

# PIONEERS OF WHEELSET SOLUTIONS



**PROFILE**



**GHH-BONATRANS**  
Pioneers of wheelset solutions

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# About us

We have been contributing to the railway industry and to the development of wheelset solutions for more than 200 years. The history of both BONATRANS and GHH-RADSATZ has been marked by major technological breakthroughs, business achievements and other important milestones.

From development and engineering to production, assembly and service, the complete wheelset system is at the core of GHH-BONATRANS expertise.

We design and produce the highest-quality wheelsets and their parts for all types of rolling stock: high-speed and mainline trains, metro, trams and LRVs, locomotives and freight wagons. We deliver our products to more than 80 countries of the world.

Our comprehensive product portfolio has reached world-wide recognition for its uncompromised performance, technological advancement, research capacities, full-service solutions and top class customer care.



GHH-BONATRANS represents an impressive part of the history of wheelset manufacturing. Generations of true experts continuously contribute to the evolution of the wheelset. Respecting the past but looking ahead, the pioneers of wheelset manufacturing produce premium solutions for the railways of the world, thanks to the master craftsmanship and expertise handed down from generation to generation. The never-ending spirit of curiosity and passion for perfection enables the birth of new innovative solutions that drive the industry forwards.

# Our values

## EXPERTISE

Wheelset development and production requires special knowledge, experience and continuous self-improvement. Our expertise has developed over many decades and cannot be transferred or replicated. It is at the core of our service.

## INNOVATION

We perceive wheelset making as a “running” process, full of changes and challenges. An innovative approach is our internal driver that helps maintain our products at the cutting edge of the industry.

## QUALITY

We strive for the perfect product that meets our customers’ needs, and constantly improves its qualities and performance over its life-cycle. Premium product quality is a must to guarantee reliability and safety during operation.

