ICTB 2013

CHALLENGES OF THE SUPERSTRUCTURE ”ÄLVSBACKA BRIDGE”

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OUTLINE

- What has been built
- Background to the chosen solution
- Assembly method
- Conclusions

WHAT HAS BEEN BUILT ?

CABLE STAYED BRIDGE IN TIMBER

- Distance between pylons, span length: 130 m, total length 182 m.
- Free width of decking: 4 m
- Height of pylons: 24 m
- Amount of timber: Approximately 200 ton, 400 m3
- Amount of steel: Approximately 70 ton, 9 m3
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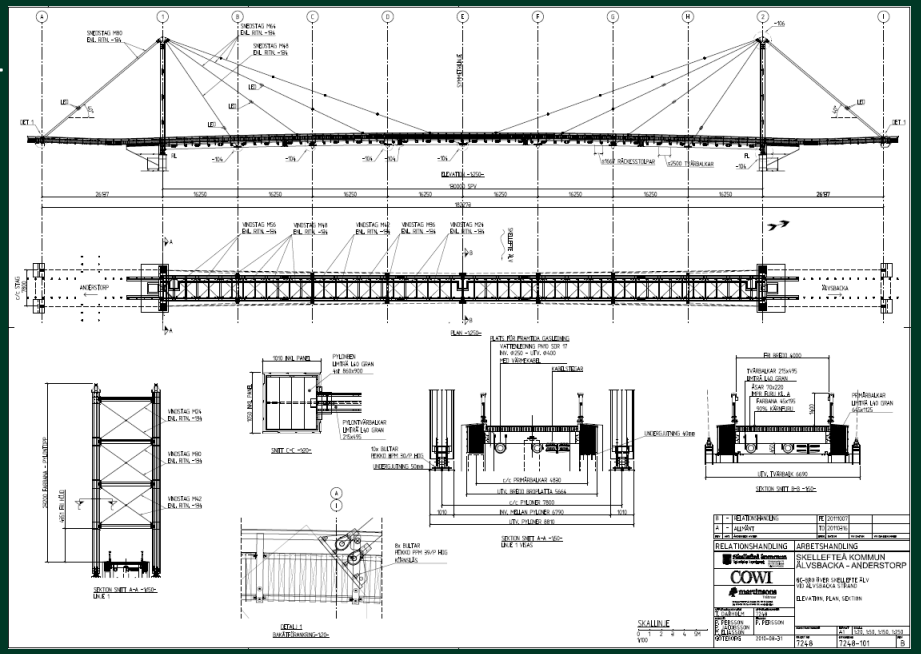

- PERFORMED ACCORDING TO THE SWEDISH BRIDGE CODE "BRO 2004"

- DESIGN WORK
  COWI & MARTINSONS

BUILT IN SKELLEFTEÅ CITY 2011, CROSSING THE ”SKELLEFTEÅ RIVER ”

CLIENT- MUNICIPALITY OF SKELLEFTEÅ

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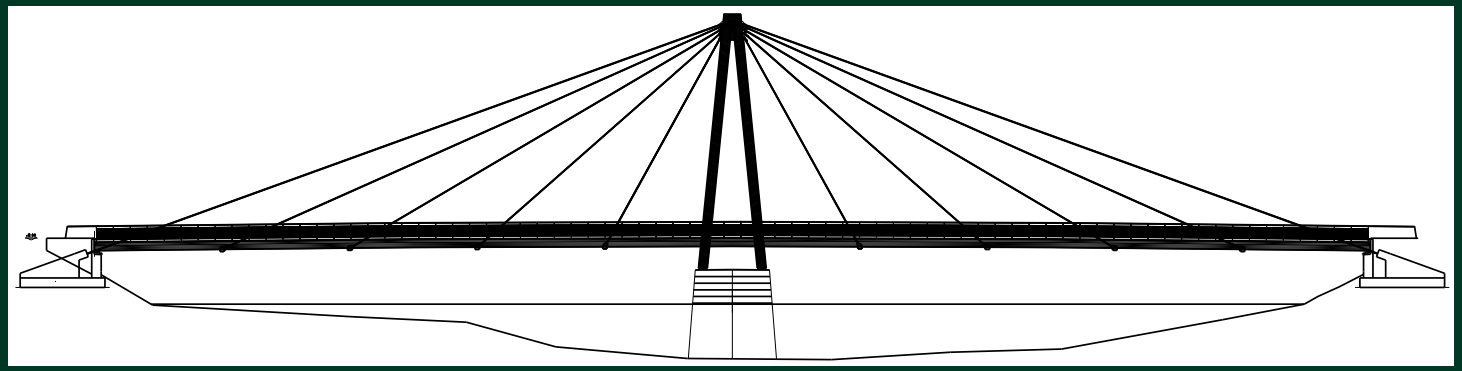
BACKGROUND TO THE BUILT SOLUTION

