



C E M I

Centre for Excellence
in Mining Innovation

LECTURE SERIES

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July 6, 2011 at 3:00pm Willet Green Miller Centre
Auditorium (Main Floor)



The role of brittle failure in sedimentary rocks in Swiss tunnel projects

Abstract Under compressive loading, brittle rocks fail in a complex process of micro-cracking, damage accumulation and crack coalescence. It has been shown that these processes cause tensile fracturing or spalling at the tunnel-scale. Resultant rock mass degradation often negatively affects the construct-ability of underground excavations. Recent observations made in Swiss tunnel projects clearly show that brittle failure has to be anticipated in low-strength sedimentary rocks such as clay shales and limestones in settings with moderate overburden (e.g. 200-600 m).

In this presentation the behavior and impact of two sedimentary rocks upon two projects will be presented. The first brittle sedimentary rock presented here is Opalinus Clay, which has been selected as the host rock for high level nuclear waste repositories in Switzerland. The second type of brittle sedimentary rock presented is a limestone in which a tunnel was recently excavated utilizing a TBM. Finally, the presentation will give an introduction to a current project related to the influence of stress fracturing and jointing on TBM penetration.

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Dr. Florian Amann

1998-2002:

Study of Applied Geology at the University Erlangen-Nürnberg

2002-2005:

Ph.D thesis at the University Erlangen-Nürnberg

2002-2005:

Project Engineer at Electrowatt Infra (Zurich, Switzerland)

Key projects: Gotthard base tunnel (Section Sedrun), Bypass Zurich, Urban Tunnel Basel, Swiss nuclear waste repositories

2005-2007:

Senior Engineer at Pöyry Energy (Zurich, Switzerland)

Key projects: Nant de Drance Hydropower project (Switzerland); Nam Ngum II hydro-power project (Laos); Santa Rita Hydropower Project (Peru)

2007-now:

Senior Scientist at the Swiss Federal Institute of Technology Zurich, Geological Institute, Engineering Geology

Key projects: Mine-by project at the Mont Terri Underground Rock Laboratory; Expert for the Swiss Federal Nuclear Safety Inspectorate; Research Project on TBM penetration