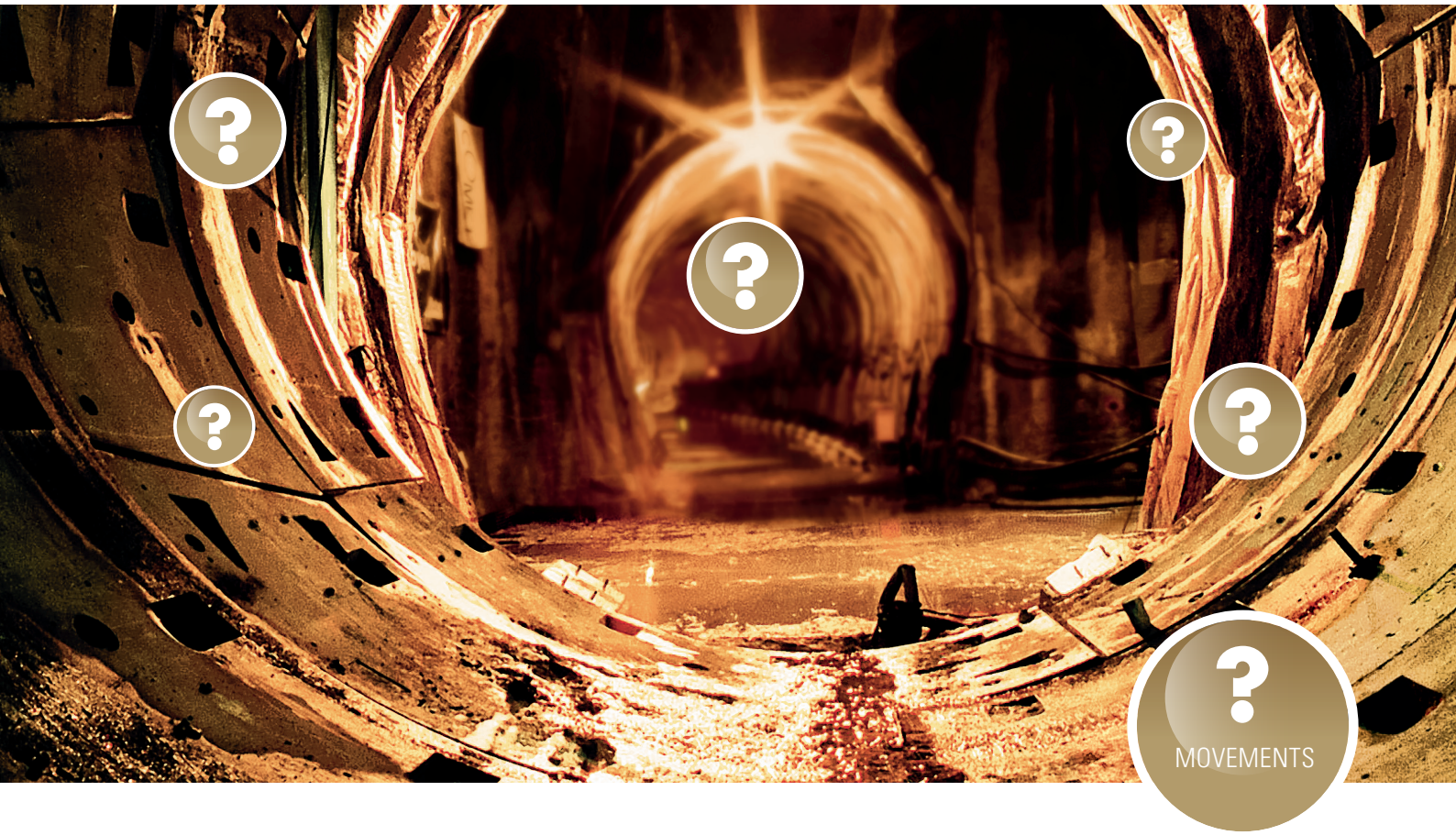
AMBERG TECHNOLOGIES

Amberg Geotechnics

See what's moving

Recognise risks and hazard potentials – quickly, clearly and comprehensively



Tunnel construction

Increasingly complex project requirements and enormous investments contrast with a continuous rise in price and deadline pressures. Efficient, cost-effective solutions are needed, without placing precision and safety at risk.

