Geophysical Research Abstracts
Vol. 14, EGU2012-4427, 2012
EGU General Assembly 2012

A web-based tool for ranking landslide mitigation measures

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As part of the research done in the European project SafeLand "Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies", a compendium of structural and non-structural mitigation measures for different landslide types in Europe was prepared, and the measures were assembled into a web-based "toolbox". Emphasis was placed on providing a rational and flexible framework applicable to existing and future mitigation measures. The purpose of web-based toolbox is to assist decision-making and to guide the user in the choice of the most appropriate mitigation measures.

The mitigation measures were classified into three categories, describing whether the mitigation measures addressed the landslide hazard, the vulnerability or the elements at risk themselves. The measures considered include structural measures reducing hazard and non-structural mitigation measures, reducing either the hazard or the consequences (or vulnerability and exposure of elements at risk). The structural measures include surface protection and control of surface erosion; measures modifying the slope geometry and/or mass distribution; measures modifying surface water regime - surface drainage; measures mo¬difying groundwater regime - deep drainage; measured modifying the mechanical charac¬teristics of unstable mass; transfer of loads to more competent strata; retaining structures (to modify slope geometry and/or to transfer stress to compe¬tent layer); deviating the path of landslide debris; dissipating the energy of debris flows; and arresting and containing landslide debris or rock fall. The non-structural mitigation measures, reducing either the hazard or the consequences: early warning systems; restricting or discouraging construction activities; increasing resistance or coping capacity of elements at risk; relocation of elements at risk; sharing of risk through insurance. The measures are described in the toolbox with fact sheets providing a brief description, guidance on design, schematic details, practical examples and references for each mitigation measure. Each of the measures was given a score on its ability and applicability for different types of landslides and boundary conditions, and a decision support matrix was established.

The web-based toolbox organizes the information in the compendium and provides an algorithm to rank the measures on the basis of the decision support matrix, and on the basis of the risk level estimated at the site. The toolbox includes a description of the case under study and offers a simplified option for estimating the hazard and risk levels of the slide at hand. The user selects the mitigation measures to be included in the assessment. The toolbox then ranks, with built-in assessment factors and weights and/or with user-defined ranking values and criteria, the mitigation measures included in the analysis. The toolbox includes data management, e.g. saving data half-way in an analysis, returning to an earlier case, looking up prepared examples or looking up information on mitigation measures. The toolbox also generates a report and has user-forum and help features.

The presentation will give an overview of the mitigation measures considered and examples of the use of the toolbox, and will take the attendees through the application of the toolbox.