keep track

2021

THE RHOMBERG SERSA RAIL GROUP CUSTOMER MAGAZINE

Highlights in this edition

RHOMBERG SERSA RAIL GROUP

FOR US, EVERY DAY IS THE "YEAR OF RAIL"

Dear Readers,

The EU has named 2021 the "Year of Rail". Through numerous measures and activities those responsible in all the Member States want to promote rail travel in Europe and encourage people and companies to switch to rail. We support this initiative unreservedly. In fact we would go even further. Because, for us, every year, indeed every single day, is the "Year of Rail". Worldwide! Everyone in our Rhomberg Sersa family – those operating track-laying machines, working on the track and in offices, right through to the Owner Board – work hard and unwaveringly every day of every year to offer you the most economical, safest, highest-quality, in short: the perfect solution to your challenge. And your feedback, your repeat orders and your satisfaction show us that we are on the right track.

It makes us proud of our technologies, our innovations and above all of our team of outstanding and dedicated colleagues. And it inspires us to continue working tirelessly to become even better and to serve you even better. Day by day. Even after the "European Year of Rail".

We hope you enjoy reading the current edition of "keep track"!

Konrad Schnyder
President Owner Board
Rhomberg Sersa Rail Group

Hubert Rhomberg
Member Owner Board
Rhomberg Sersa Rail Group

PS: This year, for the first time, "keep track" is also being published as an online magazine.

You can find the online edition of our customer magazine: magazine.rhomberg-sersa.com

INVESTING IN THE FUTURE

In December last year, the Rhomberg Sersa Rail Group caused a stir with its investment in the leading simulation developer NXRT. Just a month earlier, our partnership with the EuroTube research foundation (keyword: Hyperloop) hit the headlines. In both these news items, our international railway technology company sends the world a message: We are investing in the (digital) future! For the benefit of our clients.

However, those are just two of the countless innovations and investments which will put our company on a sound future-proof footing. But there is much more in this edition of our customer magazine “keep track”. Discover, for example, what machinery we have (p. 22 - p. 23), our new technologies, and where they are used, such as Smart Maintenance (p. 26) or BIM (p. 17, p. 18 – p. 19, p. 20). You can also find the latest information about exciting projects such as the Koralm tunnel (p. 49), “Stuttgart 21” (p. 50 – p. 51), for the Bavarian Zugspitze Railway (p. 52), Irish Rail (p. 62), Sydney (p. 59), Chamonix (p. 58) and Lucerne (p. 56). And last but not least, we present some successful new products from our company, such as track diagnostics (p. 41) and the vehicle-accessible level crossing for slab track in tunnels (p. 43).

I hope you enjoy reading it!

Thomas Bachhofner
CEO Rhomberg Sersa Rail Group

“MAKING RAIL THE MOST COMPETITIVE MEANS OF TRANSPORT.”

How the Rhomberg Sersa Rail Group is driving forward railway construction with investment, innovation and communication.

TO SUPPORT ITS CLIENTS AS WELL AS POSSIBLE, THE MANAGEMENT AT RHOMBERG SERSA RAIL GROUP LOOKS TO THE THREE PILLARS OF INNOVATION, INVESTMENT AND COMMUNICATION. GARRY THÜR, JOHANN GROSSALBER AND CHRISTOPH MATHIS ARE RESPONSIBLE FOR THESE STRATEGIC BUILDING BLOCKS. IN CONVERSATION, THE THREE MEMBERS OF THE RSRG MANAGEMENT TOGETHER TAKE A LOOK AT THE FUTURE OF THE RAIL MARKET.

WHAT DOES IT TAKE TO BE INNOVATIVE AND THEREFORE SUCCESSFUL?

Mathis To be able to offer the right products and solutions, we have to know what is needed. We can only find that out through good, effective customer relations. This is essential. And here we benefit from our decentralised organisational structure, in which solutions can be found and tested, together with our clients, directly on site, i.e. on the rails. Since challenges in Australia are fairly often quite different from those in Canada or Europe.

Thür What naturally helps very much in a family-run traditional company such as ours, is the clear commitment of the owners. Year after year, we invest large sums in innovation projects, despite the risks involved. We have belief, then, but also the structures, responsibilities and process.

Grossalber I sense this commitment in every single person at RSRG. When I started here at the beginning of this year, I was impressed by the ambitions and the commitment of the employees, as well as the many initiatives in all areas and markets, which have driven forward, for example, the rise in productivity.

WHAT IS THE MOST SUCCESSFUL INNOVATION OF THE RSRG COMPANY SO FAR? WHAT COMES NEXT?

Thür Two developments come to mind: slab track and renewal of points. A slab track example: As one of the first suppliers, we were able to develop a process with which we could noticeably increase the installation speed and therefore the cost-effectiveness of this rail system. And, of course, this develop-

Christoph Mathis
Head of Strategy, Marketing & Business Development

Johann Grossalber
Head of R&D, Innovation & Products

Garry Thür
CTO

ment is ongoing, currently with the focus on process digitalisation and industrialisation.

Mathis We've been working really hard on this recently. So that, with the help of a digital construction site, we can visualise for our clients a number of scenarios for construction processes and machine deployment, simulate costs in advance and then together develop the best solution. There is still much to be done here, and we look forward to it.

HOW ARE YOU GOING TO ENSURE THAT, GIVEN THE PRESSURE FOR INNOVATION, THE CORE BUSINESS AND, ABOVE ALL, THE CLIENT BASE WILL NOT BE NEGLECTED?

Grossalber They are not mutually exclusive. On the contrary: For the previously mentioned points renewal, for example, we developed a mechanised method, unique in the world, by which we have made points replacement substantially more productive. And, step-by-step, we are adding digital applications to further accelerate planning and implementation. This meets rail operators' basic need around the globe: availability of their infrastructure to be as interruption-free as possible.

Thür It stands us in good stead that our commitment, perhaps surprisingly, is focussed on clients only as a second step. Our aim is to further develop the railway into the most competitive means of transport of the future. An aim incidentally, and here we come full circle, that our clients pursue as well. Therefore we are certain that our innovation management is fully oriented to local and long-distance railways, freight lines and private infrastructures.

You can find the podcast of the interview in our online magazine.

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ONLINE MAGAZINE

We look forward to welcoming you online for the first time. You can find the online edition of our customer magazine at: magazine.rhomberg-sersa.com

Publication details | Publisher: Rhomberg Sersa Rail Holding GmbH, Mariahilfstrasse 29, 6900 Bregenz/AT, T +43 5574 403 0 | Würzgrabenstrasse 5, 8048 Zürich/CH, T +41 43 32223 23 00, info@rsrg.com, www.rhomberg-sersa.com; **Photos:** Rhomberg Gruppe, Rhomberg Sersa Rail Group, Walter Ruetsch, LEAG, iStock; **Responsible of the content:** Christoph Mathis (Head of Group Strategy, Marketing & Business Development), Sarah Blum (Project leader), Torben Nakoinz (Text) **Layout:** Manuel Haugke, www.haugke.com; **Paper:** Vivus silk; **Publication:** in accordance with § 25 of the Media Law: keep track appears once a year in a print run of 4, 460 copies (AT/CH/D) and 790 copies (AUS/CAN/UK/IRL).

01

COMPANY NEWS

CHE

INNOVATION IN TRAINING

Rhomberg Sersa invests in “Mixed Reality” technology leader NXRT.

CHRISTIAN SCHNYDER
Member of the Board

DEMANDS ON EMPLOYEES ARE CONSTANTLY INCREASING. SAFETY IS OUR HIGHEST PRIORITY AND TRAINING MUST BE PRACTICAL AND RESOURCE-EFFICIENT. TO GUARANTEE OUTSTANDING QUALITY, TARGETED REPEATED EMPLOYEE TRAINING IS ESSENTIAL.

The Rhomberg Sersa Rail Group has therefore invested in the company NXRT, which impressed it from the outset. NXRT develops software, among other things for Mixed Reality, a technology which allows the virtual world to merge with real components.

In addition to saving resources, cooperation brings advantages, above all in the individualisation of training: Dangerous and out-of-the-ordinary situations can be simulated specifically for trainees. As a significant added value, communication can take place between several functions together or separately.

The areas of application include simulations for train drivers as well as for shunting staff, train dispatchers through to safety managers and guards.

The focus here is always on the client. The software solution is customised to meet your requirements.

You can find further information in our online magazine.

CHE

EVERYTHING UNDER ONE ROOF

New location in Landquart: Expertise from all areas for metre gauge and standard gauge.

THOMAS MÄSER
Project Leader, Track-Laying Machines

RSRG'S EXTENSIVE EXPERTISE HAS BEEN BROUGHT TOGETHER UNDER ONE ROOF IN SWITZERLAND, AT DONATSCH SÖHNE AG, WHICH BECAME PART OF THE RHOMBERG SERSA RAIL GROUP IN 2020.

Landquart, which emerged 150 years ago as a railway town of the Rhaetian Railway, is not only the hub of metre-gauge track, but also has excellent connections to the SBB's standard-gauge track network. The needs of metre gauge and standard gauge can be covered in full from this location.

Donatsch offers its customers solutions in steel. In the area of rail infrastructure, fabrication includes products such as ribbed plates, overhead line components and also special solutions for the permanent way. At the same time the company also carries out conversions, adaptations and superstructure work on rail-mounted vehicles. From Landquart, Sersa Maschineller Gleisbau AG also looks after all metre-gauge clients. The preliminary work for permanent way renewal work in metre gauge is also carried out in Landquart. In addition, track-laying machines such as cranes and conversion machines are maintained and serviced. And: From here, Sersa Group AG (Switzerland) offers commercial rail construction and civil engineering services.

AUS

TIME FLIES WHEN YOU'RE BUSY!

March 2021 marked the official 1-year anniversary of the RSRG group owning RKR Engineering.


BART KELLY, Manager RKR Engineering (left)
SCOTT RICHARDSON, General Manager Rail Operations, Rhomberg Rail Australia (right)

RHOMBERG AUSTRALIA PURCHASED RKR ENGINEERING TO BRING TOGETHER THE EXPERTISE IN EQUIPMENT, DESIGN, FABRICATION, AND INSTALLATION OF STEELWORK WITH RHOMBERG'S SUITE OF CAPABILITIES. SO FAR, ACCORDING TO BART KELLY, MANAGER AT RKR ENGINEERING, IT HAS BEEN A NATURAL FIT. WE SAT DOWN WITH MANAGER BART KELLY AND GENERAL MANAGER SCOTT RICHARDSON TO GET AN INSIGHT ON THE YEAR THAT WAS.

When Bart Kelly embarked on his new role 12 months ago he relocated to the Emu Plains workshop to oversee the day to day management of the business. When reflecting on the year, Bart described the highlights as completing some fantastic projects that required a wide variety of skill sets & equipment that no one else has Cockle Creek, Sydney Harbour Bridge deck upgrade, Broadwater stringer replacement, Breeza bearings just to name a few.

From Scott Richardson's perspective, continued improvement of business processes and creating solid pillars for continued business growth as well as exploring opportunities within niche markets are all high on the agenda for the year ahead, Scott's biggest take-away from the last 12 months has been the dedication and passion of the RKR team to transition into the RSRG business model and continue to deliver for our clients.

A project highlight for the team this year was the Cockle Creek Bridge project. This job put the new combined teams' approach to the test on a project to design, fabricate, and install a temporary enclosure to allow for the removal and replacement of lead paint on the Cockle Creek Rail Bridge near Newcastle. The two-span bridge, built in 1957, needed to be encapsulated to allow for the blasting of the bridge without the lead paint polluting the river below. The structure also needed to support the load of people doing the repainting, all while allowing trains to continue running.

You can find further information on the article in our online magazine.

NACH-
HALTIG-
KEIT

BUILDING FOR A GREENER FUTURE

SUSTAINABILITY AT ALL LEVELS IS FIRMLY ANCHORED IN OUR CORPORATE STRUCTURE AND FORMS THE BASIS FOR OUR EVERYDAY ACTIVITY. THIS IS WHY, IN THE RHOMBERG SERSA RAIL GROUP, OUR FOCUS IS ON DEALING RESPONSIBLY WITH OUR ENVIRONMENT AND OUR RESOURCES – BECAUSE ONLY IN THIS WAY CAN WE TODAY CREATE THE CONDITIONS FOR A BETTER TOMORROW. TO CREATE A SUSTAINABLE FUTURE, WE ARE WORKING, IN ALL OUR COMPANY'S BUSINESS AREAS, ON ENVIRONMENTALLY FRIENDLY, INNOVATIVE AND HIGH-QUALITY SOLUTIONS AND CONCEPTS. HERE IS A SELECTION.

GREEN EFFICIENCY

You can find out more in our online magazine.

Rail-mounted transport solutions for sustainable construction site logistics

Track works often present huge logistical challenges, and to achieve a sustainable working method, a solution is needed that is as efficient and therefore as sustainable as possible. This is why the track-laying machines from Sersa Maschineller Gleisbau are fitted with a materials wagon containing diesel tanks, as a fuel supply for the track-laying machines. And also to move track-laying machines, SMG has for many years been using a rail-mounted transport solution: Metre-gauge vehicles are transported not by road, but by carrier truck on the railway line.

RETROFIT OF THE MFS40

You can find out more in our online magazine.

Start-stop system for RSRG's material conveyor and silo units

Machines consume fuel even when idling, and so produce CO_2 emissions. This is true of our own MFS40 machines – an analysis has shown that, in certain uses, up to 70% of a shift is in idling mode and that there is thus a huge potential for saving unnecessary energy, air pollution and noise.

Reason enough for RSRG's MFS40 machines to be retrofitted with a start-stop system, so that the motor switches off automatically after idling for a certain period of time. As well as noise, up to 40% of diesel fuel can be saved on each machine in this way.

IRELAND'S PATH TO A "GREEN" FLEET

You can find out more in our online magazine.

How Rhomberg Sersa Ireland is improving driving behaviour and with it is protecting the environment.

A successful introduction: Rhomberg Sersa Ireland has been able to successfully implement a system that analyses and asseses the driving behaviour of drivers of commercial vehicles. The system is integrated by what is known as on-board telematics, which is installed in all commercial vehicles. Personal driving behaviour can be observed by an online dashboard, which is controlled by an algorithm. As well as aspects that are relevant for safety, the system brings with it above all advantages for the environment – the consumption of diesel has been reduced by 11%. Six electric cars also save CO_2.

CONVERTED TO ACCUMULATORS

RSRG is switching to power-driven hand tools.

At the Rhomberg Sersa Rail Group we are taking a step further to climate neutrality, in that we are working continuously towards reducing the use of fossil fuels – for example by the gradual switching to power-driven hand tools.

This means that in future various hand tools such as rail saws, vibratory tampers or track band saws will no longer be powered only by petrol engines but by an electric drive with an accumulator system. This reduces not only noise but above all also CO_2 emissions.

02

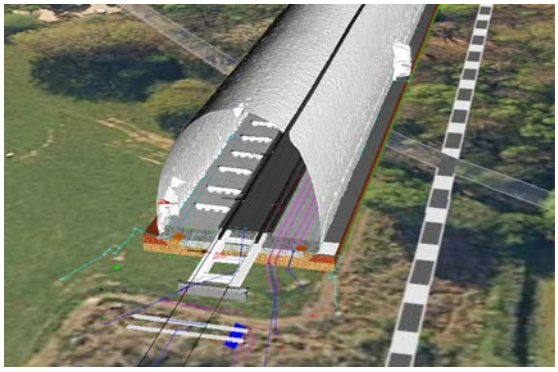
DIGITALISATION

GBR

3D MODELLING STRENGTHENS RENEWAL WORKS

Digital model assists engineering team in feasibility study.

BARNABY TEMPLE
Chief Engineer



ENGLAND
SOUTH EAST ENGLAND

Rhomberg Sersa UK utilised digital tools to support a feasibility study looking to deliver a further 30 years of service for Network Rail.

