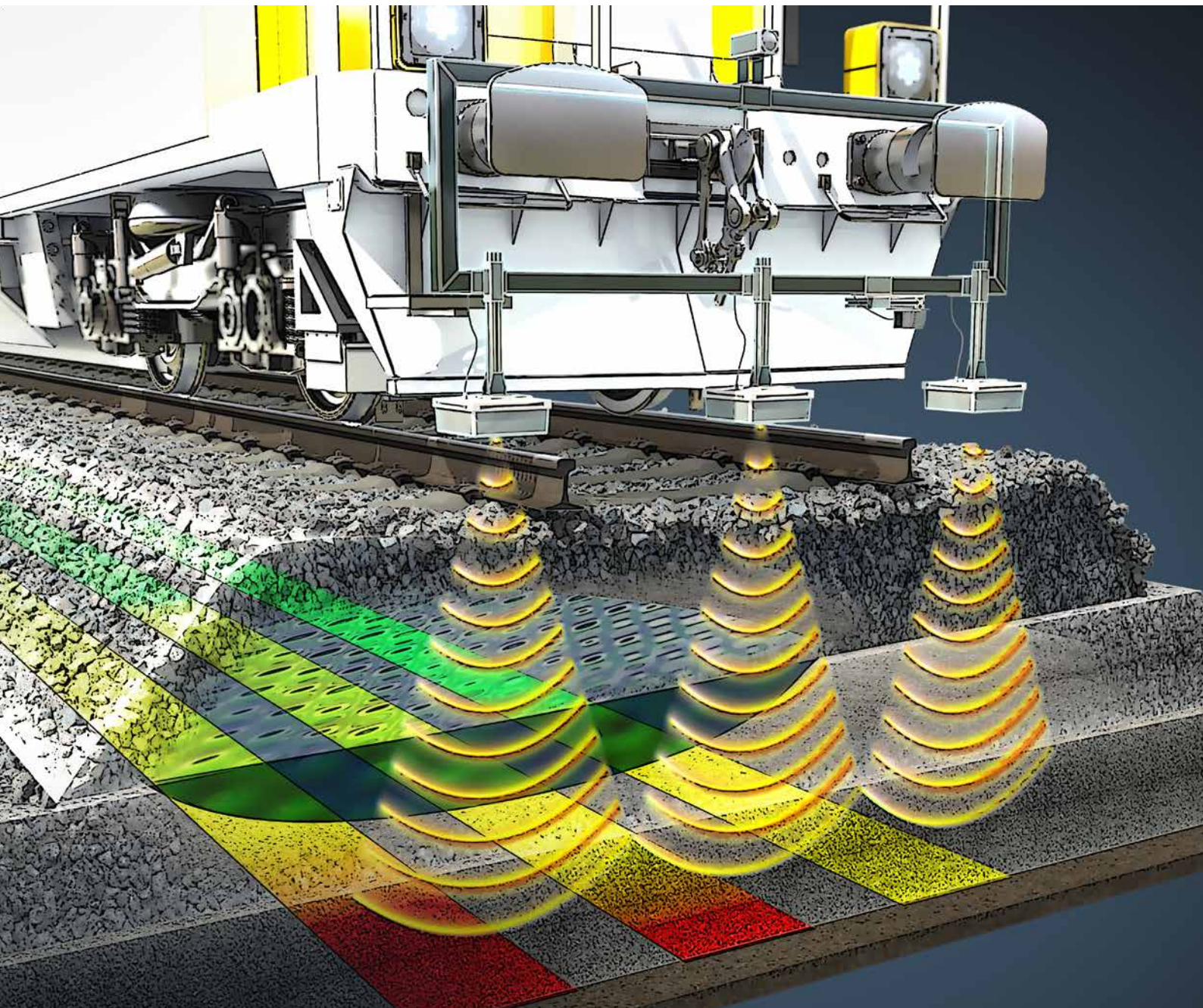# GROUNDCONTROL

Geophysik und Consulting GmbH

INNER VALUES MATTER

**Full analysis of ballast bed, formation, and substructure
using high-speed ground penetrating radar**

DON'T STOP AT SURFACE LEVEL!

