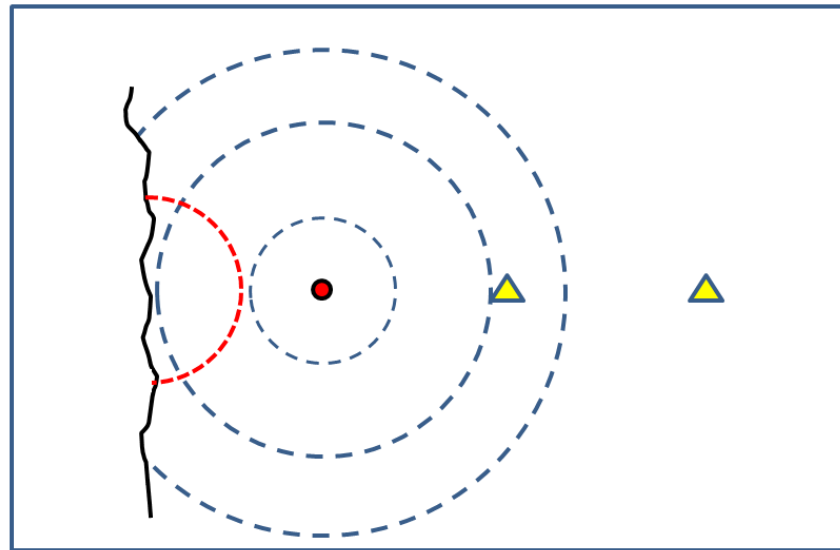


# DOES CHARGE CONFINEMENT AFFECT THE VIBRATION LEVEL IN BLASTING?

Påverkas vibrationsnivån av inspända laddningar?

Phase 1- Feasibility study



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# Background

Blasting in urban areas must involve techniques to control the vibration level. Charge confinement is one of the parameters that are believed to influence the vibration level. Some of the reasons for this are:

- Incorrect charge calculation (charge weight is too small for the drilled burden)
- Incorrect interval-time (holes behind are initiated before holes ahead)
- Incorrect selection of explosive for the burden or an influence of dead pressing
- Unfavourable selection of geometry

A common opinion among blasters is that an increased confinement results in a higher vibration level. Is there a physical explanation for this or is it just a common misunderstanding established a long time ago?

# Objective

The purpose of this pre-study is to find evidence for or against the understanding that confined charges affect the vibration level in blasting.

The results of this project are expected to have significant benefit for contractors and clients by helping them to make better decisions of how to handle infringing vibration levels.

# Contents of the report

- The report comprises a literature study and an assessment of a number of observed misfires in tunnels, still with correctly detonating charges but with a reduction of more than 50% in pull or rock breakage.
- It also comprises a statistical analysis of some of the rounds presented in the study.

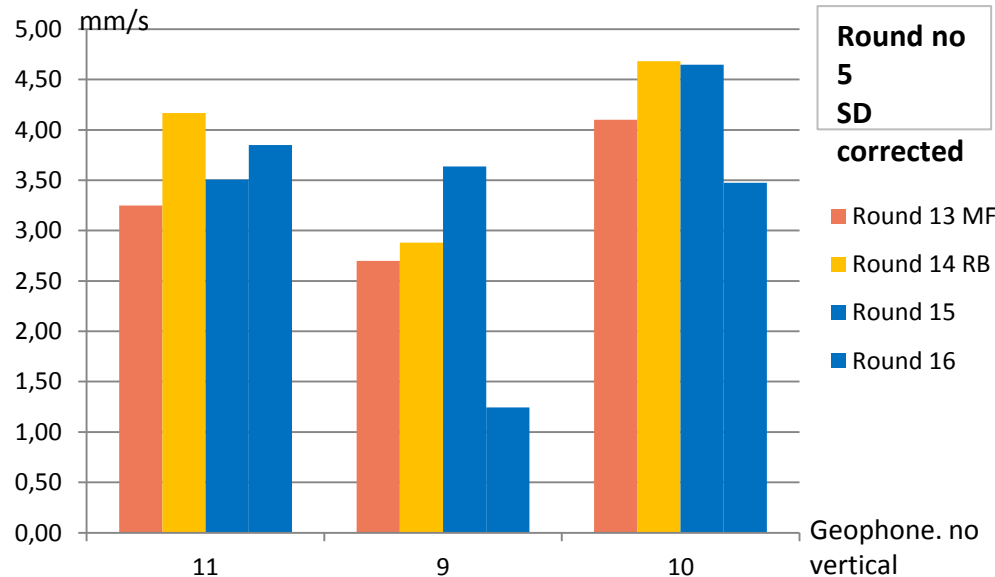
# Results from the literature study

- There are mainly two opinions. According to the first opinion the vibration levels are increased with an increased burden. The other opinion argues that the vibration levels do not increase with the burden.
- It's difficult to find details of the geology, water in the rock, explosives, equipment for the measurement etc. used in the tests.
- Most of the reports are from quarry blasting. There are very few reports from underground blasts.
- Most of the papers give no physical explanations of the results.

# Observations of some misfired tunnel rounds and test blasts in Sweden

In the study the vibration level from misfired rounds (MF), re-blasts (RB) and ordinary blasts were compared.

The figure below shows the result for one of the tunnels in the study. There are no indications found that the vibration level increases in misfired rounds.



# Conclusions

- No evidence of a relationship between degree of charge confinement and vibration level could be found in this study.
- A 2<sup>nd</sup> step of work, a field study based on single hole shots, is proposed in the report.