

Geomagnetic Observatory in Muggendorf on Trafelberg

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The location of Muggendorf Conrad Observatory is ideal due to the remoteness as well as the constant climatic conditions for earthquake research, observation of Earth's gravity and geomagnetic field measurements. The first stage, opened in 2002, comprises an underground research and training center for seismology and gravimetry. With the second stage the research center was complemented with the discipline of geomagnetism.

After an extensive and thorough planning phase the construction of the geomagnetic part of the Conrad Observatory started in April 2010. The geomagnetic observatory is a so-called "Low Noise Facility", which is guaranteed by its non-magnetic underground construction within the limestone of the Trafelberg, lower Austria.

This location is free of natural and artificial electromagnetic interference. Within the tunnels the ambient temperature is constant with negligible seasonal fluctuation. Therefore optimal conditions for high-precision geophysical measurements are achieved.

As part of the project a tunnel system was built with a total length of approximately 1,000m covering an area of approximately 2,500m². The main gallery (Fig.1) is 400m long. It runs from the south, where the entrance building is located, to the north.



Figure 1: Main tunnel during construction.

Four shorter transverse tunnels branch off from the main tunnel to the east and west in which the measuring devices are housed. Two additional short connecting tunnels run parallel to the main tunnel.

Two boreholes, 100m and 200m deep, allow for three-dimensional measurements. The realization of two

perfectly straight and waterproof boreholes was a major challenge. Within in the scope of this project such construction task was performed and solved for the first time in Austria. In addition to the tunnel system a 600-square-foot entrance and operating building (Fig.2) was constructed.



Figure 2: Entrance and operating building.

In order to eliminate any disturbances on the measurements within the research institutions, only non-magnetic materials could be used. Therefore, all components were tested prior to installation regarding their magnetic properties. For example, the wooden fire doors have non-magnetic screws and conduits for the wiring are designed in plastic.

In September 2013 the construction project, including the deep drilling, was completed.

Table 1: Numbers, data, facts.

Start of construction	April 2010
End of construction	September 2013
Tunnel area	approx. 2.500m ²
Total length	approx. 1.000m
Borehole 1	approx. 100m depth
Borehole 2	approx. 200m depth

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