



New challenges within risk-oriented analyses of rock- and soil-slides demonstrated on case studies at urban and infrastructural areas

M. Scheikl, A. Henle and C. Rachoy

(1) Department of Geology and Geotechnic (2) ALP-infra, Consulting + Engineering GmbH
(manfred.scheikl@alpinfra.com)

Within the past years we investigated several landslides along infrastructural and urban areas. The slides occurred as well in rock-slopes and in soil-slopes. All investigated slides were triggered by catastrophic rain-fall-events and were characterized by anthropogenic weakened slope toes.

In the past, engineers were strictly confronted with the detailed geological and geo-mechanical, numerical analysis of the slope failures. Since the past role of the engineer as inviolable decision leader is increasingly weakened, due to economic control obligations - mostly operated from the far desk - new ways of conviction of counter measures had to be developed. For this reason the requirement to engineers, regarding the ability to work multidisciplinary and to find more exact models, is risen, which is in general to be seen positively.

In order to fulfill the increasing justification-requires when planning counter measures, several technical and economical aspects are to be described quantitatively now. This quantitative description is the basis for risk-analysis, which has to contain beside other aspects following:

a) The probability of a certain event b) The expected harm at humans at the scenario put to reason c) The expected damage at structures d) The expected super-ordinate economical harm e) The expected costs of counter-measure variants f) The variant related residual risk, expressed in costs

While the description of the first aspect a) is mainly a geotechnical challenge, which is connected to very detailed knowledge of the slope-failure characteristic, triggering

mechanisms as well as related historical and future meteorological data, the aspects c) and e) concern exact technical cost investigations.

The hardly fulfillable challenge is the answer to sensitive, ethical questions like the expression of the economical worth of a human life or the harm related to heavy injuries of persons. But in order to be able to perform and represent a true risk-calculation, one must intensively explain the correct context regarding worth of life, in particular while representing measures or reduced measures in front of persons, concerned by catastrophes.

In our case studies, we were able to investigate and improve as well the basic data set concerning geological, technical as well as economical aspects and to perform several risk-oriented dynamic investment calculations, considering also residual risks and their cost-related effects.