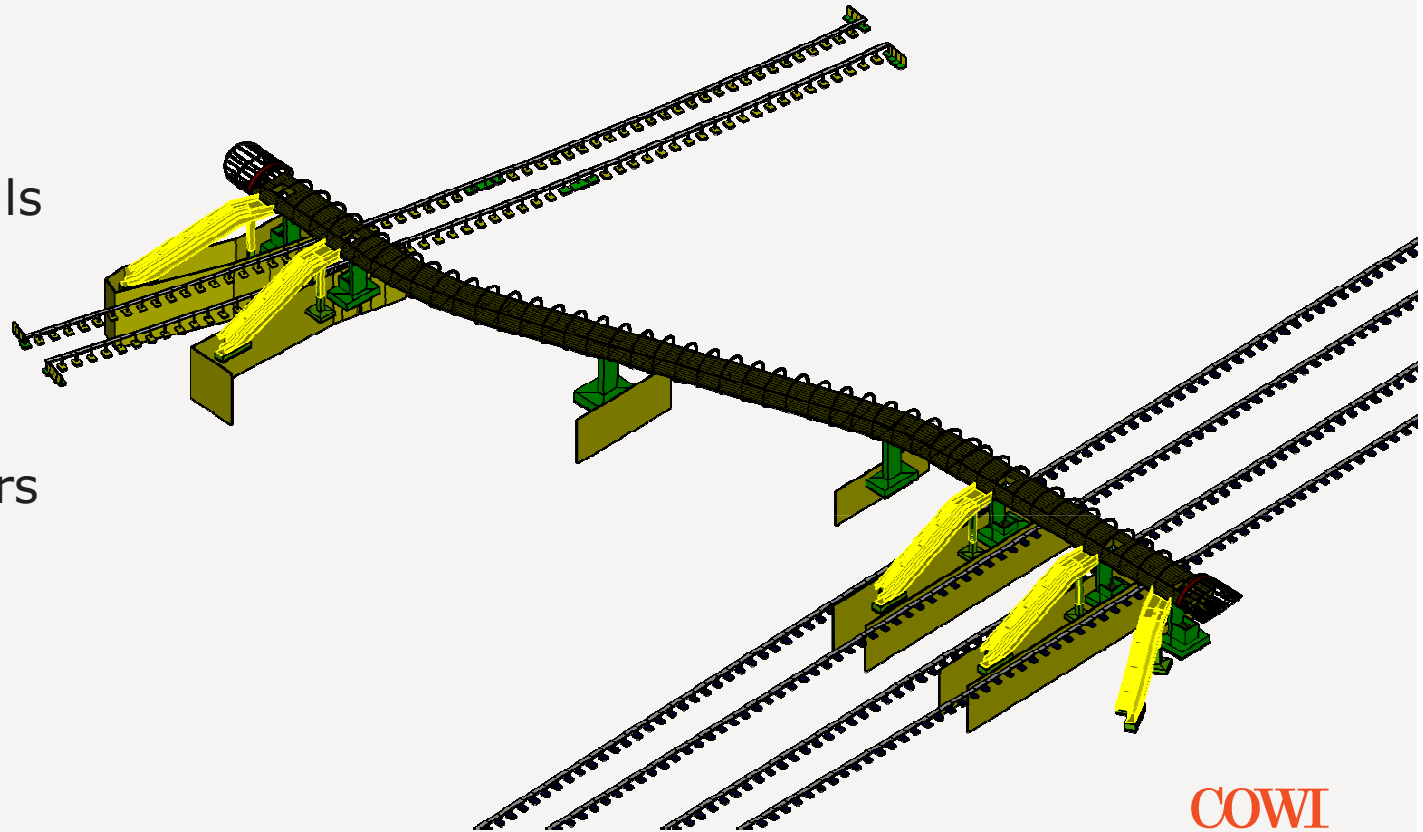
Model requirements set by client



Terrain, tracks and utilities etc. - not shown for simplification

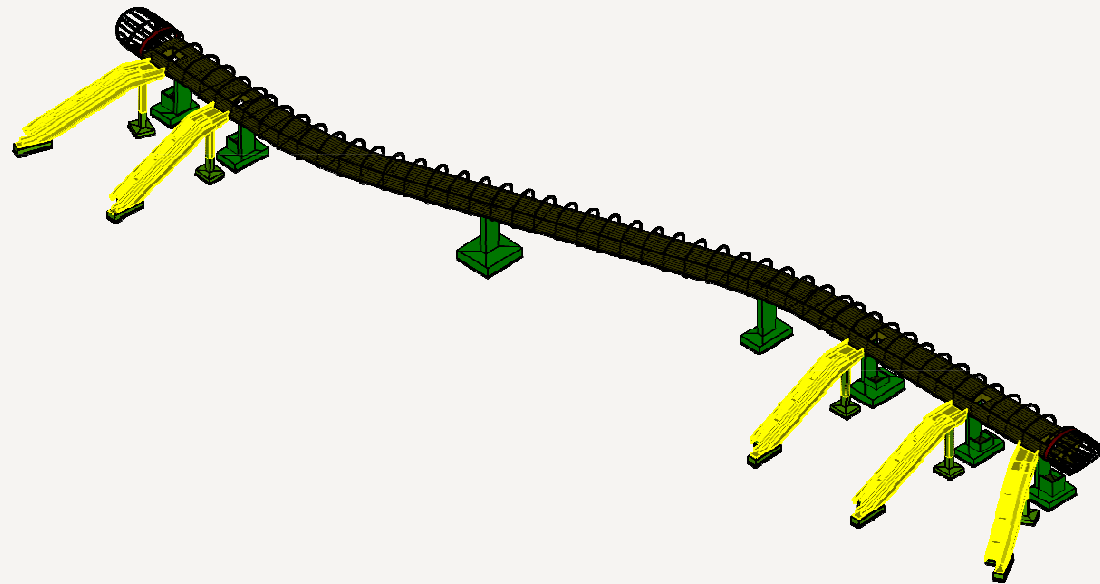
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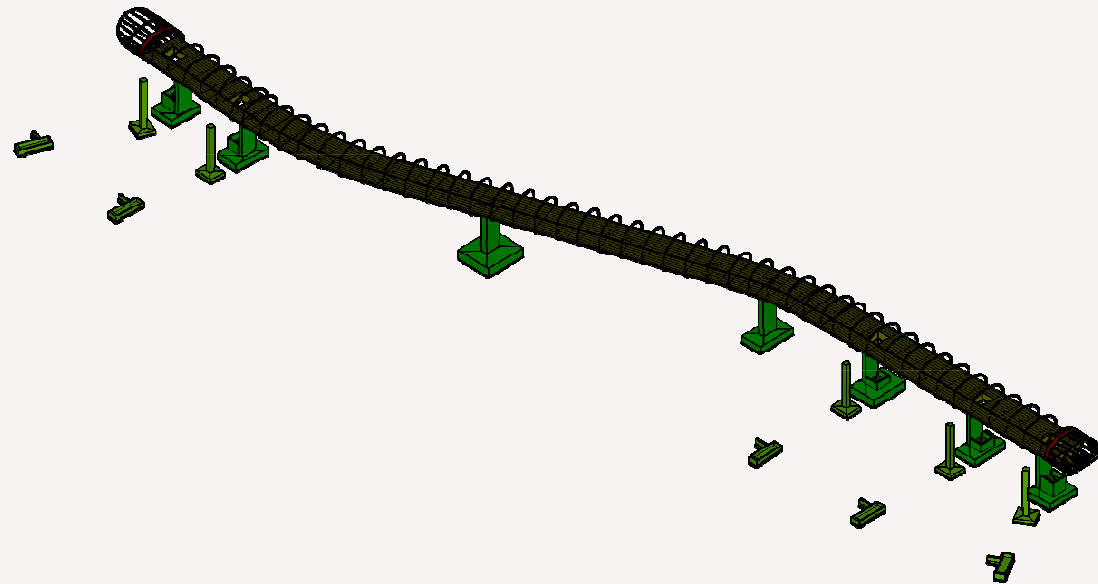
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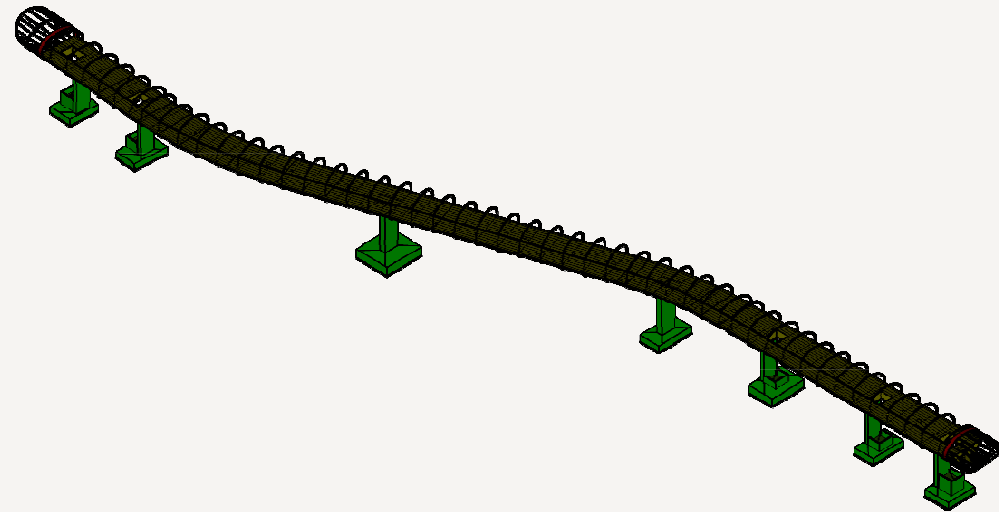
