

Monitoring System Saves Lives in Rock Fall



During the night of 14 May 2012, some 300,000 cubic metres of rock broke off the Valegion mountain and crashed 1,000m down to the valley floor below in the Swiss canton of Ticino, near the village of Preonzo. Thanks in part to Leica Geosystems'™ Deformation Monitoring solution GeoMoS, local authorities were able to evacuate the valley's™ industrial zone and to close the A2 highway and several cantonal roads at an early stage.

The Ticino community of Preonzo, between Biasca and Bellinzona in the canton of Ticino (Switzerland), has lived with rock falls for many years. Ten years ago, a huge rock mass slid into the valley. The Cantonal Forestry Office has been watching the danger zone since 1998, and has been relying on automatic monitoring systems from Leica Geosystems for

the past two years. Cantonal geologist Giorgio Valenti says to have regularly experienced small movements over the years, especially in spring time. Since the end of April of this year, the movements measured have increased to several millimetres per hour, which made the safety measures necessary.

The automatic monitoring system has provided continuous information about every movement in the affected zone. Two years ago a Leica TM30 Monitoring Sensor was installed on a stable pillar below the slide area and connected to the Leica GeoMoS monitoring system. Since then the sensor has monitored 15 observation points located inside and outside the danger zone every hour, 24/7. The results are automatically forwarded to an FTP server in the Forestry Department and then analysed by experts.

Michael Rutschmann, Product Manager at Leica Geosystems and technical consultant for this project, also has access to the data and said that for years tracking three-dimensional data with millimetre-accuracy in real-time was possible, knowing when movements took place and in which direction. The responsible experts were able to analyse developments and trends, and combined this data with additional information. The complete measurement history is very valuable to the geologists' further analysis.

The experts were kept informed by SMS about the movements. As their speed continued to increase, it became clear that the rock would soon break off.

Based on the analysis of Leica GeoMoS and extensometer data, the necessary safety measures could be initiated early. The industrial area at the foot of the mountain, which is important for the local economy in this region, could be evacuated in time. The police also closed cantonal roads and the highway. It could not be predicted if the mass would reach and damage the industrial zone when the one million ton load crashed down to the valley. So far no damage has been recorded, more detailed studies are yet to come.

At the moment of writing, the 70 employees of the six companies in the industrial zone have resumed their work. But even after this event in Preonzo, the Leica Geosystems monitoring system will continue to monitor the slope accurately to protect the people. More observation points will be installed in an extended zone around the fracture area, which will be continuously monitored for their stability.

Two years ago the community of Preonzo and the Forestry Office of the Canton Ticino (Sezione Forestale, Cantone Ticino) decided in favour of funding and commissioning an additional Leica Geosystems monitoring system to observe the area around the Valegion.