



# Amberg Rail

More Efficient. More Flexible.  
More Comprehensive.



# Partner: Amberg Rail

PARIS - B  
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For more than 25 years the Swiss global player Amberg Technologies has been one of the leading suppliers of applied system solutions for georeferenced data acquisition and processing in infrastructure construction.

Thanks to their indefatigable focus on railway surveying and the global implementation of their systems, the Rail division are experts in railway construction and tunneling and enjoy many years of cumulative experience. As a dependable partner of the international railway industry, Amberg Rail provides project-specific system solutions for the highest possible efficiency and flexibility in surveying for track construction, track maintenance and clearance profile surveying.

#### **Good to know**

Best technical design, comprehensive functionality, no-compromise reliability and quality stand for the high-quality engineering that allows Amberg Technologies to enjoy the recognition and trust of railway industry experts worldwide. With 60 employees, 2 sites and 31 distribution partners worldwide, Amberg Technologies supports professional users in more than 40 countries. Amberg Technologies is a member of the Amberg Group with head offices in Regensdorf, Switzerland.

RUXELLES  
- TIANJIN  
BARCELONA  
N - PARIS



**Your aim:**

Reliable and high-performance transport infrastructure, economically implemented and maintained

**Your demands:**

- Comprehensive infrastructure data management
- Precise knowledge of the status of your demands on the rail network
- High cost-efficiency when building and maintaining track infrastructure
- Reliable quality controls during the construction process

# Solution: Amberg Slab Track

**Identify and inspect track positions to millimetre tolerances – with the integrated surveying solution for the construction and maintenance of slab track.**

## **To the millimetre at more than 300 kph**

The demand for alternative travel options for short-and mid-range routes has increased dramatically. This has led to the worldwide development of an increasing number of high-speed rail links. Speed, travel comfort and safety are at the forefront.

Speeds of more than 300 kph coupled with smooth running and high travel comfort are just some of the advantages of the «slab track» construction method. To-the-millimetre accuracy is vital during track installation. Clients, supervisors and operators of high-speed rail links naturally count on reliable surveying technologies with a guarantee of precision during the construction process.



## **Adapting to your needs**

The Amberg Slab Track solution is a flexible system to suit your entire project. The hardware and software employed allow the best possible adaptation to your individual user requirements. In addition, Amberg GRP Fidelity enables you to independently inspect and adjust the system on-site.

## **Installation and inspection precision**

- Track positions can be determined to 1 millimetre tolerance during installation
- Deviations from the target position are displayed in real time, facilitating considerably faster track installation
- Automatic evaluation and logging guarantee error-free and complete documentation





### Economical advantages

- No interruption/delay in processes:  
Surveying can be integrated into «just-in-time» production
- Process-oriented working procedures lead to minimisation of possible operating errors, thanks to guided surveying processes
- Less repeat measurements thanks to guaranteed accuracy
- Large time gain thanks to immediately available track geometry logs
- High surveying reliability, high availability, minimised system maintenance costs thanks to integrated system of calibration management

# Solution: Amberg Tamping

**Amberg Technologies' mobile surveying solution identifies track position errors as basis for installation and maintenance of track ballast. Independent of time and space, precise and efficient, the survey data are subsequently utilised in the tamping machine.**



## **Innovative preliminary surveying solution wanted**

Railway operators require well, maintained track geometry in order to economically utilise their networks. Railway track construction and maintenance represent substantial cost items in infrastructure management. Powerful means of production combined with flexible procedures help to reduce these costs.

Railway network operators, track construction and track design companies therefore examine innovative preliminary surveying solution options, which accelerate the surveying process for identifying track position errors and provide high-quality correction data for maintenance and tamping machines.

## **Fault-free preliminary surveying thanks to maximum mobility**

The Amberg Tamping solution is a mobile surveying solution, «portable» in the strictest sense of the word, which allows the measurements made in the run up to the actual maintenance work to be integrated into normal operations. Maintenance of Permanent Way using tamping machines can be effortlessly performed without waiting time. Up to 1,200 m of track per hour can be surveyed thanks to the use of kinematic surveying methods.

