SOLUTIONS YOUR WAY.

RAILONE

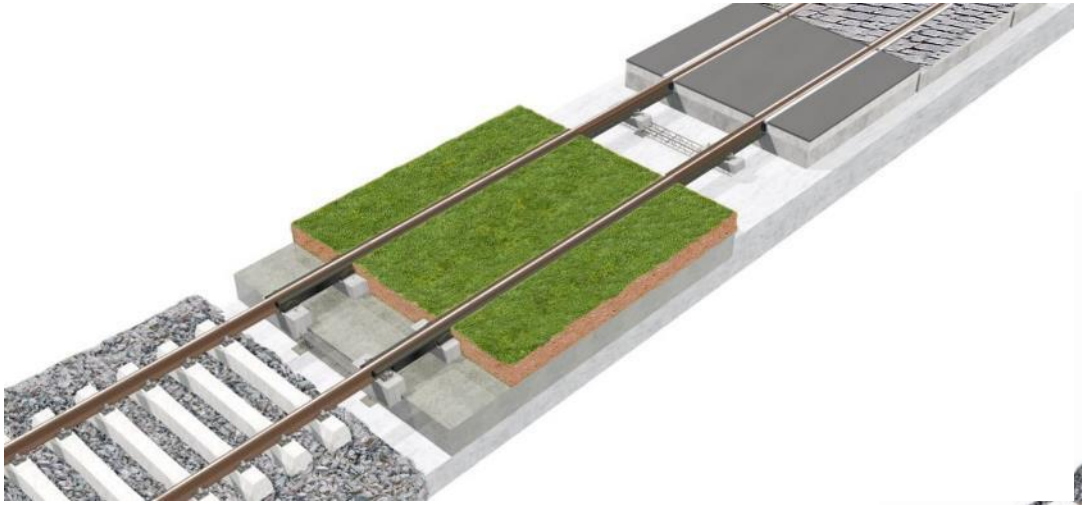
# UEEIV CONFERENCE

## BALLASTLESS TRACK SOLUTIONS

## FOR NEW AND TO BE RENEWED RAILWAY TRACKS

# ABOUT RAILONE

# RAILONE PRODUCT PORTFOLIO



Track systems for urban applications

Standard, High Speed and Heavy Haul tracks

Railway tracks systems

# QUALITY SINCE 1894

Foundation

1894

First concrete sleeper

1954

First international plant

1993

Development of ballastless track system RHEDA CITY for urban transport

1993/6

Development of ballastless track system RHEDA 2000® for long-distance transport

1999

Entry into heavy-duty transport – delivery of sleepers for US network

2004

Acquisition by the PCM Group of Industries

2013

Opening of the Aschaffenburg (DE) and Schwandorf (DE) plant

2018/9

Our Brand RAILONE is the first one railroad companies all over the world think of when they consider to build, expand or upgrade their infrastructure. Thanks to our extensive expertise, global experience and deep passion we deliver the best possible quality and generate sustainable success – for our customers, our employees and the entire PCM RAILONE Group


Since 2013 we are a proud member of the PCM Group of Industries. This strong relation enables us to act even more locally on an international basis for our customers.

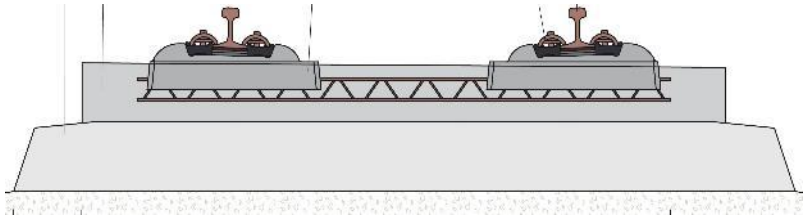
# Globally active

# RAILONE

# BALLASTLESS TRACK TECHNOLOGY

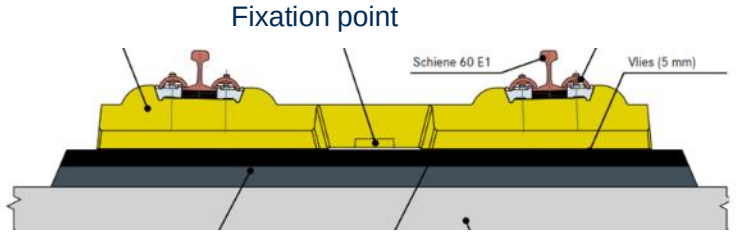
# RAILONE BALLASTLESS TRACKS
# SYSTEM DESIGN / STRUCTURE

