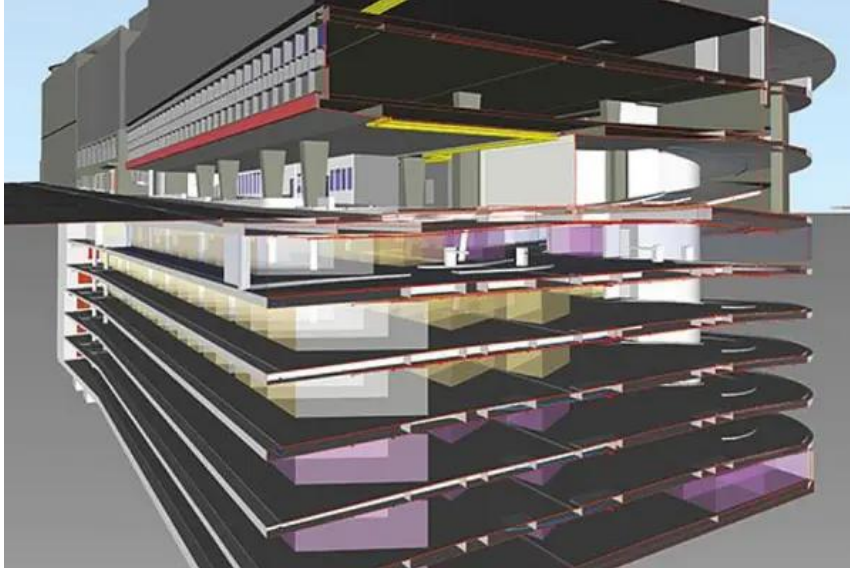


Extension car park UG25, St. Gallen

Automatic and manual building monitoring with geodetic, geotechnical and environmental sensors



📍 St. Gallen, Switzerland
 👤 Senn Resources AG
 🕒 2019 - 2023

Services

- ◆ Planning & installation of a complex and extensive measuring system
- ◆ Automated measurements at intervals between permanent and 1 hour
- ◆ Automatic calculation & alarms when limit values for settlements, positional displacements, pressing forces, vibrations, etc. are exceeded
- ◆ Manual deformation measurements on the construction site, surrounding buildings and terrain (213 3D points, 85 levelling points, 12 inclinometers)

Technologies

- ◆ 2 precision total stations
- ◆ 12 noise and 12 vibration sensors
- ◆ 45 liquid level sensors
- ◆ 4 piezometers
- ◆ 81 displacement sensors
- ◆ 162 press pressure sensors
- ◆ 24 strain gauge sensors
- ◆ 2 webcams
- ◆ Various anchor force measurements
- ◆ Web-based, password-protected customer portal with 24/7 access

A new underground car park is being built beneath an office and commercial building (construction costs approx. CHF 60 million). In addition to the existing 210 parking spaces, a further 531 parking spaces will be added on 6 new basement levels. For the underground excavation work, the entire building will be temporarily supported on solid concrete discs using presses. These were constructed across the building and are supported on both sides of the building on bored piles up to 40 metres long. Work is then carried out downwards using the cover construction method. Two storeys are excavated at a time and the ceiling is concreted until the foundation slab can be constructed at the bottom. During the construction project, the building remains in operation, i.e. not only vibrations, but also noise and other emissions such as dust, etc. must be minimised so that work can continue in the offices.

To monitor the immissions, a large number of vibration and noise sensors as well as webcams permanently measure the effects of the construction activities on the existing structure and the surrounding area.

The building statics are monitored during lifting and the subsequent permanent position monitoring of the concrete columns is carried out using a large number of sensors such as totalisers, hose scales, displacement transducers and strain sensors. The pressure of the pressing forces is permanently monitored, as is the groundwater level with 4 piezometers.

A short film about our surveying services can be found [here](#).