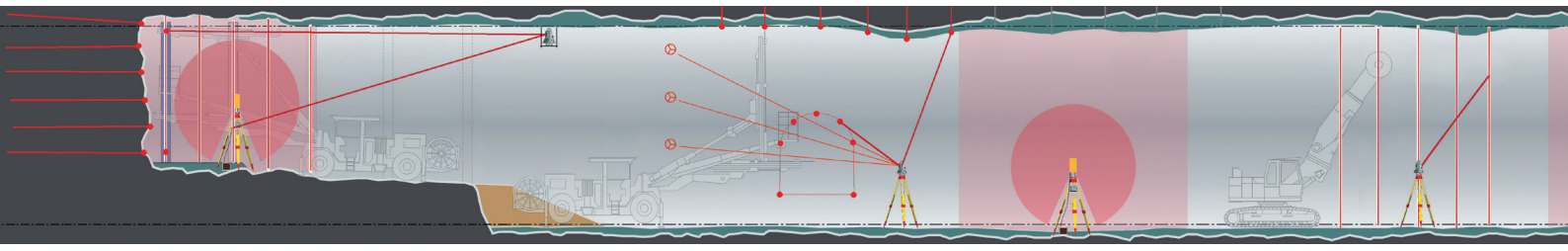
Tunnel maintenance

Tunnel construction projects require periodic monitoring both after development and prior to refurbishments, allowing rock mass movements to be recognised at an early stage and risks to be correspondingly eliminated. The focus is on the minimisation of idle-times in an operating tunnel as a consequence of servicing works.

Geotechnical measurements

Geotechnical measurements are implemented as standard in modern tunnel construction and maintenance works. Their efficient analysis and evaluation allow:

- Recognition of hazard potentials
- Recognition of movements
- Definition of stability classes
- Timely initiation of safety measures
- Documentation for conservation of evidence



More safety

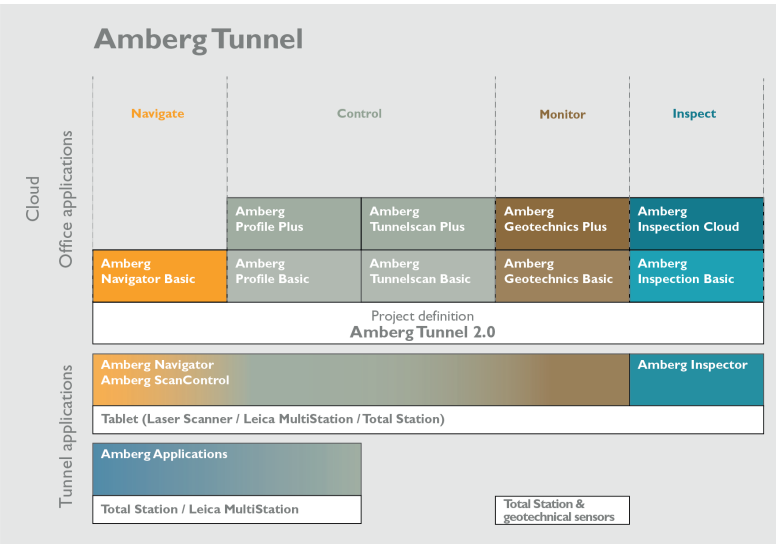
- Know where it's at and have everything under control
- For people and infrastructure
- Great tunnel safety thanks to early recognition of critical displacements

The solution: Amberg Geotechnics – the software application for recognising hazard zones in underground construction

The Amberg Geotechnics software application is an indispensable tool for surveyors and geotechnical engineers working on underground construction projects. The comprehensive software solution allows efficient and cost-effective observation and evaluation of deformations and settlements in tunnel construction, as well as in operational maintenance.

