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The use of geotechnical classification schemes in estimating the geotechnical properties of a volcanic edifice.

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An important factor in any volcanic slope stability analysis is the physical properties used within the calculations of the analysis. Field data from (North Wales, UK) and Tenerife (Canary Islands) are reported. Using rock types that range in composition from photolytic to rhyolitic, we summarise a method for estimating the overall strength of a volcanic edifice based the rock mass rating index (RMR) geotechnical classification scheme and the Hoek-Brown criterion (Thomas et al., 2004). We show that the average rock mass compressive (σ_{cm}), and cohesive (c) strengths decrease exponentially with RMR and appear largely insensitive to both initial magma composition and relative age. This exponential relationship provides a new predictive tool for directly estimating rock mass strength from quick, easily obtainable field observations. This method predicts a marked reduction of up to 96% in the rock mass compressive strength relative to the intact rock value based on laboratory tests and that overall, the averaged results from both study areas yield cohesive strength values from 4.8 to 0.44 MPa and a rock mass angle of friction ranging from 28 to c. 38°.

Thomas M. E., Petford N., Bromhead E. N., 2004. Volcanic rock-mass properties from Snowdonia and Tenerife: implications for volcanic edifice strength. *Journal of the Geological Society, London*, **161**, 939 – 946