

# Leica Geosystems **TruStory**

## Permanent Slope Stability Monitoring

### Brown Coal Excavation, Czech Republic



**Severočeské doly a.s. is the largest producer of brown coal in the Czech Republic. The company was established by the Czech National Property Fund in 1994 by merging two major brown coal producers - the Bílina Mines and the Nástup Tušimice Mines. The company's business line includes mining, processing and selling brown coal and associated by-products. The company's domestic market share in 2008 was 46.87%. The Nástup Tušimice mine is the most important mine for brown coal excavation in the Czech Republic. In 2010, approximately 12.3 million tons were extracted, and in 2011 more than 15 million tons are expected. Since 1979 the mine slopes have been monitored with Leica Geosystems equipment. In September 2011 Severočeské**

**doly a.s. decided to renew its monitoring equipment for the latest Leica Monitoring Solution.**

The Nástup Tušimice Mine with its slope declines of up to 20 degrees is located in an area with complex tectonics. When the mine operators started slope monitoring in 1979, observations were carried out manually by angle readings using a theodolite. In 1997 they switched over to a permanent monitoring installation utilizing a Leica TCA1800 and third party software, with the remote communication established via radio.

At the heart of the new, fully automatic Monitoring solution is the Leica GeoMoS software running on the MonBox30 computer installed in the ComBox10. This receives the data of the Leica TM30

#### ■ **Company**

Severočeské doly a.s., Nástup  
Tušimice Mine

#### ■ **Challenge**

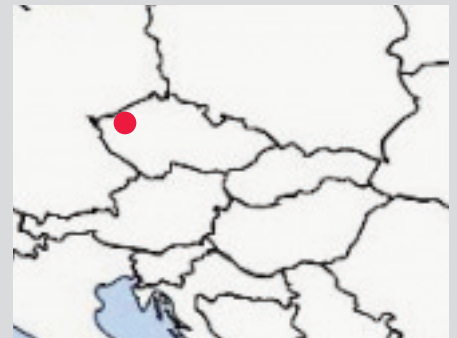
Slope Stability/Landslide Monitoring  
and prediction of failures

#### ■ **Date**

Since September 2011

#### ■ **Location**

Tušimice, Czech Republic



#### ■ **Project**

##### **Instruments**

Leica TM30  
Leica Monitoring prisms  
Meteo sensor

##### **Software**

Leica GeoMoS Monitor

##### **Communication**

Leica ComBox10 using GPRS  
Leica MonBox30

#### ■ **Objectives**

- Precise monitoring of possible slope movements and velocity
- Prediction of slope failures
- To avoid injury and damages during coal excavation



#### ■ Benefits

- Precise long-range distance measurements up to 3000m with Leica TM30
- Easy Monitoring system setup with Plug&Play solution and reliable communication
- Leica MonBox keeps system running in case there is a communication breakdown

Monitoring Sensor inside the measurement hut and the DTM meteo sensor outside. Measurement data transfer and communications are established via mobile internet GPRS.

The Leica TM30 currently measures, at hourly intervals, 15 monitoring prisms placed on the slopes at distances of 250m to 2.240m from the Monitoring Sensor. In the near future, measurements to a total of 40 prisms are planned. The measurement cycle can be adapted at any time according to the needs. Compared to the previous monitoring installations, the new system provides a complete Plug&Play solution that was easy to setup. All connections and communication are placed in the rugged ComBox housing. The integrated Leica MonBox also serves as an independent internet backup, which means that data is not lost if a communication breakdown arises.

In addition, the Leica TM30 Monitoring Sensor combines speed and accuracy. As it is especially designed for Monitoring applications the sensor provides high accuracy angular measurements of 0.5". The long range ATR detects and measures to prisms within a range of up to 3000m with millimetre accuracy. The modern drives, based on piezo technology, support a high rotation speed of 180°/s allowing shorter time intervals between measurements cycles, if required. With the TargetCapture technology, obstructions in the line of site can be inspected remotely and documented. Also, with TargetView, the sensor detects the correct prism when multiple prisms are close together.

Additionally, Leica GeoMoS supports the integration of the DTM meteo sensor for data processing, taking atmospheric corrections into account, allowing a precise and

specific analysis, based on meaningful results, to make the right decision if movements should occur.

More information about Severočeské doly a.s. at <http://www.sdas.cz>



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