RSUK were commissioned by Network Rail to undertake full topographical, drainage, and ground investigation surveys at Mountfield Tunnel. The outcome was the provision of a full condition survey in support of proposing options for a 30-year renovation / renewal for the slab and track fixing system. In addition, the specification stated that any solution must be achievable within normally booked possessions. However, if this was found to be unachievable then this was required to be made clear in the option development report. Whilst RSUK were mobilising these initial surveys, the team received a call from the client that the track slab had failed. RSUK were asked to attend site on an emergency railway possession to undertake repair works. Since these works were undertaken, RSUK has surveyed the structure and created a 3D digital twin model to assist their Engineering team in their assessment of the structure and to help recommend the best way to renew the asset to provide a further 30 years of service.

CHE

NEW COOPERATION MODELS

A one-stop shop for planning and building.

MARCEL NOLTE
Project Manager

At the end of 2019, with the award of the contract for the “SBB Points Renewal 2020–2024” project, Sersa Switzerland won an important contract on the way to new cooperation models. It includes the planning (preliminary project through to commissioning, SIA phases 31-53) and the building of around 400 points in a variety of points renewal projects throughout Switzerland.

One of the greatest challenges is to carry out the many projects in a coordinated and efficient way through the various phases. From preliminary to build-ready construction project planning and from build through to commissioning. In consultation with SBB, Sersa decided in favour of full BIM planning. Particularly in the area of planning and BIM modelling, the Sersa BIM team takes on a significant part of the project planning and brings in its expertise from developments over recent years to optimum effect.

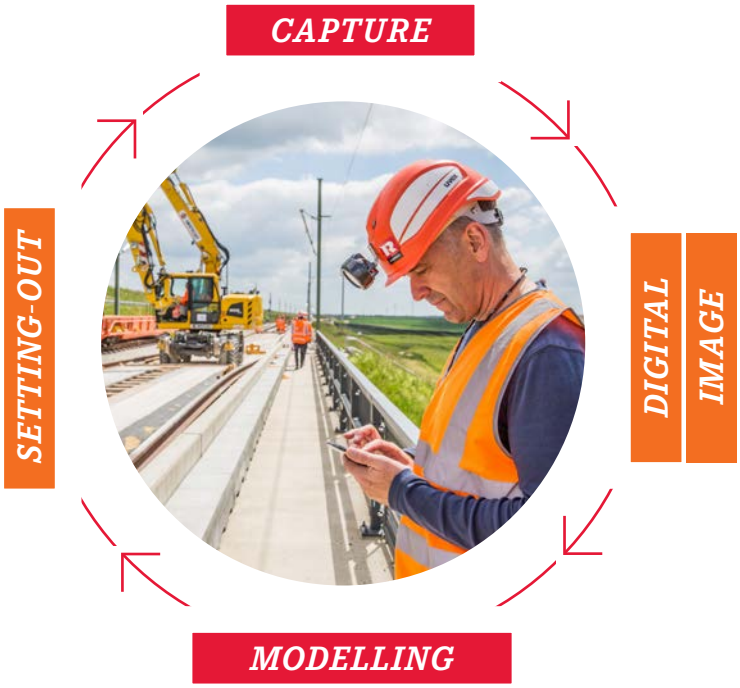
Because of the many parallel planning processes in different phases of the project, Sersa attached a great deal of value to the implementation of a reliable quality assurance system. For example, a large number of “quality gates” ensure that each next process step is only possible if the requirements specified jointly with the client are met in the BIM model. The thus clearly definable model quality can be seen by the client in real time and guarantees maximum transparency.

With this project, Sersa Switzerland proves that it can offer the client a significant added value with the “Plan and Build” concept.

REALITY CAPTURE

The link between the real and the digital world.

HELGE GRAFINGER
Project Manager R&D Reality Capture Projects

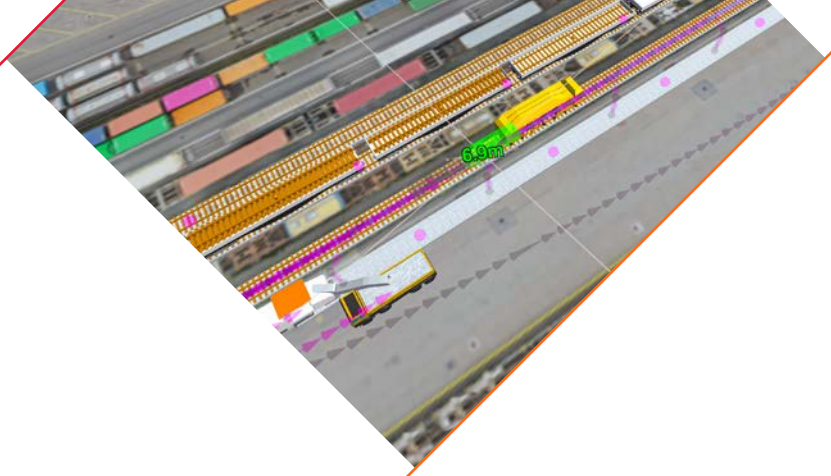


RSRG'S "BIM REALITY CAPTURE" TEAM PROVIDES SUPPORT IN PLANNING, CONSTRUCTION AND ASSET MANAGEMENT.

Building Information Modelling (BIM) is a discipline which, after years of successful use in building engineering, now also has a role in the transport infrastructure sector. This discipline includes all types of surveying methods, in particular those capturing millions of individual points of the real world. Which gives us the new term of Reality Capture (RC). With it, we describe a circuit between the real and the digital world, from capture, via processing, production of a digital image, planning, modelling and setting-out and back to capture," explains Helge Grafinger, Project Manager R&D Reality Capture Projects at RSRG.

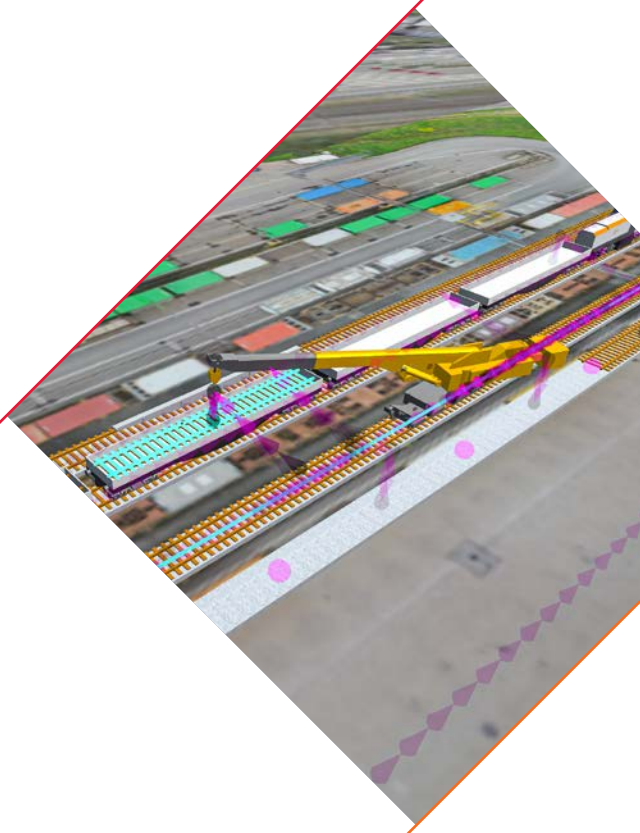
The new RC team at Rhomberg Sersa Rail Group covers all these aspects. Grafinger: "Our aim is ease of use of digital models on the construction site, so that all project participants receive the correct information about which part is to be built when and how. Subsequently, when the final infrastructure is in operation, all parts will be available in digital form, together with their history and their performance."

As RSRG covers the different stages of the digital infrastructure and standards of BIM use by infrastructure owners around the globe, the BIM RC team uses a number of technologies to meet their colleagues on site at the right level of application. The range starts with user-friendly GNSS devices with PDF 2D drawings and ends with fully model-based machine control systems. Likewise, specialists use all types of laser scanning systems and photogrammetry on the basis of drone images. All point clouds in true colour are furthermore converted into usable data structures which can be used on computer screens or smartphones via the internet.



AGAINST IMPROVISATION

The Rhomberg Sersa Rail Group uses BIM to develop the optimum construction process.



Someone going to an improvisation show wants spontaneous performances, unexpected twists and entertaining chaos on the stage. Someone acting responsibly on a construction site wants the exact opposite: clear processes, reliable deadlines and predictability. Unfortunately, reality often looks a bit more like the first scenario than it does the second. With the latest technology and the benefits of digital applications, RSRG has now managed to reconcile vision and reality.

In practical terms, project managers plan in future to establish the optimum construction process in a “digital twin”. To do this, the 3D structure model, i.e. the BIM model and the environment, are imported into a “digital construction process plan”. “Our aim is quite clear: to build, above all, complex schemes firstly virtually and only then in reality,” explains Project Manager Ralf Sommer. “In this way, we can avoid unnecessary improvisation as far as possible.”

Established construction processes are saved for items that are to be dismantled and components to be constructed. Alternatively, new processes can also be modelled. During planning, the individual operations are then defined and interlinked. The timing of individual procedures is either simulated using machine performance data or defined with valid data from past projects. To simulate device data, a 3D model

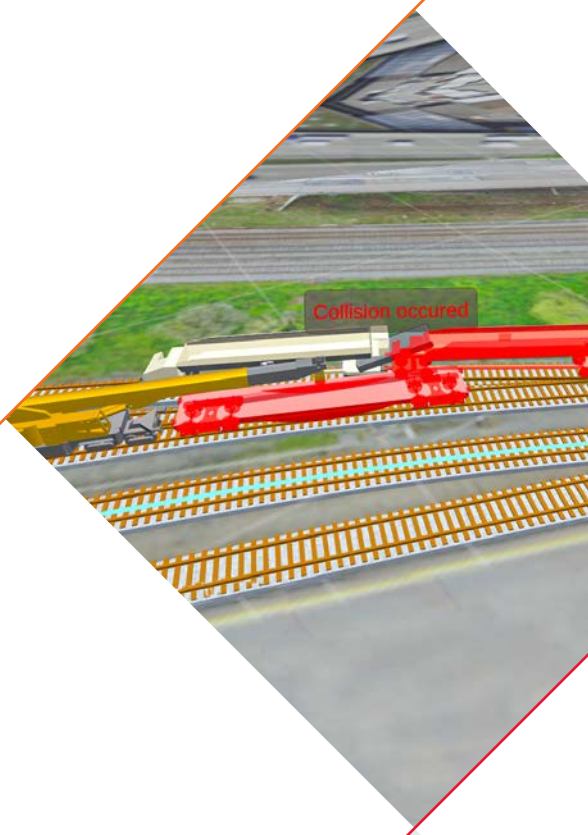
with realistic movement sequences was produced for each device, and all performance data for it saved in a database.

The individual construction processes are then optimised using Key Performance Indices (KPI's) defined in advance with the client, until the ideal construction process is achieved. The KPI's could be time, costs or CO_2 emissions, for example. Once the "optimum construction process" has been established, the individual operations can be returned, via the CSV interface, to scheduling software, such as Tilos for example.

As on-site conditions often differ from those planned, in the next stage the positions of large plant on the site are recorded in real time. The experience gained from this once again flows into future projects. "In this way, we as an organisation learn from every construction site," says Ralf Sommer.

Initial cooperation efforts have shown that by this visual type of planning, all project participants stay in step. Communication is clearly better, and clashes can be detected and managed.

You can find further information and a video in our online magazine.

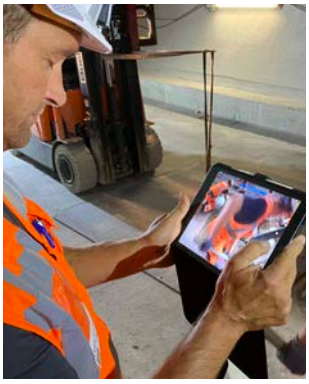


"OUR AIM IS QUITE CLEAR: TO BUILD, ESPECIALLY, COMPLEX SCHEMES, FIRSTLY VIRTUALLY AND ONLY THEN IN REALITY."

Ralf Sommer
Project Manager

DIGITAL
SITE
JOURNAL

QUALITY
PLANNING
&
MANAGEMENT



TIME
CAPTURE

PHOTO MANAGEMENT

DEADLINE
PLAN

DOCUMENTATION OF
SITE
PROGRESS

ALWAYS LIVE

Better service by the use of the latest platform technology in construction site management.

ARIAN AUST
BIM Manager

BY SYSTEMATIC DIGITAL DATA CAPTURE, RSRG PROVIDES ITS CLIENTS WITH A PERFECT OVERVIEW OF PROGRESS ON THEIR CONSTRUCTION SITE.

To serve our clients even better, the Rhomberg Sersa Rail Group is pushing forward with the latest platform technology and networked infrastructure. Today, functionalities have come to include the digital site journal and reports, time recording, plan and model management, photo management, task management, deadline integration, structured documentation of building progress, and quality planning and management. By horizontal and vertical process integration on the platform, system discontinuities are eliminated, and teams, processes and information are linked across organisational boundaries. Subcontractors and clients are invited to work on the platform with the Rhomberg Sersa Rail Group transparently and in a spirit of partnership. The platform's mobile application is supplemented by further apps and, on devices such as tablets and smartphones, supports day-to-day tasks directly on site.

"In this way, we can constantly improve our processes and automate operations," is how Arian Aust, BIM Manager, summarises the benefits. "In addition, the networked system landscape makes us even more efficient and helps us further improve Rhomberg Sersa's quality standard." For: The systematic digital capture of construction site data provides clients with a good overview of progress on site. An analysis of the data improves the preparation and implementation of future projects. All relevant project information is provided to project participants in real time.

APP

IRL

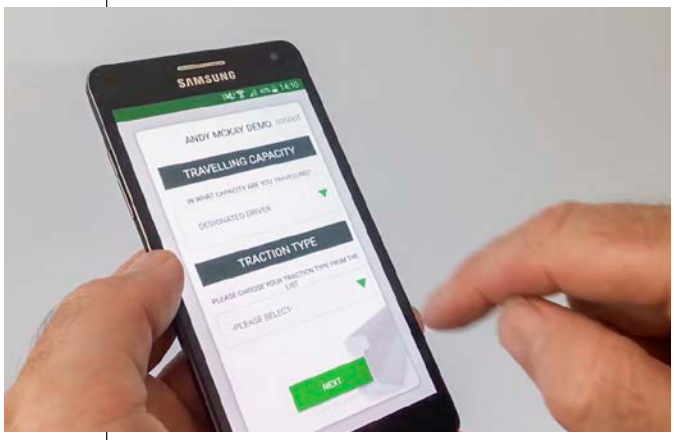
DIGITALISATION OF ROUTE KNOWLEDGE

Improved efficiency and accuracy by elimination of manual assessments.

RHOMBERG SERSA IRELAND HAS INTRODUCED A DIGITAL SYSTEM TO MANAGE ROUTE KNOWLEDGE AS PROOF OF DRIVER COMPETENCE.

As the only system of its kind on the market, the Automated Archived Route Knowledge System (AARK) digitally records which routes drivers have travelled along and thus provides evidence that they are competent on these routes on the basis of this experience. AARK replaces a hitherto paper-based system.

According to Andy McKay, Training and Competence Manager at Rhomberg Sersa Ireland, infrastructure companies and their drivers benefit from the electronic route portfolio as the system supplies instantaneous information.



The app-based system simply asks two questions at the start of a shift. The first question is: “What do you do in the train?”, and offers options such as “train driver”, “guard”, “service provider” etc. The second question asks what kind of train is being driven.

