

New construction 3rd tube of the Gubrist tunnel, Zurich

Monitoring during construction with geodetic, geotechnical and environmental sensors, as well as manual control measurements



To eliminate a bottleneck on one of the busiest stretches of road in Switzerland, a third tunnel tube was built at Gubrist (length: 3 km) near Zurich.

The mandate included the metrological monitoring of the excavation of the third tube and the ancillary structures to be built (e.g. cross-cuts, control centres, etc.) as well as the excavation pits of the two preliminary cuttings of the two open-cast mining areas and the buildings and roads in the immediate vicinity of the two tunnel portals.

The assumptions made on the basis of the potential hazards arising from the geology/geotechnics were verified and monitored using 3D convergence measurements, 3D monitoring of tracks/excavations/buildings/roads, extensometers, inclinometers, piezometers, and measurements of structure-borne sound and vibrations.

- 📍 Zurich, Switzerland
- 👤 FEDRO Swiss Federal Roads Office
- 🕒 2016 - 2022

Leistungen

- ◆ Project management of an extensive monitoring mandate with automatic and manual geodetic and geotechnical measurements by an engineering consortium with AFRY Schweiz AG and subcontractor Amberg Technologies AG.
- ◆ Advising the client on the choice of sensors and the decision to measure manually or automatically.
- ◆ Automatic measurements of structure-borne sound, vibration, excavation pit closures, convergence in the existing tunnel, track systems and building and ground movements
- ◆ Manual geodetic measurements of buildings, roads, excavation pit closures and tachymetric convergence measurements in the newly constructed 3rd tube.
- ◆ Blasting monitoring in the 2nd tube using a large number of vibration sensors
- ◆ Automatic alarm when limit values are exceeded
- ◆ Password-protected web portal with all measurement results (manual & automatic)

Technologien

- ◆ Total station (track systems, terrain, excavation pit closures, existing tunnel tubes)
- ◆ Vibration sensors (buildings, existing tunnel tubes)
- ◆ Structure-borne sound sensors

(buildings)

- ◆ Liquid level gauges (buildings)
- ◆ TEDAMOS GNSS (buildings)
- ◆ Inclination sensors (buildings)
- ◆ Chain inclinometer/extensometer (excavation pit closures, terrain, 3rd tube)
- ◆ TEDAMOS Web, password-protected customer portal with 24/7 access