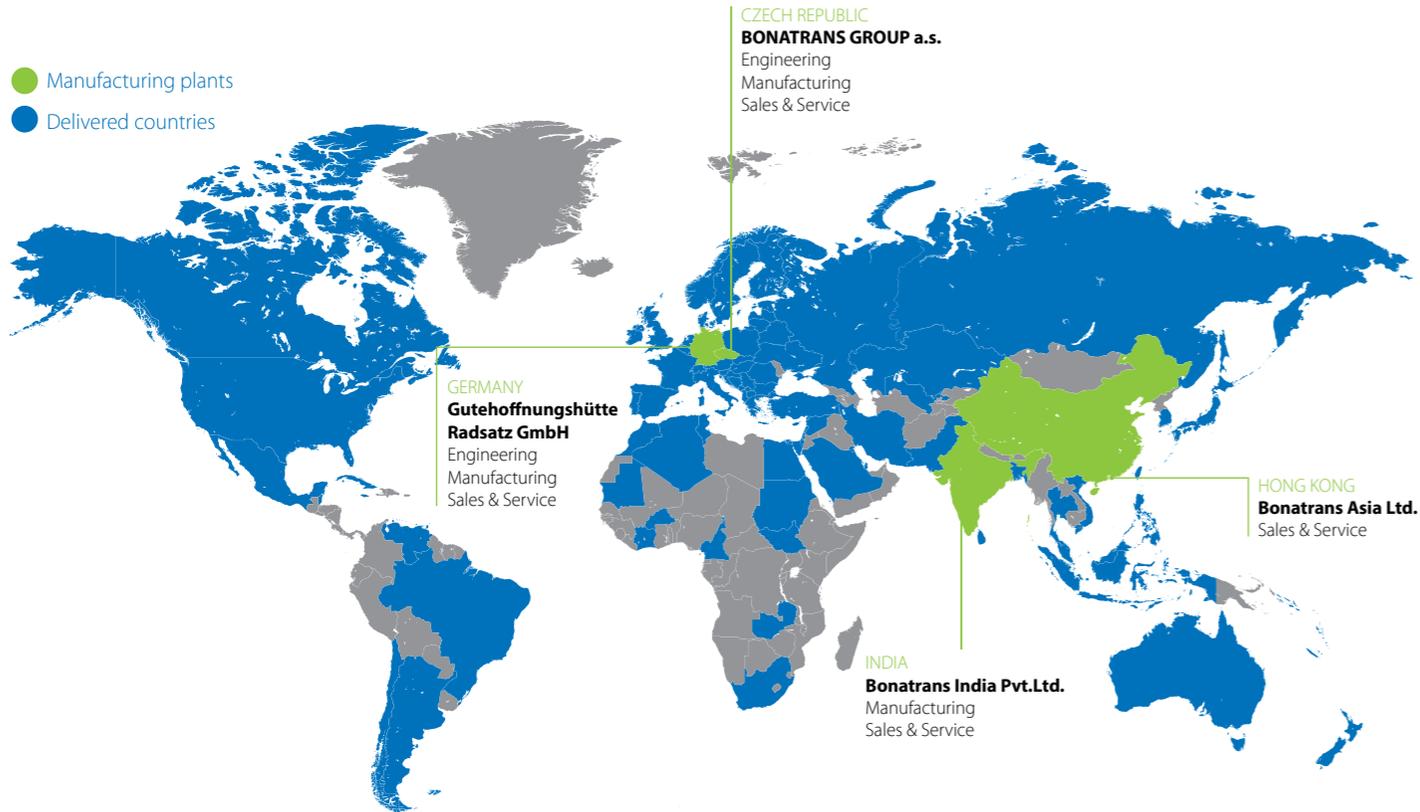
## POWER

We are a leading supplier of wheels, axles and wheelsets. Our dominant position is a result of our hard work, premium product quality and the strong drive for success and expansion.

