**Closing Seminar
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Malmö**

NordFoU

Lövö Bridge

Life cycle analysis using the ETSI LCC and LCA tools

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The Objective:

Compare design stage and construction stage LCC and LCA calculations and determine the accuracy of the design stage calculations.

The Lövö Bridge

Bridge Life Cycle Optimisation

- A continuous girder bridge
- Composite structure: steel girder with a concrete deck
- Connects two islands: Lövö and Söljeholmen
- Total length 474m, 7 spans
- Width 8m and clearance 19m

LCC inputs

Bridge Life Cycle Optimisation

- Interest rate 2%
- Average daily traffic 15 155 of which 7,2% heavy traffic
- Traffic growth 1,2%
- Maximum speed limit 80km/h, reduced to 50km/h during repair actions
- Total investment 6 270 000 €
- LCC default values were used for maintenance and repair

Bridge Life Cycle Optimisation

- Transportation by trucks and boats
- Distances of the primary materials from the contractor
- Material volumes for different bridge parts were taken from the actual bill of quantities
- Concrete reusable at end-of-life
- Reinforcement and structural steel recyclable at EOL
- Edge beams were omitted at EOL due to contamination

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LCC results

	Results in design stage	Results in construction stage
Investment	6 270 000 €	5 623 000 €
Maintenance costs	305 000 €	3 184 000 €
Repair costs	1 139 000 €	1 141 000 €
Traffic disturbance	23 000 €	215 000 €
Demolition costs	96 000 €	58 000 €
Present Value	8 488 000 €	10 222 000 €