Complete product portfolio

The Amberg Geotechnics software application complements the existing tunnelling product portfolio. The seamless integration in Amberg's overarching tunnelling solution comprising Amberg Tunnelscan, Amberg Profile and Amberg Navigator provides you with a wide range of applications and allows data exchange within the Amberg product range.



Save time and resources

Observe, analyse and document geotechnical data for your underground project quickly and easily, and recognise any hazards in good time with the aid of the software. Reduce tiring, manual tasks using automated measurement, analysis and reporting processes. Profit from more than 50% time saving compared to manual analyse methods.

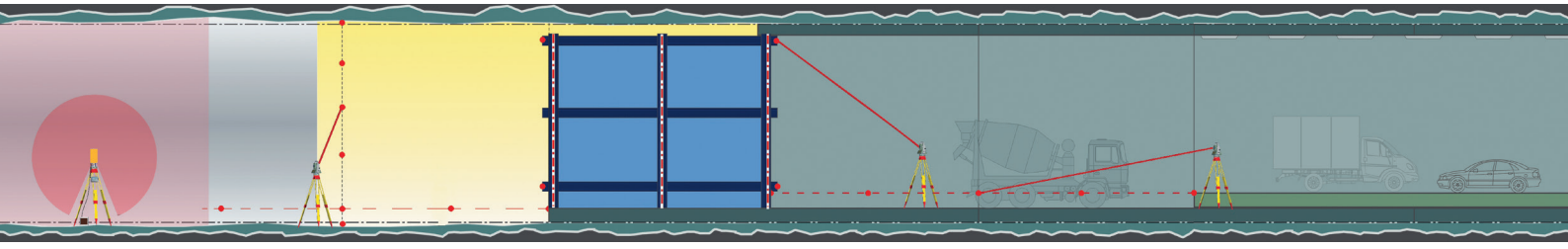
This must be avoided! Recognise possible collapses early and initiate safety measures.

Comprehensive observation and evaluation

With Amberg Geotechnics you are completely free in your choice of sensors and manufacturers. Regardless of the construction method used and the gradient of your project – Amberg Geotechnics adapts to your needs.

Up-to-date, relevant information

The time-saving analysis and easily understandable data evaluation are generated quickly and comprehensively. The results serve as the foundation for advanced decision-making and implementation of measures.



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Adopt geotechnical data – universally and comfortably

Aim: Up-to-date, reliable and relevant measurement results

The data are imported and directly processed by the Amberg Geotechnics software application, universally and comfortably. The simple, user-friendly handling concept allows fast and efficient processing, as well as project-specific management of construction stages. So you don't lose time unnecessarily with manual post-processing, and achieve your objective efficiently.

Supports geotechnical sensors

Globally, there are hundreds of types of geotechnical sensors. The Amberg Geotechnics software application supports almost all sensor types and accepts their data, simply and without problems. Adjusted 3D coordinates or datalogger formats are supported.

- Pressure sensor and load cell
- Extensometer
- Levelling
- Crack meter
- Cant sensor
- Temperature sensor
- Distance measurement
- Total station

Data flow without manual post-processing

- Multivendor capable data import
- Tunnel definition in 3D
- Manage several construction stages
- Automatic point allocation without input of point ID

