Geophysical Research Abstracts
Vol. 12, EGU2010-5178, 2010
EGU General Assembly 2010

Fast rockfall hazard assessment along a road section using the new LYNX Mobile Mapper Lidar

Carrea Dario (1), Longchamp Celine (1), Jaboyedoff Michel (1), Choffet Marc (1), Derron Marc-Henri (1), Michoud Clement (1), Pedrazzini Andrea (1), Conforti Dario (2), Leslar Michael (2), and Tompkinson William (2)

(1) Institute of Geomatics and Risk Analysis, University of Lausanne, Switzerland , (2) Optech Incorporated, Vaughan, Ontario, Canada

The terrestrial laser scanning (TLS) is an active remote sensing technique providing high resolution point clouds of the topography. The high resolution digital elevations models (HRDEM) derived of these point clouds are an important tool for the stability analysis of slopes. The LYNX Mobile Mapper is a new TLS generation developed by Optech. Its particularity is to be mounted on a vehicle and providing a 360° high density point cloud at 200-khz measurement rate in a very short acquisition time. It is composed of two sensors improving the resolution and reducing the laser shadowing. The spatial resolution is better than 10 cm at 10 m range and at a velocity of 50 km/h and the reflectivity of the signal is around 20% at a distance of 200 m. The Lidar is also equipped with a DGPS and an inertial measurement unit (IMU) which gives real time position and georeferences directly the point cloud.

Thanks to its ability to provide a continuous data set from an extended area along a road, this TLS system is useful for rockfall hazard assessment. In addition, this new scanner decrease considerably the time spent in the field and the postprocessing is reduced thanks to resultant georeferenced data. Nevertheless, its application is limited to an area close to the road.

The LYNX has been tested near Pontarlier (France) along roads sections affected by rockfall. Regarding to the tectonic context, the studied area is located in the Folded Jura mainly composed of limestone. The result is a very detailed point cloud with a point spacing of 4 cm. The LYNX presents detailed topography on which a structural analysis has been carried out using COLTOP-3D. It allows obtaining a full structural description along the road. In addition, kinematic tests coupled with probabilistic analysis give a susceptibility map of the road cut or natural cliffs above the road. Comparisons with field survey confirm the Lidar approach.