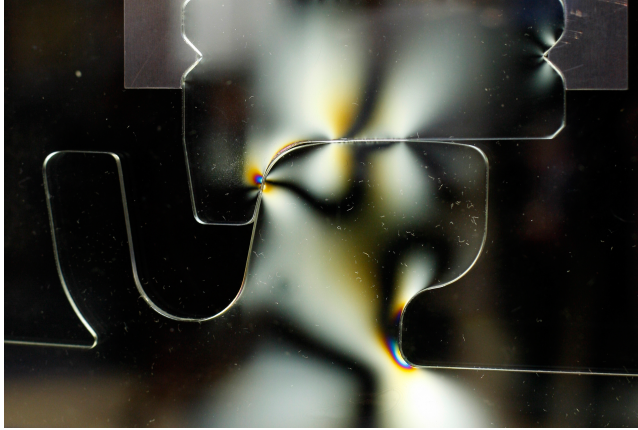




**RHOMBERG SERSA**  
SERVICE

# Wheel/Rail-System Service





**Rhomberg Sersa Service provides a comprehensive service portfolio for railway projects, and as a multidisciplinary full-service company acts as a one-stop shop.**

## ***The interaction of wheel and rail***

**Only the perfectly coordinated pairing of wheel and rail enables safe and low-wear railway operation in the long term. Even the smallest of changes to the wheel/rail geometry can have serious effects on the wear and tear as well as on the performance characteristics of the railways. Optimisation measures in this field reduce costs in the long term if carried out on the basis of sound technical investigations which we can perform for all our customers.**

The regulations relating to the construction and operation of trams require technical reconciliation of vehicle characteristics and track dimensions. These requirements ensure safe and quiet operation whilst extending the life of components by reducing wear.

- ▶ ***Safe operation is guaranteed by:***
  - A Derailment Safety Study
  - Proof of the geometric compatibility
  - Definition of wear and operating tolerances
  
- ▶ ***Quiet operation and a smooth ride is achieved by:***
  - Optimisation of the wheel / rail interface
  - Calibration of track geometry and dimensions
  - Improvement of cross profiles in the transition area

These requirements must be met starting from when the track is new, through its useful life, until the limits of wear are reached.

For expert advice and customer service within the complex subject area of wheel/rail interaction has increased in recent years. For this reason, Rhomberg Sersa Service has developed a new service together with its cooperation partner, the German Institute for Railway Technology (IFB):

### **the Wheel/Rail System Service.**

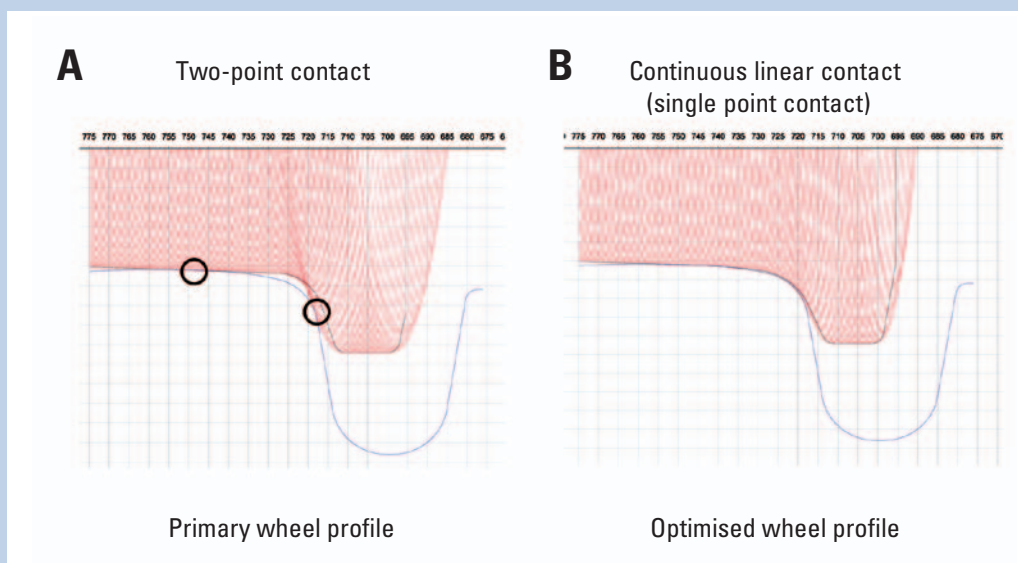
Here our experience as a manufacturer of turnouts for many different rail operating businesses is combined with the know-how of the IFB in vehicle and traction power engineering. Whether for feasibility studies, e.g. for mixed traffic measures aimed at optimising wear, or for investigations into the causes of derailments, Rhomberg Sersa Service is always a competent partner in wheel/ rail issues.