Knowing your track inside out contributes to safety, planning reliability, and transport safety. For example, most derailments result from mud pumping. In most cases, mud-pumping effects are not visible on the surface of the ballast bed.

We use informative analyses to get to the root of the problem. This enables us to offer you efficient maintenance planning.

Our method of choice: Ground penetrating radar – by far the most accurate and fastest method for inspecting ballast bed, formation, and substructure.

**Ground penetrating radar for railway construction is our speciality.**

OUR TASKS

PREVENTION

- Regular track inspection
- Mapping of layers, determination of ballast fouling, identification of mud pumping, analysis of track drainage
- Continuous calculation of track modulus and localisation of damage to load-bearing capacity
- Detection of obstacles prior to work such as track renewal or ballast bed cleaning (e.g. concrete foundation, cable ducts, munition)
- Preparation of worksites

QUALITY ASSURANCE

- Quality control of track work (e.g. track-bed layer thickness)
- Verification of work performed
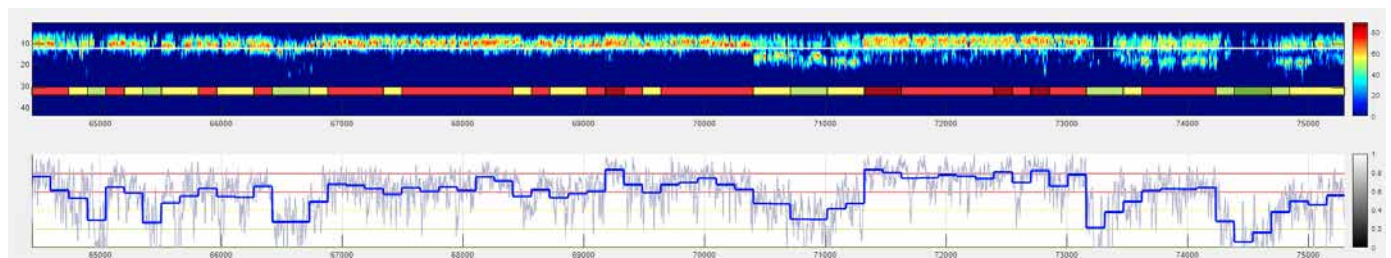
Analysis of Ballast Fouling Index (BFI) using AI

OUR SERVICES

WE MEASURE

- Recording of all relevant geotechnical parameters
- Comprehensive inspection ranging from individual lines to entire railway networks
- Up to 1,000 km per operation
- No line closures required
- Measurement under realistic load – informative measurement results

All measuring data from one partner
Our partnership with Plasser & Theurer extends the range of services to include all-in-one measuring runs. In one single run, the EM100VT track inspection vehicle enables comprehensive measurement of the track – including referenced track geometry, various profiles, levels of wear, position of the contact wire, and the recording of all relevant geotechnical parameters via GPR. Maximum speed and comfort.


SRS Track Analyzer – clear representation of measuring data

WE EVALUATE

- Fully developed software (SRS Track Analyzer)
- Fully automated evaluation using Artificial Intelligence (AI)
- Clear graphic representation of measuring data
- Display of results on digital maps (e.g. Google Earth, Bing)
- Continuous, integrated display of GPR data, track geometry, deflection data, direct drillings, etc.
- Continuous determination of humidity index, fouling index, and track modulus
- Easy data export for integration into databases