## **Data is completely integrated with direct communication to the tamping machine**

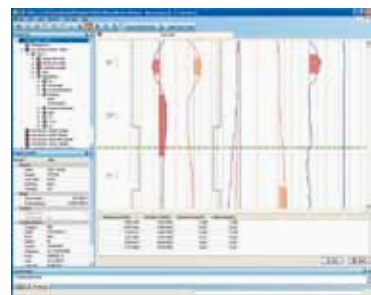
- Choice of sensors (GPS or TPS) and surveying mode (static or kinematic), depending on demands on accuracy and performance
- Improved quality assurance and user guidance, for example by visual warning, if tolerances are not adhered to





### **Economical advantages**

- Reduction in logistics costs because Amberg Tamping is not a tracked system and therefore no network user fees accrue
- More time for actual track maintenance work thanks to powerful preliminary surveying
- Optimum data quality thanks to error free survey data can lead to a reduction in tamping runs
- Uniform track quality for the tamping process



# Solution: Amberg Clearance

**Exploit the comprehensive Amberg Clearance system solution to cover all your specific information requirements. From the identification of encroaching objects in real time to complete documentation of structures and clearance analyses including automatic clearance profile mapping.**

## **Unrestricted performance for rail routes**

Besides knowledge of track geometry, complete knowledge of the utilisable clearance in the rail network is absolutely essential for reasons of safety and economy.

Railway operators expect state-of-the-art, flexible surveying, analysis and documentation solutions. These solutions need to be simple to use, impair existing operations as little as possible and reliably record all encroachments and proximate items.

Rolling stock manufacturers expect comprehensive data on structures and objects restricting their customer's clearance.



## **Extensive clearance profile analysis**

From efficient surveying to comprehensive documentation, Amberg Clearance provides a proven and scalable surveying solution.

- Modular trolley concept
- Homogeneous data and operating model
- Single-point measurements for clearance envelope and track surveying for the highest demands on accuracy
- Mobile scanner solutions with the highest image quality for condition documentation
- Analysis and clearance envelope mapping with clear result presentation and visualisation of all encroachments

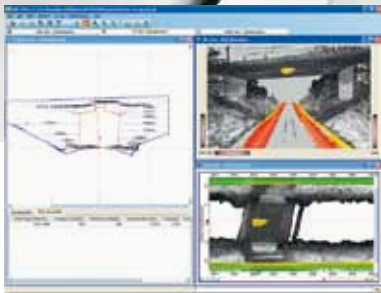


## **Multifunctional with real time results**

- Recognition of problem zones during surveying allows immediate action
- Environment surveying and complete track surveying can be completed in one pass
- Comprehensive profile data form the basis for clearance envelope simulations for a number of track variations
- Faster and simpler result availability thanks to fully automatic evaluation







### **Economical advantages**

- Faster surveying methods and system mobility reduce track possession times and increase route availability for normal operations
- Automatic evaluations accelerate result availability with reduced evaluation effort
- Once-only data acquisition for multiple data utilisation reduces surveying and logistics costs
- Liability minimisation thanks to proof of standard-conform clearance envelope status

3D data visualisation provided by the Amberg Clearance solution makes scanner data analysis easy to understand. For example, objects encroaching on the clearance envelope can be made visible by coloured markings in a virtual track inspection.

# Hardware: Amberg GRP System FX

**Amberg GRP System FX is the proven, universal system solution for acquiring precise track geometry and track environment data. Thanks to the modular design the surveying system can be optimally adapted to suit individual requirements. The system is easy to transport, allowing surveying to be easily integrated in railway construction processes.**



#### Lightweight design:

- Light, high-precision frame design
- Easy to dismantle for transport



#### Gauge sensor:

- Accuracy +/- 0.3 mm
- Measuring range -25 mm to +65 mm relative to nominal gauge
- Measurement reference 14 mm below top of rail (TOR) – other references available on request



#### Precision wheels:

- High specification synthetic (PET) wheels for completely isolated operation
- Stainless steel wheels with isolated core – precise and robust – with non-electric contact from left to right rail

#### Isolated system:

- Electrically isolated frame



#### GRP 5000

##### Amberg Laser Scanner Profiler 5002:

- 100 Hz rotation frequency
- Up to 20'000 measuring points per revolution
- Range 1 m to 79 m

#### GRP 3000

##### Profiler 110 FX:

- Motorised, reflectorless laser distance meter
- Range 0.3 m to 30 m
- Range measurement accuracy +/- 1.5 mm