## RHEDA 2000 / RHEDA CITY



- In situ concrete slab(s)
- Bi-block sleeper
  with lattice girder reinforcement

## GETRAC




- Asphalt Layer (with indentation)
- Wide concrete sleeper
  with fixation block

# BALLASTLESS TRACK
# TYPE RHEDA 2000® / REHDA CITY®

## With bi-block sleeper in in-situ cast concrete slab

References
- As per today > 3.000 km (globally) and 30 years experience

Applications:
- RHEDA2000®: For High Speed, Standard and Heavy Haul traffic
- RHEDA CITY®: For Metro and Tram traffic

Main characteristics
- for easy installation and maximum accuracy
- for high reliability and best economic efficiency

Adaptable
- on tunnel, viaduct, embankment (and more) substructures
- for special trackwork e.g. S&C, REJ (and more)
- for high attenuation (Mass-Spring, high-resilient fastening)

# BALLASTLESS TRACK TYPE GETRAC®

## With Mono-Block sleeper on Asphalt slab

References:

- As per today > 250 km (mostly track renewal)and 30 years experience

Applications:

- for High Speed, Standard and Tram traffic

Main characteristics

- for rapid installation and immediate use
- highly economic due to use of standard road and rail track installation equipment

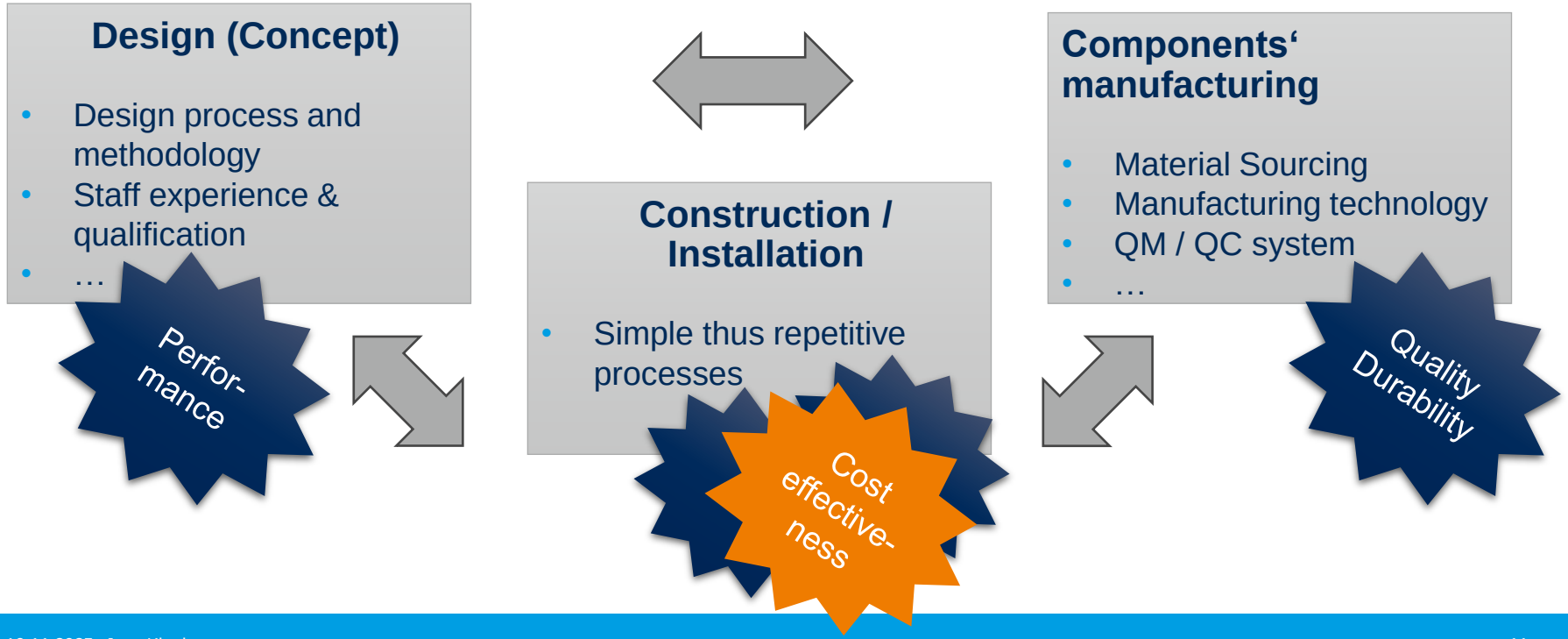
Adaptable:

