

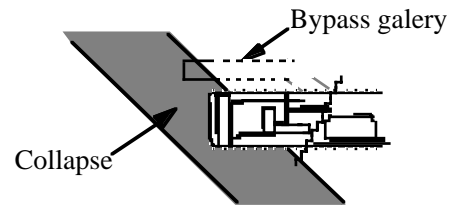
Geomechanical behaviour of cataclastic rocks

The growing need for underground structures implies excavating tunnels or galleries in more and more difficult geological conditions. Structures often cross strongly tectonic masses including numerous rock zones of crushed rock called “kikirites”. Such materials are **poorly understood** due to difficulties in observing and analysing them from the surface and in taking samples during reconnaissance campaigns.

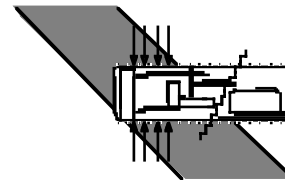
Through their behaviour, these crushed rocks directly influence the type and length of construction of the structure, the on site security, hydrogeological conditions surrounding the structure, local water resources and long-term structural behaviour (Figure 1). These different effects have a direct repercussion on the cost of the structure. This project takes advantage of the opportunity of the execution of two large underground structures through the Swiss Alps -namely the construction sites of the hydroelectric power plant of Cleuson-Dixence and of the reconnaissance gallery for the Lötschberg tunnel- to improve the determination of poorly understood properties of this kind of material and to predict their mechanical and rheological behaviour in the short and long term.

The research is divided into 3 main parts:

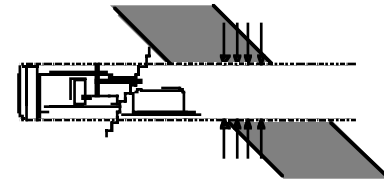
- site investigations which include sampling and the collect and the synthesis of information related to the excavation in tectonised rocks;
- laboratory testing which endeavours mechanical tests such as uniaxial and triaxial compression test, shear test, brazilian test and creep test;
- interpretation of test results which lead to the proposal of a mechanical and rheological model for cataclastic rocks and the determination of their geomechanical parameters.



a) Instabilities of the excavation face



b) Decompression and blocking of the machine head



c) Creep phenomena

Fig. 1 Progress difficulties of a tunnel boring machine in soft cataclastic rock zone

Publications

- Habimana J., Labiouse V., Descoedres F. Influence of Tectonisation on Geomechanical Parameters of Cataclastic Rocks: Experience from Cleuson-Dixence Project. 2nd Int. Symp. on Hard Soils & Soft Rocks, Napoli, 1998.
- Russo G., Scotti G., Habimana J. On the Use of Direct and Indirect Methods in Defining Geomechanical Properties of Weak and Complex Rock Masses - Application: Borzoli Cavern. 2nd Int. Symp. on Hard Soils & Soft Rocks, Napoli, 1998.
- Habimana J., Descoedres F. Comportement des roches cataclastiques financée par le FNRS, EOS et BLS: Rapport intermédiaire sur l'échantillonnage et les essais en laboratoire, EPFL - LMR 1996.