INITIALLY SUGGESTED DESIGN FROM THE MUNICIPALITY IN COOPERATION WITH A LOCAL ARCHITECT



ADVANTAGES:

- DOES NOT INTRUDE ON THE LANDAREA
- CONSIDERD AS ESTETHICAL AND A GREAT LANDMARK

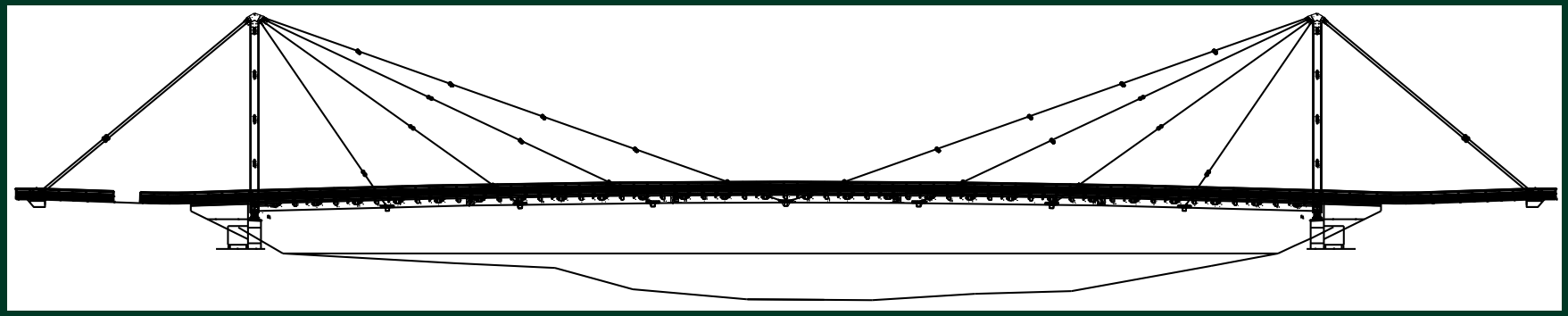
DISADVANTAGE:

- THE COST MUCH HIGHER THAN THE MUNICIPALITIES BUDGET

- A NEW EVALUATION PROCESS WITH LESS REQUIREMENTS ON APPEARANCE TOOK PLACE

- IF THE SUPPORT IN THE RIVER COULD BE EXCLUDED A LOT OF THE COST WOULD DISAPPEAR.

- SUGGESTED SOLUTION FROM MARTINSONS AND COWI



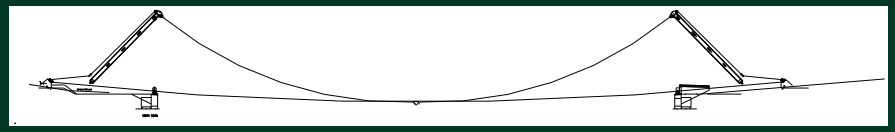
- THE MUNICIPALITY CHOOSE TO CONTRACT MARTINSONS TO BUILD THIS SOLUTION

- MAIN CHALLENGES
  - **ASSEMBLY METHOD**
  - **DYNAMIC BEHAVIOUR**
  - LARGE STATIC FORCES THAT HAD TO BE TAKEN CARE OF
  - PERFORMANCE TO ACHEIVIE A LONG LIFETIME AND PROTECTION AGAINST MOISTURE INFLUENCE.

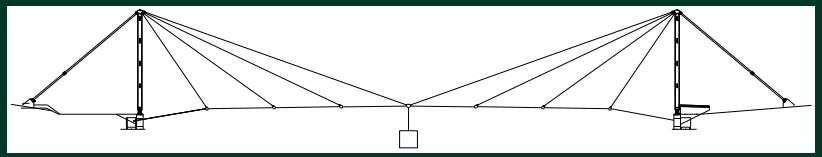
IDEA OF ASSEMBLING METHOD

CAN THE BRIDGE DECK BE PULLED OUT INSTEAD OF LIFTED OUT?