To avoid distractions, train drivers switch their mobiles to flight mode so that no calls or messages can be received, but the devices are still able to obtain GPS information. This location information is recorded and saved. Then the same route must be travelled at least once each year for the relevant proof of competence to be maintained.

If the year is coming to an end, the system sends a warning and thus ensures that all engine drivers are up to date at all times.

Digitalisation of route knowledge is just one example of the continuous development of innovations within RSRG. These innovations all serve to improve safety, accelerate progress and maximise resource efficiency.

BOOM

Digitalisation in machine maintenance.



HANS-JÜRGEN STEINBRECHER, BBW (left)
MATTHIAS GIEL, JumboTec (centre)
MATTHIAS MANHART, Rhomberg Sersa Technology (right)

IN PAST YEARS, THERE HAS BEEN A MASSIVE PUSH TO DIGITALISATION IN ALL AREAS OF THE RHOMBERG SERSA RAIL GROUP. WITH "BOOM" SOFTWARE, IT HAS ALSO FOUND ITS WAY INTO THE MAINTENANCE OF SPECIAL VEHICLES AND FREIGHT WAGONS.

In parallel to the digitalisation of Disposition (Scheduling) and EVU (Railway Companies), the ECM area (Entity in Charge of Maintenance) is also to be gradually included in this change and linked to it. The means to this end is the well-established maintenance software BOOM, with which maintenance procedures for Sersa Maschineller Gleisbau, Sersa Group Switzerland (Maintenance), JumboTec and Bahnbau Wels are optimised. The objective is to implement a complete digital procedure in all four firms.

Currently, the structure of vehicle data (component structure of vehicles, definition of operations, check lists, maintenance planning etc.) is initialised on the production system. To ensure that operations are completed efficiently, the next step is to connect the ERP's via an interface. The complete digitalisation of processes offers further potential for more innovations.

There is a clear added value to be gained from the change: The system models all ECM-relevant areas and supports RSRG on its path to paperless maintenance management. Thanks to the high data transparency, jobs can only be closed when all items have been completed. Substantial optimisations are achieved in parts ordering and in process flows by means

M

of interfaces to equipment. For vehicles in our own fleet and also clients' vehicles, complete digital documentation of working procedures including proof of maintenance can be provided for each vehicle. There is a seamless life cycle file, so to speak, for a vehicle and/or its components.

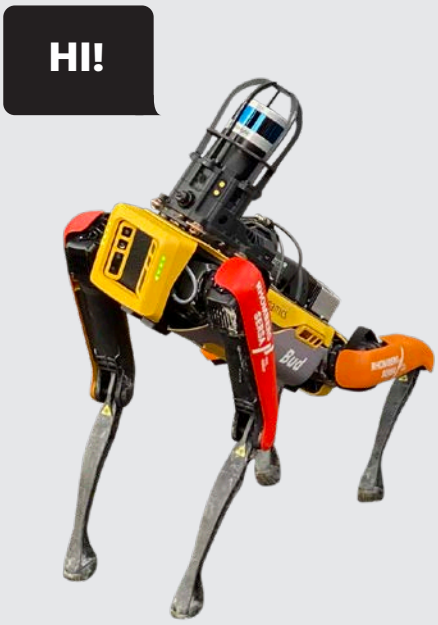
The operational personnel in the workshops also benefit. For example, signatures will in future be replaced by an automatic digital user signature. Data from peripheral systems can be transferred directly to Boom via an interface. Work allocation efficiency is increased and the task of archiving analog files is eliminated.

Moreover, once the system is connected to the "Dispo" and "EVU" modules, maintenance scheduling can be perfectly coordinated with usage and transport.

AUT

WELCOME TO THE RHOMBERG SERSA RAIL GROUP: "BUD"

RSRG was to be the first business in Europe to use and test a robotic dog from Boston Dynamics: the spot "Bud". And the rail engineering and technology specialist has used it extensively. For example, the device was used to document a site inspection, to scan tunnel profiles and for surveying purposes. Together with Microsoft, the relevant teams also tested its image recognition and AI skills. In cooperation with Swisscom, it was also fitted and tested with 5G technology. "Bud" coped well with all these tasks.



CHE

DIGITA-LISATION

AWARD

BROUGHT TO LIFE

MICROSOFT'S GLOBAL "INTERNET OF THINGS" AWARD: THE RHOMBERG SERSA RAIL GROUP AND SWISSCOM WON THE AWARD FOR THEIR "DIGITAL CONSTRUCTION SITE".

For the Rhomberg Sersa Rail Group and Swisscom, the digital construction site is already a reality: In five digitalisation projects, the partners are developing and testing how the industry can in future design rail construction more safely, more economically and more efficiently. This did not go unnoticed: Swisscom won Microsoft's Global "Internet of Things" Partner Award for its cooperation. The "digital construction site" beat a total of 4,400 nominees worldwide in this category.

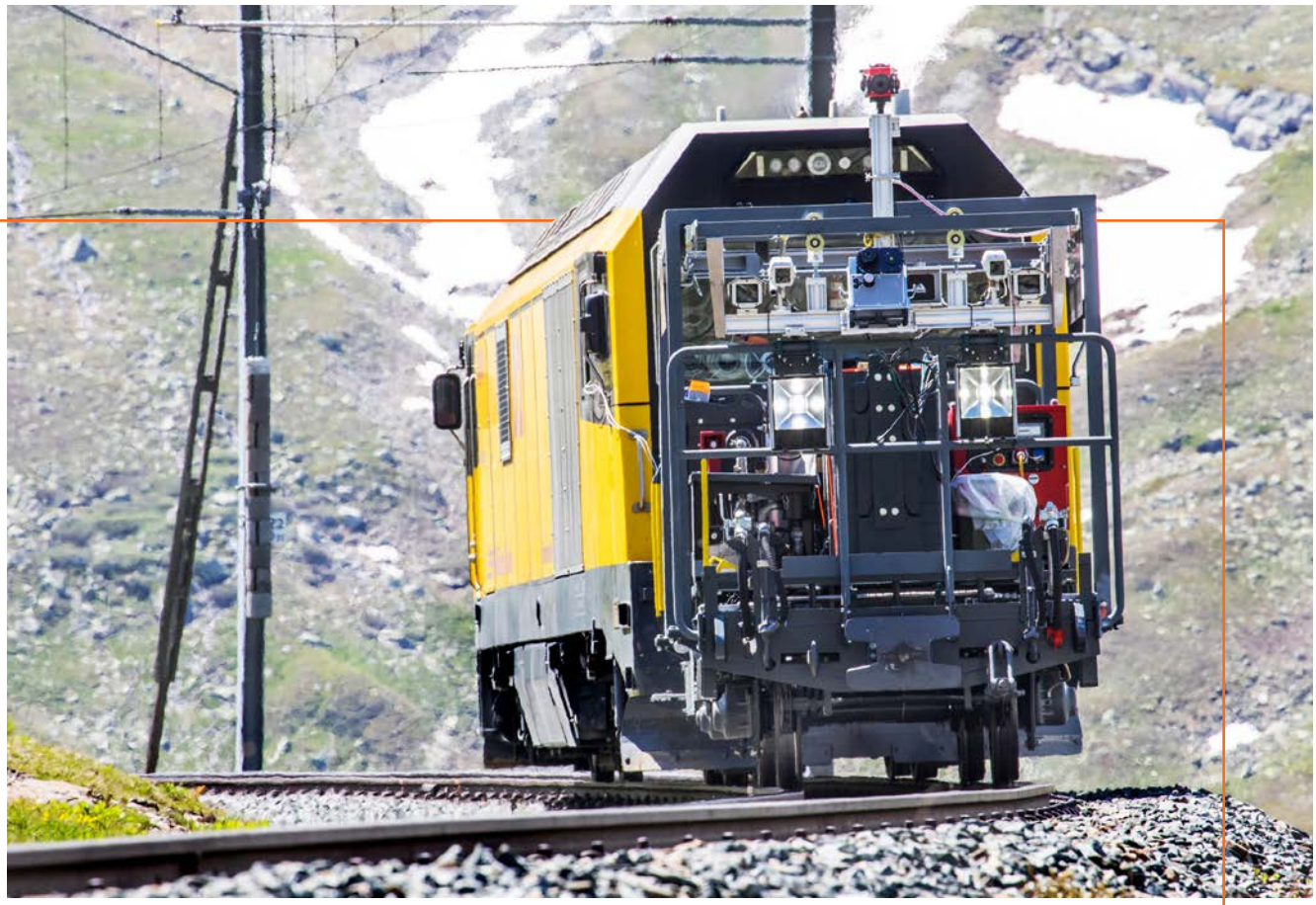
The Californian tech concern thus acknowledged the "outstanding success and innovation ability" which Swisscom demonstrated with RSRG in the application of digital technologies. Thomas Winter, Member of the Management Board of Microsoft Switzerland and Head of Partnerships, says: "The Swisscom-Rhomberg Sersa project is setting global benchmarks. There have been very few successful attempts to combine the harsh construction site environment with technologies such as 5G, IoT, cloud and data analytics."

Hubert Rhomberg, co-owner of the Rhomberg Sersa Rail Group, is delighted with the success: "The award is a wonderful confirmation of our commitment to innovative and digital technologies, especially our approach to transferring our construction know-how to our own hardware and software solutions. Without the appreciative, open and absolutely transparent partnership with Swisscom, we would not have been able to make the digital construction site a reality, nor would we have won this award."

The aim of the collaboration between Swisscom and Rhomberg Sersa was, from the outset, the production and optimisation of a digital image of the actual construction site. This should make it possible to organise the construction process perfectly, even before the arrival of the first excavator. "With this 'Construction before Construction', we can rise even better to the challenges facing the industry,

"THE SWISSCOM-RHOMBERG SERSA PROJECT IS SETTING GLOBAL BENCHMARKS. THERE HAVE BEEN VERY FEW SUCCESSFUL ATTEMPTS TO COMBINE THE HARSH CONSTRUCTION SITE ENVIRONMENT WITH TECHNOLOGIES SUCH AS 5G, IOT, CLOUD AND DATA ANALYTICS."

Thomas Winter
Member of the Microsoft Switzerland executive board



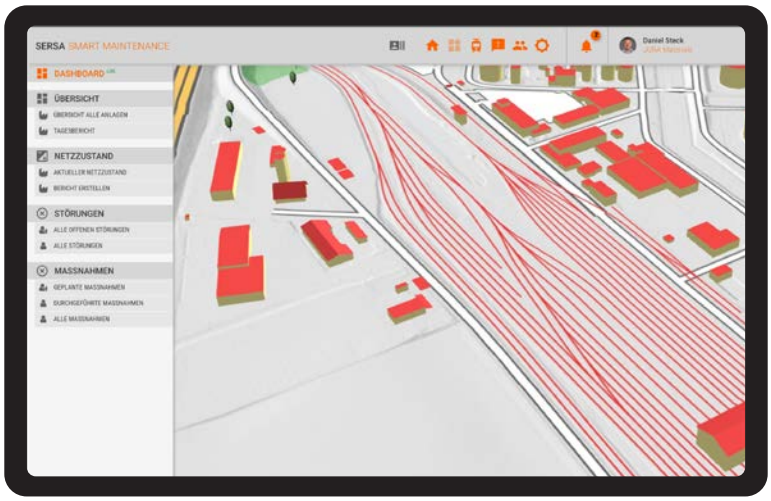
Prototype of a test coach in which a cloud solution, a cellular connection and much more are installed.

such as tight time windows, weekend shifts and dangerous and physically tough work," Rhomberg declares.

Digital applications in the working environment are being used and tested in a total of five partial projects. In the Swiss rail network for instance, a prototype test coach is used, fitted with a cloud solution, a mobile phone connection and much more besides. In this way, data is collected and pre-processed by means of AI and machine learning. Christian Schollenberger, Head of Group IT, says: "The cameras on the test coach measure the rail track, while moving, with an accuracy of tenths of a millimetre. This helps detect where maintenance work is needed and can reduce downtime on the world's busiest rail network." Incidentally, the test coach even detects loose nuts as it travels along the track at 60 km/h. Other tests relate to machine monitoring, and machine tracking and localisation, to guarantee full utilisation and functionality as well as personal safety.

With the IoT solution, an important component for comprehensive route diagnosis can be provided, as shown on p. 41.

You can find further information and a video on the article in our online magazine.



CHE

A MODEL WITH A FUTURE

With Smart Maintenance, Sersa inspires confidence in smaller infrastructure companies and industrial customers in particular.

MARKUS BERGER
Head of Total Maintenance Railways

THE INFRASTRUCTURE SYSTEMS ARE EVERY BIT AS DIVERSE AS THE MAINTENANCE REQUIREMENTS AND SYSTEM MANAGEMENT. THANKS TO THE MODULAR "SMART MAINTENANCE" SOLUTION BY SERSA, CLIENTS GET EXACTLY WHAT THEY NEED. YOU ARE ONLY SEVEN STEPS AWAY FROM YOUR INDIVIDUAL SOLUTION:

- **1. Advice and needs analysis:** Thanks to its expert knowledge, Sersa works with clients to find a solution that is tailored precisely to their needs.
- **2. Inventory:** We digitise the objects of infrastructure systems with millimetre precision – from simple 2D location illustrations to complex BIM models.
- **3. Categorisation:** We know where to set priorities. A clear categorisation of the system objects simplifies the automated creation of the network status report.
- **4. As-is survey:** The know-how-based, understandable and level-appropriate documentation of the as-is situation offers clients an honest assessment of the work required.
- **5. Asset management:** The seamless documentation of the infrastructure presents complex information in a simple way, so that the client always has an overview.
- **6. Planning:** Smart Maintenance always stays one step ahead. Our analyses of the network status allow forward planning and the optimisation of life cycle costs.
- **7. Carrying out the work:** Smart Maintenance is a one-stop shop for a full range of services – this simplifies planning and reduces costs.

CLOUD SOLUTION

Clients have live access to the Smart Maintenance Portal at any time, which gives them a comprehensive overview of their system. Constant further development and adaptation to individual client requests allows us to benefit from the experience of other infrastructure operators.

SOFT-
WARE

CHE

SO DIGITALISATION RUNS SMOOTHLY

The first component of construction site digitalisation: Sersa introduces the data hub.

AIDEN BREEN
Development engineer
Rhomberg Sersa Technology

RHOMBERG SERSA RAIL GROUP'S CLIENTS BENEFIT FROM THE GREATEST POSSIBLE DIGITALISATION IN ALL CONCEIVABLE AREAS.

For example, the SBB decided that from 1 July 2021, all welding construction sites should be paperless. Paper invoices and reports are no longer accepted. The full-service provider for railway technology used this decision to simultaneously set up a more efficient reporting process. It is, in a way, the first step towards digitalising construction sites.

To this end, Sersa Switzerland has consistently pushed ahead with the implementation of the data hub in collaboration with the software developer LogObject AG. The data hub will digitalise all processes related to the construction site: From scheduling, reporting and submission to the business software for invoicing, everything has to be done via the data hub.

Welding managers can now simply open the relevant reporting app on their mobile phone or tablet. Paper is no longer filled out on the construction site itself; all relevant information is now entered directly on the tablet. By a push of a button, the report is immediately sent to the office where the report data is processed further without delay.

The introduction of the digital work report brings both clients and Sersa real added value and promising potential. Work can now be paperless on both sides without intermediate steps, thereby significantly reducing processing time. In the future, the data hub will include all digital construction site processes including time reporting and anomaly reports.

03

MACHINERY

IRL

40% PRODUCTIVITY BOOST

Increasing utilisation thanks to a new maintenance method.

A JOINT TASKFORCE OF RHOMBERG SERSA IRELAND (RSIE) AND ITS CLIENT IARNRÓD ÉIREANN/IRISH RAIL (IÉ) DELIVERED A 40% JUMP IN PRODUCTIVITY ON A KEY MACHINE.

