

Slim Borehole Scanner

Monitoring of the Borehole Wall for Structural & Geotechnical Analysis




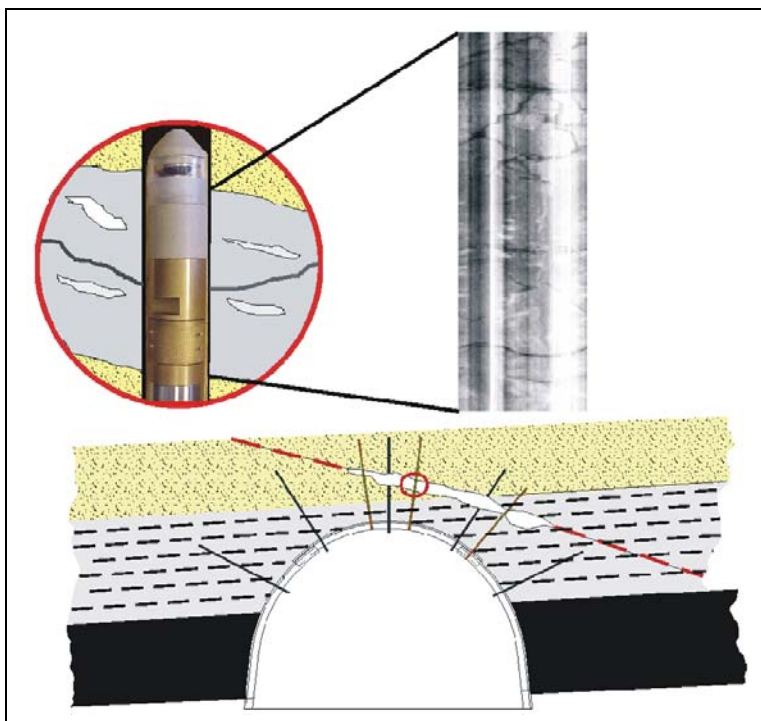
The digital video module

The Slim Borehole Scanner Tool produces a highly accurate optical image of the anchor borehole wall. With an integrated orientation device, the borehole images can be oriented in 3D-space and be used for digital documentation of the rock formation stability. With additional software, the pictures can be used for geological structure analysis of bedding, foliation, joints, faults and veins.

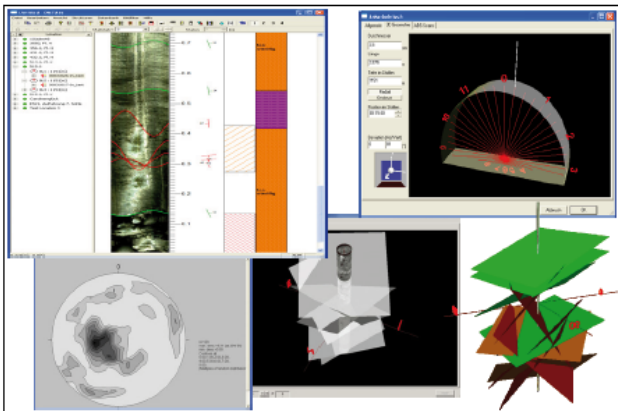
The structures can be identified, oriented in space, statistically analysed and finally be used for an update of the geological geotechnical model during the construction phase of a tunnel.

Tool characteristics

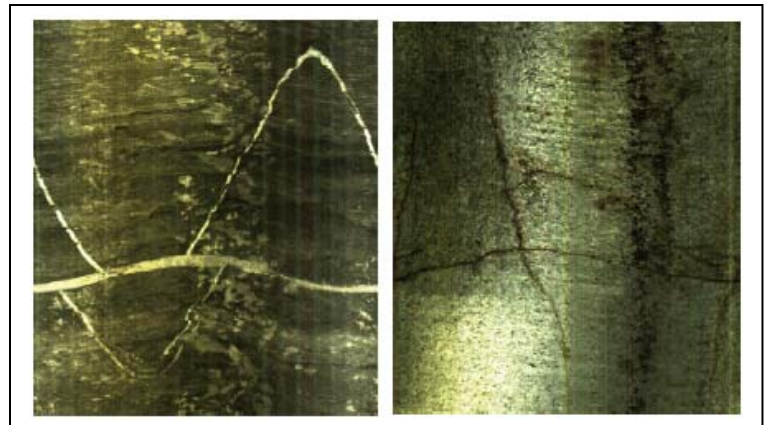
- Diameter: 23 mm, length: 130 cm
- Stand-alone system
- 360° optical scanning in short and slim drill holes
- Digital image storing
- Oriented acquisition of discontinuities from anchor boreholes
- Mobile monitoring tool for the determination of fracture widths
- Software for statistical and quantitative analysis
- Intrinsically safe for application e.g. in coal mining  [I M1 EEx ia I]



