



EasySMR: A computer program to check kinematic feasibility and calculate Slope Mass Rating

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Rock falls, rock slides and rock avalanches are natural or anthropogenic phenomena, mostly result of unstable rock slopes. So to determine the stability of a slope mass, rock mass classification systems are often used in rock engineering practices. Slope Mass Rating (SMR) is an efficient rock mass classification system to assess structurally controlled stability of natural and engineered rock slopes. The SMR system is an adaptation of Rock Mass Rating (RMR) system and is calculated by adding correction factors to the basic RMR. The correction factors depend on the interrelation of existing joints in a slope with respect to the slope geometry and excavation method. The conventional method of determining SMR includes the collection of slope and joint orientations followed by determination of planes and/or line of intersections of wedges responsible for kinematic instability. Then the correction factors are assigned to the most unfavourable planes and/or wedges according to the discrete ratings proposed by Romana (1985) and Anbalagan et al. (1992).

To ease the tedious process involved in SMR calculation, a GUI based windows application software, EasySMR, has been developed by the first author. The application itself determines kinematic feasibility from input discontinuities and slope orientation as well as friction angle followed by direct calculation of SMR using input basic RMR. The application checks the possibility of planar, wedge and flexural toppling failures by using the equations suggested by Leung and Kheok (1987) and simultaneously calculate SMR for all the unfavourable planes and wedges. The continuous functions given by Tomas et al. (2007) has been used to determine the correction factors. The program is also aided by statistical analysis of SMR for all the kinematic failures. The outputs of the software have been validated by manual calculations for 23 rock slopes.