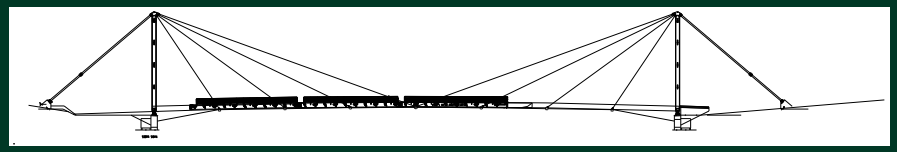
- ERECTING THE PYLONS & LONG BARS WITH TRANSVERSE BEAM



- STRETCHING UP THE BAR SYSTEM



- PULLING OUT THE BRIDGE DECK PIECES.



- A LOT OF TIME WAS SPENT DURING DESIGN WORK TO MAKE THE METHOD FEASIBLE AND EFFECTIVE

ASSEMBLING METHOD – TWO TEMPORARY CABLES

ASSEMBLING METHOD – PULLING OUT BARS AND TRANSVERSE MID BEAM

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ASSEMBLING METHOD – PYLONS TO NORTH BRIDGE SITE ON THEIR WAY..

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ASSEMBLING METHOD – PYLONS READY TO BE ERECTED

ASSEMBLING METHOD – PYLONS ON THEIR WAY UP

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ASSEMBLING METHOD – PYLONS IN PLACE

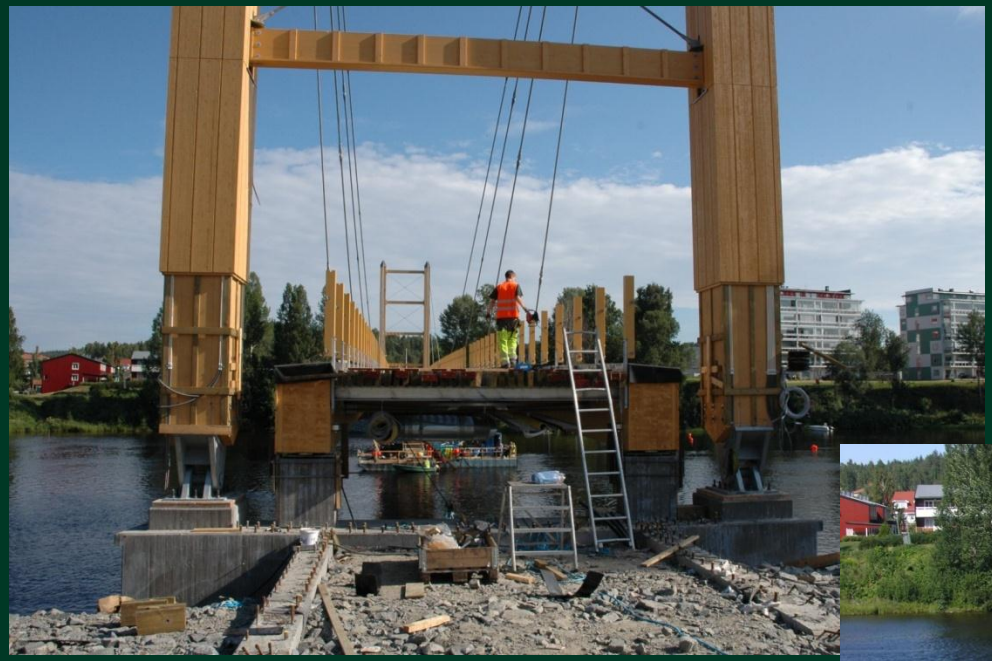
ASSEMBLING METHOD – PULLING OUT BARS AND TRANSVERSE BEAMS

ASSEMBLING METHOD – FIRST BRIDGE DECK PIECE ON SITE

ASSEMBLING METHOD – PASSING MIDSPAN

ASSEMBLING METHOD – IN POSITION FOR THE FOURTH BRIDGE DECK

ASSEMBLING METHOD – BRIDGE DECK IN POSITION



COMPLETING THE CONCRETE FOUNDATION

REMAINING WORK FOR 2-3 WEEKS
- ADJUSTMENTS
- PERMANENT LOOKING
- REMOVING TEMPORARY MATERIAL
- INSTALLATIONS
- REAMINING CLADDING

CONCLUSIONS

- The assembly method
  - worked out well and is definitely something we will use again if the opportunity comes up.
  - can be refined to achieve an even more effective method.
  - handled 270 ton material with only a small barge in he river. Can it be don without the barge? – That's a future challenge we would like to evaluate.

- THE "Älvsbacka" bridge is frequentley used every day and is appreciated of the citizens
  - Very positive response from users – dynamic response OK!
  - The client, Municipality of Skellefteå, is very satisfied

THANK YOU FOR YOUR ATTENTION!