Monitoring the Lipica II quarry
1st GNSS Monitoring Project in Slovenia

Challenge / Objective

- Aim was to establish a 24/7 monitoring system that allows unmanned operation, remote access from anywhere in the world and at all times, alarming in case of events, giving answers:
- Determine how anthropogenic activities influence environment (surface)
- Providing safety of workers in a quarry
- Determine the correlation with other events (temp, weather, blasting etc.)
- Collecting experiences and knowledge in monitoring systems

Key Facts

- Date Installed: 24.09.2008
- Type(s) of service: Monitoring
- No. Stations: 4 (3 Monitoring, 1 Ref)
- Remote Access: via internet

Leica GNSS Spider is responsible for automatic once-per-day calculation of 3 baselines. Results are fed to Leica GeoMoS.
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Benefits – Monitoring System Saves Time and Money

- Safety of workers in a quarry/mine
- Automatic operation, instant display of measurements
- If something moves we are the first who knows and we react the first
- Remote access to all the data from anywhere in the world and at any time

System Components

- Leica GNSS Spider with Positioning
- Leica GeoMoS
- 1 x Leica GMX902 GG
- 3 x Leica GMX901
- 3 x Leica Nivel 210
- 3 x Moxa Wireless Device Server
- 1 x Moxa Wireless Access Point
- Personal computer with UPS and internet con.

More information on “www.geo.ntf.uni-lj.si/mvulic/rt_monitoring”

Mr. Andrej Kos, Marmor Sežana, Technical Manager at the monitoring point above the quarry.

On top of a steel pillar there is a GPS sensor and WiFi antenna, Nivel is fixed on the foundation, power supply and communication is installed in a box.
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The Decision was Right

- One monitored point was under question well before we started with monitoring
- After only 3 months of operation it was clearly proved that the rock is moving
- Blasting away the 150 ton rock showed that it was just slightly leant on the slope; remaining surface was nearly smooth
- Removed equipment is now set up at another point and continually provide valuable data

Three months time series shows slow but constant movements at one of monitoring points (slight negative trend in height)

Based on results from monitoring system experts decided for the right decision – removing equipment and blasting away a 150 ton rock which would be danger for all the workers and mine equipment

Single frequency GPS receiver Leica GMX901 can provide mm accuracy with short baselines and long observation times. Below GMX901 there is uni-directional WiFi antenna.