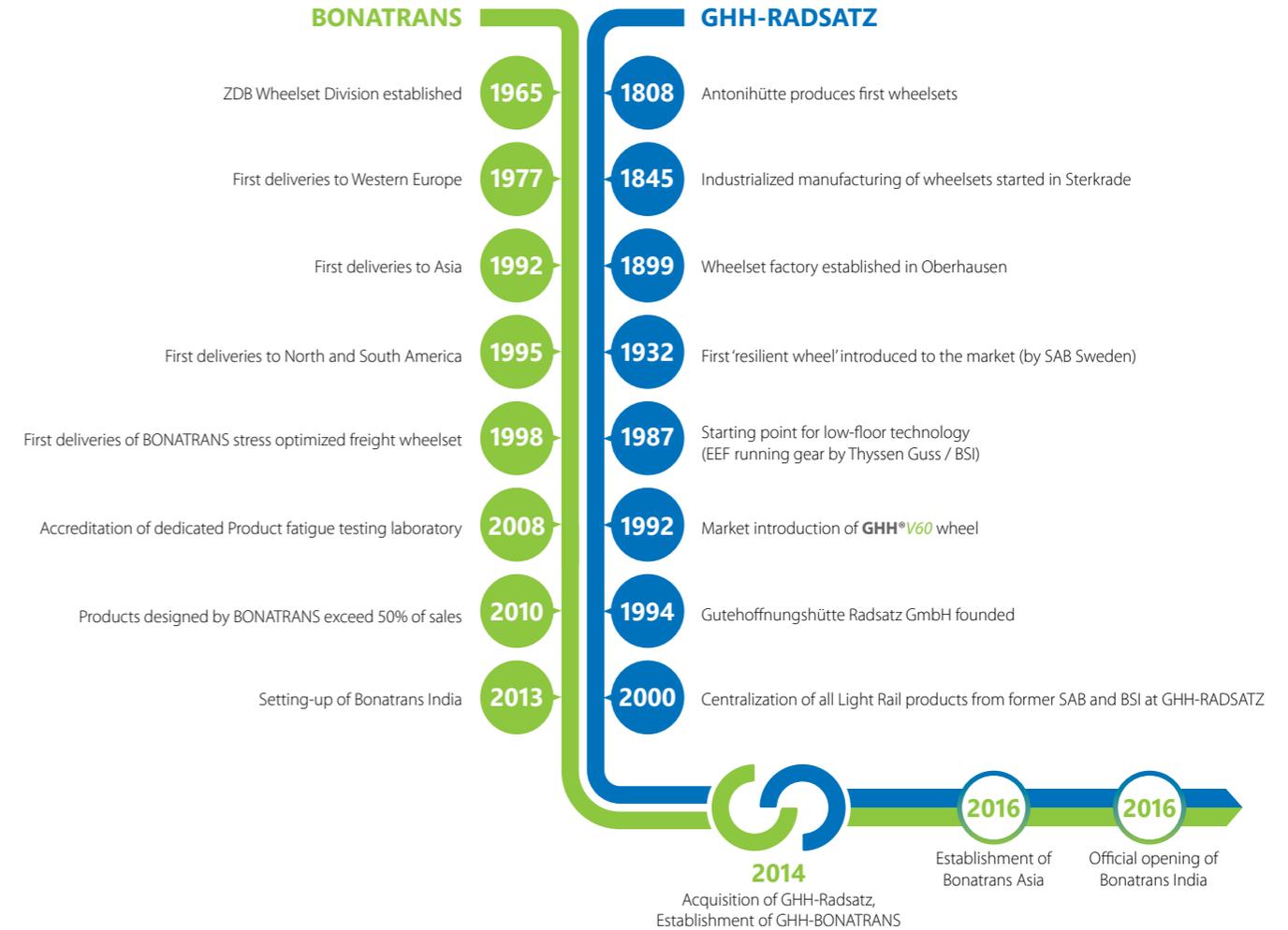
## PASSION

We are focused, persistent, detail-orientated and passionate about the product application. We are proud of our contribution to the industry, our innovations, world-wide coverage and our companies’ success in general.

# Key facts



# Milestones



**30+**  
thousand wheelsets

**200+**  
thousand monobloc wheels

**20+**  
thousand resilient wheels

**60+**  
thousand axles

**30+**  
thousand tyres

**300+**  
million EURO sales

**40%**  
sales for OEM

**1700**  
employees worldwide

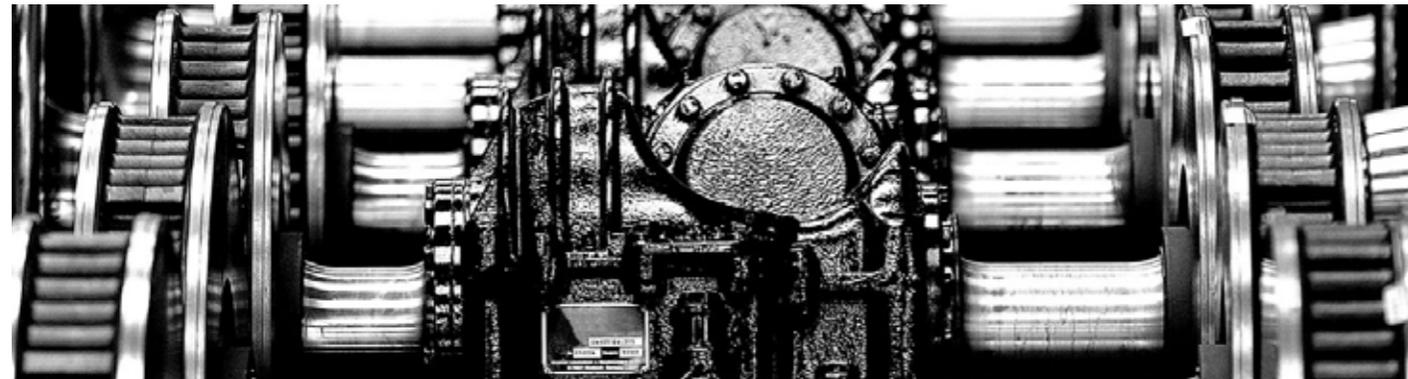
# Wheelsets

## Safety, comfort, optimized costs

Wheelsets carry the whole weight of rolling stock, at speeds up to 450 kph. Each wheelset is thus the safety critical component for any rail-bound vehicle. Our wheelsets pride themselves on robust and service-proven design, strict standards of manufacturing quality and a thoroughly studied maintainability.

