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Abandoned mine after-use as a museum and research site

Vesta Kaljuste, Erik Väli, and Andrus Paat

Tallinn University of Technology, Department of Geology, Tallinn, Estonia (vesta.kaljuste@taltech.ee)

Abstract. Abandoned mines are unique underground facilities due to their unique conditions. Mined-out mine can be used as a museum or scientific and technical research site. Depending on specific mine conditions the after-use purposes can vary. The former Kohtla oil-shale mine, located in the eastern part of Estonia, was closed 10 years before the idea to re-open it as a mining museum. Now old Kohtla mine is used as an underground museum to present for local people and tourists how mining works were carried out in the past (Estonia has 100-year-old experience in oil shale mining) and which methods are still in use. Besides mining, it also shows ventilation and water barrier solutions in the mine.

We present an overview of abandoned mine new challenges to be a safe environment for tourists and as a future research center. The project team had a challenge do design:

- Renovate underground railway, walker's platform's, design and establish new roof supports
- New railway platform, stations for tourists, water barriers (3)
- Ventilation duct and walls (8), new ventilator;
- Closing the workings which are not needed.

Designing was challenging but not the most difficult part of the project. More complicated was to find a competent builder for the underground museum. Renovated and re-ventilated mine was opened in 2012 and today museum is one of the most visited places by the tourists in the eastern part of Estonia, because of its uniqueness.

Besides as a museum, it can be used as a testing site for researchers, because its former infrastructure and facilities have remained. For example, 4 years ago Tallinn University of Technology used the museum area for the backfilling testing because the temperature and other underground conditions were suitable for room-and-pillar mining method backfilling tests. By using backfilling technology, environmental problems such as ground collapses can be avoided and production residues can be reused. As a result of the research, it became clear which ashes of Estonian power plants and the oil industry are suitable for the backfilling technology in terms of physical-mechanical and chemical properties.

In addition, we will highlight the best design practices and experiences that have implemented in order to improve old mine everyday working conditions as a museum. These best practices are usually more than the national laws and regulations have requested and they are deeply connected with practical experiences. It meant a lot of collaboration in bringing the best know-how together by different stakeholders.