## Analysis and optimisation

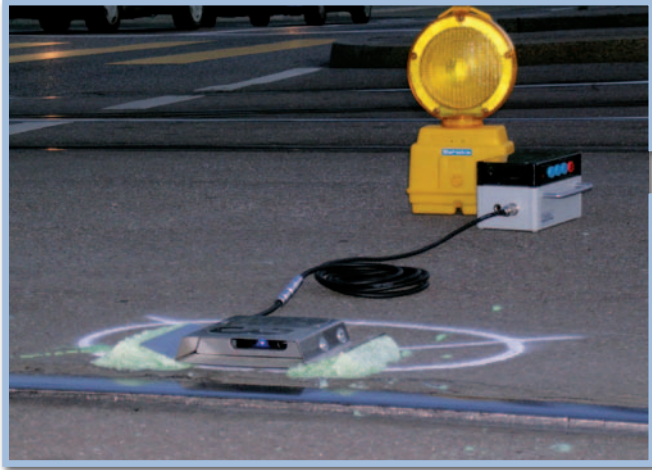
On the basis of well-founded, theoretical principles and taking account of practical operating experience, we carry out individual analyses adapted to the specific traffic operation circumstances, such as all-embracing situation audits, evidence of protection against derailment, wheel profile optimisation, the determination of optimum cross-dimensions, tracking examinations (SpÜ), the determination of wear tolerances (tolerance examination TolU) and feasibility studies for special solutions (e.g. for mixed operations).

The results of these examinations are realistic and can be immediately included in optimisation measures which result in very concrete technical and economic advantages and improvements for our customers.

- ▶ *Improved performance characteristics*
- ▶ *Improved travelling comfort*
- ▶ *Reduced strain on vehicle and track*
- ▶ *Noise reduction*
- ▶ *Avoidance of initial high wear (e. g. during running-in)*
- ▶ *Stable wear contour on wheel and rail (wear at the "right place")*
- ▶ *Protection against derailment*
- ▶ *Optimisation of the useful economic life of track and vehicles*
- ▶ *Minimisation of re-profiling costs*
- ▶ *Long-term reduction of maintenance costs on wheel and rail*
- ▶ *Monitoring of the achievement of maintenance objectives (target-actual comparison)*
- ▶ *Valuable input towards optimisation of task planning*



**The optimisation of the contact ratio between wheel and rail improves the rolling characteristics and reduces wear, tear and noise pollution.**

