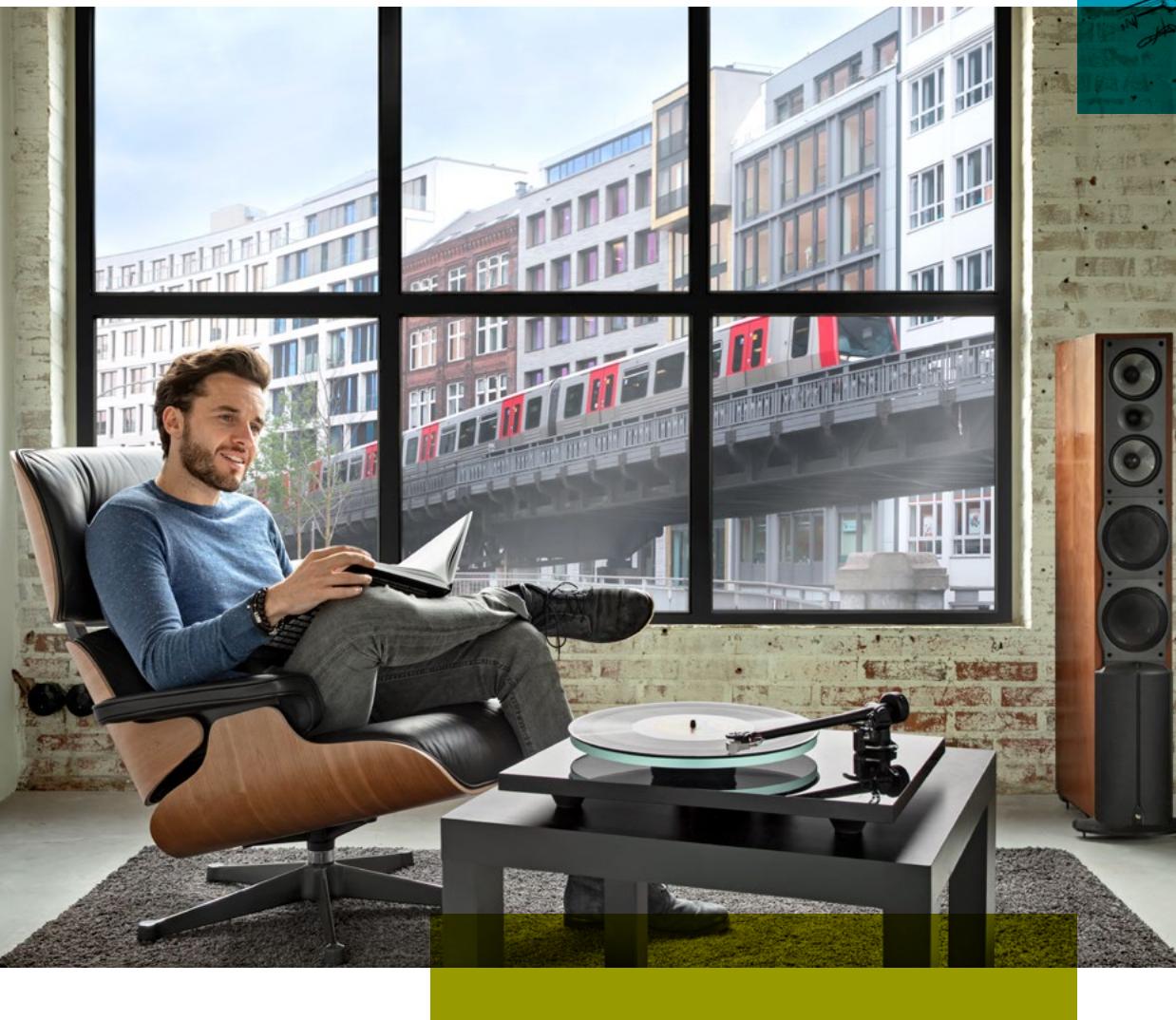
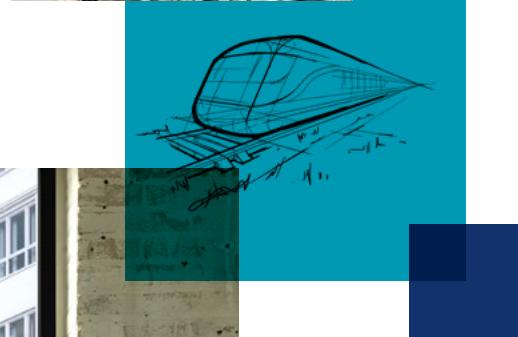