User-friendly, simple handling concept

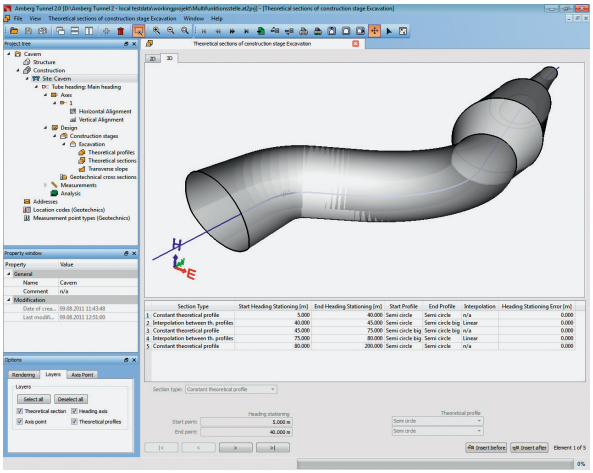
- Automatic project data consistency checks on input
- Comprehensive import and export formats for data transfer from other Amberg products and third-party applications
- Flexible use of units and display of decimal places for project-specific requirements
- Integrated address management for personalised reports

Manage several construction stages

- Project data input as a function of heading direction
- Profile definition vertically or perpendicular to the longitudinal profile in line with project requirements
- Comprehensive profile editor for simplifying routine tasks (blow-up function, mirroring, etc.)

Visualisation of tunnel definition in 3D

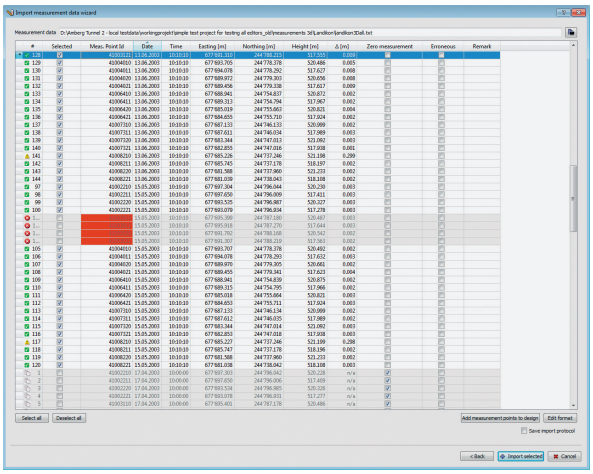
- Visual control for recognising problems, for example, in interpolation zones or when entering axis data before execution
- Illustration for presentation purposes



Visual control of tunnel definition in 3D

Flexible data import

- Supports any data logger format or coordinate lists thanks to flexible ASCII import
- Import formats are stored in data point types in order to ensure smooth import
- Data points can be linked by point ID or automatic point allocation as preferred



Flexible data import from geotechnical sensors

Enrichment of data from monitoring systems

Recorded data of any monitoring system can be imported effortlessly, verified and processed by Amberg Geotechnics.

- Import of recorded monitoring data
- Data refining and conditioning
- Generating meaningful and easy readable reports of displacements

Data interpretation in relative and absolute mode

Deviations from geotechnical measurement results can be analysed in absolute or relative reference frames. The deviation mode can be quickly changed by a click of the mouse.

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Geotechnical evaluations – clear and relevant visualisations

Aim: Best performance for routine evaluations

Using the Amberg Geotechnics software application you can generate clean and structured reports of geotechnical analyses in only half the time required for traditional methods. After initial configuration geotechnical engineers, surveyors or the client can access the evaluations by mouse click.

Automated analyses and reports

Measurement data are allocated to the appropriate construction stages in a database. Sudden changes in the project data and measurement variables or corrections are updated by mouse click and recalculated. Input and process steps are logged and are therefore retraceable.

The demands on geotechnical measurements often change in the course of an underground project. If evaluation is carried out manually a very large adaptation effort is generally required. With the aid of the new Amberg Geotechnics software application this time and cost expenditure can be substantially reduced.

