



Bridge Life Cycle Optimisation

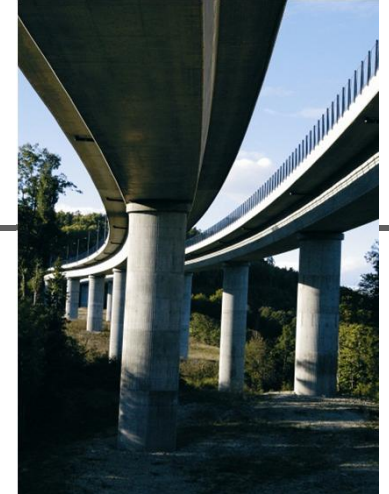
Closing Seminar
14-15 May, 2012
Malmö



Implementation of ETSI tools in Norway **ETSI III - End seminar,** **Malmö May 2012**

On behalf of the management of
Norwegian Public Roads Administration

Presented by Otto Kleppe,
chief engineer - bridges





The intension with this Nordic project

Bridge Life Cycle
Optimisation

- ✓ To develop methods and tools on LCC/LCA for bridges
- ✓ To do it in a Nordic project (share of experience, resources and costs)
We have all different background and may be different view

✓ **The Norwegian Parliament claim in 2008**

«....in connection with large road projects a carbon budget should be worked out for the purpose of visualizing the impact that the construction will have to the surrounding communities and compare it to national environment gaseous emissions from other sources...»

(shorten of the original text)

✓ **The minister of transport stated that NPRA shall make this carbon budget for roads and bridges**

More work to do after this end seminar

Bridge Life Cycle Optimisation

- ✓ **LCC has to be nationalised with construction and maintenance data relevant for Norway**
 - Then tested and compared with other available information
- ✓ **LCA will be tested as well with different input data**
- ✓ **“LCE” will only be a supporting system**
- ✓ **A test project will be set up in order to evaluate how this spreadsheet program can be used and how valuable they are for us**
- ✓ **Some modifications on the tools will most likely be made**



Existing LCA system compare to this new one

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- ✓ Norway has already an environmental gaseous emission system for bridges, tunnels and roads on a rough basis for planning issues
- ✓ The existing system is calculation of CO₂
- ✓ This new system will be a system for finding environmental impacts in detail for bridges

Bridge Life Cycle
Optimisation

- ✓ **We wish to see the cost effect from different construction methods/choice of construction materials and the sensitivity if we made some other choice**
- ✓ **We also wish to see the environmental effects from choose in the design face, the construction face and the operating face**
- ✓ **In addition we**
 - **Compare results from ETSI with other applications**
 - **Find out which choice that will give the best total result**
 - **Find the best way to collect the data - organizing**
 - **Doing some sensitivity tests to find the simplest way to obtain good enough results**



Length 46.9 m

Width clearance 4.0 m

Max span 42 m

Year of construction 2006



The decision in how to use LCC/LCA

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- ✓ The final decision in how to use LCC/LCA in Norway will be taken after the test face
- ✓ We have to gain some experience before the final decision

Tailormade basis data

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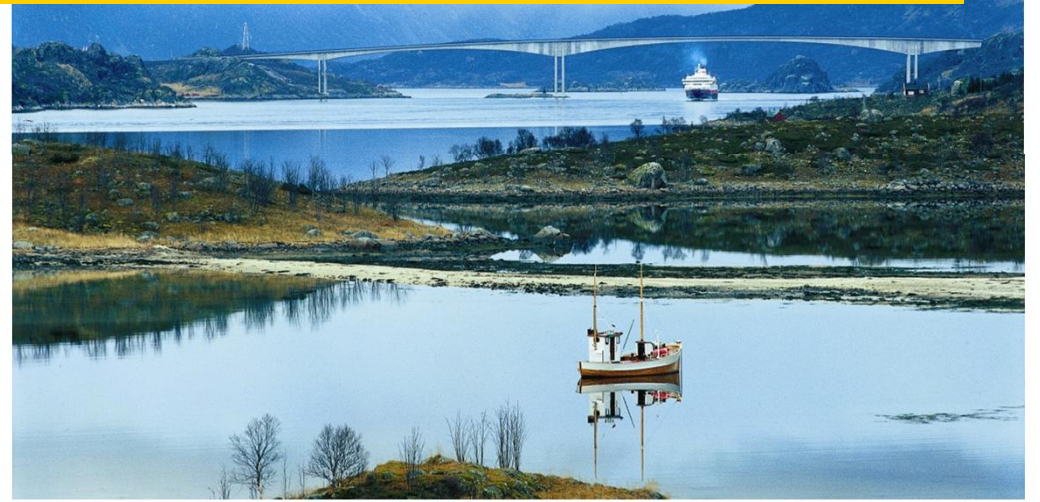
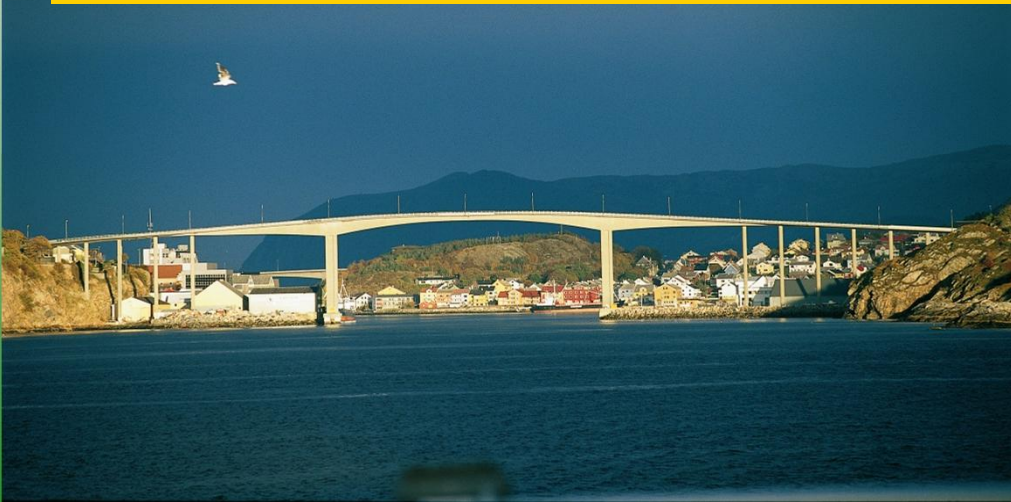
- ✓ **Based on EPD one can tailormake the LCA tool with actual data for the material in the construction**
- ✓ **The same will be done for the LCC tool**

Bridge Life Cycle Optimisation

- ✓ **The overall aim is to include LCC and LCA calculation in our work with**
 - Design
 - Construction
 - Operation/maintenance
- ✓ **LCC: is to include the total cost when making decisions on construction and maintaining the bridges**
- ✓ **LCA: is to measure the environment pollution when constructing and maintaining the bridges**
- ✓ **We can then follow the impact of the environment emission – increasing or reducing?**



Thanks you for your attention





**Bridge Life Cycle
Optimisation**