Rockdelta®

Long life. No maintenance.
A proven solution for railside living.

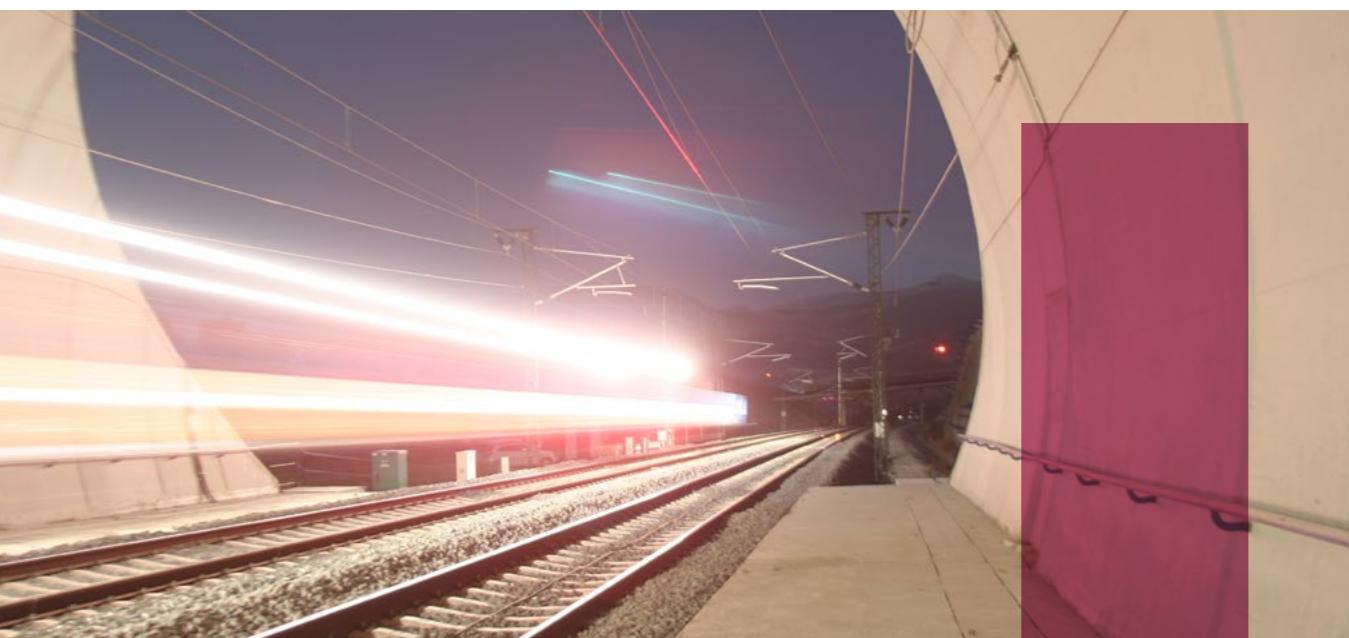


Introduction

The world is moving towards a future in which 80% of the population will be living in urban environments and energy resources will continue to shrink. This will result in more rail traffic, which could potentially create more vibrations and noise. Ground-borne vibrations may cause stress for people and damage to buildings and other structures. That is why as communities consider new rail projects, they are looking for more effective solutions to control ground-borne vibrations, reduce maintenance and prolong the life of track components.

