Geophysical Research Abstracts
Vol. 14, EGU2012-13112, 2012
EGU General Assembly 2012

Landslides risk mitigation along lifelines

G. Capparelli (1), P. Versace (1), G. Artese (2), S. Costanzo (3), P. Corsonello (3), G. Di Massa (3), G. Mendicino (1), D. Maletta (1), S. Leone (1), F. Muto (4), A. Senatore (1), A. Troncone (1), E. Conte (1), and D. Galletta (5)

(1) University of Calabria, Dipartimento di Difesa del Suolo, Rende, Italy (kgiov@dds.unical.it), (2) University of Calabria, Dipartimento di Pianificazione Territoriale, Rende (CS), Italy; , (3) University of Calabria, Dipartimento di Elettronica Informatica e Sistemistica, Rende (CS), Italy; , (4) University of Calabria, Dipartimento di Scienze della Terra, Rende (CS),Italy;, (5) Società Autostrade

The paper describes an integrated, innovative and efficient solution to manage risk issues associated to landslides interfering with infrastructures. The research project was submitted for financial support in the framework of the Multi -regional Operational Programme 2007-13: Research and Competitiveness funded by the Ministry of Research (MIUR) and co-funded by the European Regional Development Fund. The project is aimed to developing and demonstrating an integrated system of monitoring, early warning and mitigation of landslides risk. The final goal is to timely identify potentially dangerous landslides, and to activate all needed impact mitigation measures, including the information delivery. The essential components of the system include monitoring arrays, telecommunication networks and scenario simulation models, assisted by a data acquisition and processing centre, and a traffic control centres.

Upon integration, the system will be experimentally validated and demonstrated over ca. 200 km of three highway sections, crossing the regions of Campania, Basilicata, Calabria and Sicily. Progress in the state of art is represented by the developments in the field of environmental monitoring and in the mathematical modeling of landslides and by the development of services for traffic management. The approach to the problem corresponds to a “systemic logics” where each developed component foresees different interchangeable technological solutions to maximize the operational flexibility.

The final system may be configured as a simple to complex structure, including different configurations to deal with different scenarios. Specifically, six different monitoring systems will be realized: three “point” systems, made up of a network of locally measuring sensors, and three “area” systems to remotely measure the displacements of large areas. Each network will be fully integrated and connected to a unique data transmission system. Standardized and shared procedures for the identification of risk scenarios will be developed, concerning the surveys to be carried out, the procedures for each type of on-site testing and guidelines and dynamic templates for presentations of results, such as highway risk maps e.g. The setting up of data acquisition and processing centre and traffic control centre are the core of the integrated system. The DAC (data acquisition center, newly designed) will acquire and process data varying in intensity, dimensions, characteristics and information content. The Traffic Control Center (TCC) is meant to integrate the scientific and the management aspects of hydrological risk monitoring and early warning. The overall system is expected to benefit of the development of new, advanced mathematical models on landslide triggers and propagation. Triggering models will be empirical or hydrological, represented by simple empirical relationships, obtained by linking the antecedent rainfall and the landslide time occurrence, and complete models identified through more complex expressions that take into account different components as the specific site conditions, the mechanical, hydraulic and physical properties of soils and slopes, the local seepage conditions and their contribution to soil strength.

The industrial partners of the University of Calabria are Autostrade Tech, Strago and TD Group, with the Universities of Firenze and Catania acting research Partners.