## Expertise handed down from generation to generation

With more than 200 years of history in wheelset manufacturing, we have developed an unrivalled expertise which is continuously strengthened by investments into our own research and development.



## Full product range and complex services

GHH-BONATRANS supplies major railways and rolling stock manufacturers with a full range of first-class products and reliable solutions, such as heavy rail wheelsets for high-speed trains and locomotives, low-floor solutions for light rail, including resilient wheels and noise absorbing solutions. Not only do we manufacture solutions of the highest possible standards, we design the products together with our customers.

- High-speed wheelset solutions
- Low-floor wheelset with independent axle and resilient wheels
- Driven and non-driven wheelsets for passenger solutions
- Wheelsets with wheel-mounted noise absorbers
- Complete locomotive wheelsets
- Stress and heat optimized wheelsets, including heavy-haul application

# Wheels

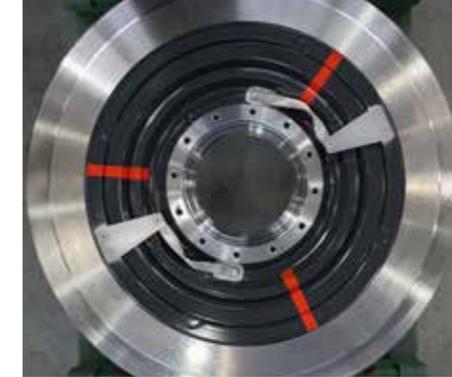
## Key element of rail-bound vehicles

GHH-BONATRANS is a leading manufacturer of wheels for all kinds of rolling stock with a history dating back to 1808. Our wheels are running under high-speed trains, metro, trams, locomotives and freight wagons in more than 80 countries. We have supplied more than 8 million monoblock and 160 thousand resilient wheels onto the market.

## Reduced wear and tear, low noise

Thanks to the improved steel grades and our state-of-the-art heat treatments, we ensure reduced wear and tear of wheels, as well as tyres. We design the wheels to withstand increasing axle loads and to enable a higher number of re-profiling. Our resilient wheel family is just further evidence of continuous product evolution and improvement. Rubber-sprung resilient wheels offer significant reduction in noise levels and increases in comfort to tackle the effects of rail-wheel contact.

- Special wheels for high-speed trains
- Wheels with noise-absorbing systems
- Resilient and super-resilient wheels
- Large diameter locomotive wheels
- Shot peened wheels
- Stress and heat optimized wheels
- Special wheels for mining or safety wheels



# Axles

## Accuracy is the key

GHH-BONATRANS supplies axles integrated in wheelsets as well as loose axles for the assembly of wheelsets managed by customers. Axles for passenger transport, often for high-speed, are characterized by high processing accuracy and a sophisticated quality control system.

## Protection for better safety & reliability

Adhering to life-cycle costs we dedicate our efforts to protect the axle and its lifespan starting with the initial design phase. Our technological know-how and long-term experience in wheelset production gives us confidence in developing and applying axle adjustments and upgrades, which increase the product safety and reliability. The evidence of our efforts and competence in research and development of axles with improved protection is the induction-hardened axle **BONAXLE®**.

- Powered and non-powered axles
- Axles with additional wheel seats
- Solid, semi or fully hollow axles, including threaded axles
- Induction-hardened axle **BONAXLE®**
- Axles with molybdenum coating
- Cold rolled axles
- Axles with special coatings

## Spare parts

Rolling stock in operation requires the periodical replacement of worn parts. Spare parts thus represent a considerable portion of GHH-BONATRANS production. The spare parts are manufactured by applying the same strict standards, procedures and inspection methods as the original (built-in) products.

