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New classification of landslide-inducing anthropogenic activities

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Although landslides are usually considered typical examples of natural hazards, they can be influenced by human activities. Many examples can be found in the literature about slope instabilities induced by anthropogenic activities, ranging from small superficial landslides to rock avalanches. Research on this topic is of primary importance for understanding and mitigation of landslide risk. Indeed, slope stabilities influenced by human actions contribute significantly to the risk level because, by definition, they are located where elements at risk and people are present.

Within the framework of the European project SafeLand "Living with Landslide Risk in Europe", the authors analyzed the landslides induced by anthropogenic factors in Europe and elsewhere (SafeLand deliverable D1.6). During the bibliographical research, it appeared that a complete and illustrated classification on human activities influencing slope stabilities does not yet exist. Therefore, a new classification was introduced by Michoud et al. (2011) about anthropogenic activities affecting slope stability conditions. This classification takes into account conceptual processes leading to landslides (Terzaghi, 1950; Jaboyedoff and Derron, 2005) and the distinction between destabilization factors and triggering factors (Vaunat et al., 1994; Leroueil et al., 1996). The classification was tested and improved through fifty-eight well-documented case studies, even lots of large landslides, such as Elm, Aberfan, Namsos and Rissa landslides, etc.

Furthermore, the boundary between natural and "anthropogenic" landslide triggers (e.g. water run-off modified by new land-uses, creating landslides some km farther), and the time during which changes and reactions are to be considered as direct consequences of human activities were highlighted. Finally, anthropogenic influences can also be positive and examples of (non-voluntary) positive human impacts on slope stability are presented.

Jaboyedoff, M. and Derron, M.-H. 2005. Integrated risk assessment process for landslides. In: Landslide risk management, Hungr, O., Fell, R., Couture, R. and Eberhardt, E. (eds.): 776 p.
Leroueil, S., Locat, J., Vaunat, J., Picarelli, L. Lee, H. and Faure, R. 1996. Geotechnical characterization of slope movements, Landslides, Senneset (ed.), 53-73.
Michoud, C., Jaboyedoff, M., Derron, M.-H., Nadim, F. and Leroi, E. 2011. Classification of landslide-inducing anthropogenic activities, 5th Canadian Conference on Geotechnique and Natural Hazards, Kelowna, Canada, 10 p.
Terzaghi, K. 1950. Mechanism of Landslides, The Geological Society of America, Engineering Geology (Berkley) Volume, 83-123.
Vaunat, J., Leroueil, S. and Faure, R. 1994. Slope movements: a geotechnical perspective. Proc. 7th Int. Congress of Int. Association of Engineering Geology, Oliveira (ed.), 1637-1646.