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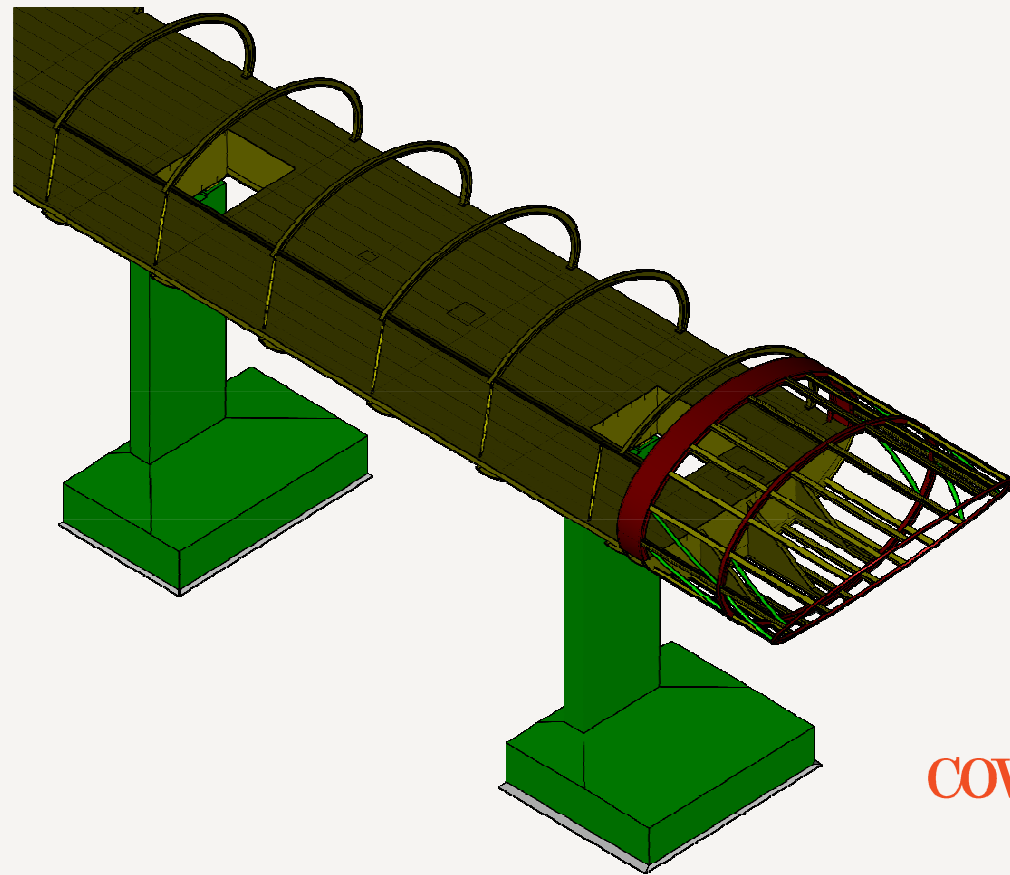
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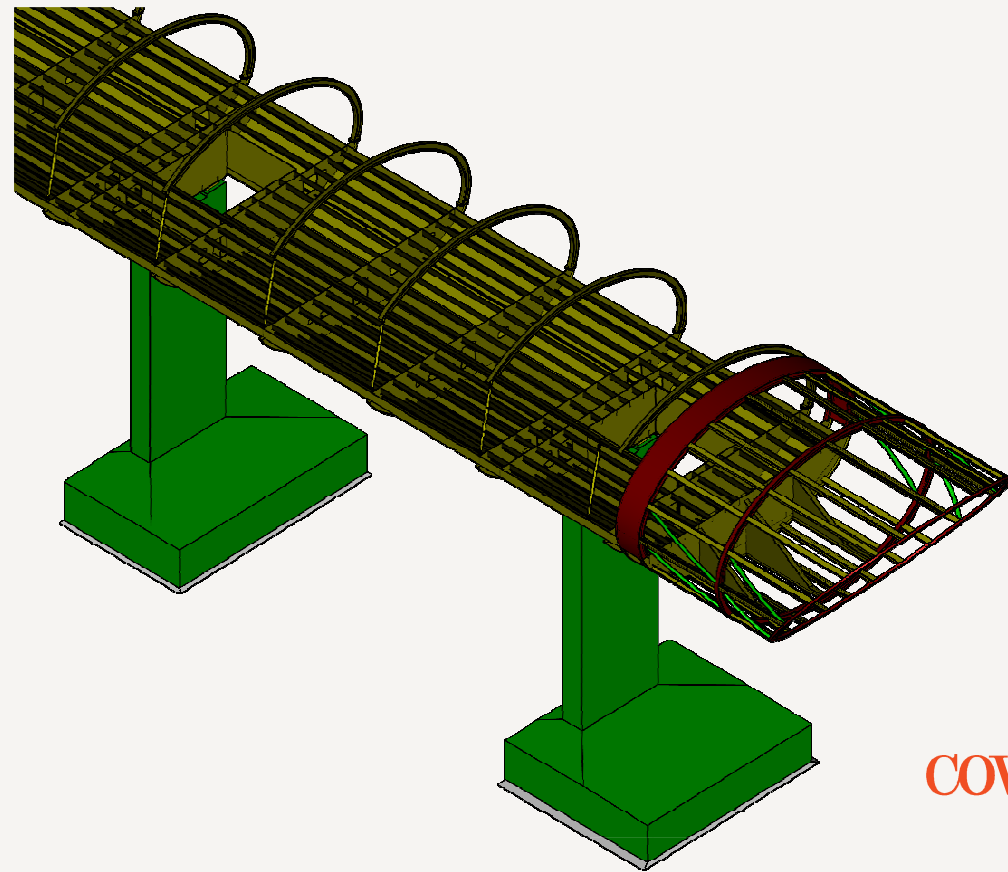
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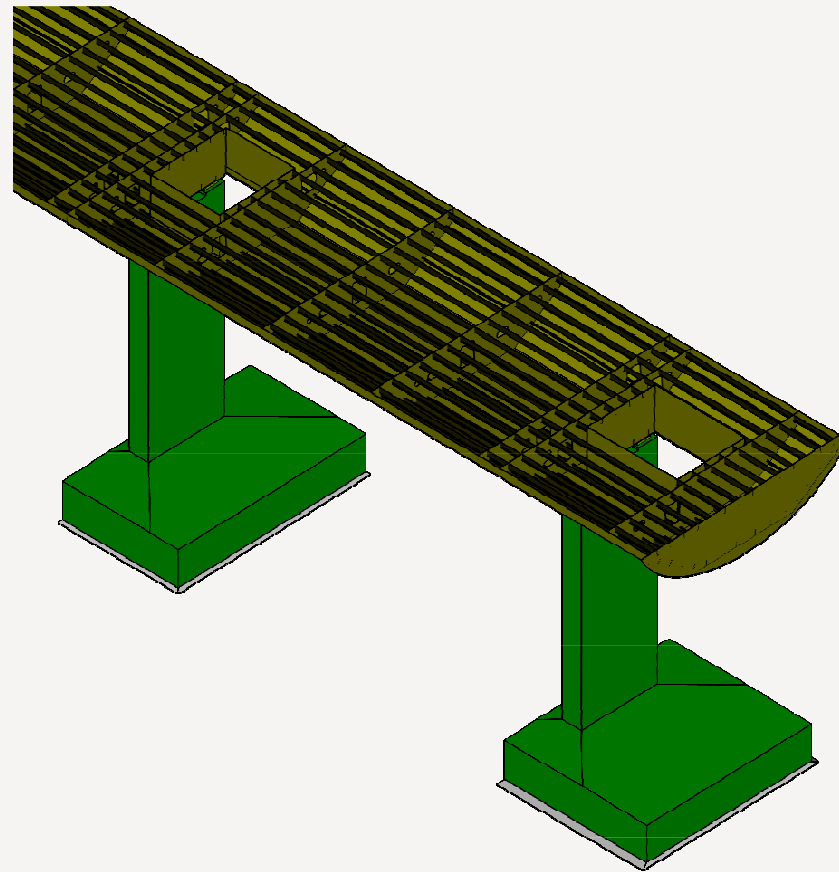
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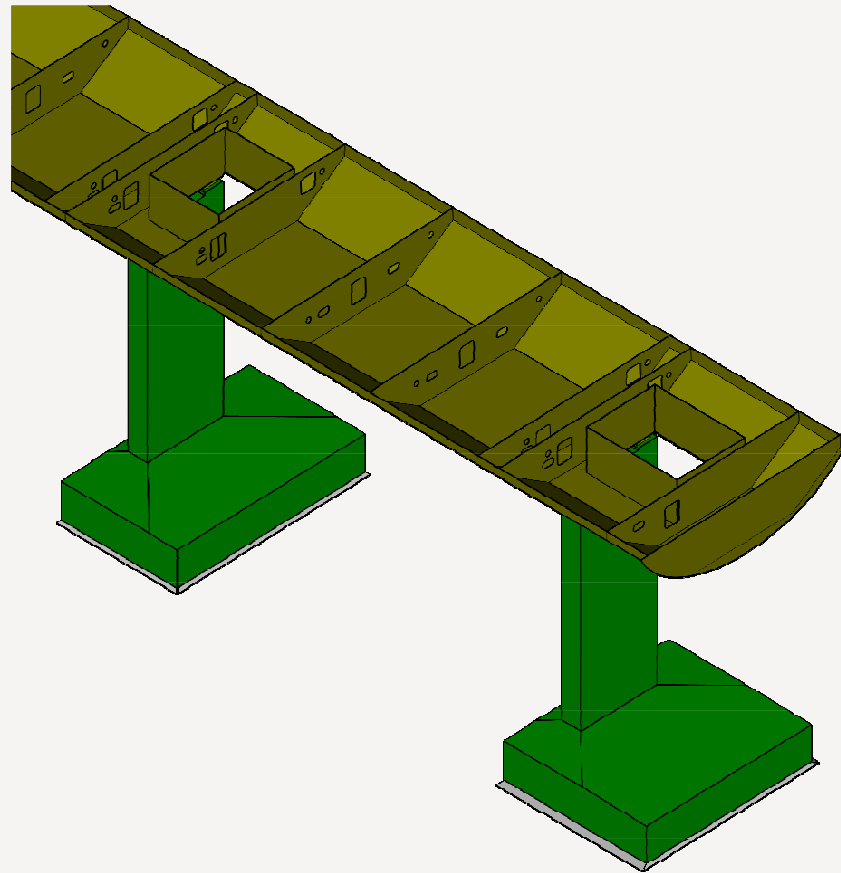