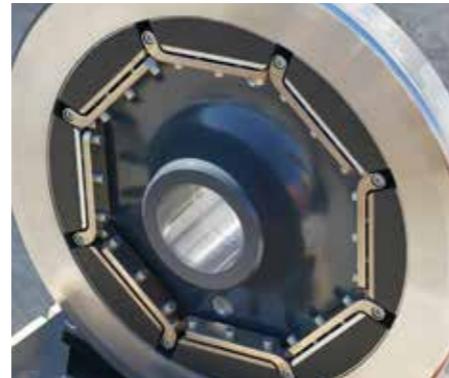
- Tyres
- Resilient wheel components (tyres, hubs, wedge rings)
- Rubber elements and fastening material for resilient wheels
- Earthing contacts and shunts
- and many more



## Noise absorbers

Our R&D department has developed a number of solutions for reducing noise caused by railway wheel operation. GHH-BONATRANS achieves a reduction in vibration (and thus also noise) of wheels in operation by the application of specially developed noise absorbers mounted on the wheels. GHH-BONATRANS delivers complete systems specifically designed for different vehicle types.

- High absorption effect – up to 5dB(A) rolling noise, up to 30dB(A) squealing noise
- Applicable in all types of rail vehicles
- Service life is not limited by the service life of the wheels/Low weight (approx. 10kg)
- Easy maintenance
- Specific design tailored to the customer's needs



## Service

Our competence and proven track record in design and manufacturing as well as best-in-class, reliable equipment and devices enable us to offer one-stop service for the wheelset. Professional consultancy, support by product design, testing capacities and experience in product certifications and homologations are provided to all customers entering new markets. We offer independent expert reviews of wheelsets and wheelset parts.

- Optimized maintenance concept for reduced LCC of wheelset and parts thereof
- Repair, modernisation, overhaul
- Exchange of wheel tyres
- Expert consultancy and technical advise, incl. assistance with launches into operation
- Homologation testing in own accredited laboratories
- and many more



## Quality

### Quality means safety

The consistently high quality of products and services is an implicit and necessary pre-requisite for supplying to the railway industry, especially in the case of wheelsets, which directly influence the safety of the railway rolling stock. GHH-BONATRANS considers ensuring the continuous improvement of the quality of its products, services and systems to be one of its primary priorities.

### Accuracy and control at every stage

Tests and measurements are made while our products are passing through the production process. From the testing of raw material and components, through customer acceptance, all manufacturing steps are regularly audited to eliminate any source of malfunction and loss of process control. All results and empirically established figures from production and service are continuously incorporated into the development process of new products.

### Testing

The proven quality of GHH-BONATRANS is related primarily to the quality of design and production and so testing equipment plays a pivotal role in both phases. Having complete range of testing equipment in-house we are proud and happy to offer our customers higher flexibility and lower costs to ensure all tests in compliance with regulation and customer requirements.

### Quality management system



Own fully  
ILAC certified  
mechanical,  
metallographic,  
non-destructive  
and fatigue testing  
facilities

Metallurgical  
laboratory  
certified to  
EN ISO/IEC  
17025:2005

# References



High-speed trains  
◀ TGV 2N2  
ICE 3 ▶



Trams and LRV's  
◀ Alicante LRV  
Flexity Berlin ▶



Mainline Passengers  
◀ Coradia  
Regio 2N ▶



Metro  
MI 09 ▶  
◀ Shanghai



Locomotives  
◀ Vectron  
109 E ▶



## Some of our customers



# People



## People as the ultimate competitive advantage

As one of the market leaders we realise that our top competitive advantage and a key factor for long-term success are skilled, motivated and professional employees. The energy, passion and determination of our employees energize our growth, enable continuous improvements and innovations and open new business opportunities.

Our goal is to further strengthen our human resources and maintain this ultimate competitive advantage by hiring talented as well as experienced professionals who will be driven by the same corporate goals and who will share the same passion for their job and our industry. We seek those who are open to learning new things, not only in their field of expertise, but also in other aspects of work.



Physical and mental health as well as the work-life balance of our employees is something we take very seriously. We provide our employees with various social and health programs and positively affect different aspects of their working and personal time. We endorse activities organised internally and we also include external activities and events into our employee programs. We encourage them in their personal development, next career steps and their fields of interest.

- Wide range of employees benefits
- Regular training and systematic education
- Fair and open corporate culture
- Events and activities for employees, ex-colleagues and families
- Internal Code of Ethics

# Innovation

During more than two centuries we have developed an extremely high level of expertise which makes us capable of reacting to any challenges or requirements for wheelset solutions. This could never be possible without an innovative soul and a focus on systematic research.