Proven solution for challenging projects

In that future you can make a difference with Rockdelta stone wool mats. The use of stone wool for vibration control in railways may seem relatively new or even counterintuitive. However, they have been successfully used to control ground-borne vibrations on railways in some of the harshest conditions in Scandinavia since the early 1970s. Rockdelta® stone wool mats are backed by over 80 years of experience in stone wool production and over 43 years of expertise in vibration control solutions. Today stone wool is the preferred solution for rail track vibration control and structure protection in Scandinavia and many other countries across the globe.



What we do

Vibration control and structure protection



Vibration control: Protecting people and buildings from harmful vibration

Rockdelta tackles vibrations annoyance by isolating the track and protecting nearby structures from ground-borne vibrations caused by rail transport systems: tramways, light rail systems, subways, metros, main lines and high-speed lines.

Attenuation of vibration is achieved by decoupling the track from the surrounding environment using Rockdelta as a resilient mat.

Ballast and Subgrade protection: Reducing ballast attrition and protecting the substructure by decoupling the ballast bed

Rockdelta mats may be used as well for decoupling the permanent way from the railroad formation to reduce ballast attrition, prolong the life of the ballast bed and limit maintenance activities by improving the distribution of the acting dynamic forces in traditional ballasted railways and bridges.

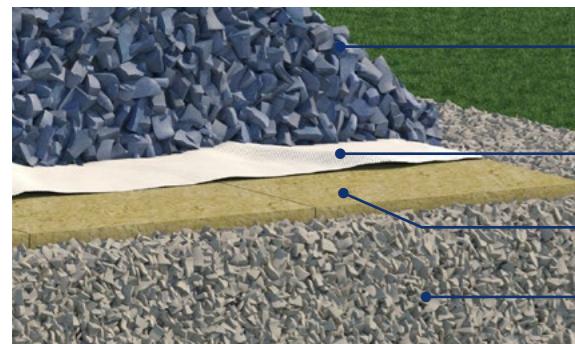
Rockdelta applications

The natural solution for every track

Rockdelta mats are designed, tested and manufactured to have an extended lifetime with retained functional performance even under extreme conditions.

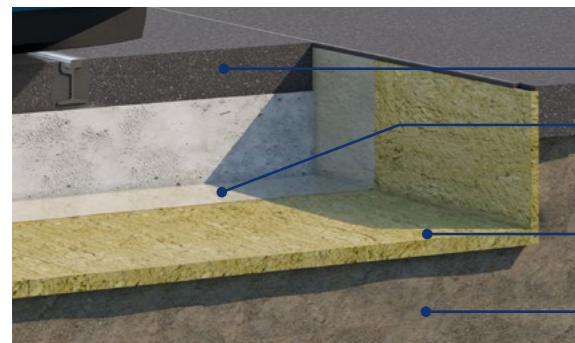
This helps ensure the exceptional long product life cycle of Rockdelta mats.

Vibration control for ballasted tracks



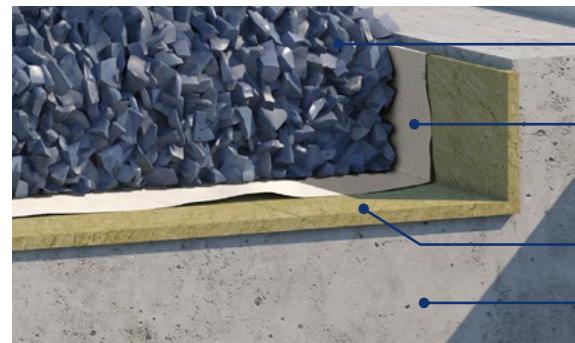
ballast layer
protection geo-composite layer
Rockdelta RB
track substructure

Vibration control for slab tracks



track finishing layer
separation layer
Rockdelta RX
slab substructure

Structure protection for all track types



ballast layer
protection layer geo-composite
Rockdelta RG
bridge deck/ballasted track substructure