- on tunnel and embankment substructures
- for special trackwork e.g. S&C, REJ (and more)

# BALLASTLESS TRACK TECHNOLOGY

# SUCCESS FACTORS

# BALLASTLESS TRACKS
# SUCCESS FACTORS (RISKS)



# BALLASTLESS TRACKS
# ASSESSMENT „INTERNAL USE VS. DEPLOYMENT“

**Exemplary request to ChatGPT:**
**I have invented a new construction machine. I can either use it myself, as a construction company, or make it available to any construction company.**

If I use it myself, I will generate profits through the sale of the machine, as will my construction company that uses it. Alternatively, I can make the machine available to many construction companies in many regions and markets.

Furthermore, I think that several construction companies will develop multiple uses for the machine that I probably wouldn't have identified on my own.

Please create a comparison of using the machine myself versus selling it and draw parallels to open-source versus proprietary software.

**AI generated result:**

| | weighting | Internal use | Deploy-ment |
|---|---|---|---|
| Control & Quality Assurance | 3 | 5 | 2 |
| Scalability & Growth | 3 | 2 | 5 |
| Speed of Innovation | 2 | 2 | 5 |
| Investment Requirements | 2 | 2 | 3 |
| Short-Term Profitability | 3 | 5 | 3 |
| Long-Term Enterprise Value | 3 | 3 | 5 |
| **Result:** | | **47** | **62** |

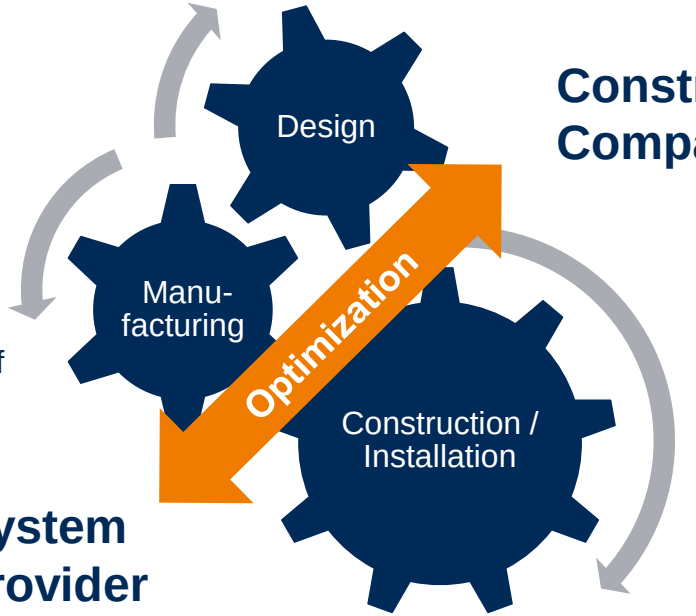
# BALLASTLESS TRACK PARTNERSHIP
# JOINT ACTIVITY TO OPTIMIZE PERFORMANCE (REDUCE RISKS)

**Construction Company**

***Has excessive knowledge and experience on (BLT) construction***

Is aware of basic design principles

Gives feedback on constrcutability to system provider




**System provider**

***Has excessive knowledge and experience on BLT technology***

Considers constructability at the level of basic installation process

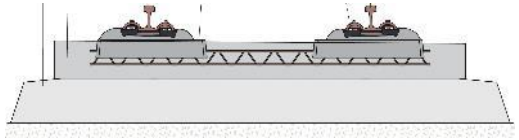
Takes feedback of >> 1 contractors

# BALLASTLESS TRACK

# INSTALLATION

# RAILONE BALLASTLESS TRACKS
# SYSTEM DESIGN / STRUCTURE

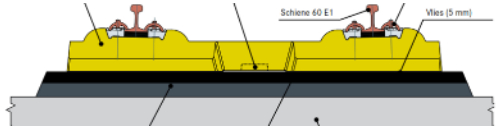
## RHEDA 2000 / RHEDA CITY



Top down procedure → rail comes early

1. Make / lay out track panel
2. „Roughly“ adjust track panel
3. Place reinforcement (if applicable) and formwork
4. Adjust track (rail) in final position
5. Pour concrete slab

## GETRAC




Bottom up procedure → rail positioning comes last

1. Lay asphalt base layer(s) (vertically in maximum precission)
2. Lay out sleepers
3. Place rails (on sleepers)
4. Align track laterally (final alignment)
5. Install fixation blocks

