



BODAN

GLEISEINDECKUNGSSYSTEME
LEVEL - CROSSING - SYSTEMS



Innovations for the future.



We will smooth the way for good and secure connections

GMUNDNER FERTIGTEILE

is a successful medium-sized enterprise for the production of prefabricated concrete parts, with special focus on products for use in the traffic and transport and in the power supply sectors.

The company was founded in 1972 by the firms of Asamer&Hufnagl (concrete, cement) and Stern&Hafferl (private railways, construction) and exports the products manufactured in the Ohlsdorf/ Gmunden plant to Australia, the Czech Republic, Denmark, France, Germany, Ireland, Japan, Malaysia, the Netherlands, Romania, Switzerland, Taiwan, Thailand and Tunisia. Important national railways all over the world are among long-standing partners and appreciate the high quality of the products from Austria.

Since 1984 **GMUNDNER FERTIGTEILE** is the sole patent owner of BODAN level

crossing systems in Austria and abroad, and since 1985 the elements of that system are made from polymer concrete. The company's employees have constantly been in close contact with railway operators in order to optimize the application potentials of the product portfolio (BODAN, BODAN-Reffo, BOT-RACK slab track system, RIBORD, drainage elements). In addition to the BODAN level crossing system range the company's know-how lies in the production of prefabricated reinforced concrete elements which are manufactured for technical buildings for railway installations, prefabricated railway platforms, cable stations, gas distributors and bus and tram stops.

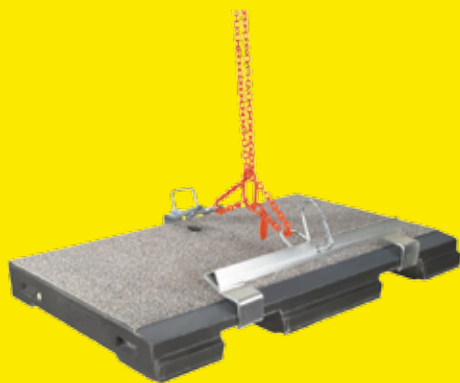
All the products from the **GMUNDNER FERTIGTEILE** programme are characterized by high quality and a long service life under all kinds of different load stresses and climate conditions.



Gmundner Fertigteile Team



ADVANTAGES OF THE SYSTEM



BODAN external panel with BODAN tools

Level crossing systems are required to cope with the necessities of two entirely different kinds of traffic and transport system. On the one hand there are the demands of rail-bound traffic (elastic trackwork), on the other the constantly changing demands of road traffic. **BODAN** is a level crossing system that will transfer the traffic loads of the road by means of frame-less bridge-like polymer concrete panels - dissipated over a large area - through the rail sleeper grid into the ballast bed.

Technical properties

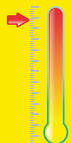
- ♦ Elastic support on railfoot in rubber profile wedges
- ♦ High electrical resistance with track insulation
- ♦ Ventilation of rail track body through bridge construction
- ♦ One type of panel for all rail profiles
- ♦ Retaining of regular track superstructure
- ♦ High level of durability with heavy duty truck & lorry traffic, high quality for passing-over rail traffic

Economic advantages

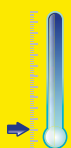
- ♦ Exchange of individual panels possible
- ♦ Low expenditure required for routine maintenance
- ♦ Easy maintenance of fastening and fitting equipment
- ♦ Long-time durability of BODAN panels due to polymer concrete
- ♦ Good rating for life cycle costs (LCC)

Material properties

- ♦ Water resistant
- ♦ Frost and de-icing resistant
- ♦ Salt and oil resistant
- ♦ Resistant to chemical substances
- ♦ High compressive strength
- ♦ High flexural and tensile strength
- ♦ High skid resistance due to grain-rough surface
- ♦ Reinforcement by anti-corrosive coating



BODAN level crossing in Malaysia



BODAN level crossing in Switzerland



RAILWAY

The **BODAN** level crossing system is being applied in more than 20 countries worldwide. Country-specific peculiarities as well as particular requirements by customers are factored in through individual adaptations. Important national railways worldwide are among long-standing partners as well as private railways operating within their nation in Austria, Germany, Japan and many other countries.