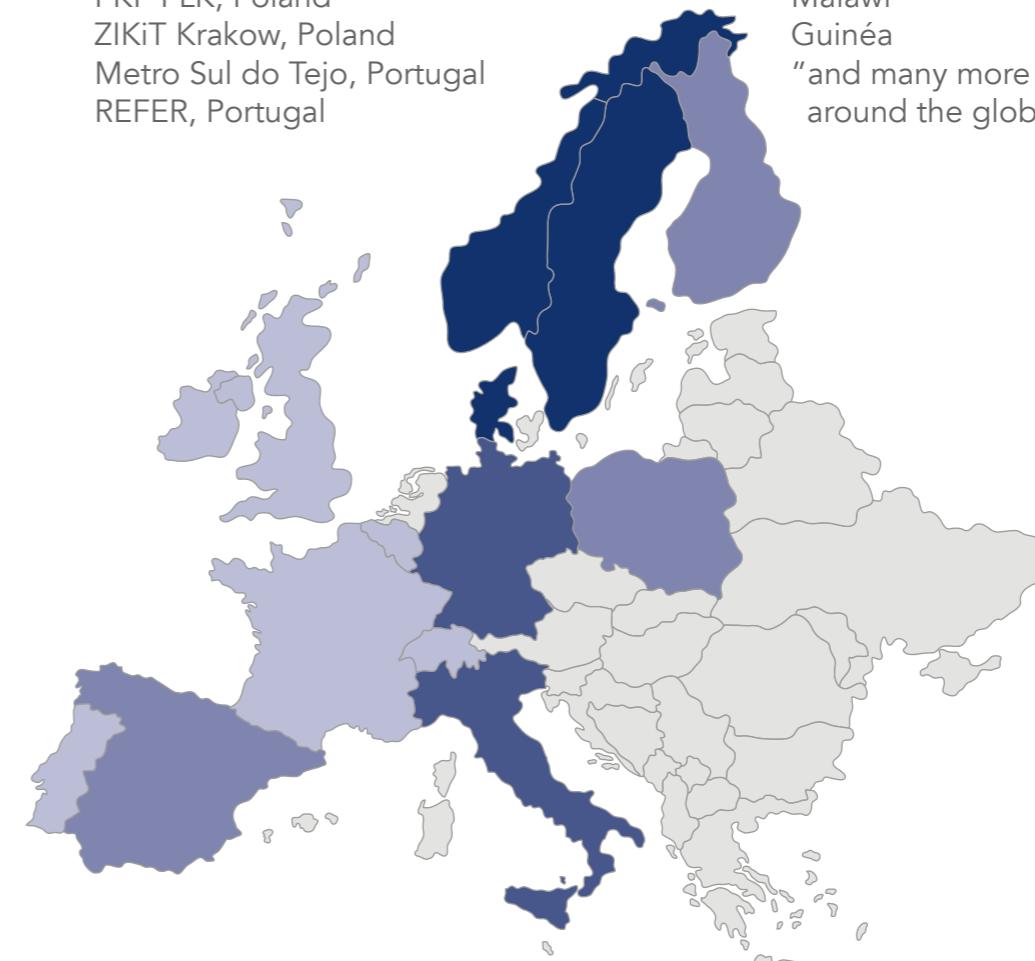
Our track record

Selected customers and projects

Infrabel, Belgium
Banedanmark, Denmark
Copenhagen Metro, Denmark
The Finnish Transport Agency, Finland
RATP, France
Bordeaux Metropole, France
Freiburger Verkehrs AG, Germany
Rostocker Strassenbahn AG, Germany
Luas, Ireland
Metro Milan, Italy
RFI, Italy
Prorail, the Netherlands
Haagsche Tramway Maatschappij, the Netherlands
Trondheim Tram, Norway
Oslo Sporveien, Norway
PKP PLK, Poland
ZIKiT Krakow, Poland
Metro Sul do Tejo, Portugal
REFER, Portugal

Metro de Madrid, Spain
ADIF, Spain
Trafikverket, Sweden
SL, Sweden
Bernmobil, Switzerland
Transport Publique Genève, Switzerland
NET Nottingham, UK

And:
EMA, Algeria
CPTM, Brazil
Ottawa council-OLRT, Canada
CFM, Mozambique
AATE Lima, Peru
Malawi
Guinéa
"and many more around the globe"



Bern Tram



Citybanen Stockholm



Gdansk SKM Line

Services and tools

Rockdelta offers outstanding customer support in all phases of the process, from preliminary design, impact assessments and prediction models to on-site installation supervision and logistic services.