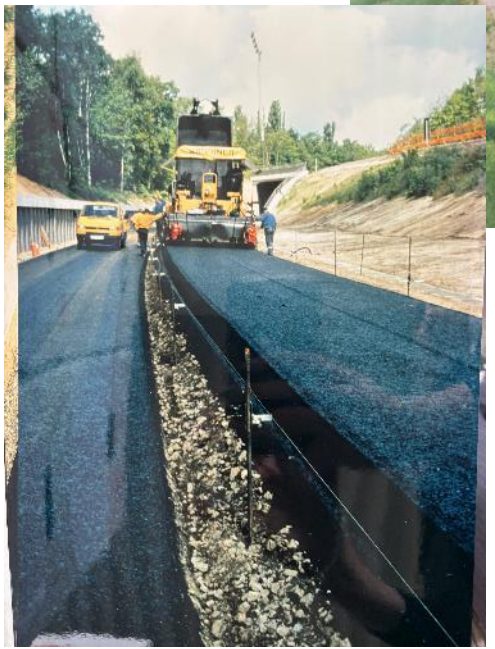
# RAILONE BALLASTLESS TRACK INITIAL INSTALLATION PROCESS

## RHEDA 2000

Portals/Frames
for track adjustment


Concreting with pump
at parallel road

## GETRAC



Quite mechanized
process with standard
road and rail equipment

# EXAMPLE RHEDA 2000 & GETRAC LONG RAIL LOGISTICS (NON RAIL BOUND)


Construction with short temp. rails
→ late long rail installation

Construction with long, final rails
→ early long rail installation


# EXAMPLE GETRAC TRACK RENEWAL

## Removal of damaged track

Tunnel floor / invert



Grinding old asphalt surface

# EXAMPLE ASPHALT
# HIGH PRECISSION PAVING

Paving new asphalt (surface) layer in max. accuracy
Standard road installtion process



# EXAMPLE GETRAC A3
# TRACK PANEL INSTALLATION

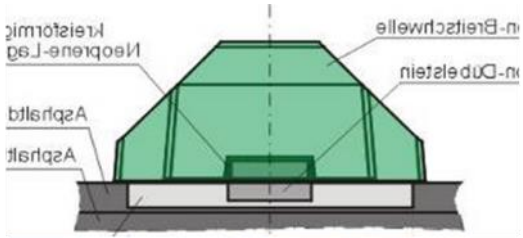

Quelle: EIFFAGE INFRA-BAU

Early delivery


Quelle: EIFFAGE INFRA-BAU

Supply from parallel track/road

Indentation

Grout filling

# EXAMPLE RHEDA 2000 / RHEDA CITY TRACK SUPPLY AND PLACING


Source: Rheda 2000 v.o.f.


Source: EIFFAGE Infra Rail

Source: Rheda 2000 v.o.f.

Source: Rheda 2000 v.o.f.