IÉ and RSIE formed a joint Continuous Improvement Group (CIG) to identify, prioritise and deliver on improvement projects.

One of its first projects was to reduce maintenance time on the On Track Machines (OTMs) in order to protect the “golden hours” when the OTMs are working on the tracks.

The CIG focused on the Plasser & Theurer RM 90 ballast cleaner, which is owned by IÉ and operated by RSIE. It was previously utilised for an average 57% of available possession time, mostly due to a 3-hour maintenance break after 10 hours of cutting.

The aim was to increase the utilisation time and in order to do that, the CIG designed a new dynamic maintenance productivity methodology.

As part of the change, fitters were integrated into the operations team, changing the team configuration from 4 operators, to 2 fitters plus 2 operators. The next stage was the creation of an onsite maintenance plan which supported 3 types of maintenance – non-stationary, stationary, and full stop.

By creating a new standard with an event timeline and relocating the tools required for each task into a local position, the maintenance tasks could be carried out rapidly and more efficiently.

The result is that non-stationary maintenance is now carried out on the ballast cleaner by a fitter while the machine is in use, delivering a significant increase in productivity .

The ‘record’ prior to the new CIG productivity method was 2,800 yards during a 37 hour possession window. This meant that the average possession utilisation for production per weekend was 57%.

Now the maximum available production time for any shift is 85% with the remainder of the shift time taken up by preventative maintenance and pre-work safety briefings.

Works are now being carried out on almost 4,000 yards in the same possession time.

DARRYL GWILLIAM
Operations Manager

VECTRON X4-DE

AUT

NEW ARRIVAL

Locomotive for construction site logistics.

IN RECENT YEARS, HIGH-PERFORMANCE LOGISTICS VEHICLES HAVE BECOME MORE AND MORE IMPORTANT IN CONSTRUCTION SITE MANAGEMENT. THE BBW GROUP THEREFORE INVESTED IN A FURTHER TRACTION VEHICLE.

A Siemens VECTRON X4-DE locomotive has been part of the Bahnbau Wels fleet since spring. With a diesel engine output of 2,400 kW, the traction vehicle has a top speed of 160 km/h on the rails. A starting tractive power of 275 kN can set quite a load in motion and is therefore perfect for construction site and machine transport. With a length over buffers of almost 20 metres, the "new arrival" looks impressive.

In the brand-new Rhomberg Sersa Rail Group design, it is now picking up speed in the service of construction site logistics.

"WITH THE VECTRON DE, OUR LOGISTICS FLEET HAS BEEN EXPANDED TO INCLUDE A REAL POWERHOUSE."

Christoph Schürz
Head of BBW Track Construction Machine Operations

ITC-1

Construction year: 2017

Weight: 40.9 t

Vmax own power: 14 km

Average excavation capacity: approx. 100 m³/h

CHE

SPECIAL EQUIPMENT OPTIMISES THE RANGE OF SERVICES

ITC-1: Excavation machine
Standard gauge.

THE ITC-1 HAS BEEN AVAILABLE SINCE IT WAS ADDED TO THE RSRG FLEET OF STANDARD-GAUGE EXCAVATION MACHINES THIS YEAR. ORIGINALLY BUILT FOR THE ENGLISH MARKET, THE MACHINE CAME BACK TO SWITZERLAND AT THE END OF 2020 AND WAS SUCCESSFULLY REPAIRED IN SPRING 2021.

The ITC-1 is a road-rail excavation machine and is based on ITC tunnel excavators. For excavation (ballast, PSS) to a depth of 1.2 metres, the machine has a swivelling excavator arm with Rototilt. Conveying and loading is carried out by a scraper belt on the machine and an additional, approx. nine metre long transfer belt (40° swivel to each side). This means that longitudinal loading in the working direction as well as transverse loading onto the adjacent track are possible without any problems. The ITC-1 can move independently on caterpillar or track. One axle is hydrostatically driven for travel on track. It has four-wheel braking on both axles. All moving components on the track are doubly secured in their parking position, monitored by the integrated PLC control to SIL-2. Work (excavation, loading) is carried out exclusively on the caterpillars.

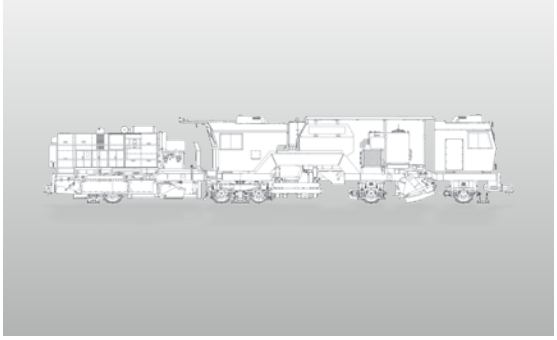
Transport to the entry point of the construction site is by HGV. The machine then can be driven on the track to the excavation point. Depending on the construction site, the excavated material can be loaded into the downstream MFS+/AVES or by transverse loading into ballast trains, dumpers or HGV's. Spray nozzles are available to reduce dust. Leica 3D monitoring is retrofitted to ensure the correct excavation level.

In June 2021, the ITC-1 made a good impression on the first construction sites in Switzerland.

VINCENT KURING
Head of Technology Projects (SMG)

You can find out more in our online magazine.

R22RD-1



Engine power: 400kW

Length over buffer: 20 m

Weight: 64 t

Speed Vmax own power: 60 km/h

Speed Vmax towed: 80 km/h

CHE

MODERN FOR THE METRE GAUGE

The new R22RD-1 grading and compacting machine will go into operation in spring 2022.

SERSA MASCHINELLER GLEISBAU AG ALREADY OPERATES TWO SMALLER R20RD-TYPE MACHINES WITHOUT A BALLAST SILO AND TWO LARGER R21RD-TYPE MACHINES WITH A BALLAST SILO.

Like the B40UM-5 tamping machine, the new machine will be fitted with a magnetic rail brake for work above 60 per thousand and ZSI127 tension control. Machine operation has been completely revised and also simplified by the modern FACTO brake system. The workload is significantly optimised with modern video surveillance, touchscreen and joystick. The R22RD-1 will be able to properly level wood/steel sleepers and concrete sleepers. In addition, Sersa, in collaboration with Matisa, is developing a broom with an adjustable shape for metre gauge. The silo also allows ballast to be picked up and unloaded in this machine, which ensures optimal ballast management.

MATTHIAS MANHART
Area Manager
Rhomberg Sersa Technology

You can find out more in our online magazine.

SF02T-FS LB

Track width (adjustment range): 1067 mm – 1676 mm

Travel speed in self-propulsion: up to 60 km/h

Processing speed when milling: 360 m/h – 720 m/h

Metal removal rate: from 0.1 mm – 1.5 mm in one pass

Engine power: 400 kW @ 1650 rpm

CAN

FIRST IN NORTH AMERICA

A rail milling train in action.

RHOMBERG SERSA ACQUIRED A HIGH PERFORMANCE LINSINGER RAIL MILLING TRAIN TYPE SF02T-FS LB THAT WAS DELIVERED TO TORONTO IN JANUARY 2021.

This milling train is equipped with the latest diesel-electric exhaust system to comply with the highest North American emission standards. The milling technology efficiently removes rail damage and restores rail profiles without emitting sparks or dust.

The machine can also operate extended work windows without the need to refuel or to empty out the chip bunker. Additionally, the train is equipped with a switch-add on function that enables the machine to process mainline track as well as switches and crossings. Due to the unique low bed design the train is not only capable to fit into smallest clearance envelopes, but also suitable for applications at freight railroads as well as LRT's (light rail transit systems).

The train is equipped with latest LINSINGER profile measurement technology for transversal and longitudinal profile as well as metal removal determination. Furthermore, the SF02T-FS LB uses a Sperry eddy current system for crack detection and crack depth determination. This eddy current system is already successfully used in Ireland and the UK and is currently also tested for application in North America. This is the first rail maintenance machine in North America that will be capable of characterizing cracks on the rail surface.

Rhomberg Sersa North America has won a multi-year contract with subway at Toronto Transit Commission and will be continuing with rail milling in Toronto at the start of the new year in 2022. Currently, the machine is milling at Metrolinx which manages the public transport system for the entire Greater Toronto Area.

MICHAEL MATCH
Chief Executive Officer

AUT

COMPETENCE CREATES TRUST

JumboTec and Bahnbau Wels offer machine maintenance at the highest level.

ASIDE FROM CLASSIC TRACK CONSTRUCTION SERVICES, THE RHOMBERG SERSA RAIL GROUP HAS ALSO MADE A NAME FOR ITSELF IN MAINTENANCE FOR THIRD PARTIES. IN ADDITION TO SERSA MASCHINELLER GLEISBAU, TWO COMPANIES IN THE BBW GROUP ALSO MAINTAIN SPECIAL VEHICLES AND FREIGHT WAGONS FOR THEIR CLIENTS: JUMBOTEC AND BAHNBAU WELS.

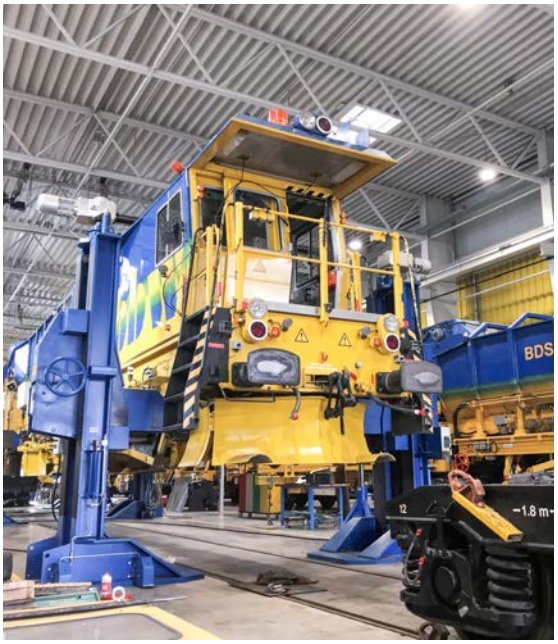
JumboTec has been involved in maintenance for third parties for around three decades. At two locations in Germany, the company carries out maintenance and repair work for its clients on track construction machines from a wide range of manufacturers. A fully equipped maintenance hall with several tracks is available in Spremberg. Around 30 employees mainly look after machines from external clients. Merseburg principally maintains its own machines, but can do contract work too.

JumboTec handles the maintenance and modernisation of track construction machines, rail and road-rail vehicles, repairs individual vehicle components, trades in used track construction machines as well as spare and wearing parts for all types of track construction machines and offers a Europe-wide service around the clock.

If a company cannot transfer the track construction machine to Spremberg, specialists from JumboTec come to them. The prerequisite is the availability of a hall and track areas on site. Individual components can be transported to the workshop in Spremberg instead of the entire machine. This means that, for example, clients from Australia are also able to use JumboTec's services.

Change of location to Wels: Bahnbau Wels can also look back on several decades of experience in maintenance. The company's own machines have been serviced in-house for 70 years. The company would now like to increasingly offer this wealth of experience to its clients.

The maintenance halls in Wels have multiple tracks and inspection pit tracks. They have state-of-the-art operating systems and the company is constantly optimising processes to increase efficiency. Bahnbau Wels invests in innovative technology, and its experience benefits this technological develop-



ment. A bespoke and optimised concept for rail vehicle maintenance is developed jointly with clients.

The company is qualified for the preventive and corrective maintenance, inspection, servicing, adaptation, improvement and overhaul of vehicles from different manufacturers. In addition, Bahnbau Wels – just like JumboTec – offers the sustainable, service-life-extending measure of basic maintenance.

It goes without saying that both companies are ECM-certified and are approved for the welding of rail vehicles and vehicle parts to DIN EN 15085-2. The continuous increase in the degree of digitalisation in workshops optimises throughput times. High-quality workmanship and use of state-of-the-art processes guarantee clients efficient management and low downtimes. Companies that operate machines find reliable, competent partners in JumboTec and Bahnbau Wels for the maintenance of their special vehicles and freight wagons, together with comprehensive advice and support.

MARKUS PFARL
Head of Mechanical Track Construction
BBW Authorised Signatory

DANIEL WEICKERT
Managing Director
JumboTec

You can find further information and a video about the article in our online magazine.

KRC1200-2/ SYSTEM7

CHE

SIGNIFICANTLY MORE POWERFUL

The new KRC1200-2.

FOR YEARS, SERSA HAS BEEN USING ONE OF THE FIRST KRC1200 RAIL RANES ON STANDARD-GAUGE POINTS CONSTRUCTION SITES. INVESTIGATIONS INTO AN OPTIMISED SUCCESSOR MODEL BEGAN IN LATE 2018. THE NEW KRC1200-2 WILL COME INTO USE IN AUTUMN.

The KRC1200-2 takes up the counterbalance in a single step, thereby achieving significantly shorter set-up and take-down times. The balance car and buffer wagon are each mounted on a container wagon, forming a compact unit with the crane. Different configurations of the distance and height adjustable supports enable a perfect adaptation to the individual loading conditions. The optimised boom design and sophisticated sensors/controls allow the KRC1200-2 to rotate 360° without any supports, using its counterbalance and cross-beam, and to lift significantly heavier loads in profile-free operation. The form-matched counterbalance is carried along for up to five degrees, resulting in more efficient and safe operation.

JÖRN SCHMIDT
Specialist Crane Support

IRL

REVOLUTION IN MATERIALS TECHNOLOGY

Improved productivity and less impact on workers and the environment.

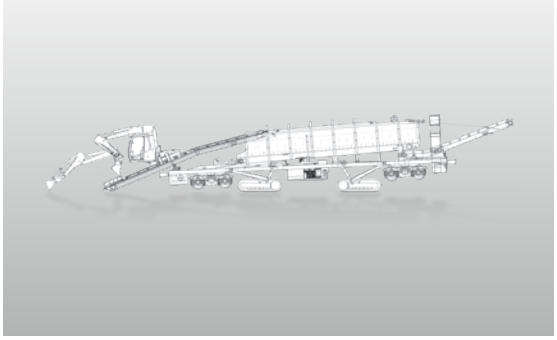
THIS YEAR, RHOMBERG SERSA IRELAND INSTALLED THE SYSTEM7 TECHNOLOGY ON A PLASSER & THEURER UNIMAT 08 COMPACT TAMPING MACHINE FROM IRISH RAIL. IT IS THE FIRST SUCH INSTALLATION ON A COMPACT TAMPER.

The System7 tamping units are unique in that no rotating parts are required. The fully hydraulic drive units only vibrate during placement and compaction of the ballast. This technology also “reads” the ballast and adjusts the compacting pressure accordingly.

In addition to the improved results of the tamping process, the noise generation is significantly reduced compared to older tamping units. Noise emissions, vibrations, and the amount of silica fume are reduced by up to 50%, thus minimising the burden on operators and the environment.

BILLY STAMP
Managing Director

MFS40-B1+



Silo volume: 25 m³

Output: 500 m³/hour

Dead weight: 73 t

Minimum railway curve radius: 150 m

CHE

STANDARD GAUGE EXCAVATION MACHINE

REBUILDING POINTS DURING OPERATION PLACES ENORMOUS DEMANDS ON HUMANS AND MACHINES. SERSA HAS MANY YEARS OF EXPERIENCE IN MANAGING SUCH CONSTRUCTION SITES. THE FIRST IN-HOUSE DEVELOPMENT – THE W1+ EXCAVATION MACHINE WITH REINER-1+ BALLAST CLEANING – WAS SUCCESSFULLY BROUGHT INTO OPERATION IN 2008.

While machines and construction methods are continuously improved over the years, every construction site has its own challenges. The Wirtgen "RailRoadRunner" W200H cold milling machine introduced in 2020 is an excavation machine that can excavate and load ballast very quickly. With the ITC-1 excavation machine, a direct conveying excavator was added, which successfully completed its first operations in 2021.