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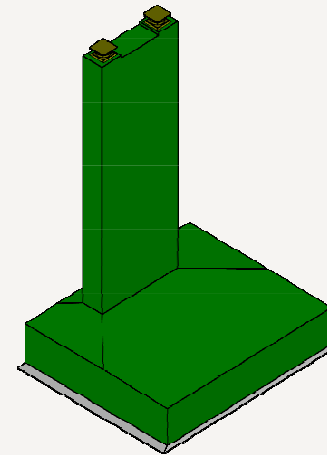
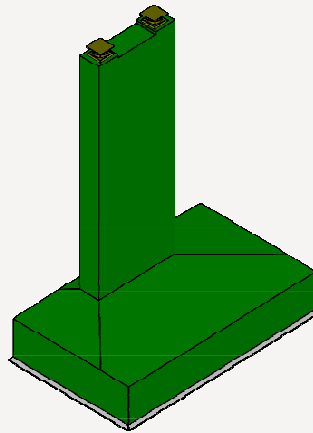
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# Construction status October 2017

- > Preparing for lifting operations end October



## Lessons learned:

- > Be prepared to step out of the comfort zone  
(there is more to life than box shaped structures)
- > Embrace other parties ideas and have respect for their expertise
- > Stick to your gut feeling (gravity can not be turned off)
- > Involve client early on if possible or at least have respect for his needs
- > Design process takes time (more than you can imagine)
- > Engineering can easily end up on critical path so define and agree upon deliveries and deadlines
- > Use 3D models as design tools, for optimization and to involve co-partners, client and contractor



## Acknowledgement:

- > COBE / Dissing+Weitling architects:  
Design sketches and additional material
- > Banedanmark and the municipality of Køge:  
Extract from Competition Brief and Assessment Panel Report
- > Køge Dagblad: Article about the Design Competition