Inspection of the roof rocks with the Slim Borehole Scanner



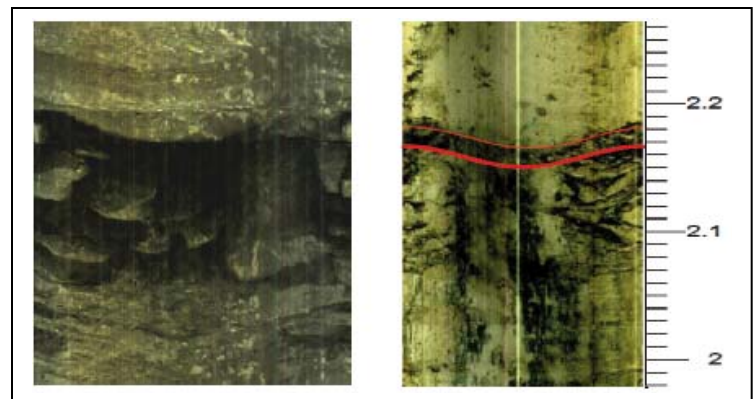
Borehole image analysis with SBS analysis software



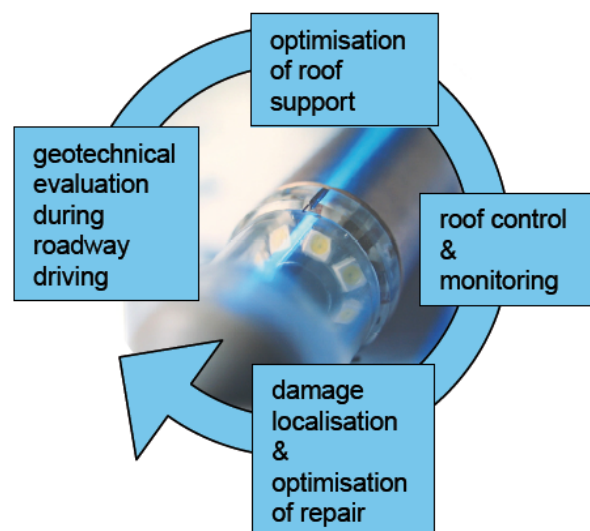
Borehole images of mineralized (left) and open (right) joints

Advantages of application for roof control

- Determination of the orientation of discontinuities for the calculation of potential sliding wedges
- Optimal roof bolt pattern according to the exact structural fabric
- Monitoring during the roadway driving; thereby optimal adjustment of the roof bolt pattern according to occurred changes
- Determination of the opening width of discontinuities
- Supervision of the roadway roof and monitoring of the loosening of the roof rocks for the convergence control and the investigation of damages
- Documentation of temporal changes of openings by comparison of repeated measurements
- The digital image storing and the integration into a database with SBS analysis software allow a reinterpretation of the data at any time
- Objective geological documentation of the on-site situation for a supplementary management



Borehole image of a shatter zones



Benefits of the Slim Borehole Scanner during the lifetime of a roadway

SBS-Vision

Software for managing, processing and interpreting anchor borehole images

SBS-Vision is the professional software solution for interpreting images of the borehole wall taken by the Slim Borehole Scanner tool (SBS).

SBS-Vision provides you with a database application for managing, archiving and monitoring all your geological/geotechnical data relevant to borehole images. With the program you can carry out efficient image processing and then optimally interpret the borehole images. The software enables you to take full advantage of the high degree of functionality of the SBS tool when in operation.

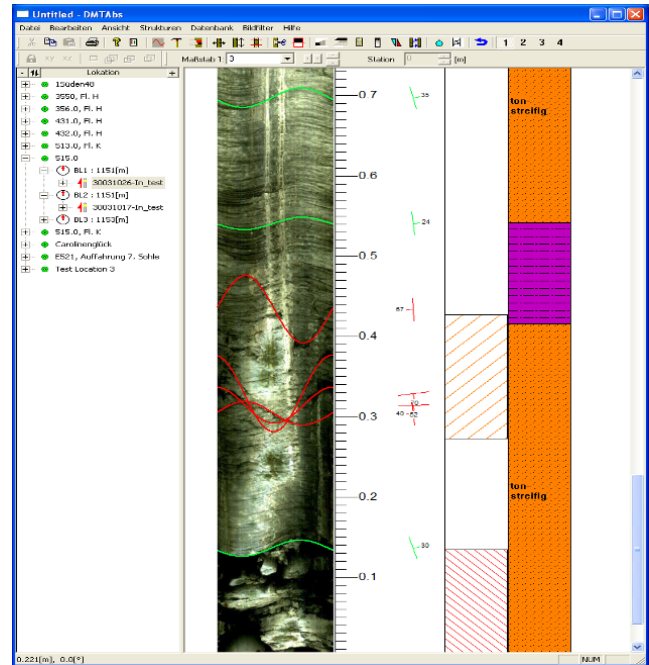
- **2D and 3D visualization**
 - Display of results in diagrammatic profiles
 - Freely rotatable 3D views of image of borehole all with and without interfaces
 - Virtual borehole camera
 - Freely rotatable 3D display of boreholes and tunnels