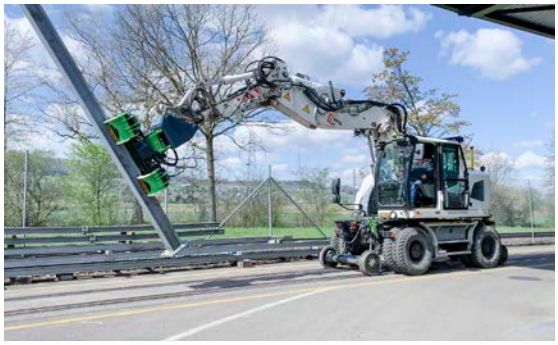
All these excavating machines move around the construction site on caterpillars. Transport to the construction site poses particular challenges that need to be taken into account in the construction sequence, as the machines are not standard rail vehicles.

Sersa Maschineller Gleisbau is in the process of purchasing yet another machine – an MFS40 with caterpillars and an integrated ATLAS excavator – from the manufacturer Plasser & Theurer in Linz (Austria). This excavation machine is a track-laying machine that can be incorporated into the train set. This eliminates shunting manoeuvres around construction sites. The new excavation machine is moved into the construction site together with the other MFS+, AVES+, AVES and MFS flatbed wagons. This simplifies the construction site processes and saves time.

The ATLAS excavator on the MFS40-B1+ excavation machine has a Leica 3D monitoring system to ensure the excavation level meets the client's specifications exactly. The 25 m³ silo ensures that the MFS40-B1+ can work continuously on typical construction sites, while the subsequent flatbed wagons transport the excavated material away on caterpillars. In spring 2022, the new excavation machine will be used for the first time on construction sites in Switzerland.

MATTHIAS MANHART
Area Manager
Rhomberg Sersa Technology

MAST-GRIPPER



Weight: 1000 kg

Tilt angle: +/-55

Rotation angle: +/-360

Quick-release coupler system: OQ65-5

H-mast profiles: HR 120 – HR 340

CHE

ASSEMBLED AND DISMANTLED PROBLEM-FREE

Mast gripper improves efficiency in overhead line construction.

THE NEW "MAST GRIPPER" WAS SPECIFICALLY DEVELOPED AND BUILT TO MEET THE CONTINUOUSLY INCREASING DEMAND FOR THE FAST AND PROBLEM-FREE ASSEMBLY AND DISMANTLING OF VARIOUS TYPES OF OVERHEAD LINE MASTS.

To be able to perfectly position overhead line masts, it has a 360° rotating motor and a 100° swivel motor. Inside it also has an optical display for the operator. Its rollers guarantee a firm grip and accommodate different mast profiles. The mast gripper is also fitted with the OQ65-5 quick-release coupler system and can therefore be used on all RSRG's road-rail excavators. During the Zentralbahn / Swiss Federal Railways remodelling project at Lucerne station, it has already demonstrated how efficient and versatile it is in removing masts and how time-efficient the installation of ceiling masts is, carried out in cooperation with the Swiss Federal Railways.

DANIEL NEUGEBAUER
Manager Maintenance Depot

You can see a video of the mast gripper in our online magazine.

CABLE DRUM WAGON

Maximum total weight: 85 t

Dead weight: 24 t

Payload: 61 t

Maximum sound pressure level (7 m from the unit at 75% load): 61 dBA

Operating temperature range: -30 °C to +40 °C

CHE

PARTICULARLY EFFICIENT:

The new Sdmmrs cable drum vehicle.

FROM MARCH TO JUNE 2021, SERSA PROVIDED LOGISTICAL SUPPORT TO STUDER CABLES AG IN THE INSTALLATION OF TWO NEW 132 KV CABLE LOOPS IN THE ZIMMERBERG BASE TUNNEL. THE NEW SDMMR CABLE DRUM VEHICLE WAS ALSO USED.

It transported up to four heavy cable drums that could be driven or braked during installation. In the Zimmerberg tunnel, two 132 kV cable sections were installed during every installation shift. The two 3.4 metre diameter cable drums weighed 20 tonnes each.

The Sdmmrs twelve-axle low-loading freight wagon was originally used by the Austrian Federal Railways as a heavy haulage vehicle. Extensive modifications made it today's powerful cable drum run-out wagon. Four run-out stands with individual drives, an auxiliary generating set to supply electricity, various additional units and a shaft bearing were installed. Two specially trained employees operate the run-out stands, winches, etc.

The cable drum wagon is used in conjunction with a traction unit and an auxiliary wagon. A generator obviates the need for an external power supply. The installed lighting ensures safe operation in railway tunnels and at night. Emergency stop switches stop the motors immediately in the event of imminent danger. The maximum speed of the cable drum is 8.7 rotations/min., the laydown rate is 90 m/min. The vehicle can be used for dismantling and installation operations. The winding machine's high pulling force (up to 5000 N) allows large-diameter or extremely long cables to be laid.

This cable drum wagon, unique in Switzerland, was the ideal solution to the economic and technical requirements of the Swiss Federal Railways' cable project in the Zimmerberg Base Tunnel. The cable drum wagon was the only option for laying two 1,300-metre-long cable sections in the short installation shifts.

MARTIN KUHN
Head of SA/Cable and Head of Project Management Electrical Systems

04

PRODUCTS

See the video and images about the article in our online magazine.

© Georg Traub

DEU

SOLUTION FOR IMPORTANT CLIENT CONCERNS

ARGE FahrwegDiagnose adds a ripple detection system to test coaches.

FABIAN ANGEHRN
Head of Diagnostics Department
Rhomberg Sersa Technology

THE HIGH DEMAND FOR THE METRE-GAUGE TRACK TEST COACH IS CLEARLY DEMONSTRATED BY THE FACT THAT IT HAS MEASURED 1,500 KILOMETRES OF SWISS METRE-GAUGE TRACKS SINCE ITS LAUNCH IN AUTUMN 2020. FURTHER TEST RUNS WILL TAKE PLACE THIS AUTUMN. PLANNING FOR NEXT YEAR IS ALREADY UNDERWAY.

From 2022, the unique new ripple detection system will be added to the test coach. ARGE FahrwegDiagnose thus meets an important client need, as has been widely acknowledged.

In addition to the data generated by the test coach, the measures identified from this data are a great added value for clients: ARGE FahrwegDiagnose builds the software solutions and supports clients in understanding and analysing their data. Those responsible for the various metre-gauge railway assess where tamping is necessary, where it is not, and where a renewal would be more effective. Settlement measurements are an important factor in assessing the right track maintenance work. They are an effective support when judging whether a problem is caused by the permanent way or the track bed.

The new, promising FahrwegDiagnose dashboard will be available from 2022. It will provide access to complex data and simplify the interlinking of data. For example, the infra3D service can display measurement data from the test wagon for virtual line inspections. Data sources can be the ARGE FahrwegDiagnose systems or clients' data, such as Excel files, GIS data, facility management data, or real-time information.

DEU

QUALITY ON RAIL

How RSRG ensures a high-quality slab track.

FOR THE RHOMBERG SERSA RAIL GROUP, QUALITY CONTROL IS NOT JUST A CLIENT REQUIREMENT BUT A CRUCIAL FACTOR IN THE COST-EFFECTIVENESS OF ITS OWN WORK.

"Slab track is particularly important to us," explains Project Manager Helge Grafinger. "After all, major benefits of this track system are low maintenance requirements and high precision." And the sooner the RSRG rail technology specialist recognises drifts from tolerances, the easier it is to correct them. "Ultimately, clients have a twofold benefit," says Grafinger. "On the one hand, they get the highest quality, for which, on the other hand, they pay less."

The RSRG's "BIM Reality Capture" team carried out a pilot project on the Wendlingen-Ulm high-speed track (in Germany) to improve the quality control standard even more:

"ULTIMATELY, CLIENTS HAVE A TWOFOLD BENEFIT. ON THE ONE HAND, THEY GET THE HIGHEST QUALITY, FOR WHICH, ON THE OTHER HAND, THEY PAY LESS."

Helge Grafinger
Project Manager R&D Reality Capture Projects

1

INSPECTING INTERNAL GEOMETRY ON THE CONCRETE FINISHING MACHINE

An IMU (Inertial Measurement Unit) wagon was connected directly to the concrete finisher. The horizontal and vertical curvature was automatically recorded and compared with the plan data. The results were sent to the cloud, where graphs were created in semi-automatic mode.

2

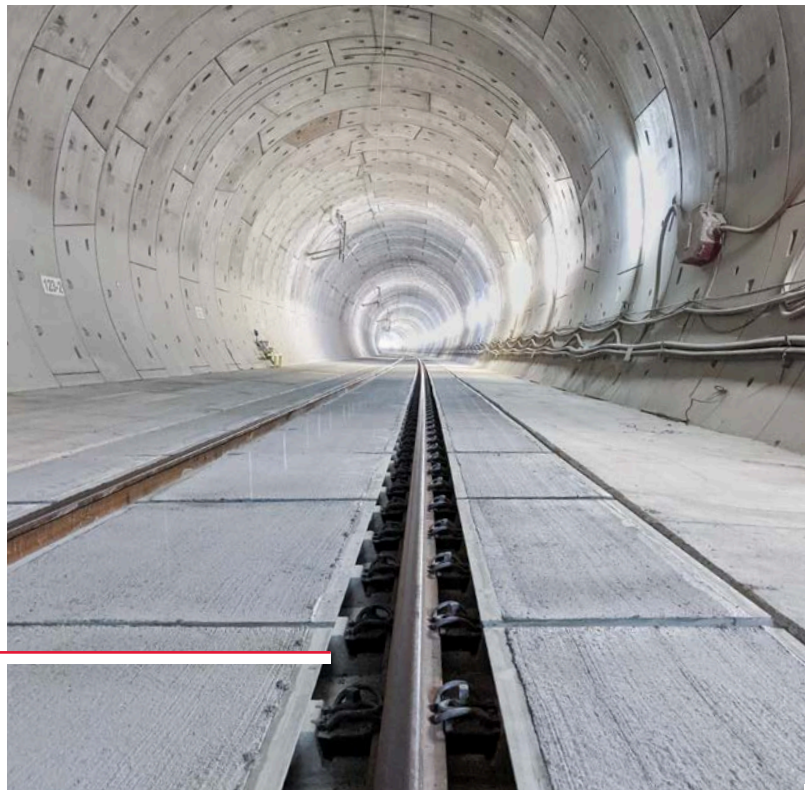
VERIFYING THE CONCRETE SURFACE PLANE

Ensuring the correct placement of prefabricated parts for usability. This solution involved kinematic scanning of the surface and subsequent automatic detection of regular check points along the axis.

3

FINAL INSPECTION OF THE INTERNAL AND EXTERNAL TRACK GEOMETRY

By combining static position measurements (total station) with kinematic 3D trajectory determinations (IMS), results could be generated at record speed in accordance with the specifications of the client, Deutsche Bahn.



The in-house development of level crossing segments for slab track systems allows access for road vehicles.

AUT

ROAD-VEHICLE-ACCESSIBLE TUNNELS

Level crossing segments made of in-situ concrete for slab track systems.

PHILIPP NACHBAUR
Managing Director

FOR SAFETY REASONS, IT MUST BE POSSIBLE TO DRIVE ROAD VEHICLES IN RAILWAY TUNNELS – OFTEN A CHALLENGE WHEN INSTALLING TRACKS.

So our level crossing segments, developed in-house, for slab track systems are now in use for the first time in the tunnels on the new Wendlingen-Ulm line.

As part of the “Eisenbahntechnik Schwäbische Alb” (ABSA) consortium, Rhomberg Bahntechnik GmbH is jointly responsible for the new section of the Wendlingen-Ulm line. All the tunnels along this line which are more than one kilometre long are to have level crossing segments made of in-situ concrete that are negotiable by emergency service vehicles. The level crossing segments will be installed from the tunnel portals to the rescue stations as well as on the Filstal bridge. The system was originally designed by Ed. Züblin AG, and is now being further developed in cooperation with Rhomberg Bahntechnik to meet the requirements of the new line. For example, a clever solution was found to ensure that the gap between the level crossing segments and the rail is narrow enough for emergency vehicle tyres, but still wide enough to ensure that the rail fastening and sleeper head can be inspected. The formwork frames of edge elements were designed to be width-adjustable to compensate for track bench tolerances. And: An easily adjustable coupling was developed to safely prevent any movement of elements due to inclined tunnel tubes.

All in all, railway operators benefit from the ease of installation, the wide range of adaptation options for various installations, the robust and maintenance-free design and, ultimately, from a high level of cost-effectiveness.

See more pictures relating to this article in our online magazine.

DEU

GREEN LIGHT FOR PROBLEM-FREE LEVEL CROSSINGS

NORMAN KRUMNOW
Head of Innovation / Authorised Signatory

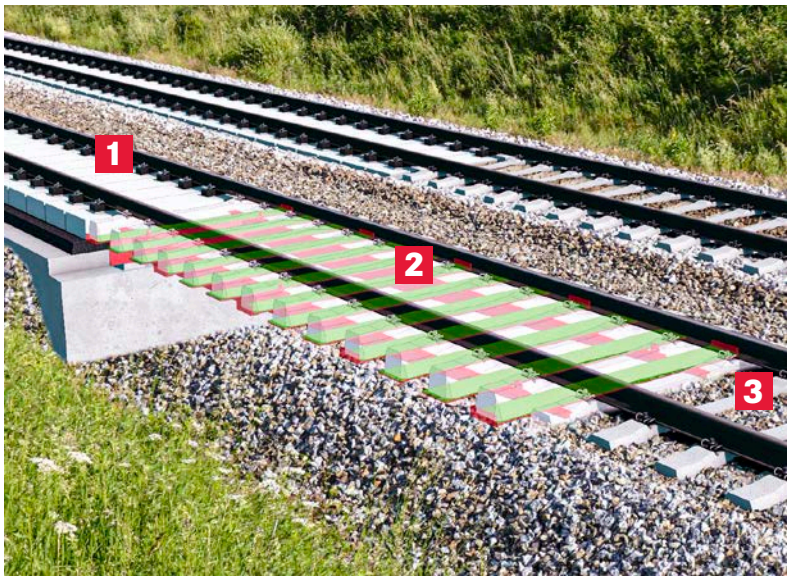
FOR THE FIRST TIME, RHOMBERG SERSA DEUTSCHLAND (RSD) IS CONNECTING BALLAST TRACKS AND SLAB TRACKS WITH THE V-TRAS LEVEL CROSSING MODULE.

Lower maintenance and greater track availability: These are the advantages the German subsidiary of the Rhomberg Sersa Rail Group believes to be achievable – and promises to its client Deutsche Bahn – by installing a V-TRAS module on the Wendlingen-Ulm high-speed track. It is the first such module in Germany. The preparatory planning for it has already been completed. Installation is scheduled for completion in spring 2022. At the same time, the installation of the module on other existing bridge structures is under preparation. RSD is also carrying out tests as it wants to get the module approved for speeds up to 250 km/h.

The company has ample experience as it is part of the international RSRG: “V-TRAS has proven effective for more than eight years in a wide variety of track categories, be it in the transition area from slab track to ballast track or as a transition structure from bridges to earthworks,” says Norman Krumnow, Head of Innovation at RSD. “The group has already installed it around 50 times. This has made the existing railway infrastructure more reliable and efficient. This is in line with our client-focussed approach for the transport of people and goods.”

THE ADVANTAGES

The different types of track construction differ greatly in terms of their performance over time. As a result, transitions often develop into sensitive trouble spots during operation. V-TRAS ensures that permanent way and track bed settlement and settlement between engineering structures and earthworks are seamlessly compensated – regardless of slab-track design. Special sleepers or other additional measures are unnecessary as the installation uses conventional track-laying methods.The module provides all the advantages of factory prefabrication and the small number of individual elements reduces potential sources of error. And the additional track equipment can be integrated without any problem. The installation of the V-TRAS transition module is therefore the ideal option for not only ensuring problem-free rail traffic but also the long-term and sustainable usability of new and existing rail-bound infrastructures. At the same time, the installation of V-TRAS is a sustainable construction option which meets economic requirements.