Why use AI for the evaluation of measuring data?
Unlike manual evaluation, the use of AI allows for the automated, highly accurate, and, above all, reproducible analysis of measuring data. With the help of machine learning algorithms, the software learns to interpret reflection patterns in radargrams correctly.
Every kilometre investigated increases accuracy. Our software has already learned from 130,000 km of tracks. In addition, AI accelerates the process of evaluation; this translates into reduced costs.
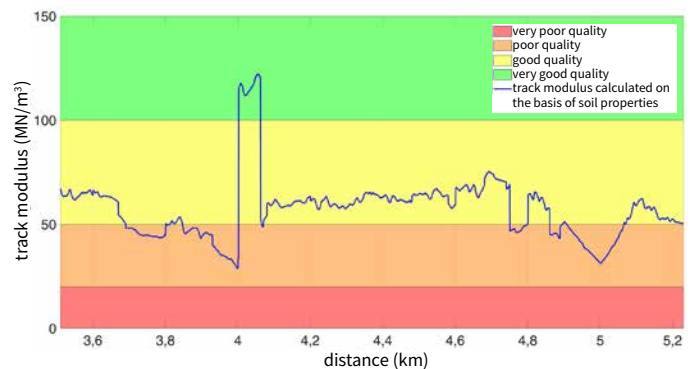
Continuous calculation of track modulus
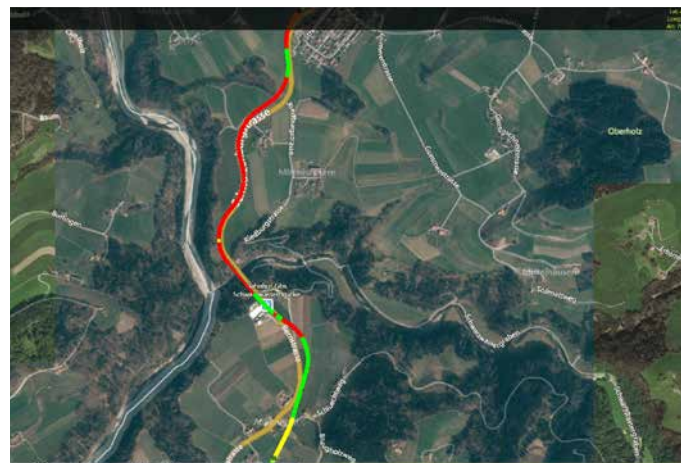
Display of results on digital map

OUR TECHNOLOGY

POWERFUL

- Utmost data quality up to measuring speeds of 300 km/h
- Up to 2,000 scans per second – high horizontal resolution
- Up to 1,024 pulses per scan – high vertical resolution down to a depth of 2.5 m
- Antenna frequencies between 100 MHz and 900 MHz – optimum resolution at different depths
- Special trigger system for measurement only between sleepers – interference-free data quality
- Integrated DGPS and Doppler radar – Position accuracy < 0.3 m
- Shielding against interference from signalling systems

ADJUSTABLE

- Can be combined with any carrier vehicle, with or without buffer bar
- Measurement for both directions of work possible, towed or pushed
- Independent system, can also be fed via battery
- Power supply: 12 V DC, ~ 120 W

Usable with any carrier vehicle

OUR STORY

OUR EXPERIENCE
IS OUR ADVANTAGE

When geophysicist Giuseppe Staccone established the company in 1993, the use of GPR for railway systems was still in the early stages of development. It was a controversial topic among experts. Since then, Ground Control GmbH has had a leading role in further developing this technology.

