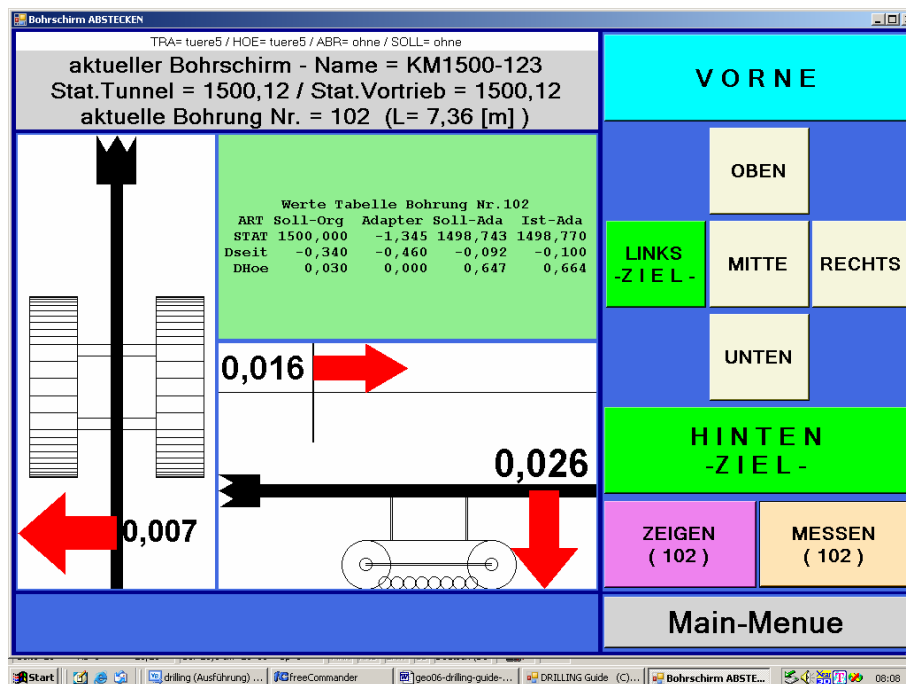


DRILLING GUIDE-06

All drilling works will be controlled by using the guidance system TUSCAN . This system is based on a remote controlled servo theodolit with adapted laser and a robust industry computer.



The unit makes measurement, processing and display of the topical position of stand pipes and drilling rods in real time possible. As a matter of principle two glass prisms parallel to the drilling rod will be compared with the designed 3dimensional line of the drilling hole.

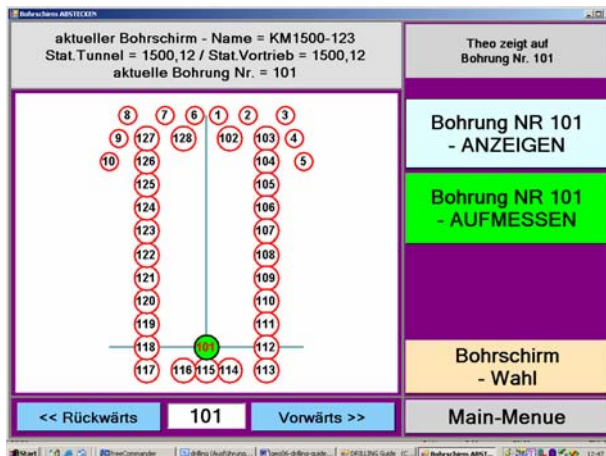
The miners are able to set all drilling works in the correct position by current corrections of the drilling tools. Targets fixed installed at the end of the drilling frame are checked by target locking and a visible laser spot of the system, positioned approximately 10 – 30m backwards of the tunnel face. Details of this centred and excentered targets are traced in enclosed workshop drawings.

First process will be the laser-guided set-out of the start positions of the boreholes. Next process is adjusting the drilling rigs.

Optional a horizontal borehole survey by incline probes to get 3D-results of the borehole is possible. All data will be took over in the computer model (3D) for precalculating the expected freezing solid and recognising gaps. Direct committing and definition of additional boreholes is possible. These information's will flow back to the guidance system for further checks.

The system services will be carried out by the instructed surveyor. All check operations will do the drilling shift engineer or pitboss. Changing of base data by the tunnel staff is not possible, the surveyors mode is locked by password.

The 3D – model works will be carried out in the CAD departments. Any information will be sent by email to the site.



Borehole data to choose the actual one.

Stake out of the starting point of borehole.

