

Hagerbach Underground Test Gallery

By Dan Millette

A world-class facility, the Hagerbach underground test gallery is located in Flums, Switzerland. Officially called Versuchs Stollen Hagerbach, which is its original German name, the facility goes by V-S-H for short. It is roughly a 1.5-hour train ride from the Zurich airport to Sargans, and then about a 10- to 15-minute drive to Hagerbach from there.



Construction on this facility began in 1970 with Dr. Rudolf Amberg, a mining engineer, doing research and development for tunnel construction. The facility now has several test galleries, caverns, laboratories, and conference rooms. Research and testing is carried out on all types of underground construction elements, including drilling, blasting, concreting, injecting, and bolting. There are almost 3 miles (4.5 km) of tunnels beneath the mountain that are used for various purposes, such as research and development work and presentations and training seminars, as well as banquets, fashion shows, concerts, and all types of private events. Hagerbach is open to everyone who has a requirement for a portion of the facility, even if it is not typically an underground event or function.

This test site was designed to enable R&D in a controlled environment. The massive ventilation system can be varied to provide as much or as little air as required for a specific task. Being underground, it allows for trials that would be somewhat prohibitive in a populated surface environment, such as drilling and blasting. There is even a shooting gallery in the facility that enables marksmen or trainees to vary the lighting to match day, night, dusk, dawn, or anything in between.

The International Centre for Safety in Tunnels uses the facility for the design and trial of smoke detection systems, fire detection systems, extinguishing equipment, materials testing, and also for training of rescue and firefighting personnel. There is a 650 ft (200 m) long fire tunnel with secondary and parallel tunnels to form a complete testing network. Accredited fire tests are offered here, as this portion of the facility enables tests up to 2500°F (1350°C).

My trip to the Hagerbach facility was to attend a course and examination to become certified as an EFNARC Shotcrete Nozzleman Examiner. This course is offered by the International Center for Geotechnics and Underground Construction. EFNARC (Experts for Specialized Construction and Concrete Systems) is the certifying body. The entire course was taught in the underground environment. Our lectures were held in very comfortable con-



ference rooms. The practical portions of the course took place in a rock gallery using the latest in robotic shotcreting equipment from Normet. It was a very hands-on training session where classroom education was put into practice. The examination consisted of a written exam and evaluation of a nozzleman applying several cubic meters (cubic yards) of concrete using the spraying machine.

Having been in several other underground research and training facilities throughout the world, I was accustomed to rather cool meeting rooms (when they existed) and generally more of a mining-like environment. But Hagerbach was climate-controlled to the same standard as you would get in any large office building. There was no need to leave the underground facility for any reason. It contained clean, modern restroom facilities and even had a large cafeteria where we were served morning coffee, lunch, and afternoon tea.

All of the concrete used at the facility, including the shotcrete material, comes from an underground batch plant that is located within the facility. Along with the batch plant is a concrete testing facility used for QA/QC testing to ensure that the mixture is ready to be shot. Transmixers are used to haul the concrete to the test site or to the shotcreting area, depending on what is being done.

The Hagerbach Test Gallery is definitely a one-of-a-kind facility and it is unfortunate for us that it is located so far away. But then again, there are not that many places that are nicer to visit than Switzerland and if you ever have a need to go to Hagerbach, make sure to take a few extra days to visit Lucerne and Zurich while in the area. And if you happen to be in Switzerland for any other purpose, Hagerbach does offer tours on a regular schedule and it would be something to include during your visit.

References

<http://www.hagerbach.ch/sites/esite1.htm>



Dan Millette, a Mining Engineer, is the Director of the Mining and Tunneling Division of The Euclid Chemical Company. He is a member of ASA, Chairs the ASA Underground Committee, and is also a certified EFNARC

Nozzleman Examiner.