The loads of road traffic weighing on the panels are elastically transferred through rubber profile wedges to the railfoot which means that the elasticity of the rail is maintained also in the area of the level crossing.

The **BODAN** system is suitable and officially approved for heavy duty truck&lorry traffic as well as for medium and light road traffic loads and for pedestrians.

If long external panels are used, mechanised ballast cleaning does not require any

further measures to be taken at the track foundations and edge beams.

The individual-panel system ensures that the installation procedure takes little time and can be carried out while the road is only partially closed.

International experts have expressed the opinion that **BODAN** guarantees highest quality for passing-over rail traffic, highest durability with heavy duty truck&lorry traffic and best grip of the cover surface in wet conditions, to mention but a few of the excellent properties.

Application areas

- ◆ Single-track level crossing
- ◆ Double- or multi-track level crossings
- ◆ Level crossing with Y-shaped sleepers
- ◆ Level crossings in points area
- ◆ Rail-entering sites for maintenance vehicles



BODAN level crossing in Japan



BODAN level crossing in Germany



UNDERGROUND, RAILWAY, TRAMWAY



BODAN level crossing Ireland (with special surface)



U-BODAN level crossing in Austria

Particularly suited for the specific requirements of the underground railway and tramway sector are the **U-BODAN** panels which are used for service staff crossings, emergency escape routes and in depot and workshop areas.

The light-weight **U-BODAN** panels make possible a fast and easy installation by hand. Due to their narrow design the **U-BODAN** panels can be stored in the tunnel alongside the tracks outside of the minimum clearance outline (structure gauge).

All the regular **BODAN** components can also be used for the superstructure constructions of underground railway and tramway systems in the area of level crossings, rail-entering sites or depots.

Special **Le-BODAN** panels can be used for grooved rails; they are folded between the rails.

Application areas

- ♦ Service staff crossings at workshops
- ♦ Pedestrian crossings
- ♦ Emergency escape routes
- ♦ Safety crossings
- ♦ Rail-entering sites for maintenance vehicles
- ♦ Intra-urban level crossings
- ♦ Level crossings with grooved rails
- ♦ Rail-entering sites at tunnel portals
- ♦ Depots



INDUSTRY

The **BO-TRACK** slab track system represents another level crossing system of **GMUNDNER FERTIGTEILE** especially where the installation of heavy-duty level crossings in the industrial sector is concerned. The regular elements are 400 and 500 cm long, 240 cm (at the bottom) and 230 cm (at the top) wide, and - depending on requirements - 35 or 45 cm thick.

- ◆ Design with anti-skid surface (crushed hard grain)
- ◆ Configuration of rail channels for common rail shapes
- ◆ Edge protector profiles in galvanized finish at the inside edges of the rail channels
- ◆ Installation in track curves with polygonal formwork and adapted layout of the rail channel
- ◆ Grouting of the rail channels with „Edilon Corkelast ERS“

Application areas

- ◆ Port facilities
- ◆ Assembly halls
- ◆ Container terminals
- ◆ Industrial facilities
- ◆ Heavy haul tracks

