



NTNU

Kunnskap for en bedre verden

Reliability of Structures

Possible Project and Master's Thesis Topics

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Reliability of structures
- a fundamental requirement



Efficiency and optimization
for safe and sustainable structures

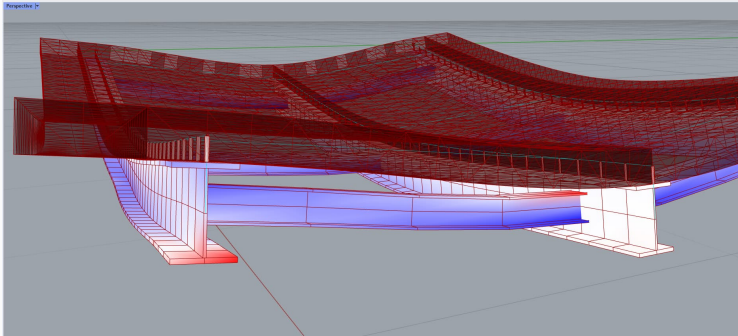
- Risk- and reliability-based design/dimensioning
- Calibration of simplified/generalized safety concepts
- Reassessment of existing structures

Possible topic areas for projects

I. Optimal Design of Structures

Project

- How can we reconcile requirements for **safety** and **material efficiency**?
- How can we link **parametric** and **probabilistic optimization**?
- Results pointing towards a **paradigm shift** in structural design!



II. Sustainable Design Codes



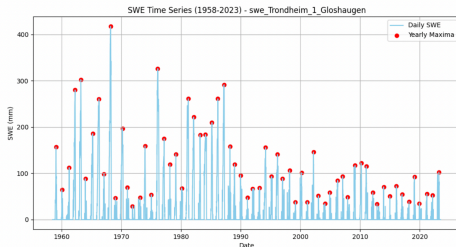
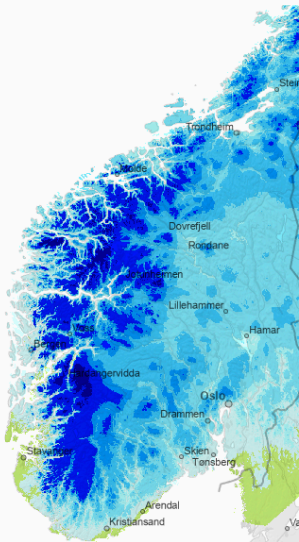
Project

- How can we optimize safety factors while accounting for **material efficiency and safety**?
- What does it actually **cost** society to use non-optimized factors?
- Opportunity to influence future design standards used for all structures in Norway!

III. New Snow Map for the Eurocode

Project

- The **snow map** showing design values for snow loads **needs to be revised?**
- How can we account for **climate change?**
- Work together with meteorologists and “snow experts”.
- The result will be **implemented in the new Norwegian standard.**



IV. SMARTER Bridge Maintenance



Project

- Methods and strategies that make reliability assessment of existing bridges **feasible**.
- Take into account damage mechanisms, load changes and **complexity**.
- Use load simulations and FE analyses.
- Close collaboration with the concrete group, Daniel Cantero.

Examples of previous theses/projects

- Design and Development of an Impact-Energy-Dissipating Ski Pole Tip for Roller Skiing
- Reliability Analysis of Snow-Exposed Structures
- Probability-based assessment of the Stavå bridge
- Numerical investigation of 3D scanned mooring chains
- A Bayesian Approach for Risk-Based Replacement of Mooring Lines
- Reliability assessment of concrete structures using non-linear finite element analysis
- Assessment of a semi-probabilistic safety concept for reinforced concrete columns using non-linear finite element analyses
- Generic Framework for Stochastic Modeling of Reinforced Concrete Deterioration Caused by Corrosion
- Reassessment of the integrity of a partially failed glulam structure

Questions?