#### Odometer:

- Measurement of relative track stationing
- Accuracy < 0.5%

#### Cant sensor:

- Superelevation measurement
- Accuracy +/- 0.5 mm for 1,435 mm nominal gauge



**GRP 1000**

**GPC 100 prism column:**

- Prism carrier for raised prism position to reduce refraction effects

**Variable gauges:**

- GRP System FX operation on common gauges between 1000 mm and 1676 mm
- Additional gauges on request



**GRP Fidelity:**

- Adjustment kit for regular system tolerance checks



**Georeferencing**

**Leica GPS:**

- For general surveying with lower (GPS) accuracy demands
- GRP System FX is compatible with Leica GPS systems GPS1200 and GPS500
- GPS integration kit including antenna pole, installation and accessories

**Leica TPS:**

- For track surveys at the highest precision
- GRP System FX is compatible with Leica total stations TPS1100 / TPS1200 / TPS2000 (ATR required)

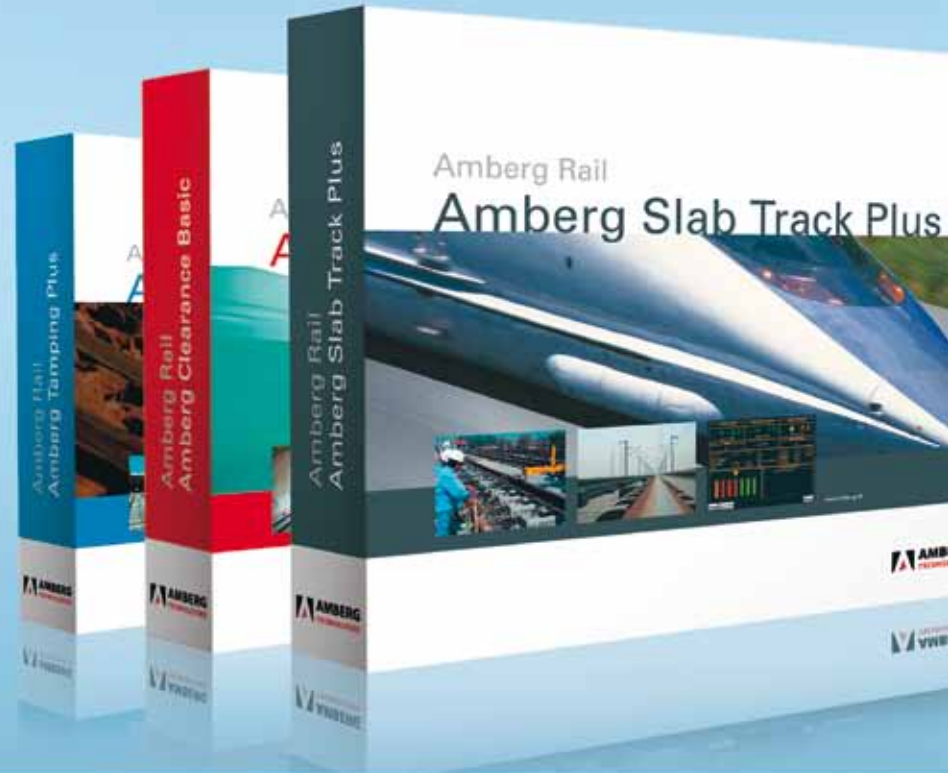


**User ergonomics:**

- For track surveys at the highest precision
- Fully adjustable push handle
- Balanced device for safe «one-man» operation
- Dead-man's brake to prevent unintentional trolley movement

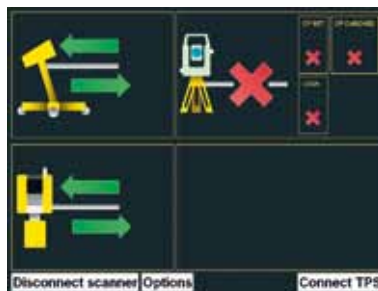
# Software: Amberg Rail 2.0

**Amberg Rail 2.0 is a comprehensive solution for all georeferenced, trackspecific surveying tasks.**



## Railway line and track condition management

Logical and efficient management of survey data in a project is a central issue in the Amberg Rail 2.0 solution. Among other things, this is achieved via the management of various track conditions. Survey data is allocated directly to the corresponding tracks.