Installation of V-TRAS from slab track to earthworks – ballast track to earthworks (Variant 1) 1 Slab track | 2 V-TRAS transition module | 3 Ballast tracks

INSTALLATION VARIANTS AND APPROVALS

There are six different transition areas from engineering structures to earthworks. In February 2021, Rhomberg Sersa Deutschland GmbH received approval from the German Federal Railway Authority for all these variants:

- Var 1: Slab track to earthworks <--> ballast track to earthworks,
- Var 2: Ballast track to earthworks <--> ballast track to bridge structure,
- Var 3: Ballast track to bridge structure <--> slab track to bridge structure,
- Var 4: Slab track to earthworks <--> ballast track to bridge structure,
- Var 5: Slab track to bridge structure <--> ballast track to bridge structure,
- Var 6: Slab track to earthworks <--> slab track to bridge structure (not an area of application for V-TRAS).

V-TRAS is also approved up to a speed of max. 160 km/h and Variant 1 is approved for installation in Switzerland, Austria, Australia, and Great Britain.

You can find more information about this article in our online magazine.

DEU

A NEW GENERATION OF SIGNAL BOXES

KAI ZIEGLER
Managing Director

ONE OF DEUTSCHE BAHN'S LARGEST DIGITAL INFRASTRUCTURE PROJECTS IS CURRENTLY UNDERWAY: THE DIGITAL SIGNAL BOX - AND RSRG IS THERE!

The digital signal box is an integrative system with standardised interfaces. It is set to become the heart of Deutsche Bahn's digital control, safety and security system and will be key to improved reliability, quality and cost-effectiveness.

"We are very proud to be given the opportunity to be part of this historic change by winning the contract for the digital signal box on the Koblenz-Trier line," said a delighted Kai Ziegler, Managing Director of Rhomberg Bahntechnik in Essen. The rail technology experts will build the new technology base near the Wittlich main station by February 2022 – and thus contribute to the further digitalisation of rail.

DEU

REACH YOUR DESTINATION QUICKLY AND SAFELY

handraiLIT in use.

STEFAN POSCH
Project Manager

- Modular system with 0.75 m and 2 m long individual segments made of high-quality stainless steel (V2A)
- Easy and quick to assemble and install
- Single colours and RGB components possible
- Fire-retardant and halogen-free materials
- State-of-the-art LED technology with different lighting options

IT WAS RECENTLY INSTALLED IN THE WILFENBERG TUNNEL ON THE HIGH-SPEED MANNHEIM–STUTTGART LINE, AND ALSO IN THE LONGEST FIVE TUNNELS OF THE ULM–WENDLINGEN S21 SUBPROJECT: THE HANDRAILIT LED HANDRAIL FROM RHOMBERG BAHNTECHNIK.

This top product from the construction site and tunnel safety equipment specialist in the Rhomberg Sersa Rail Group is a modern, robust and inexpensive guidance system. The stainless steel handrail with integrated orientation lighting guarantees the highest level of safety. handraiLIT meets the most exacting demands with its optimal user-friendliness, low maintenance requirements and compliance with all relevant standards and guidelines.

Modern LED technology guarantees a long service life. The optional redundant operation and the protected integration of the lighting fixture in the handrail profile (impact strength IK10) ensures full and continuous illumination. The handrail can be fitted in existing and new tunnels, has an LED light strip permanently integrated into the housing and recess lighting and escape sign luminaires can be added without difficulty. handraiLIT has injury-free, seamless transitions and is quick and easy to assemble. No special tools are required. This product is so robust that it can be cleaned with a water pressure of up to 100 bar – an invaluable advantage in areas that are highly prone to soiling, such as railway tunnels. The guidance system has been tested in accordance with current EMC directives.

In addition to being used in tunnels, the handrail is also suitable for municipal or private projects such as underpasses, emergency staircases, schools and kindergartens, or hotels. The product's quality was recently confirmed by Deutsche Bahn, which has assigned it its Q1 "Lighting" quality status.

AUT

INNOVATION AS PROJECT ENABLER

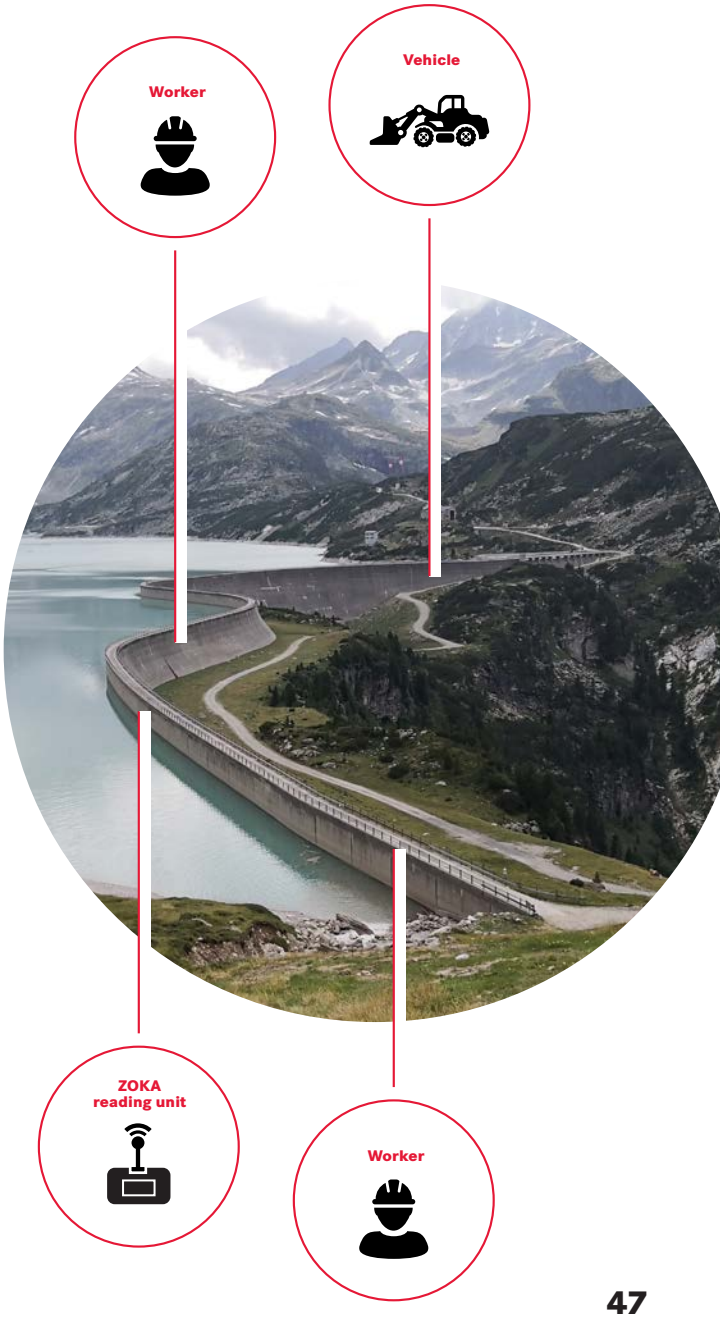
New ZOKA positioning technology ensures complex and large-scale rojects are safe.

PETER MANGENG
Head of International Sales
RK Safetec

THE COMPREHENSIVE NEW DEVELOPMENT OF THE ZOKA POSITIONING TECHNOLOGY HAS REINFORCED THE ZOKA SYSTEM'S COMPETITIVE ADVANTAGE ON THE INTERNATIONAL MARKET AND ENABLED IMPRESSIVE LARGE-SCALE PROJECTS TO GO AHEAD. MEGA-PROJECTS BENEFITING FROM THIS NEW TECHNOLOGY INCLUDE THE PIONEERING TAUERNMOOS PUMPED-STORAGE HYDROPOWER PLANT AND VIENNA'S LARGEST INFRASTRUCTURE PROJECT WITH NEW METRO STRUCTURES ON LINES U2 AND U5.

RK safetec GmbH offers a wide range of security, alarm and communication services for underground and large construction sites. Part of the ZOKA system is the reliable positioning of people and vehicles. Constantly growing client demands have led to the development of our own tracking and positioning system, which combines many years of experience with new ideas and features. The newly developed ZOKA positioning technology uses standardised BLE 5.0 (Bluetooth Low Energy) technology and thus provides a high level of reliability and availability. The necessary development know-how was brought together in the R&D team at Stams under the direction of Jürgen Martin. The R&D team could thus respond more quickly to client needs. A market-ready product with unique technical features was created in record time. The main components of the new positioning technology are a sophisticated reading unit for up to three positioning directions and a new generation of portable BLE transponders for people and vehicles. The system is therefore very modular and cost-efficient, particularly for large projects with a high level of spatial and structural complexity.

The Tauernmoos power station and the Vienna metro project are therefore ideal for the efficient use of this newly developed technology: Both include a variety of tunnels and underground structures, making them extremely complex projects. During the five- to six-year construction period, RK safetec as safety equipment supplier, was responsible for the safety-critical location of people but also for all communication technology required for GSM mobile radio and the private radio service used by the fire service.



05

ON LOCATION

AUT

CONNECTING STYRIA AND CARINTHIA

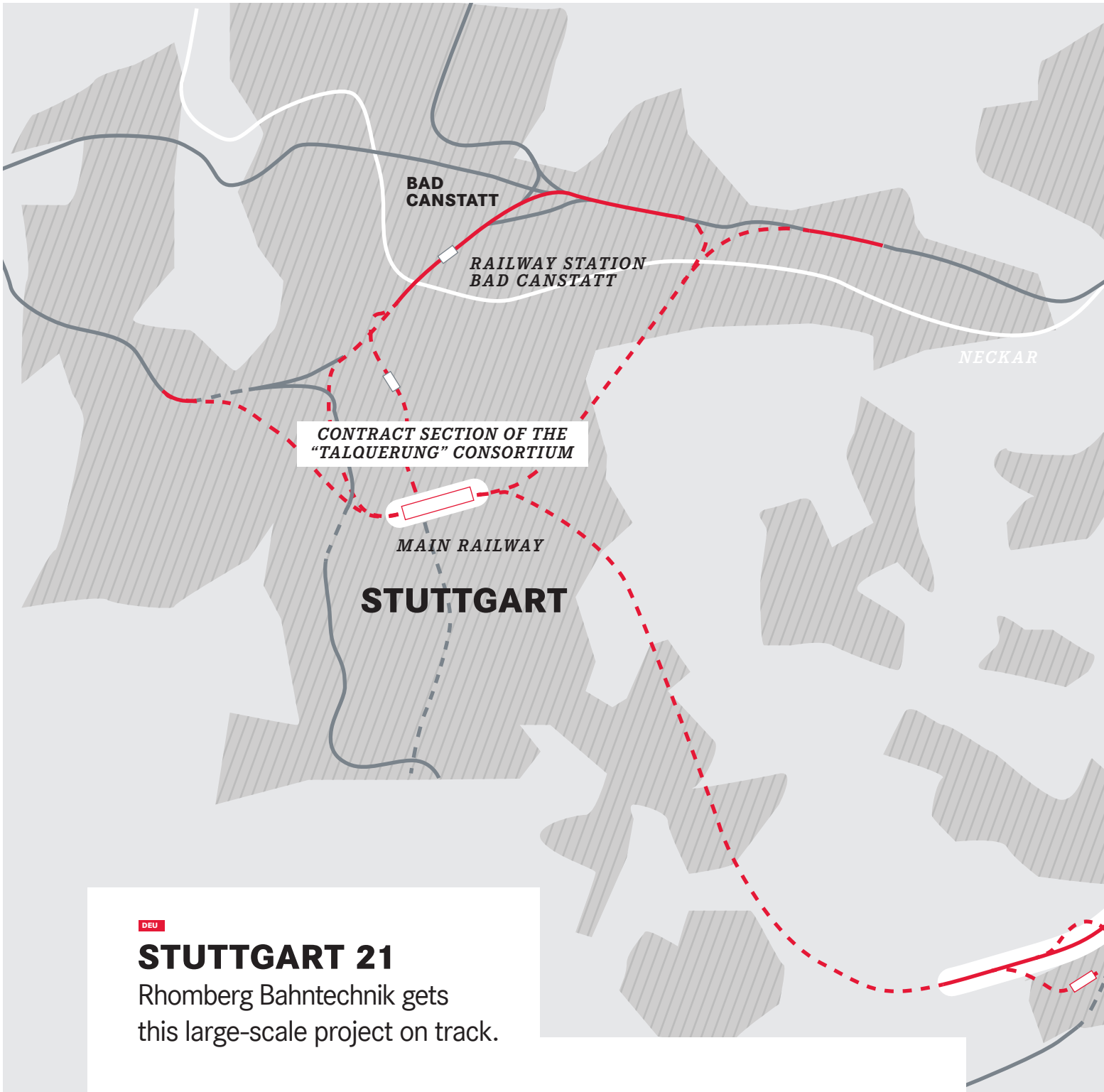

GERNOT GASSNER, Marketing Director/General Manager, Rhomberg Bahntechnik (left)
KARL-HEINZ STRAUSS, CEO, PORR (right)

FROM BUILD TO COMMISSIONING OF THE HIGH-SPEED TRACK: AS PART OF A CONSORTIUM, RHOMBERG EISENBAHNTECHNIK IS INSTALLING SLAB TRACKS FOR AUSTRIAN FEDERAL RAILWAYS MAJOR PROJECT. NOT THE ONLY CONTRACT.

The "FF Koralm" consortium, in which Rhomberg Bahntechnik is working with PORR Bau GmbH, took on the first construction section in May of this year. Since then it has been full speed ahead to complete preparations for the successful implementation of the construction work, ranging from drainage and sewerage work to commissioning tank farms and concrete mixing plants to constructing trial tracks and supply lines and temporary structures. A further incentive was the recent announcement that a consortium of the same partners has succeeded in securing the follow-up project. Rhomberg Bahntechnik and PORR are now responsible for the complete railway engineering-package: from the construction of the slab track to the commissioning of the technical railway equipment in the twin tunnels, each over 32 km in length.

"It is a great achievement that we can now play a decisive role in shaping our largest construction site right through to completion as we have been actively involved in it since carcassing," says a happy Karl-Heinz Strauss, CEO of PORR. And Robert Kumpusch, Managing Director of Rhomberg Bahnechnik GmbH, adds: "It makes us proud to work with the Austrian Federal Railways on a project, which promises a particularly sustainable and high-quality result thanks to innovative ideas and a cost-effective approach."

You can find more pictures relating to this article in our online magazine.