## BONAXLE®



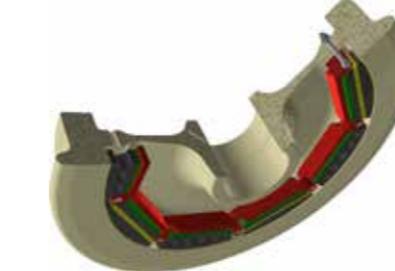
**BONAXLE®** is an innovative induction-hardened axle. It is our solution to the requirements of increased safety and reliability as well as it brings significant decrease of life-cycle costs (LCC).

## BONASTAR®



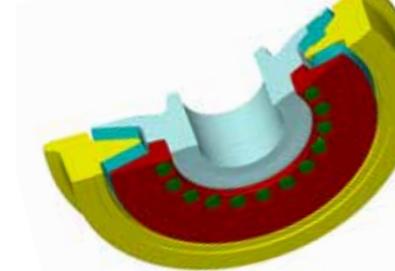
**BONASTAR®** is a family of new wheel steel grades for all types of passenger, locomotive and freight wheelsets. In comparison with wheels made of standard EN grades, **BONASTAR®** ensures significantly greater life in mileage.

## BONASILENCE®



**BONASILENCE®** is a family of dynamic noise absorbing systems developed and being diversified by GHH-BONATRANS. Multi-segmented dampers, mounted on the wheels, reduce significantly the wheel noise both rolling and squealing.

## GHH®ULTRA-S



The newly developed super-resilient wheel **GHH®ULTRA-S** for 12.5 t axle load meets all requirements for a resilient wheel with tread diameter of 600 mm new / 520 mm worn and secures low radial stiffness (20-40 kN/mm).

**100+**  
new products  
launched into  
operation  
annually

**14**  
currently  
valid patents

**3 mil.€**  
in R&D  
annually

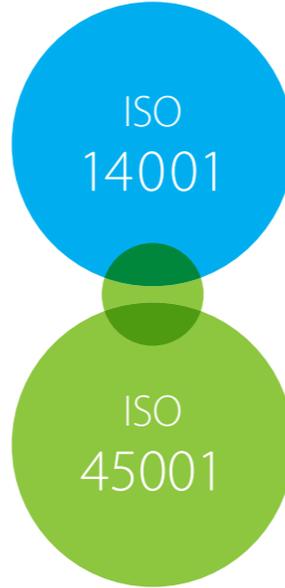
# Sustainability

## Environmental policy

Environmental policy is one of the major foundations of our social responsibility programs, with our top management actively involved in its updates and supervision. GHH-BONATRANS follow strict rules for environmental protection in-house but also in the neighbourhood. Ecological prevention programs contain employee education and training, close monitoring and reduction of environmental impacts, prevention of potential accidents and emergency situations affecting environment and health. Regular upgrade of production facilities and implementation of new technologies results in significant decrease of ecological footprint.

## Corporate social responsibility

GHH-BONATRANS is fully aware of the importance of social responsibility programs carried out in the areas of its presence. Not only do we represent a locally important and attractive employer, we also try to significantly contribute to the development and support of local societies by organising or endorsing local events and activities. We aim to build an environment that enables our current and former employees and their families to live with dignity and joy. At the same time we respect nature and the environment, and pay close attention to the reduction of the ecological impact of our activities. Our support and sponsorship projects cover a wide range of social fields.



## Code of ethics

It is extremely important for GHH-BONATRANS and for each of us to maintain our good reputation and also to nurture relations based on trust with regards to the people and companies we come into contact with. Having committed itself to increasing its value for customers, employees and other stakeholders, GHH-BONATRANS will at the same time maintain a high level of ethical standards. Code of Ethics serves to help us understand our ethical and legal obligations which we come across at work. The rules determined in this Code are binding.

**GHH-BONATRANS:  
ONE GROUP.  
SAME VALUES.**

**EXPERTISE  
INNOVATION  
POWER  
QUALITY  
PASSION**

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