

Rönnskär repository: Site-descriptive model with photogrammetric verification

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Boliden Mineral AB has recently established a deep rock repository for the deposition of hazardous waste at 350 m below the ground surface. Environmental permitting required assurance from ground investigations and research that the repository system can limit leakage from the repository to a maximum of 10 kg of cadmium and 10 g of mercury per year. An investigation strategy and site-descriptive model was developed in the years 2008 – 2018 as a basis for an integrated assessment of Rönnskär's suitability for a deep rock repository for the waste. The strategy was based on thorough borehole investigations from the surface supplemented with extensive borehole investigations and tunnel mapping during the construction phase of the ramp down to the storage level. Through active design, the supplementary investigations during the construction phase were used to guide the ramp towards a rock volume for the repository with suitable geological, hydrogeological and rock mechanical properties. Guiding the establishment was the deterministic structural model of deformation zones that was established successively during the investigations. This work, as well as all other investigations, were summarized in a site descriptive model before the repository area was chosen.

Before the storage area was built, a photogrammetric mapping methodology was developed to verify that the rock conditions were in line with the models developed. The methodology utilized the contractor's presence on site, which enabled engineering geologists to remotely map all tunnels and mine halls, which reduced production time while documenting them in very high resolution for future relational documents. The use of photogrammetry also had the advantage that the location descriptive model of deformation zones could be verified with high accuracy. The results from the mapping were also used as a basis for updated hydrogeological calculations to verify the site's suitability as a storage volume.

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