Vibro-acoustic solution expertise

"We provide you vibro-acoustic expertise support based on your requirements"

- Acoustic knowledge sharing and training
- Calculations and mathematical model simulations
- High professional level of documentation

Optimum project integration

"We support you in choosing the optimum resilient solutions for your project"

- We provide project-based specification data
- Certificates according to local legislation and regulations
- Efficient communication with different project stakeholders

One point of contact

"One single and easy entry point for all your project needs"

Backed up by a dedicated project team

- Technical
- Logistics
- Sales
- Installation

Installation follow-up

"We support you and your project from start to finish"

- Professional guidance, training & supervision during installation process
- Support during logistic process

Certified solutions Your reliable partner

All Rockdelta products are produced to the highest standards

- Tested by accredited institutes as per world-recognized railways standards such as BN 918-071-1, DIN 45673, EN 17282
- Production process according to the highest standards
 - ISO 9001 and ISO 14001 compliant
 - CEN standards EN 13162 and EN 13172
- Health and safety: chemical fibre composition controlled by EUCEB



Rockdelta solutions have been tested and evaluated at European top institutes, laboratories and consulting engineering groups:

- Brekke & Strand Akustikk as, Norway
- Danish Technical University, Denmark
- EMPA, Switzerland
- Ingemansson, Sweden
- KM Akustikbyrån, Sweden
- Müller-BBM, Germany
- Norwegian Building Research Institute, Norway
- Technical University of Munich, Germany
- TGM Vienna, Austria

We are part of the ROCKWOOL Group

At the ROCKWOOL Group, we are committed to enriching the lives of everyone who comes into contact with our solutions.



Firesafe insulation for all types of buildings and installations



Precision-engineered stone wool for global industries



Precision growing for the horticultural industry



Exterior cladding for buildings



Acoustic ceiling and wall solutions

39

countries in which we operate

11,600

employees worldwide

45

manufacturing facilities

Why Rockdelta?

Thought Leader



- More than 80 years of experience in stone wool production
- More than 40 years of know-how in resilient systems for railways

Reliable



- Since 1974, market leader in Nordics
- Proven technology in vibration control and railway superstructure protection
- Business stability (part of the ROCKWOOL Group)
- Flexible and hassle-free logistics

Sustainable



- Natural products made from stone
- Safe for humans and the environment
- Improves safety, comfort and well-being
- 100% recyclable, contributing to a circular economy

Lapinus
ROCKWOOL B.V.

P.O. Box 1160, 6040 KD
Roermond, The Netherlands
Tel: +31 475 35 35 55
Fax: +31 475 35 36 77
E-mail: info@lapinus.com

lapinus.com/rockdelta

Lapinus is the world leader in precision-engineered stone wool solutions. We develop and supply versatile and innovative products that help global industries to improve quality of life.

Our products are used in a wide range of applications.

© ROCKWOOL B.V. 2019.
All rights reserved. - Reference: September 2019
ROCKWOOL, Lapinus, Rockdelta and Noistop are registered trademarks of ROCKWOOL International A/S. The information contained herein is based upon data considered to be accurate. However, no warranty is expressed or implied regarding the accuracy of this data or the results that will be obtained from the use thereof, or that any such use will not infringe on any patent. This information is furnished as a guide only and on condition that those receiving it shall carry out appropriate tests to determine the accuracy and suitability for the intended purpose.



Rockdelta applications

The natural solution for every track

Armed with unique material characteristics and unmatched, proven long-term functional performance, Rockdelta mats significantly aid the attenuation of ground-borne vibrations stemming from any type of track system. Vibrations are attenuated thanks to a mass spring system which decouples the dynamic behaviour of the track effectively from the ground.

