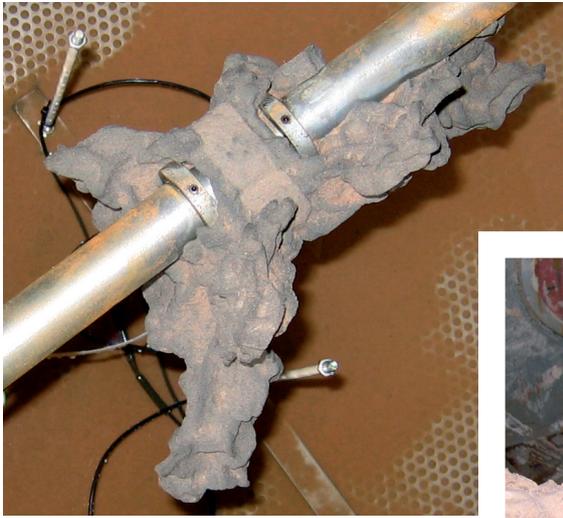


# Compensation grouting



SUMMARY

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## THE REASON FOR THE RESEARCH

Compensation grouting is used to prevent or compensate unwanted settlements caused by for example tunnelling. Tunnelling may create a settlement trough that can lead to settlements of buildings. This can be prevented or compensated by the injection of grout in the area beneath or adjacent to the building. The grout is injected in the soil by injection lances. With packers each individual injection opening can be used to inject the grout. The injection lances are operated from a vertical shaft that is constructed before the tunnel passes. The length of the lances can be up to approximately 40 m. The system has been used regularly to protect buildings founded on a shallow foundation. However, the mechanisms that determine the shape and the length of the fractures are still unknown.

## THE PLAN OF THE PROJECT

In this programme model tests are performed with different grout mixtures and the influence on the shape of the fractures is studied. In these tests the injection pressure, pore pressure, total pressure and volume changes are measured. It appeared that most common applied grout mixtures did not lead to fracturing of the soil but more to a densification of the soil.

## THE RESULTS OF THE PROJECT

Element tests have been developed and performed to check the properties of the grouts that are used in the model tests. This resulted in relations how permeability of the grout depends on the amount of cement and what parameters determine the leak-off. Furthermore the influence of these parameters on the compensation grouting process is investigated. With these results it is possible to 'design' a grout that leads to a fracture.

Further research will focus on the influence of the injection velocity and a quantifying of the conceptual model that exist to describe the fracture initiation behaviour. Furthermore the influence of a fracture on the heave of the soil above the fracture will be studied.