Analyses

- Evaluation of convergences and geotechnical sensors (including extensometer) in a single system
- Clear graphical interpretation of 3D displacement
- Longitudinal and cross-section-based analyses of displacements as a function of time and for several tunnel construction stages
- Calculation and observation of distances and angles between 3D points

General analysis properties

- Changes in the measurement results in the visualisation are displayed immediately in the report preview
- Legend texts as a function of the direction of view
- Automatically or manually scalable diagrams

Geotechnical reports with only a few mouse clicks

- Fast, reliable evaluations
- Configurable evaluations for optimal data flow
- Flexible report settings for project-specific printouts

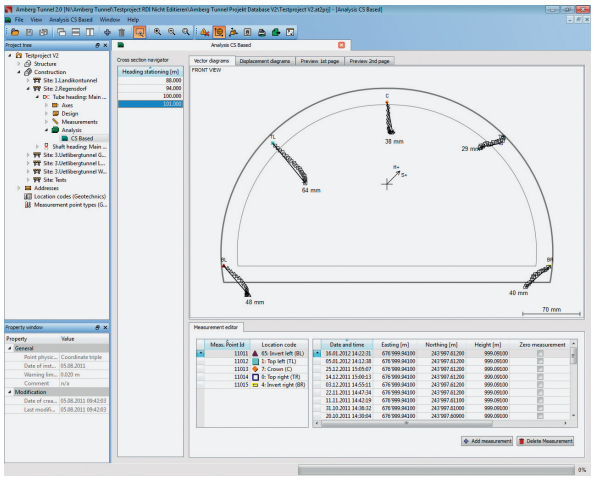
Vector-based visualisation

- Evaluation of geotechnical measurements in terms of a measurement section in 3D
- Project-specific visualisation of displacements, e.g. cone of deviation or vector view
- Visualisation of several construction stages in a single measurement section

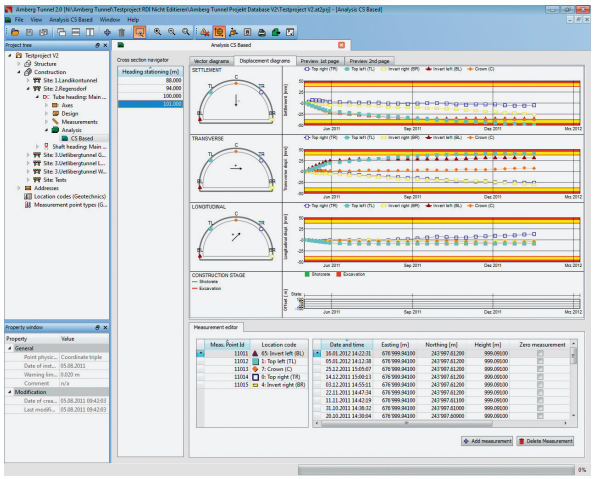
Displacement-time diagrams per component

Visualisation as a function of time and for several tunnel construction conditions:

- Settlement, transverse and longitudinal displacements for 3D points
- Visualisation of tolerance stages



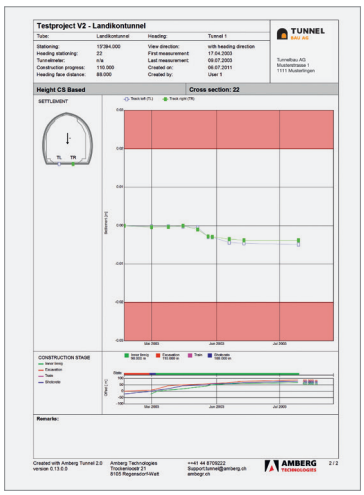
Vector diagram for 3D displacements



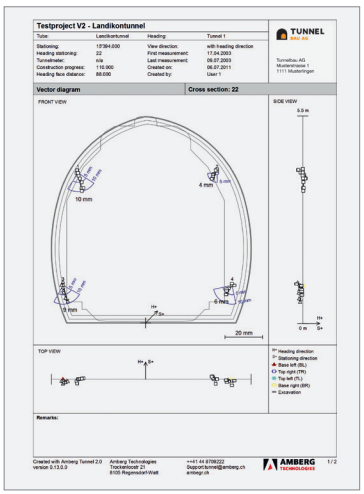
Settlement, transverse and longitudinal displacement for 3D points