- **Image analysis & interpretation**
 - Intuitive picking of lithological units directly on screen
 - Intuitive determination directly on screen of geotechnically homogenous sections and anomalies
 - Picking of structures for straightforward determination of their position in space
 - Measurement of the fracture opening of interfaces
 - Interface analysis with display of pole point diagrams and rose diagrams

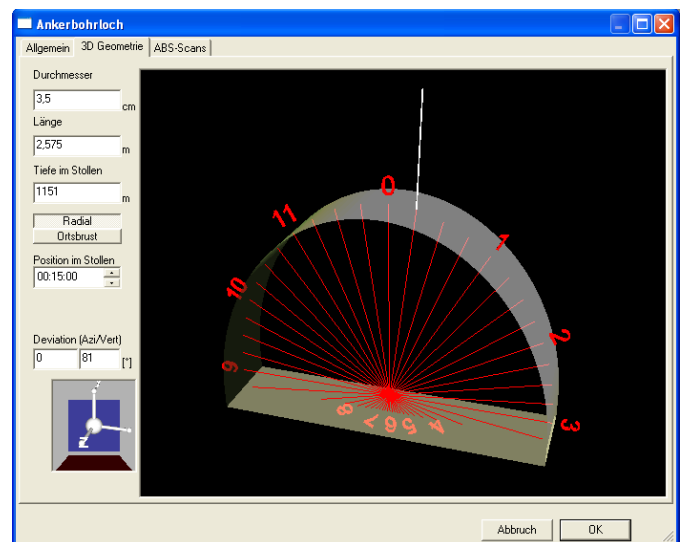
- **Image Data base**
 - Fast access via data tree structure
 - Access to database tables

- **Direct borehole comparison**

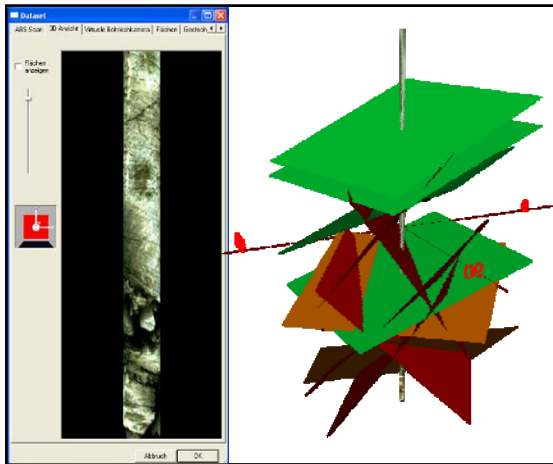
- **Image processing**
 - Optimization of the borehole image with professional image processing tools
 - Efficient processing by creating your own filter scripts



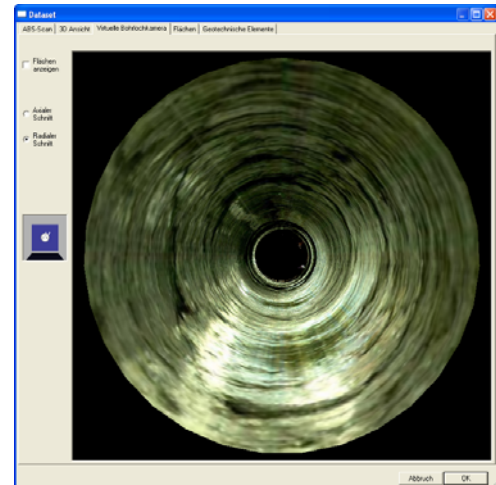
Main screen with data tree structure, borehole image, symbols indicating the inclination of interfaces, and geotechnical and lithological units (from left).



Adjusting and visualizing borehole data.



3D borehole images



Virtual borehole camera

- **Export and import function of borehole image data**

- Creation and input of xml-files of the locations, boreholes and image data

- **Definition of location and borehole**

- Input of all relevant data and extra information in the data window with visual display

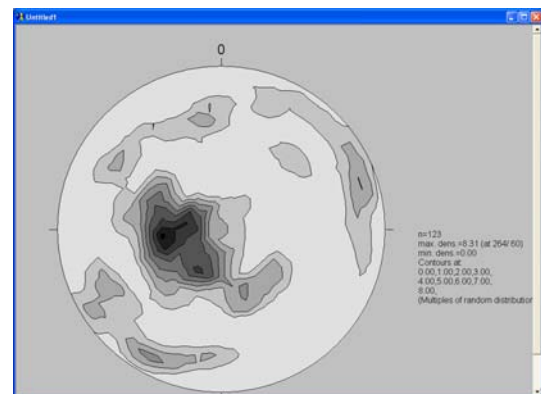
- **Export of images and interpretations**

- Support of numerous export formats (metafiles and pixel maps)

- **Assistant for importing new images**

- **Adjustment to suit individual user needs**

- Non-restricted definition of your own lithologies and geotechnical homogenous areas
- Creation and modification of your own samples for the lithological and geotechnical display of the profile
- Creation and modification of structure types



Example of a structure displayed as a density plot