



## **Numerical modelling of blast-induced damage around rock tunnel using LS-DYNA**

### **Numerisk modellering av spränginducerad skada runt bergtunneln med LS-DYNA**

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BeFo projekt 427

### **Summary**

In Scandinavia, tunnels are mainly excavated by drilling and blasting. This investigation aims to predict the damage (in form of cracks) that occur in rock masses during tunnel excavation. The blasting process causes damage that affects stability, safety, water inflow, and costs. The project involves small-scale experiments to calibrate the LS-DYNA model for predicting blast-induced cracks. The experiments use non-contact visual techniques to capture crack growth in rock samples, and the focus is on blast design parameters, particularly the decoupling ratio. The equipment used includes an ultrahigh-speed camera and flicker-free LED lights, and the samples are prepared for digital image correlation. The calibration and testing of the equipment are carried out in a controlled laboratory environment. The results from the trials are promising, providing reliable data for further analysis. Digital Image correlation analysis will be performed to estimate the crack development velocity. The goal is to optimize blast design and improve the contour blasting of tunnels through a systematic numerical study based on reliable experimental data.