DEU

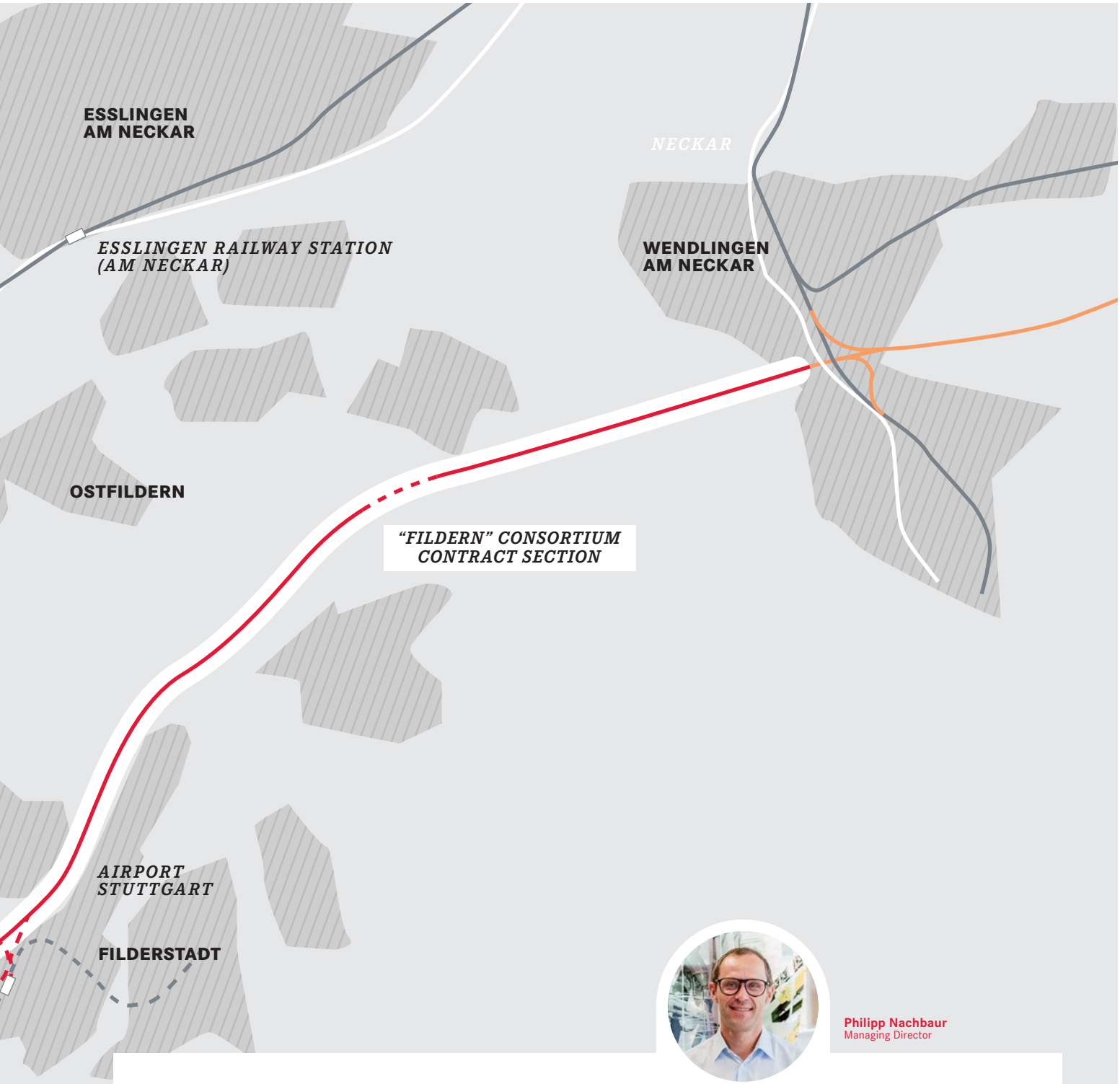
STUTTGART 21

Rhomberg Bahntechnik gets this large-scale project on track.

IT IS DEUTSCHE BAHN'S MOST PRESTIGIOUS INFRASTRUCTURE PROJECT: STUTTGART 21. ALSO ON BOARD IS RHOMBERG BAHNTECHNIK WHICH, AS PART OF A CONSORTIUM, WILL BE RESPONSIBLE UNTIL THE END OF THE YEAR FOR THE TRACK LAYING AND RAILWAY ENGINEERING OF THE NEW LINE FROM WENDLINGEN TO ULM.

So far, its performance has been so good that it has been awarded two further contract sections. Together with Ed. Züblin AG and DB Bahnbau Gruppe, the railway engineering experts from Bregenz have secured a contract for the construction of slab tracks on two sections, one at the new main underground station of the Baden-Württemberg state capital and the other between the airport and the river Neckar. In total, Rhomberg will build about 200 kilometres of slab tracks for S21 with a contract value in the region of 400 million euros.

"Winning the next two construction sections is the greatest compliment for our successful project in the Swabian Mountains," says Philipp Nachbaur, Managing Director at Rhomberg Bahntechnik, beaming with pride in his team. "We are very pleased to continue to play our part in this important infrastructure project and to establish our long-term future in Germany."



Philipp Nachbaur
Managing Director

For the first time, an innovative new development is being used in these projects: vehicle-bearing level crossing segments (see also p. 43). It enables road rescue vehicles to enter the tunnels in the Swabian Mountains and the railway junction in Stuttgart, making the prestige project even safer.

- NEW TRACK
- NEW TUNNEL TRACK
- EXISTING TRACK
- EXISTING TUNNEL TRACK
- NEW WENDLINGEN-ULM TRACK

"WINNING THE NEXT TWO CONSTRUCTION SECTIONS IS THE GREATEST COMPLIMENT FOR OUR SUCCESSFUL PROJECT IN THE SWABIAN MOUNTAINS."

DEU

UP, UP AND AWAY

Tamping on the Bayerische Zugspitzbahn.

MATTHIAS GIEL
Head of Track-Laying Machine Department,
Authorised Signatory

LAST YEAR, JUMBOTEC GOT A SOMEWHAT UNUSUAL JOB: EXTENSIVE TAMPING WORK WAS TO BE CARRIED OUT ON BAYERISCHE ZUGSPITZBAHN'S RACK RAIL TRACKS. THE CORE SECTION OF THE CONTRACT EXTENDED FROM GRAINAU TO KLEINER TUNNEL.

The metre-gauge railway line, built from 1928 to 1930, is the highest railway line in Germany. The section between Garmisch-Partenkirchen and Grainau is designed as an adhesion section. The mountain section - the rack rail section with gradients between 40‰ and 250‰ - starts at Grainau railway station.

The construction work was preceded by months of preparation and planning to ensure the success of this extraordinary construction project. Only the Matisa B20 AC4 narrow-gauge tamping machine could be used for this work. A particular challenge was the fact that an additional backup locomotive was necessary from an uphill gradient of more than 70‰ as the brakes of the tamping machine were not designed for such steep slopes. The client provided a backup locomotive with the appropriate brake holding, to which the tamping machine was coupled. Thanks to the prudent preparations, both systems fitted together straight away and the works were completed on schedule. After completing the mountain section, the upgrade areas of the new Garmisch-Partenkirchen railway station were also tamped and handed over to Bayerische Zugspitzbahn to deadline.

The close coordination and excellent cooperation with the client, the Bayerische Zugspitzbahn, ensured the project was successful. JumboTec was also able to demonstrate its versatility as a Rhomberg Sersa Rail Group company.

You can find more pictures relating to this article in our online magazine

INNO-VATION

AUT

MOBILE AND FLEXIBLE

The portable container switchgear.

PETER ZENZ
Junior Project Manager
Rhomberg Fahrleitungsbau

1 15 kV TracFeed@TAA switchgear
2 External pressure relief
3 Neutral point niche
4 Transfer niche to external system components
5 Distribution of internal power consumption, battery charging and UPS
6 Battery system
7 Distributed control system
8 Protective relaying
9 Counting

LAST YEAR, RHOMBERG FAHRLEITUNGSBAU GMBH, RHOMBERG SERSA RAIL GROUP'S SPECIALIST FOR OVERHEAD LINES AND ELECTRICAL SYSTEMS, WAS COMMISSIONED BY THE AUSTRIAN FEDERAL RAILWAYS TO CONSTRUCT A PORTABLE SWITCHGEAR CONTAINER (TSA2).

This is the second contract of its kind. Valuable preparatory work was done on the first project a few years ago: A prototype of the portable switchgear, to the client's design, was planned by Rhomberg Fahrleitungsbau, fitted, checked with all the trades involved and handed over to the client after successful completion of the test phase.

This type of mobile container switchgear is used to keep the railway in operation during construction work. The system is particularly suitable for the modernisation of essential substations that can only be upgraded section by section, where space is limited or where substations do not have a track connection.

Limited space presents a major challenge given the need for mobility and flexibility. Particular features here are the pressure relief of the 15 kV switchgear as well as the cable routes and an extensive connector system for easy connection to other parts of the system. The twelve-metre-long container is equipped with 15 kV switchgear, consisting of two combined transformer/measuring cells and four overhead line branches as well as the associated protective relaying, distributed control system and internal power consumption systems.

In addition to the above specifications, tSA2 is to provide additional safety and metering components and be able to feed in renewable energy. The system in Bruck an der Leitha will start operation in May 2022 and feed electricity from the Höflein wind power station directly into the overhead lines of the trains. This is an environmentally friendly and sustainable contribution to electromobility.

DEU

THE GROUP'S POWER FOR THE CLIENT

Close networking and good cooperation ensure success.

MARTIN RINNERBERGER
Site Manager

ONCE AGAIN, THE BBW GROUP DEMONSTRATED THE PERFECT BALANCE OF COMMERCIAL AND MECHANICAL TRACK LAYING AND CONTRIBUTED TO THE EXPANSION OF THE REGIONAL LINE IN THE BAVARIAN FOREST.

In this project, the BBW Group companies were commissioned by DB Netz AG (acting as executing company) for two construction sites.

The first construction scheme started in Deggendorf-Ulrichsberg. This contract was to screen the ballast and was carried out with the RM 80-92 UHR. After the new rails and sleepers had been laid, the 09-3X tamping machine established the final track position. Both machines were provided by JumboTec, one of RSRG's mechanical track laying specialists. The commercial track laying part of BBW group carried out the extensive related works.

A logistical challenge was the location of the construction project, namely a wooded area that was difficult to access and only allowed limited access to the track. A logistics concept specially created by the BBW team ensured that the construction site ran smoothly.

The second construction project, Zwiesel–Bodenmais, was divided into two parts. The tracks between Zwiesel and Bodenmais were replaced and several points at Zwiesel railway station were renewed. The project also included extensive cess work. This was necessary as a large part of the track ran on embankments up to eight metres high and the cess works prevented the ballast from slipping.

DEGGENDORF-ULRICHSBERG

Employee Christian Henisch sets survey stations using a GNSS positioning antenna

Ballast screening machine RM 80-92 UHR on the Deggendorf-Ulrichsberg line (JumboTec)

ZWIESEL-BODENMAIS

Ballast works by tracked excavator and dumper during the construction project in Zwiesel

A 3D model, which precisely simulated the soil structure, was created in advance for the removal and installation of the ballast. On the one hand, these data served as a precise basis for installing and removing the layers using a caterpillar, and on the other hand as a basis for creating the acceptance documents. The SitePlan tool was used in the acceptance process. This system allows the “digital navigation” of construction plans and provides documentation features using geo-referenced photos. Further, GNSS positioning antennas allow highly precise inventory and measurements in the field. These data provide a very precise performance report with which the actually removed and installed ballast thickness can be verified.

Due to the narrow radii on this route, so-called Y-sleepers were installed over more than 1500 metres. These have a greater internal rigidity and avoid warping at high temperatures. The special form of these sleepers requires very precise handling during installation and the support of the internal surveying department ensured this was done.

One of the challenges of the entire construction project was the fact that all materials had to be delivered by road. Several road-rail excavators, a 15-strong team and the tamping machines were used to produce the final track position.

The project was completed on schedule and to the client’s complete satisfaction due to the excellent cooperation with the client DB Netz AG and the support of the Berlin, Mühlacker, Halle (Saale) and Dresden branches. Because of the close networking within the group, RSRG can always offer complex projects of this kind to its clients.

CHE

CHALLENGE ACCEPTED

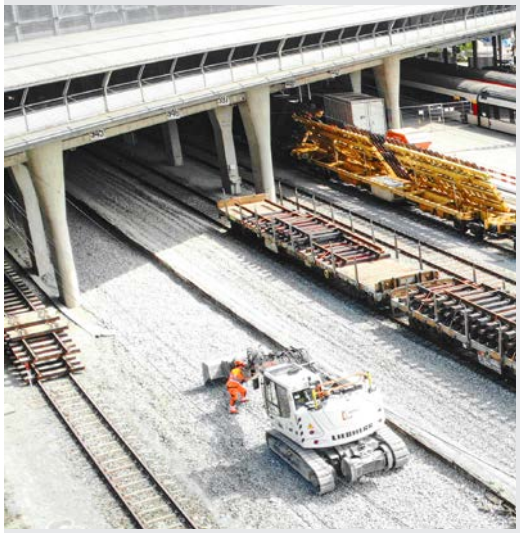
Renovation of Lucerne freight station: Dual tracks for Zentralbahn.

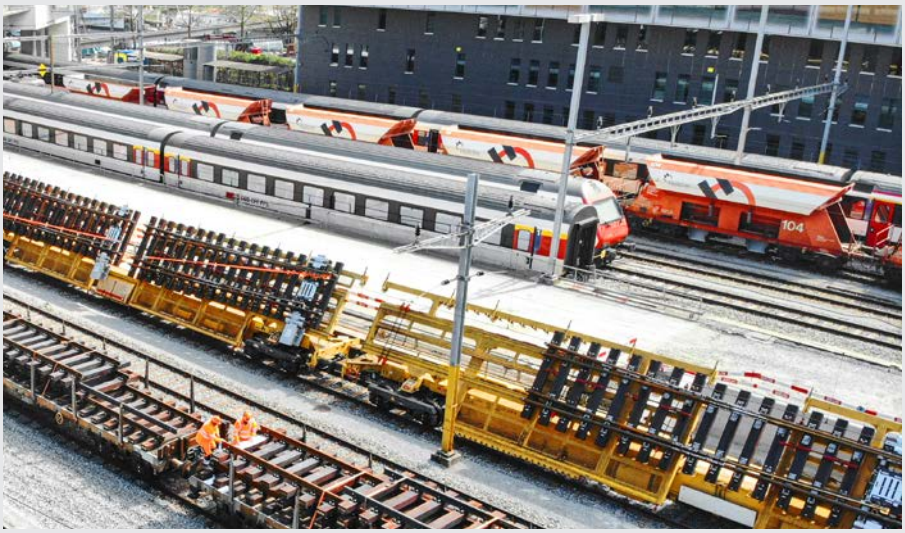
DOMINIKO BILIC
Project Manager

SERSA SCHWEIZ WAS CONTRACTED BY SWISS FEDERAL RAILWAYS AND ZENTRALBAHN IN LUCERNE TO COMPLETELY RENEW ITS FREIGHT STATION.

This project came about due to the Zentralbahn expanding its services by introducing a second track to the station and repairing non-conforming railway systems. The contract with a value of around CHF 22 million was awarded to the "BAHNINFRA" consortium, headed by Sersa Switzerland which has a 50% stake in the consortium. The work will continue until April 2022.

A total of 21 metre-gauge and 14 standard-gauge points will be installed and 4,200 metres of new track will be laid. Cable ducts and walkways are also included in the contract. The project conditions are complex, as the work has to be carried out during continuous





operation of the sidetracks or during short track closures. Cooperation and coordination with specialists from Swiss Federal Railways and security services as well as consortium partners are additional challenges.

You can find further information and a video about the article in our online magazine.

The track bed is another special feature of this project, as the groundwater table is only a few centimetres below the permanent way. Therefore, the water level has to be lowered temporarily and filled with light and large-pored material, the so-called Lucerne profile. The aim is to achieve a dimensionally stable structure while reducing the dead weight as much as possible.

The project works were carried out in seven phases. Phase 6 in November 2021 is particularly demanding. In this phase, Sersa has to get a considerable amount of work done during a three-day track closure, as eight different types of points have to be dismantled and rebuilt within this time window.

DEU

RHOMBERG SERSA DEUTSCHLAND GOES DIGITAL

New technologies make construction easier.