## Customised user guidance

In Amberg Rail 2.0, surveying procedures are controlled by defined processes with the aim of eliminating surveying errors. They are adapted to the various applications using simple and clear masks on the touchscreen.



## Planning, analysis and evaluation

Project-specific, field-tested and simple to use, the Amberg Rail 2.0 software application is designed to facilitate optimum data flow between project management, survey data acquisition, evaluation, export and reporting. The software can be configured by the user to suit individual requirements. National standards can be integrated in the solution.





**Amberg Slab Track Plus**  
Software suite for new slab track design

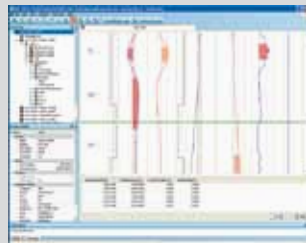


The screenshot shows a detailed data table with multiple columns and rows, likely representing track design specifications or surveying data. The table is organized into several sections with headers.

- Control of track surveying Track adjustment in real time
- Analysis and documentation of geometric track quality



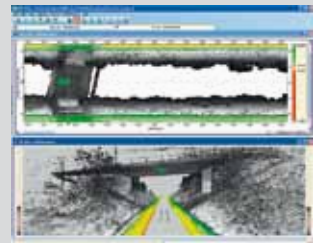
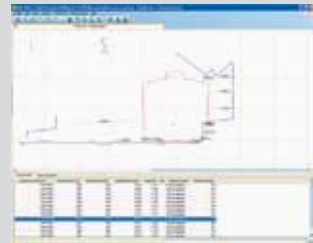
**Amberg Tamping Plus**  
Software suite for new track construction/maintenance for tracks on ballast



- Recording track position
- Automatic computation of correction values
- Direct data export to the tamping machine



**Amberg Clearance Basic und Plus**  
Software suites for clearance surveying



- Profile point measurements
- Fully automatic scanning of clearance envelope
- Evaluation and result documentation



# Support: Amberg Rail Support



**Service and support in-house**

Amberg's distribution partners are carefully selected, regionally rooted organisations, whose employees understand your particular issues and wishes, expertly and dedicatedly advise you and ensure that Amberg Rail products and services provide a significant contribution to the safety and efficiency of your transport infrastructure.

**Global support from the Amberg Support Team**

Optimum support for the Amberg distribution partners is the core task of the Amberg Support Team. Alongside day to day back-up valuable information is gathered and recorded to help Amberg Rail solutions to constantly improve and develop to match market and customer requirements.



#### **Amberg GRP Fidelity**

**Only a correctly adjusted surveying system provides reliable survey data. With Amberg GRP Fidelity you can be sure your system is 100% reliable at all times.**

- Examination and adjustment of all critical geometry and surveying elements
- Safeguarding system accuracy in the framework of a quality assurance system, with test certificate on request
- GRP Fidelity quality assurance programmes are offered locally by Amberg Service Centres

#### **Amberg OptiPlan™**

**Even the best application hides optimisation potential. Use Amberg Technologies' servicing and support agreements for:**

- More economic efficiency
- Unrestricted readiness
- Guaranteed high quality survey results
- Risk minimisation for unanticipated repairs
- Minimum downtimes during surveying operations

# Amberg Rail

## More Efficient. More Flexible.

## More Comprehensive.

Identify and check track positions to the millimetre when installing slab tracks. Determine track position errors in track construction and maintenance for direct use in tamping machines. Exploit the comprehensive Amberg Clearance solution – from examination of encroaching objects in real time to automatic clearance envelope analyses.

Amberg Technologies has developed specialised system solutions for the infrastructure industry for more than 25 years. The unique combination of systems development experience and industry know-how results in measuring 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.



Profiler 110 FX –  
distance meter (RL, standard range):  
Laser Class II compliant to FDA 21CFR Ch. §1040  
Laser Class II compliant to IEC 60825-1 and  
EN 60825-1

GRP 5000:  
Profiler 5002 / Profilr 5003 Scanner:  
Laser Class 3R compliant to EN 60825-1

Amberg Technologies AG  
Trockenloostrasse 21  
CH-8105 Regensdorf  
Switzerland

Phone +41 44 870 92 22  
Fax +41 44 870 06 18  
info@amberg.ch  
www.amberg.ch