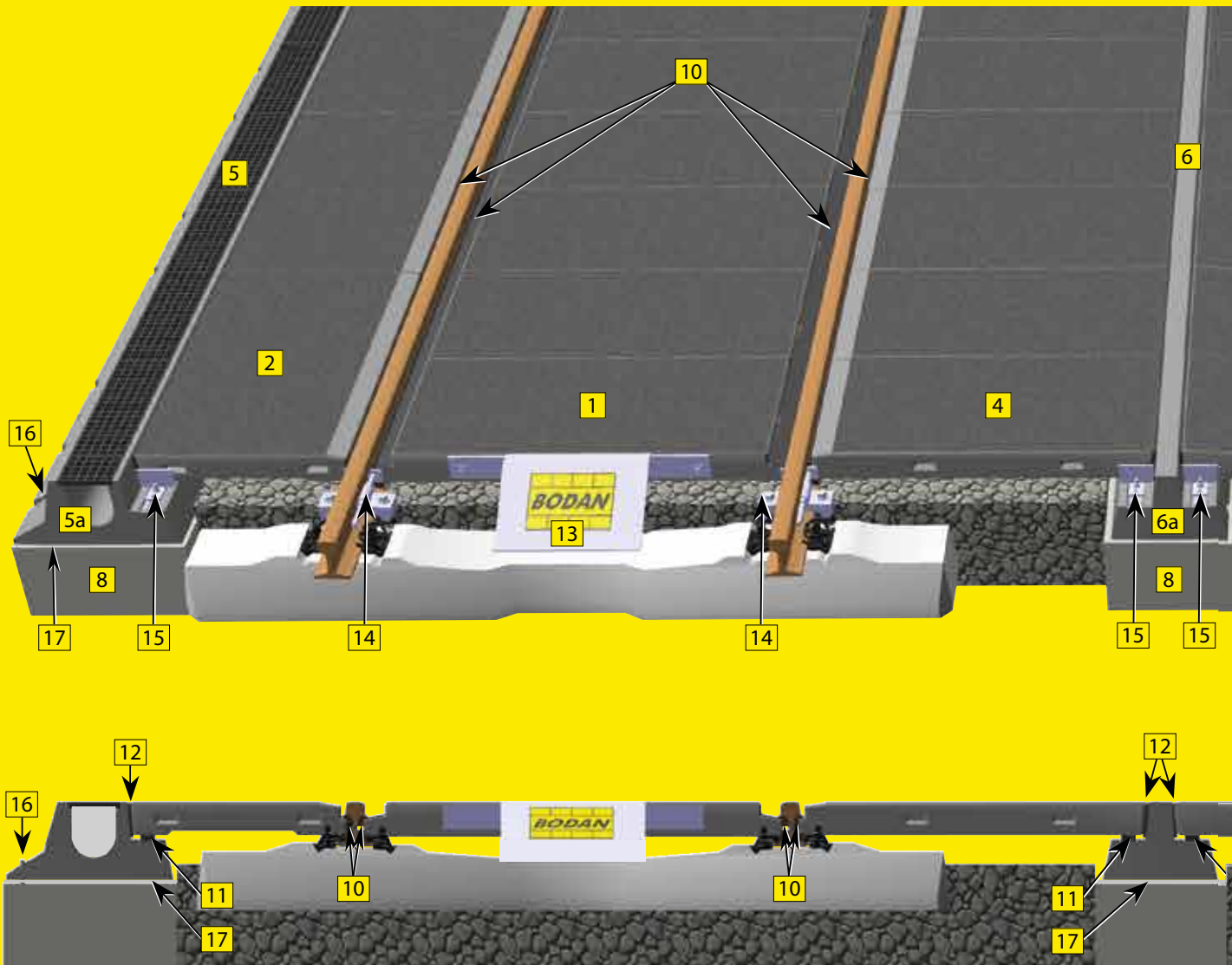


BO-TRACK level crossing in Austria


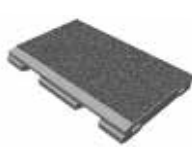

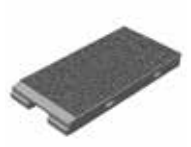