Today, GPR measurements are the standard procedure, and Ground Control GmbH has gained recognition as a professional and reliable service and system provider. This, however, is not a reason for us to rest on our laurels. On the contrary, we will continue to provide innovative developments that contribute to the success of rail traffic. It is not without reason that infrastructure managers, infrastructure planning offices, engineering offices, and measurement companies worldwide rely on our expertise.
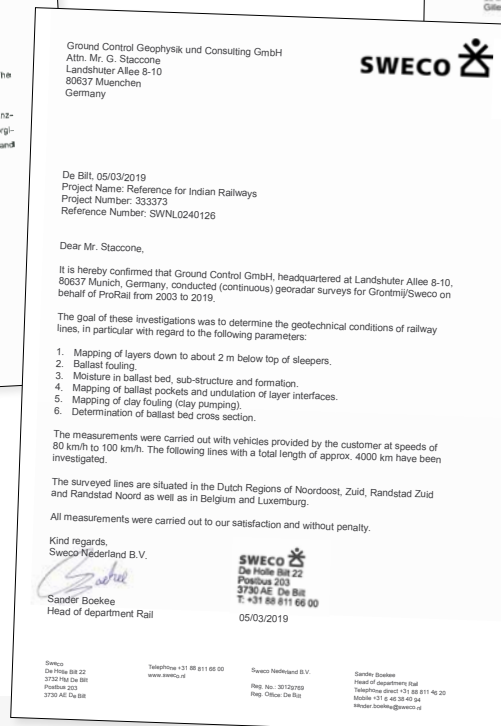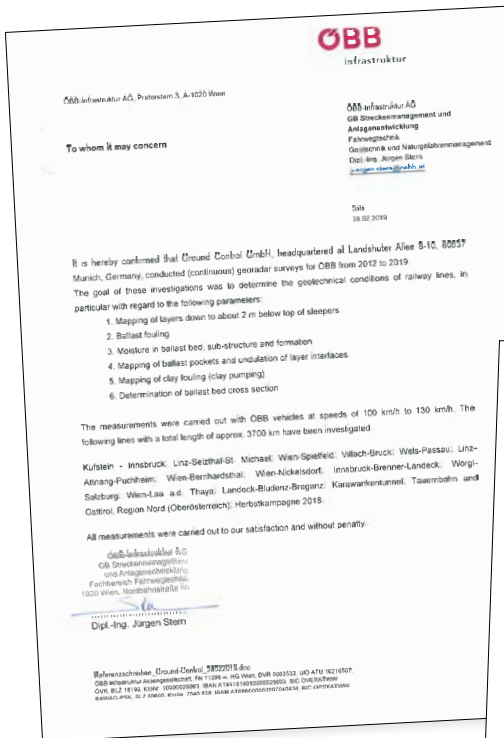
BENEFIT FROM

✓ **cost saving through efficient maintenance planning**

✓ **planning reliability through in-depth track knowledge**

✓ **targeted use of resources through specific rehabilitation proposals**

We'll keep you on track.

OUR REFERENCES

COLOMBIA BELGIUM CHINA SLOVENIA
HUNGARY AUSTRALIA THE NETHERLANDS
SWITZERLAND **Services & solutions**
GERMANY **for up to**
RUSSIA **20 years in ...** BRAZIL
SERBIA TURKEY
LUXEMBOURG SWEDEN DENMARK
INDONESIA AUSTRIA
FRANCE GREAT BRITAIN

OUR PROJECTS

SYSTEM SALES

- Australia
- Brazil
- Indonesia
- Colombia
- The Netherlands
- Russia
- USA
- Austria

LARGE-SCALE PROJECTS

France
High-speed lines
Paris – Lille, Paris – Marseille, Paris – Bordeaux,
framework agreement 2019 to 2024
for the inspection of 25,000 km
5,000 km, 2010–2020

Austria
Kufstein – Innsbruck, Vienna – Slovakia,
Tauerntunnel, Styria, East Tyrol,
Western main line, Southern main line
5,000 km, 2001–2020

Sweden
Bothnia line
1,600 km, 2005–2019

Russia
Moscow – St. Petersburg line
1,500 km, 2006

Australia
Roy Hill Mine – Port Hedland line
1,250 km, 2012–2018

Turkey
Istanbul – Ankara,
Basmane – Bandırma,
Karabük – Zonguldak
1,400 km, 2006–2018

The Netherlands
Noordost, Zuid,
Randstad Zuid,
Randstad Noord regions
4,000 km, 2003–2020

Germany
Supraregional networks:
Würzburg, Nuremburg, Augsburg
1,500 km, 2008–2020

Luxembourg
Entire network
440 km, 2008–2011

Colombia
Cerrejón Coal, mine – port line
150 km, 2006

GROUNDCONTROL
Geophysik und Consulting GmbH

GET IN TOUCH WITH US

Would you like to know more about our products and services?
We are happy to answer your questions.

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