

Z-FABRIC

Rock fabric data reduction and modelling

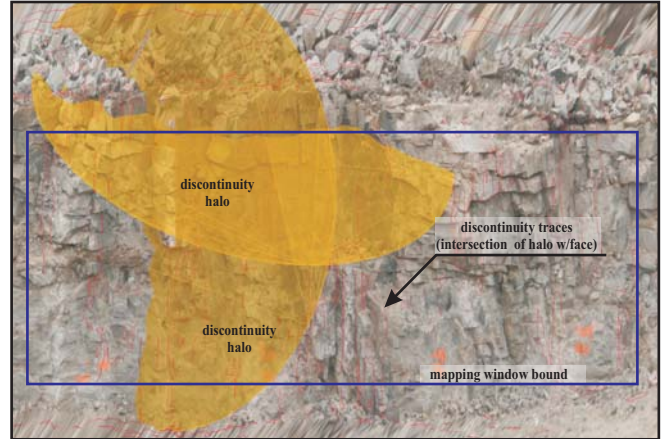
Discontinuities are, in many cases, the primary weakness in a rock mass. These discrete planes, if properly modelled, can be utilized to infer the behavior of rock for geotechnical design. Z-Fabric does just that.

The routines utilized in Z-Fabric have been developed over many years and have been utilized on mine designs around the globe. This program is likely one of the few, if not the only, such program that has been developed in conjunction with a mapping methodology. In other words, the mapping methodology was developed such that discontinuity data collected could be reduced to model parameters. These collected "spatial characteristics" are the raw material for discontinuity model construction.

Z-Fabric presently incorporates a polar plot stereonet routine with set picking capabilities, a spatial characteristics routine for reduction of cell mapping data, and a statistical bench face calculator for bench design in jointed rock masses.



Bench fabric mapping using Adamtech's 3DM software

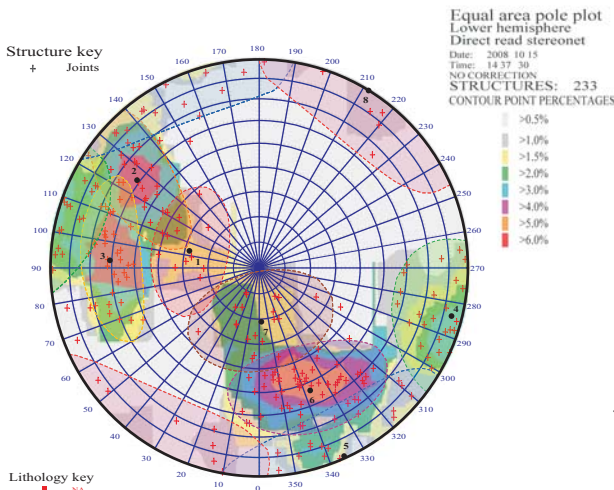


Cell window definition for Z-Fabric

Cell or Window Fabric Mapping

The key to the mapping process, as well as to proper rock mechanics engineering, is the ability to accurately describe the myriad of discontinuities, collectively called "rock fabric", in the rock mass. This is readily achievable using photogrammetric methods, both in surface and underground environments. Manual mapping can, however, be utilized as well.

A detailed description of the methodology can be obtained at <http://www.edumine.com> under the title of "Bench Face Design in Rock"



Set No.	Dip Direction	Dip	No.	Sigma Max	Sigma Min	Omega	Joint length		Joint center density	
							Mean	St. Dev.	Mean	St. Dev.
1	104	28	8	9.015E-02	5.311E-02	94.63	4.05	5.20	0.077	0.080
2	126	61	33	2.435E-01	7.934E-02	163.31	4.82	2.55	0.022	0.021
3	93	61	35	1.962E-01	8.583E-02	101.50	8.17	2.87	0.015	0.008
4	284	84	40	2.360E-01	1.620E-01	184.23	6.18	2.15	0.014	0.007
5	336	89	24	2.859E-01	1.833E-01	101.34	6.53	4.32	0.049	0.065
6	337	53	58	1.837E-01	1.139E-01	74.23	4.71	1.22	0.008	0.003
7	358	21	20	8.073E-02	5.198E-02	102.86	13.38	11.80	0.032	0.040
8	212	90	11	3.018E-01	2.032E-01	65.76	4.32	2.38	0.037	0.033

Discontinuity sets are digitized on-screen. This allows the user complete freedom in determining set bounds. A bivariate normal distribution is utilized to determine statistical parameters to describe the orientation distribution.

The determined sets orientation characteristics are then utilized, in conjunction with the field obtained cell mapping data, to determine the remaining spatial characteristics for modelling. This includes an estimate of the continuity and joint center density (spacing equivalent) for each set.

The resulting values can then be utilized to numerically describe the rock mass fabric for design purposes.