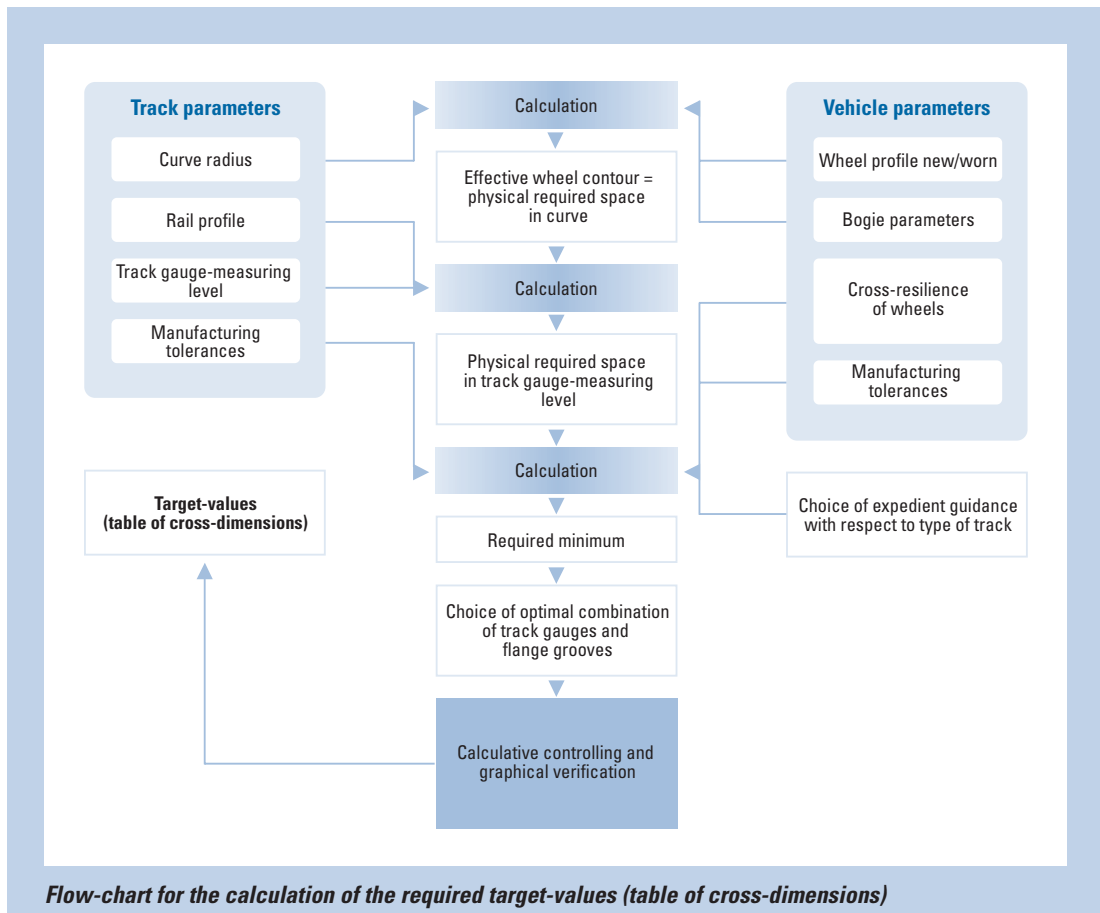


*The DigiLot® measurement system developed by Rhomberg Sersa Service detects horizontal deformations of the wheels to enable accurate recording of track geometry.*

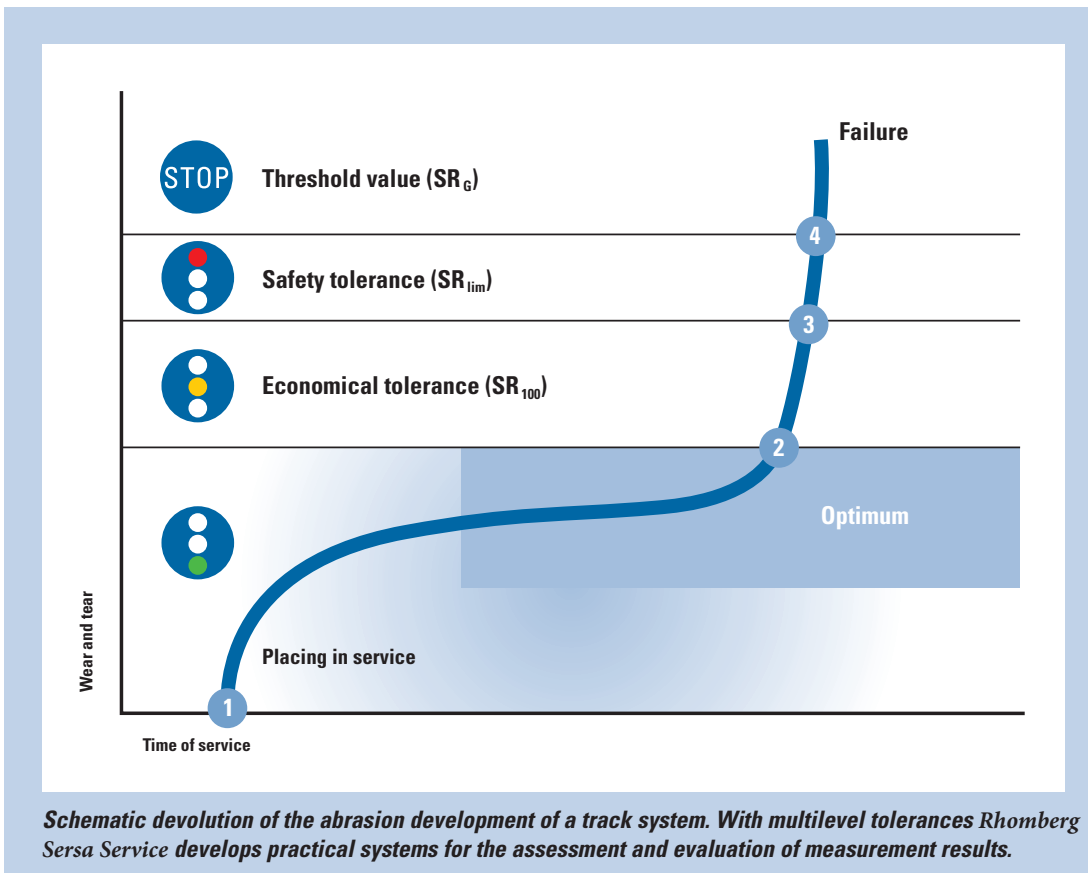
## Track dimensioning

Optimally designed standard dimensions of the gauge and groove width form the basis for economic operation of track systems. The basis of design is formed by the new Technical Guidelines for Tracking (TR Sp).

