

KONRAD REPOSITORY - GROUND-CONTROL IN CHALLENGING CLAY STRATA

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The bedrock of the Konrad repository is characterized by a complex geology. While the emplacement horizon is in competent iron ore strata, the infrastructure of the repository is situated in different layers of clay.

One of the many clay strata of the Konrad stratigraphy is the “Fladentonsteinserie”, where the inlet of shaft 2 into the second level is located.

In comparison to other clay layers the Fladentonsteinserie shows a distinctive squeezing behavior. While crystalline systems and sandstone become stable after years of rock mass movement the Fladentonsteinserie stays mobile for many decades. This effect is enhanced at the inlet of shaft 2 into the second level because there are a lot of tectonic fractures nearby.

The system of the outer lining is installed directly after excavation in multiple steps. It is complex and includes rock bolting, shotcreting and injections to control the ground.

But due to the longterm mobility of the Fladentonsteinserie also the design of the inner lining is extremely strong with high quality concrete combined with lots of steel to deal with the abutment stress.

We have learned, when building a repository in clay, you have to consider the characteristics of the different clay formations to find a suitable ground control system. This ground control system should not only consists of rock bolts and shotcrete but also of intelligent design of geometry and stratigraphical setting.