Source: PCM RAILONE

# EXAMPLE RHEDA 2000
# TRACK PANEL INSTALLATION

For tight site conditions

E.g.:
Old tunnel with small
tunnel cross section

# EXAMPLE RHEDA 2000
# TRACK PANEL INSTALLATION



For tight site conditions
E.g.: Modern single line tunnels

# VISION: GETRAC ( AND RHEDA2000? )
# TRACK PANEL INSTALLATION WITH TRACK LAYING MACHINE


Portal cranes


# EXAMPLE GETRAC TRACK POSITIONING

Use aligning/survey and poistioning kit of tamping machine

Note:
Vertical alignment (mostly) given from high asphalt accuracy

Source: PCM RAILONE AG

# EXAMPLE RHEDA 2000 TRACK POSITIONING

Lifting & „Rough Positioning“ Machines → fast, effective and accurate

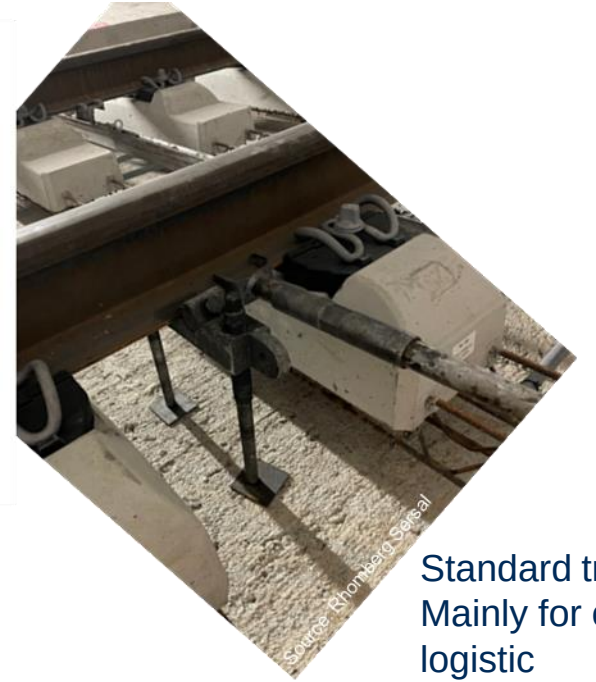

# EXAMPLE RHEDA 2000 / RHEDA CITY TRACK ADJUSTMENT

Simple and robust
Integrated or reposishionable spindles





# EXAMPLE RHEDA 2000 / RHEDA CITY TRACK ADJUSTMENT (UNDER MOVING WHEEL)




Standard traffic (20 to):
Mainly for on site logistic




Tram systems:
For permanet / ongoing operation
(with restrictions)

# EXAMPLE RHEDA 2000 / RHEDA CITY CONCRETE CASTING

# EXAMPLE RHEDA 2000 / RHEDA CITY CONCRETE CASTING


Source: PCM RAILONE AG


Source: PCM RAILONE AG


Source: PCM RAILONE AG

Concrete casting platform

Self propelled, fully integrated concreting unit

- Concrete handover
- Concrete casting & finishing
- Concrete curing

# RHEDA 2000 CONCRETE LOGISTIC BASIC PRINCIPLE


Track 1 under construction
Track 2 for concrete logistic
Vice versa for second track with rail bound vehicles

# RHEDA 2000 CONCRETE LOGISTIC
# BASIC PRINCIPLE – TUNNEL MODIFICATIONS

Concrete logistic

Safety doors

Work front (concreting)

Track installation

# RHEDA 2000 CONCRETE LOGISTIC
# SINGLE TUBE TUNNEL - MINING TRAIN

# RHEDA 2000 (AND GETRAC) PERFORMANCE

bam
infra

BAM HSL Infraprovider vof

Bleiswijkseweg 37a, 2712 PB Zoetermeer / P.O. Box 7333, 2701 AH Zoetermeer, The Netherlands
Telephone +31 (0)79 750 15 30 / Fax +31 (0)79 750 16 31
ABN Amro Bank Rotterdam 69.10.37.230 / NL 8098.16.693.13.73

P.O. Box 7333, 2701 AH Zoetermeer, The Netherlands

Date 16 February 2007
Your reference
Our reference L-TRK-TRK-000501
From S. van Royen
Direct line
E-mail s.van.royen@infraspeed.nl
Page 1 of 2
Subject

RAIL.ONE GmbH
Pfleiderer track systems
Ingolstaedter Strasse 51
D-92318 Neumarkt

**TO WHOM IT MAY CONCERN**

Undersigned as Project Director of Bam HSL Infraprovider v.o.f., as part of the Infraspeed consortium, herewith declares that our subcontractor Rheda 2000 v.c.f. (consisting of Bam Rail, BAM Civiel and Rail.One) has fulfilled all the obligations following the "Rheda 2000 contract relating to HSL ZUID" of 1st March 2003 in a highly satisfactory manner. These obligations consisted mainly of (but not limited to) the aspects of Safety, Quality and Overall Progress.

In this manner the overall mean production speeds on the overall HSL Zuid project achieved by R2V amount to 20.9 m/hr for Tunnels, 24.1 m/hr for Viaducts & Bridges, and 26.2 m/hr for Embankment. In these figures an hour (hr) is part of a working shift which in principle is 8 hours of concreting work (up to a maximum of 10), and construction was in principle done during the week days. Note however that peak values were reached of 30.0 m/hr for Tunnels, 34.5 m/hr for Viaducts & Bridges and 38.3 m/hr for Embankment in optimal circumstances.

| | Average | Max |
|---|---|---|
| Tunnel | 20.9 m/hr (165 m/shift) | 30.0 m/hr (240 m/shift) |
| Viaduct | 24.1 m/hr (190 m/shift) | 34.5 m/hr (275 m/shift) |
| Embankment | 26.2 m/hr (210 m/shift) | 38.3 m/hr (300 m/shift) |

Jens Kleeberg
Chief Sales Officer
Mail: sales@railone.com

PCM RAILONE AG
Dammstrasse 5
92318 Neumarkt | Germany

www.railone.com