All results are repeatedly verified through the use of mathematical and graphic evidence. As a result, our customers can be sure that everything is 100% correct. The results are shown in a very comprehensible manner.







## Calculating tolerance and wear threshold dimensions

Based on the table of cross-dimensions and the vehicle-specific threshold operating dimensions, Rhomberg Sersa Service draws up practically-oriented recommendations for the threshold wear dimensions of track and turn-outs. Tolerance standards are absolutely essential for the automatic assessment and evaluation of measurement results (target-actual comparison). Thanks to the use of "genuine" and differentiated operating tolerances, measurement results are evaluated both in terms of their influence on the safety as well as on the economic efficiency of the necessary repair.

Prioritising and scheduling tasks (especially those which have a direct influence on action and reaction times) to individual tolerance levels according to the malfunction-reaction plan will have a positive influence on repair and maintenance task programmes.

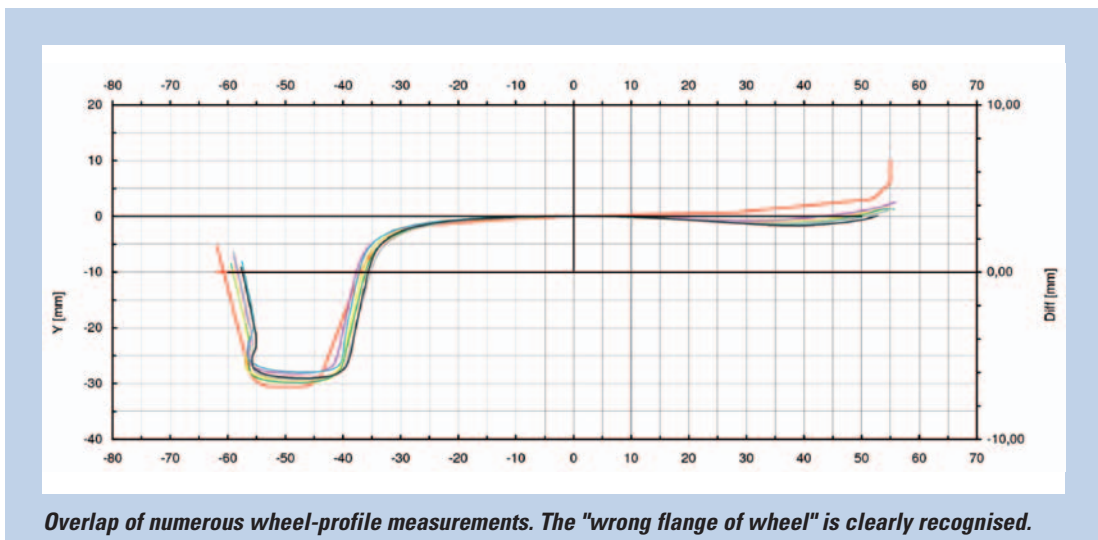


**Consequences of inadequate wheelset maintenance. Hollow wheel profiles cause massive beating sounds.**

## ***Unnecessary wear and tear to the track***

Our experience shows that measures aimed at improving the tracking must always be adapted to the prevailing operating conditions. After all, every railway network is unique. Consequently, particular importance must be attached to individual analysis of the actual condition.

Wheel and rail profiles are measured, recorded and digitalised on-site with the use of modern measuring devices. The result is a representation of the current level of wear of the present in time. High measurement and repetition precision are optimum preconditions for the qualified examination of the wheel /rail profile pairing.



