

# Tunnel heading survey

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## HIGHLIGHTS

- Many years of experience in the control of conventional and machine heading
- Flexible construction site monitoring in the form of day operations, week-long or continuing operation
- Supply and installation of alignment and motor lasers
- Supply and maintenance of control guidance systems for TBMs and road headers
- Synergies with construction surveys and optical 3D displacement measurements



*Surveying in the side wall gallery of the Lainzer tunnel in Vienna*

## Field of Application

The demanding task of controlling tunnel and shaft heading comprises all the surveying required for the construction of underground and mining structures. In conventional excavation methods such as NATM for instance, this work comprises the on-going establishment of the exact break-out profile at the heading face and planning the positioning of supports such as tunnel arches, anchors etc., using alignment or motor lasers.

Systems for TBMs and road header guidance are deployed for automatic control of driving machines.

## Description of Services

Geodetic measurements and analyses are continuously performed during tunnel heading control and surveying, in order to provide positioning and directional specifications for the work directly at the excavation face. In conventional tunnel driving, alignment lasers or our TALOS motor laser system are deployed for this purpose. These are installed in the tunnel, calibrated, secured and continuously advanced as driving advances. They generate axis-referenced laser spots directly at the working face and are also utilised by the heading team for various tasks such as positioning of arches, for instance.



*Heading control of side-wall drifts during construction of the Lainzer Tunnel in Vienna*



*Continuous heading control with alignment laser...*

## Tunnel heading surveys

Our EUPALINOS software allows the evaluation and seamless documentation of all geodetic heading measurements and provision of the results in the form of setting-out lists and sketches for alignment lasers or as control data for our TALOS motor laser. In this way, conventional tunnel drives can be achieved with accuracies of a few mm to 1 cm, whilst continuously maintaining the correct relationship with the underground reference point system (tunnel network).

With machine-based drives, our proven control guidance systems (TAUROS) can be used, by which the spatial position and orientation of complex heading machines such as TBM's or road headers, for instance, can be continuously recorded, compared to their planned position and orientation with respect to the tunnel axis and all the data presented to the machine operator on an ongoing basis. The control guidance systems are installed on the machine once and permanently maintained in the course of heading (advanced, serviced, checked etc.).



...or motorlaser system TALOS

## User advantages

- Maximum synergies in combination with construction site surveys and optical 3D displacement measurements
- Experienced staff and extensive selection of control guidance systems under one roof
- Short measurement times and virtually uninterrupted construction activities by utilising flexible measurement methods



Installation of the guidance system for a road header in the manufacturing plant

## Scope of services and delivery

We offer construction companies and consortiums as well as mining companies all components required for high-quality performance of these services.

- Accurate and quality targets and marking material
- Specialised heading surveying software
- Alignment and motor lasers for conventional tunnel headings and control guidance systems for machine heading
- Experienced staff



TBM guidance system on site

## Tunnel heading surveys

For smaller tunnelling projects up to large and complex underground construction sites we can customise these services, from day-jobs to jobs lasting weeks or for the duration of the construction. Our expertise lies especially in the handling of total projects, i.e. we consider ourselves a national and international service provider and supplier of integrated surveying solutions and products.

*The following other data sheets are associated with this data sheet:*

Services:            *TALOS III Motor Laser System*  
                              *TAUROS TBM Guidance System*  
                              *TAUROS Roadheader Guidance System*

Software:            *EUPALINOS Surveying Software*