

Masters Thesis (MA, 30 ECTS)

Determination of the ISBD of a quarry using remote sensing techniques

Description

The in situ block size distribution (ISBD) represents a characteristic block size (volume and shape) of rock blocks generated by the intersection of discontinuities in a rock mass. The determination of the discontinuity orientations in an outcrop has become quite detailed with the development of remote sensing techniques and the appropriate analysis tools. However, usually an outcrop is only “half-the-truth” since it seldom represents all the discontinuities within a rock mass due e.g. to the orientation of the outcrop and the discontinuities. To cope with this shortcoming, statistical models to determine the ISBD within a rock mass have been developed but not validated yet.

Aim of this thesis is the validation of the current models to determine the ISBD by investigating an outcrop by means of remote sensing to derive the geometrical information about the discontinuity network and compare it with information about the block size distribution given by the quarry owner. The work shall answer the following questions:

- Is it possible to simplify, fasten and refine the process of the ISBD-determination by using remote sensing techniques?
- Do the numerical models give realistic results for the ISBD?
- What degree of detail is necessary to generate a realistic discontinuity map of an outcrop for the determination of the ISBD?

For the thesis, the following steps shall be elaborated:

- Literature research on the determination of the ISBD and discontinuity analyses
- Generation of a 3D surface model of a representative quarry bench using SFM (ShapeMetriX3D)
- Mapping of the discontinuities using ShapeMetriX3D Analyst and DSE (Discontinuity Set Extractor)
- Deriving information about spacing and persistence (trace length)
- Applying current models for the ISBD-determination under consideration of the outcrop-size and known block size distribution (numerical modelling)
- Determination of the ISBD and the typical block shapes
- Writing of a technical report with the results of the investigations

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Start by arrangement

Duration ca. 6 months

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