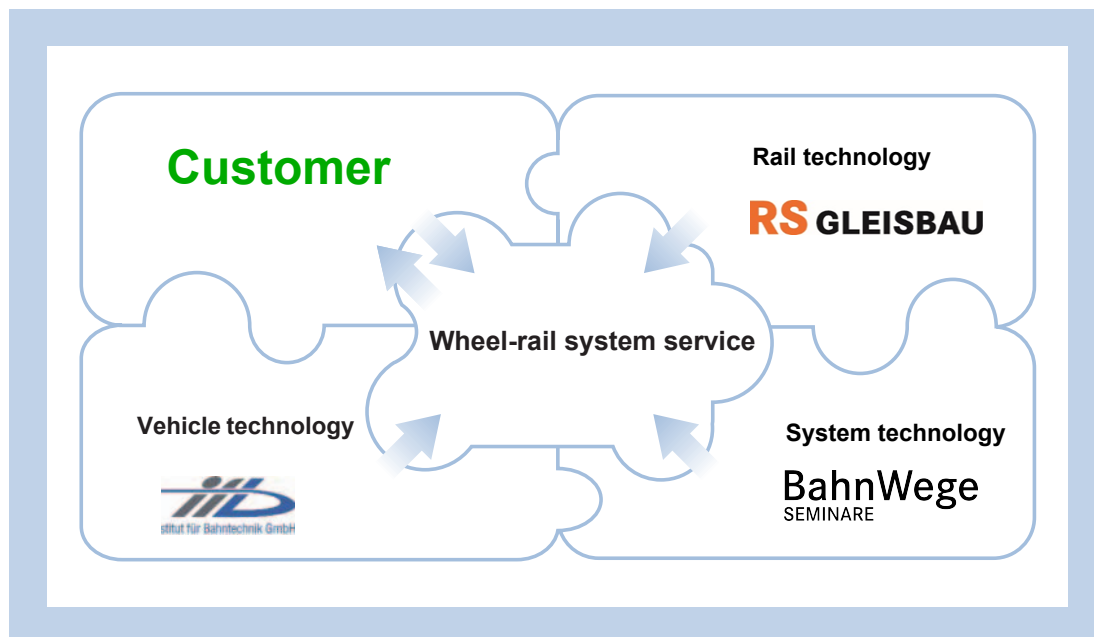
**Overlap of numerous wheel-profile measurements. The "wrong flange of wheel" is clearly recognised.**

## ***Longer life for wheel and rail***

One of our central tasks is the analysis of early failures of components as well as the optimisation of the life-span of wheel and rail. Tracking examinations include both the track (in particular points and crossings) as well as the vehicles. In this respect, account is taken not only of different rail profiles but also of varying types of running-gear. Clear and graphics-oriented documentation enables decision-makers to complete an unambiguous interpretation of the results.

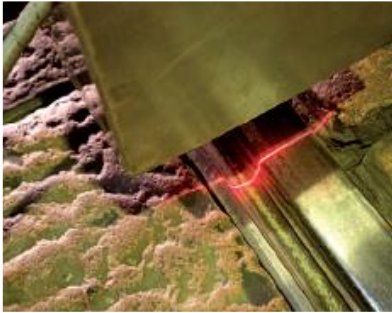
The regulations on the Construction and Operation of Tramways (BOStrab. dated 11 December 1987 (§ 35, paragraph 1)) demands some form of technical coordination between the performance characteristics of the vehicle and the track dimensions. It is precisely such positive coordination that enables high quality and safe tracking plus the quietest possible ride even if wear is present (within the admissible limits).

## ***The benefit to our customers***



Together with our cooperation partner IFB, we offer our customers a unique network of expertise in the rail/wheel sector. Thanks to our comprehensive spectrum of services and a healthy mixture of theory and practice, we

create transparency in defining optimisation measures and double safety through the keeping of mathematical and graphical evidence. In this way our know-how guarantees the long-term success of our customers.



# Lightrail Service

Of course, iterating optimization procedures in accordance with the principle of trial and error are still in use. However, due to the many possible failures and the long test periods it is very likely that such procedures will not work out.

Sound and documented results of calculations, simulations and – above all – the experience of all the various kinds of experts definitely offer better results in a fraction of the time.

Thus, due to the complexity of the railway system optimization projects require competent consultancy and assistance from all kinds of experts as a function of the need.

On the basis of well-founded theoretical knowledge and in consideration of the interdisciplinary experience from our many successful projects we contribute substantially to ensuring that

- immissions can be reduced,
- wear and energy consumption optimized and
- maintenance performed economically in the long run.

You are also welcome use our know how as a guarantee for your long-term success.

QM zertifiziert  
Qualität, Umweltschutz,  
Arbeitsschutz, SCC



- A) survey
- B) system assessment
- C) implementation
- D) ensuring the success

With an extensive range of service and a healthy mixture of theory and practice we provide the required transparency for upcoming optimization measures.

We ensure your success sustainably with clear and understandable arguments and documentation.

Rhomberg Sersa Service GmbH  
In den Kreuzfeldern 2  
54340 Longuich (Trier)

Tel.: +49 6502 9941-66  
andreas.marx@rhomberg-sersa-  
service.de