ELISA-MARIE GEIDEL, BIM Manager, (left)
MARCUS KERN, Technical Branch Manager East and Authorized Signatory RSD (right)

For several reasons, the "Cannstatt-Stg. Münster + Kornwestheim PBF" project was a huge success for Rhomberg Sersa Deutschland (RSD). Within a few months, 20 points were replaced and 1,500 metres of track were laid in the three train stations of Münster, Cannstatt and Kornwestheim. RSD locations in Dresden and Mühlacker, and Rhomberg Gleisbau GmbH in Bregenz coordinated with the support of Jumbo Tec to ensure compliance with the planned track closure times.

3D MACHINE CONTROL

An exciting aspect of this project was the use of new technologies and digitalisation processes. Among other things, a 3D machine control system from Leica was used for a road-rail excavator and the required digital terrain models (DTM) were created. This resulted in a significant productivity improvement when creating the earth and ballast planum. The machine operator can now carry out this work independently without support, which in turn improves safety at work. This is possible thanks to sensors on the excavator and an additional display in the excavator driver's cab. By comparing the as-is situation on the construction site with the digital target situation in the DTM, the excavator driver knows how far he still has to excavate or to fill.

FOREMAN STICK

The foreman stick enabled a rapid entry into digitalisation. It consists of a GPS antenna and the Siteplan app. This app, using a satellite map and PDF plans, assisted colleagues in quickly getting to grips with the project, navigating around and adding geo-referenced evidence photos to the documentation. Using the GPS antenna, time-consuming measuring tasks using measuring tapes are reduced by centimetre-accurate capture of construction work data and digital field measurements can be generated on the computer for billing purposes.

The consistently positive feedback from the construction team encourages managers to continue on their chosen path.

You can find more information about this article in our online magazine.

ACTION!

CHE

Sersa Süd had a camera crew in tow when the rack railway line was being renewed.

STEFANO ROSSI
Managing Director
Sersa Süd

ON 8 MAY 2021, THE FRENCH NEWSPAPER "LE DAUPHINÉ" REPORTED ON "SECTION 9" OF THE RENOVATION WORK ON THE CHAMONIX – MONTENVERS RACK RAILWAY LINE IN THE DÉPARTEMENT OF HAUTE-SAVOIE (FRANCE).

Despite constant rain, Sersa Süd completed the penultimate section of the renovation work on the Montenvers rack railway line in May 2021. Tourists use this route to travel from Chamonix to the "Mer de Glace" glacier. The 5,141 metre long line was inaugurated on 29 May 1909. It and the "Tramway du Mont Blanc" are part of the infrastructure that enables the general public to discover the glaciers within the Département of Haute-Savoie.

Since 2012, Sersa Süd has been working with a specialist team on the renovation of the local infrastructure. Despite the difficulties resulting from the Covid protection and control measures as well as extremely adverse weather conditions, this approximately 600 metre long 9th section was also completed on time and in compliance with the client's safety and quality requirements.

A team of reporters from "Le Dauphiné" accompanied the construction team and produced an interesting video. The site manager Ilidio Boucinha de Amorim used the opportunity to explain work processes and the machines and devices used. As the steep gradient of the railway infrastructure did not allow the use of machines that complied with the rules for the construction of railway systems, Sersa's construction team needed to fall back on raw muscle power and use their extensive expertise and experience gained over many years.

The report by "Le Dauphiné" impressively documents why Sersa Süd can be proud of the successful completion of the 9th track renewal stage of the Montenvers rack railway.

You can find more pictures and information in our online magazine.

SYDNEY HARBOUR BRIDGE

Construction: Arch bridge
Overall length: 1149 m
Width: 49 m
Height: 134 m
Construction time: 07.1923 – 01.1932
Number of lanes: 8
Number of tracks: 2

AUS

RSRG RENOVATES NATIONAL LANDMARK

RKR ENGINEERING & RHOMBERG RAIL AUSTRALIA WERE DELIGHTED TO SUPPORT SYDNEY TRAINS WITH THE SYDNEY HARBOUR BRIDGE RAILWAY DECK UPGRADE PROJECT.

The project scope included the provision of specialist labour and plant to replace and refurbish structural steelwork, replacing the existing timber transoms and railway deck with a continuous concrete slab deck. Delivering these works plays to the unique bridge and structure skills of RKR Engineering. Rhomberg Rail Australia also assisted on this project with both the construction and resurfacing teams supporting.

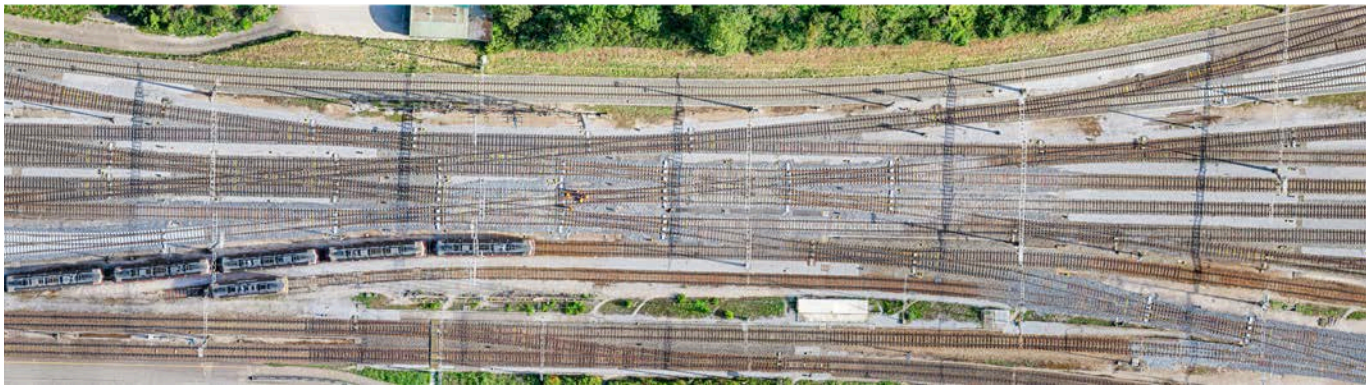
The national icon comprises of ten lanes, two for rail and eight for road traffic. Sydney Trains operates approximately 500 services across the Bridge each weekday and the upgrade is expected to extend the life of the railway corridor by 120 years.

The complex engineering required for this project included removing the existing railway infrastructure, dismantling the timber deck and installing 266 locally made concrete panels. Installed to replace the ageing 555-metre timber deck on the northern and southern approaches, the concrete composite deck will reduce maintenance by being more robust and using longer lasting materials.

NSW Minister for Transport and Roads Andrew Constance acknowledged the work of teams who completed the work during a 10-day shut down. “I would like to thank the more than 420 people who worked through the heavy rain and around the clock to complete the biggest upgrade to rail over the bridge in its history.” he said.

While the majority of the work has been completed, RKR will be involved in providing some final touches during scheduled weekend maintenance.

See more pictures on the project in our online magazine.



CHE

WELL UNDERWAY

"Weichenlos" Programme

ROLAND KUGLER
Team/Major-Project Leader Equipment
Sersa

The "Weichenlos" project (meaning "lot for switches") currently underway in cooperation with Swiss Federal Railways, had a successful first year in 2020 and is going full speed ahead to the complete satisfaction of all involved.

This year, we must closely monitor the various project phases of the 85 track renewal projects (in the "Track renewal 2021–2024" programme). To do so, a LEAN planner based on Last-Planner technology has been created and has been operational since July.

15 "Track renewal 2023" projects are planned using BIM. In a first step, the existing structures to be modified were modelled and the project modelling requirements were specified. The individual project models are now being created on this basis. Thus, BIM is used operationally in the "Weichenlos" programme.

CON-VERSION

DEU

GREEN WAVE FOR THE SWABIAN METROPOLIS

BENEDIKT NEPPL
Site Manager

Grass instead of ballast, roundabout instead of intersection: Rhomberg Bahntechnik's modernisation of a Stuttgart traffic junction is on track.

Fewer traffic jams, more green: On behalf of the Stuttgarter Straßenbahnen AG (SSB), Rhomberg Bahnechnik has created a new grassed track for a more sustainable and aesthetic cityscape at the busy street crossing of "Hedelfinger Strasse" and "Otto-Konz-Brücken". Specifically, the local public transport specialists were allowed to convert the railway trackbed between "Wangener Bahnhof" and "Otto-Konz-Brücken" from a track on ballast bed to a 450 meter long double-tracked grassed track. Challenge: Simultaneously, the busy intersection at Neckarhafen was converted into a roundabout. No problem for the Rhomberg railway engineers. They installed the "Güsener Balken" grassed track system in Stuttgart on time, helping to minimise traffic and make the city a little greener. To the client's complete satisfaction.

GBR

SLIM SLAB ALLOWS 70CM LOWERING

Modifications needed to 173-year-old tunnel to achieve clearance

BARNABY TEMPLE
Chief Engineer

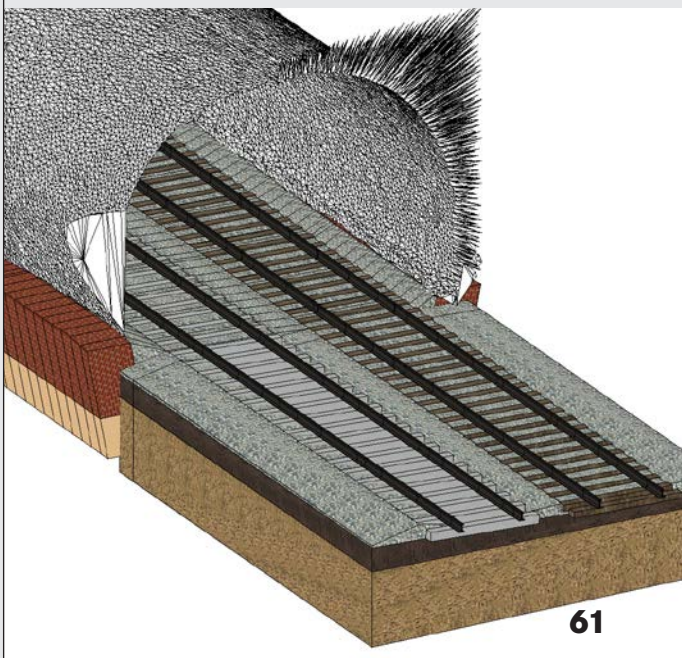
RHOMBERG SERSA UK WERE COMMISSIONED TO DELIVER PRELIMINARY DESIGN ON AN INTRICATE PROJECT IN YARM TUNNEL DUE TO THEIR EXPERIENCE AND EXPERTISE ON SIMILAR PROJECTS.

Rhomberg Sersa UK was commissioned to carry out significant engineering works at Yarm Tunnel in the UK to ensure increased structure gauge clearance for client Central Rail Systems Alliance (CRSA).

While the Northallerton to Eaglescliffe route generally met the new requirements, several structures were identified as fouling the gauge and required significant modification works to achieve clearance.

The most significant is at Yarm Tunnel which requires a track lower of approximately 70cm. Constructed in 1848, Yarm Tunnel is a short single bore tunnel and allows the passage of the Up and Down Eaglescliffe non-electrified rail lines beneath the A67 road which is skewed at an angle of approximately 45° above. The horse-shoe shape brickwork tunnel comprises an 8-ring brick arch barrel approximately 70m in length. It has a maximum span of about 7.5m. The cover to the tunnel extrados varies throughout the length of the tunnel, but it is believed that the minimum cover is only approximately 80cm. Due to the limited cross-section of the tunnel, track fixity provided by the narrow STA track slab system was identified as the best solution to improve the clearances both to the tunnel walls and to the adjacent track within the tunnel. Rhomberg Sersa UK was engaged by Network Rail for advice during the preliminary design of the route gauge enhancement scheme and secured the project working with CRSA. This partnership had successfully delivered the new slab track installation in Gasworks Tunnel at the entrance to London Kings Cross station and was chosen by the Client due to the combined design and construction expertise of RSUK, with CRSA as Principal Contractor.

Below is the preliminary 3D model generated from the point-cloud survey showing the current arrangement of the structure



IRL

PRUDENT FLEXIBILITY

Change in Rule Book leads to additional flexibility and increased productivity in the event of fluctuations in demand

BILLY STAMP
Managing Director

RHOMBERG SERSA IRELAND (RSIE) PARTNERED WITH IARNRÓD ÉIREANN/IRISH RAIL (IÉ) TO IMPLEMENT A RULE BOOK CHANGE WHICH ALLOWS FOR ADDITIONAL FLEXIBILITY AND INCREASED PRODUCTIVITY DURING SURGES IN DEMAND FOR ON TRACK MACHINE (OTM) OPERATIONS.

Passenger and freight trains on the Irish network require one driver. However due to custom and practice, OTMs required two drivers, each of whom was required to hold a European Train Drivers License (ETDL). The Rule Book Change saw the introduction of a 'Drivers Assistant' to update the requirement for two ETDL holders.

The change means that when an OTM is moving in traffic under the control of Central Traffic Control (CTC), the OTM no longer requires two ETDL holders, but rather one ETDL holder and one Drivers Assistant.

The change came about after RSIE – which operates and maintains IÉ's fleet of OTMs – identified a risk in 2020 that a high level of shift demand may not be met in the near future due to resource constraints.

Limited driving school access combined with COVID19 had resulted in our inability to replace departing staff and increase driver numbers in the highly skilled Operations Team. It was clear that a supplementary solution was required to parallel the driver recruitment and training effort.

A Rule Book change is an exceptional event and can take a significant amount of time due to the number of stakeholders and the necessary requirement to consider fully the implications of such a proposal.

RSIE engaged with the various stakeholders – IÉ's Rule Book Committee; Northern Ireland Railways/Translink; the Commission for Railway Regulation – to initiate an examination and possible change to the requirement for two ETDL holders on OTMs under CTC control. After extensive consultation, an 18-month process resulted in the Rule Book change being introduced in January 2021.

The Rule Book change has resulted in the ability of RSIE to provide significant extra capacity from existing resources in times of high demand allowing us to continue to play our part in the continued safe and timely delivery of passenger and freight services.

AUT

SERVING THE INFRASTRUCTURE

Austrian State Secretary Dr. Magnus Brunner visits BBW Group's construction sites.

State Secretary Dr. Magnus Brunner (left) and Walter-Heinz Rhomberg Kom.-Rat BM Ing. (right) visiting a construction site.

APPOINTMENT ON SITE

DURING VISITS TO CONSTRUCTION SITES IN VORARLBERG IN APRIL OF THIS YEAR, STATE SECRETARY DR. MAGNUS BRUNNER (FEDERAL MINISTRY FOR CLIMATE PROTECTION, ENVIRONMENT, ENERGY, MOBILITY, INNOVATION AND TECHNOLOGY) AND CHRISTIAN ZOLL (MANAGING DIRECTOR OF THE VORARLBERG FEDERATION OF INDUSTRY) GAINED INSIGHTS INTO THE COMPREHENSIVE SERVICES PROVIDED BY THE BBW GROUP.

After a reception at the Rhomberg Sersa Rail Group headquarters in Bregenz by Walter-Heinz and Hubert Rhomberg, the visitors went to the "Bregenz Station Conversion" construction site to gain an insight into the extensive construction work. On site, managers of Austrian Federal Railways presented the project, which essentially comprised track and point renewals with subsoil improvement and underground cable works. Rhomberg Gleisbau GmbH and Bahnbau Wels GmbH were the BBW group members involved in this construction project. From the beginning of April to the end of May, works were carried out in four construction phases during ongoing rail operations – except construction phase 3.

The visit continued to the no less exciting "Conversion Lustenau - Lauterach" project, about which Austrian Federal Railways' project partners were happy to provide information. Rhomberg Gleisbau was commissioned with extensive track laying work in this two-year construction project.

Several companies in the Rhomberg Sersa Rail Group were involved in both construction projects. They impressively illustrated the perfect collaboration within the group of companies.

During this visit, RSRG once again demonstrated the company's outstanding performance and valuable contribution to the expansion of the environmentally friendly means of transport, the railway.

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