All concepts and methodologies presented herein are considered proprietary information and technology of Zostrich Geotechnical



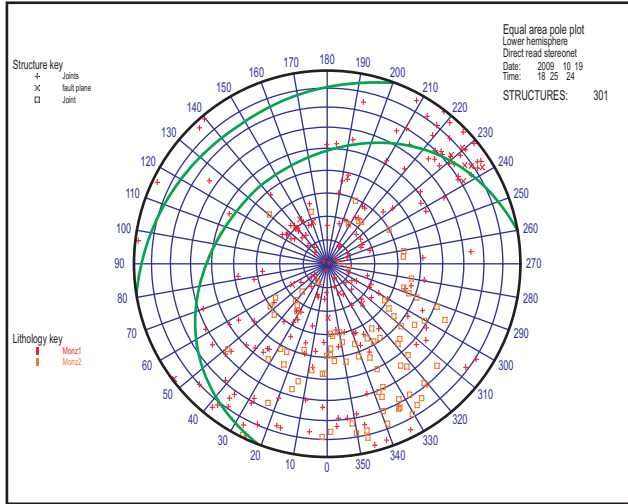
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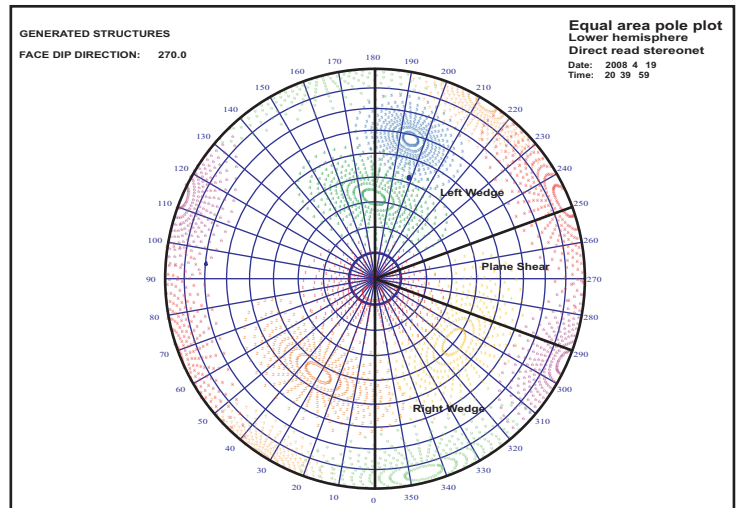
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Oriented Core Reduction

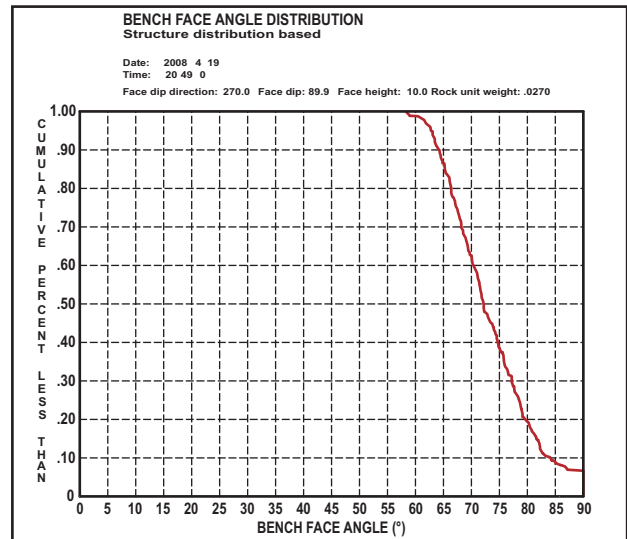
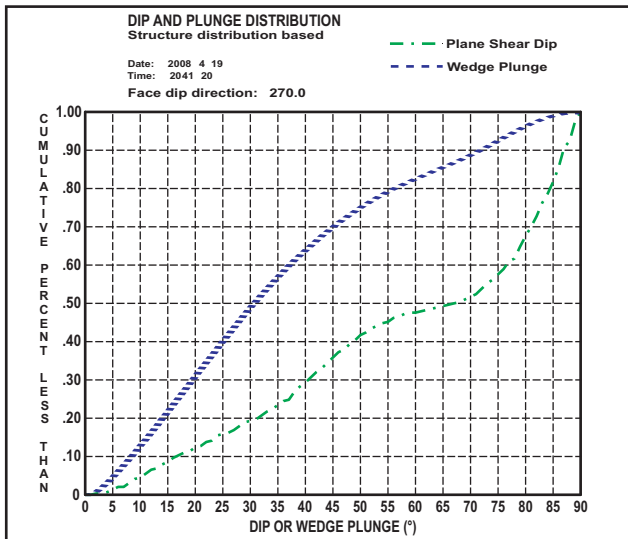
Oriented core data can be utilized in refining the orientation parameters of the rock fabric spatial characteristics. Continuity and center density (spacing) parameters are difficult to obtain from oriented core drilling and as such, are not included in Z-Fabric.

The blind zone, or the zone parallel to the core axis in which there is poor sample representation, can be described as shown to the left. This can be utilized to visually ascertain the impact of the orientation on existing, or planned, drillholes.



Fabric modelling

The spatial characteristics derived from the input data base, as defined by fabric set, can be utilized to create synthetic data for analysis. As can be seen in the stereonet to the right, the fabric sets have been discretized as individual points. These orientation values, together with the center density and continuity information, are utilized for design purposes.



Face analysis

Given the synthesized orientation data, a distribution of plane shear and wedge structures can be generated for a provided face orientation (above, left).

If the discontinuity shear strength distribution is utilized, it is also possible to generate the bench face angle distribution for a given bench height and orientation (above, right). This, together with the required catch bench width will assist in determining the optimum bench geometry for a rock cut with excavated benches.

A detailed description of the methodology can be obtained at <http://www.edumine.com> under the title of "Bench Face Design in Rock"

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