Reports

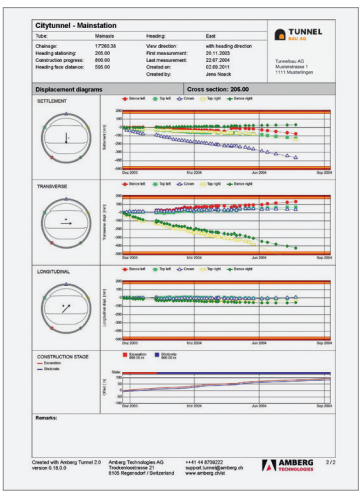
- Flexible report settings for project-specific printouts
- Reports available with a mouse click in PDF, EXCEL, etc.
- Amberg Geotechnics Viewer for expert analyses
- Free data export for special analyses



Track levelling analysis



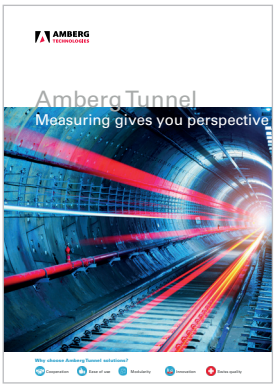
3D analysis in a rail tunnel



Displacement-time diagrams per component

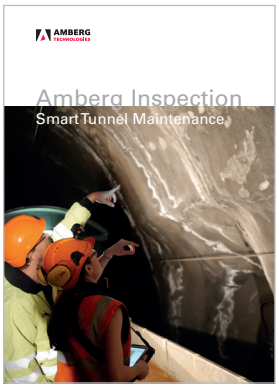
Amberg Tunnel Solutions

Information on Amberg Technologies' tunnel solutions can be found in this brochures or at www.amberg.ch/at/downloads. Get there also your free trial software, feel it and test their functionality!



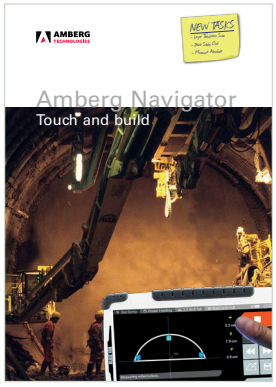
Amberg Tunnel

- One software package for heading guidance, excavation control and surveying of the inner lining for the entire tunnel construction process as well as maintenance
- Illustrated, intuitive and easy-to-understand workflows
- Measurements can be made by the tunnelling crew, enabling them to work independently



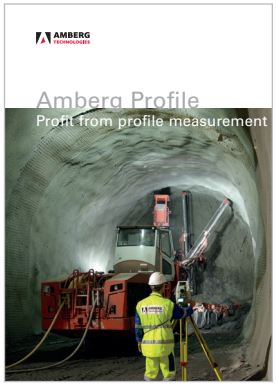
Amberg Inspection

- Open interface for any kind of background images (e.g. from laser scanner, inspection train, unmanned carrier, …)
- Pre-defined feature catalogue definition covering specific needs for a more systematic and efficient inspection work
- Using artificial intelligence for a semi-automatic inspection process which will increase the productivity by 60%



Amberg Navigator

- Increased tunneling performance through minimization of idle time.
- Every task can be called up by the tunneling crew at the tap of a finger
- A tablet with a modern, intuitive handling concept
- One tablet for the control and verification of an entire tunnel project



Amberg Profile

- The software package is tailored to your needs in terms of profile analysis
- Quick results for surveying and tasks which are repeated daily
- Full 3D calculations for complex projects
- Flexible report generation for project-specific requirements

Amberg Technologies has been developing specialised system solutions for the infrastructure industry for more than 35 years. The unique combination of systems development experience and industry know-how results in measurement systems characterised by precision instruments, practical system design and powerful software. Last but not least, Amberg Technologies' products have gained the trust and recognition of tunnelling and railway industry experts thanks to a worldwide service and support network.

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