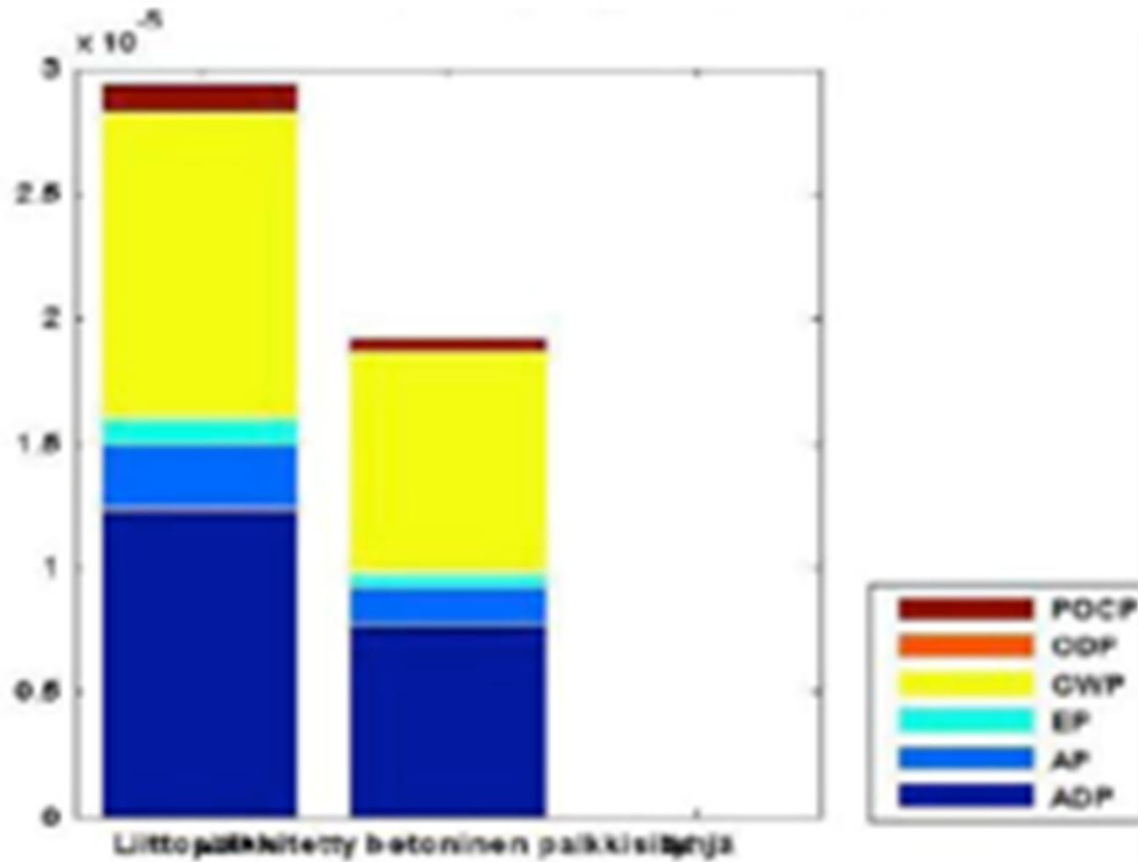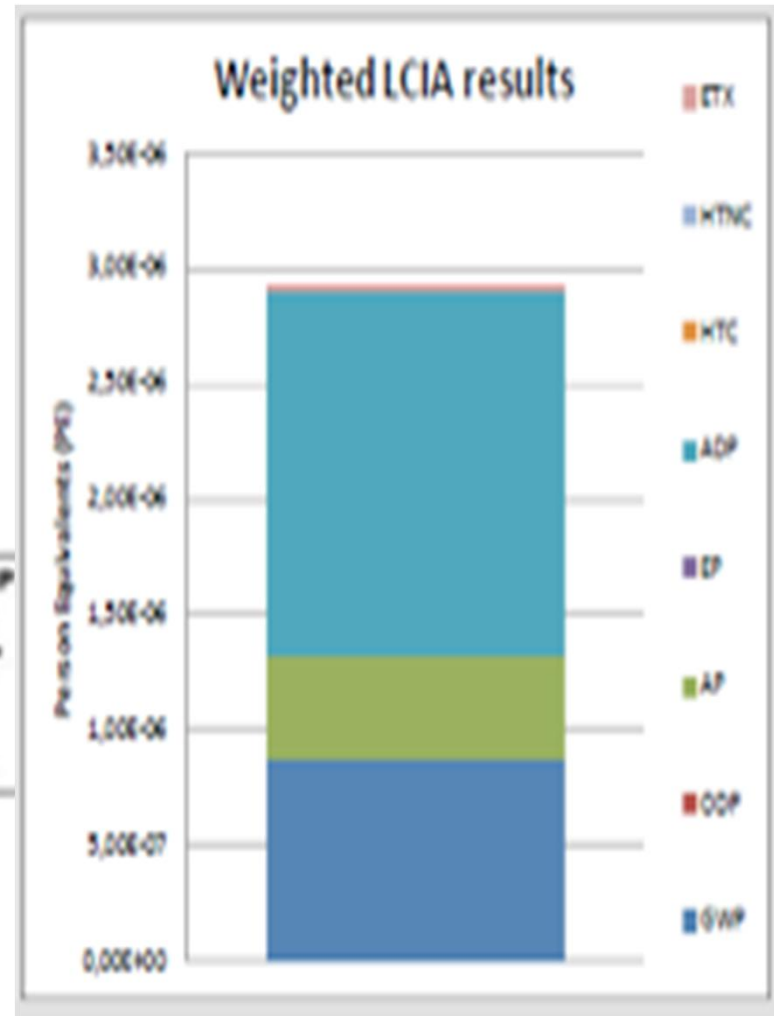**Bridge Life Cycle Optimisation**
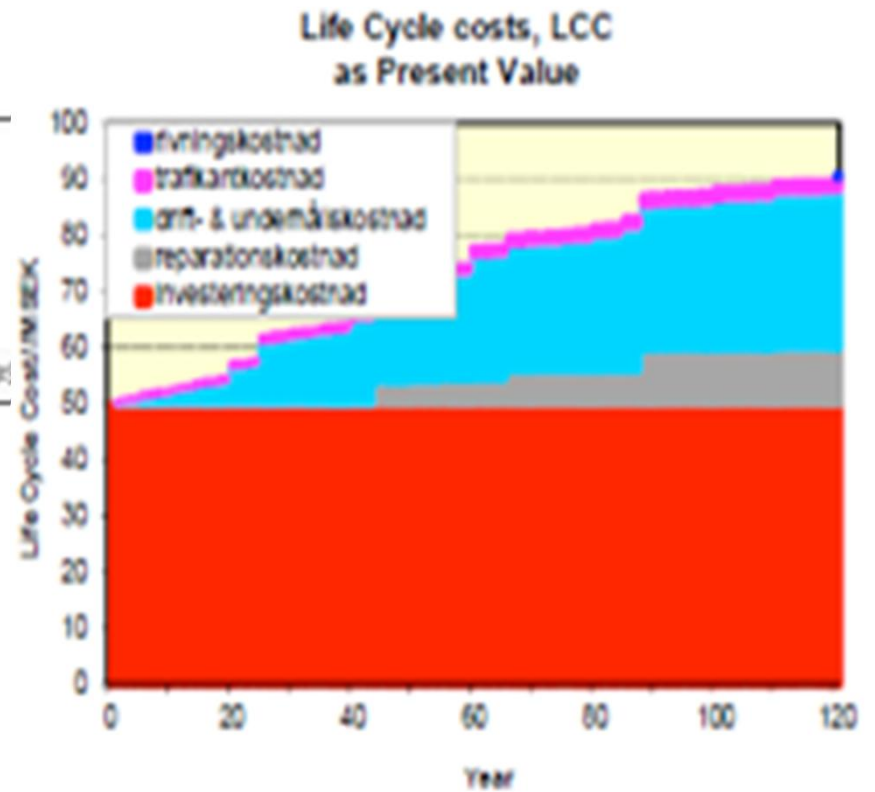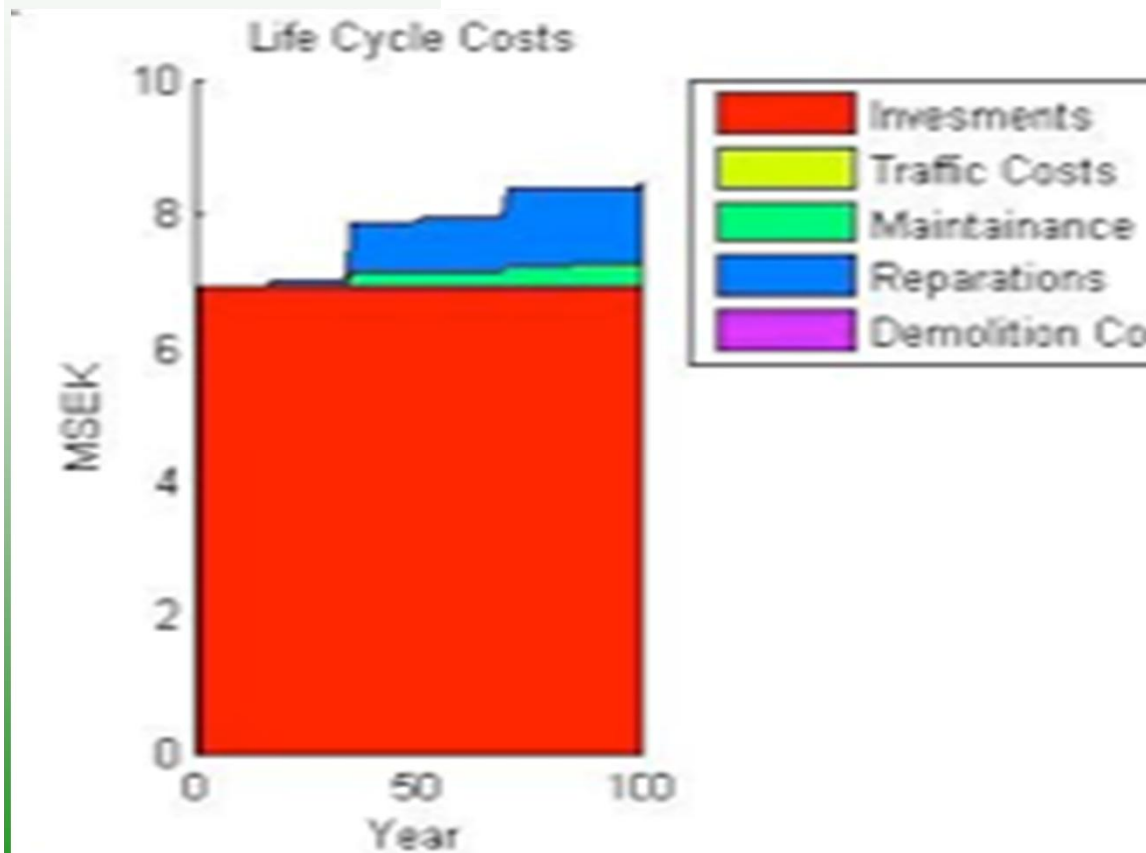
Figure 1: Total weighted impacts

Conclusions LCC

**Bridge Life Cycle
Optimisation**

- Predicting the input much harder at design stage

- Hardest to predict: maintenance

- Investment estimate on the safe side, whereas

  maintenance, repair and traffic easily

  underestimated

Conclusions LCA

- Results very similar, construction stage impacts a bit higher

- Biggest difference is in the GWP and ADP

- Differences in the design and construction stage stem from the lack of sufficient data at design stage

Bridge Life Cycle Optimisation

Thank you for listening!