Rockdelta mats are designed, tested and manufactured to have an extended lifetime with retained functional performance even under extreme conditions. This helps ensure the exceptional long product life cycle of Rockdelta mats.

The right choice

Based on knowledge and experience and according to the project requirements and specifications our Rockdelta experts help you to choose the optimal solution for each situation in terms of stiffness, vibration reduction and cost effectiveness.



Rockdelta RB: Vibration control for ballasted tracks

High-performance, dual density Rockdelta mats with a composite geotextile top layer are the effective solution for resiliently supported ballasted tracks.

The dual density mats consist of a high-density force-distributing top layer and a low-density soft, resilient bottom layer. The top layer also provides even and equal stiffness throughout the entire width of the track and distributes force from the rail structure evenly.

The high-density top layer protects the mats from potential impairment by the ballast stones, preventing the stone wool fibre material from deteriorating due to the static

and dynamic loads from gravel, stone, soil and other covering materials. The low-density resilient bottom layer provides optimal spring-mass effect. Also, it enables installation on surfaces that are not completely evened. The functionality of the mat is not affected by punctures.

The geotextile layer on top with high resistance to stretching and tearing enables easy maintenance of the ballast. This geotextile is a high-quality composite product, comprising two membranes of non-woven geotextile and a load-distributing core.

Rockdelta RB
track substructure



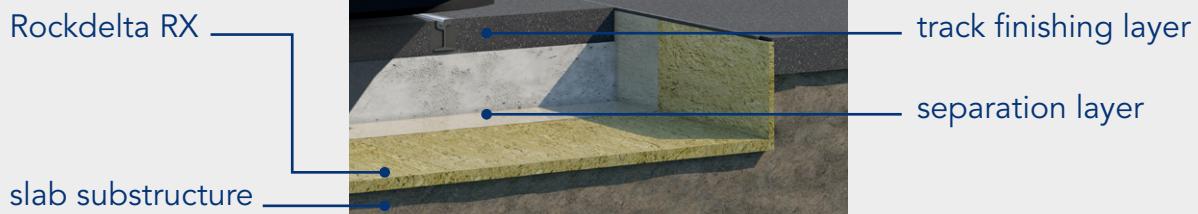
ballast layer
protection geo-composite layer



Rockdelta RX: Vibration control for concrete slab tracks

The Rockdelta solution for slab track systems consists of a full-contact single-density mat that decouples the concrete slab from the substructure. The resilient stone wool-based support system introduces a durable and high-efficiency spring element into the track structure. By separating the concrete slab from the foundation, the dynamic behavior of the system is changed by creating a mass-spring system where vibrations are attenuated thanks to the elasticity of the mat.

The mats provide for the attenuation of ground-borne vibrations stemming from any type of floating slab track system. The unique material characteristics include very low levels of damping and unmatched, proven long-term functional performance. With ultra-low sensitivity to weather conditions (rain, temperature changes) Rockdelta mats exhibit outstanding efficiency and durability even after decades of operation under harsh climatic conditions.



Rockdelta RG: Structure protection for all track types

Rockdelta offers superior ballast, sub-grade and bridge deck protection. The Rockdelta solution for structure protection (i.e. bridges, viaducts, etc.) is a single density, force-distributing stone wool mat with unmatched dynamic properties with inherent, first-rate volume compressibility.

Rockdelta mats may as well protect the track superstructures against dynamic forces and extend the life of the ballast stones by reducing attrition, thereby enhancing overall ballasted track performance while significantly reducing maintenance costs. Rockdelta mats may be used as well for decoupling the

permanent way from the railroad formation to reduce ballast attrition, prolong the life of the ballast bed and limit maintenance activities by improving the distribution of the acting dynamic forces in traditional ballasted railways and bridges.

The exceptionally strong mats have a geotextile top layer with strong resistance to stretching and tearing. The mats are lightweight and have no significant influence on the total weight of the superstructure they are installed on.