BO-TRACK level crossing in Austria

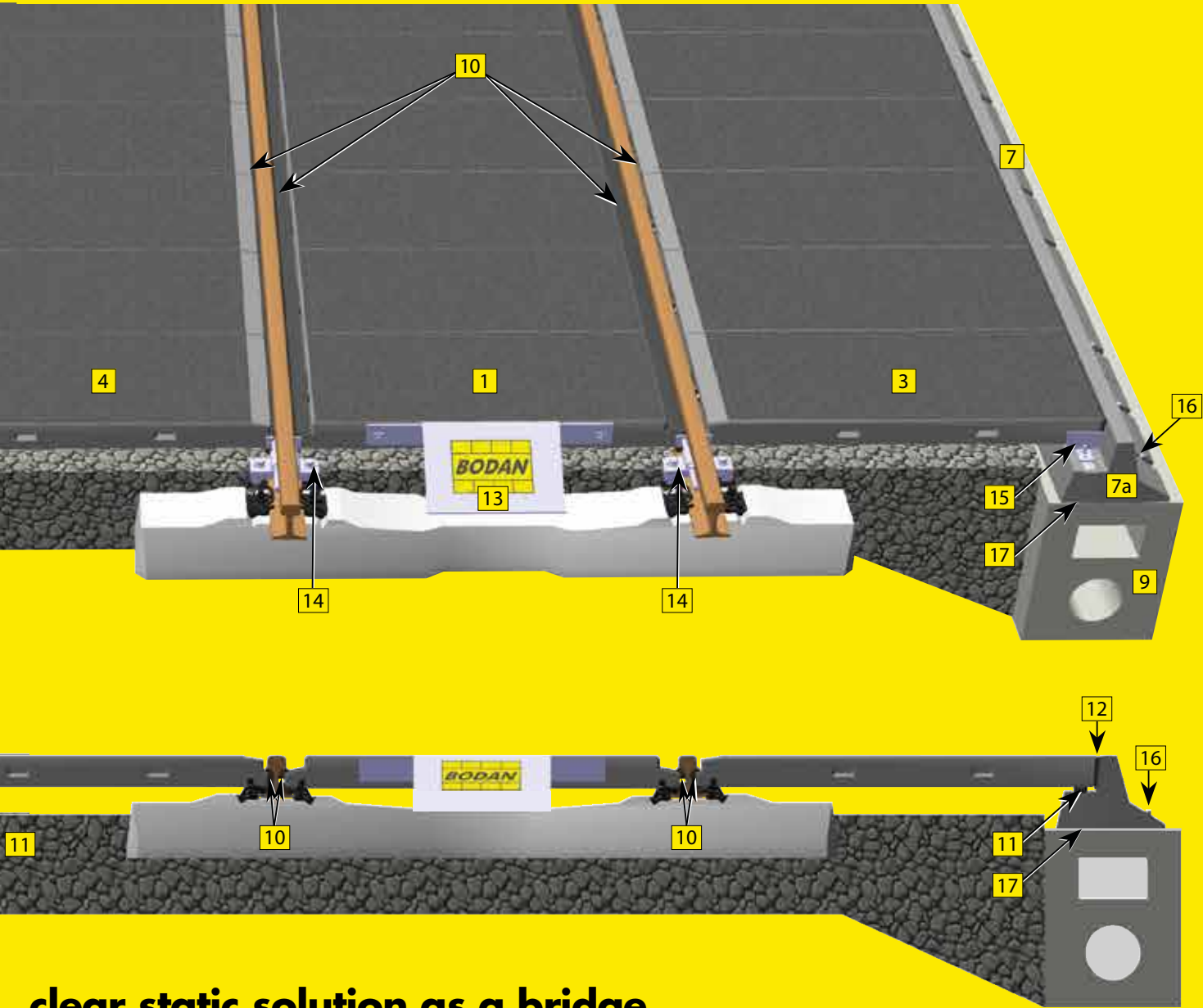
Schematic illustration of a double-track







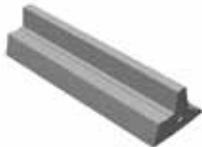





BODAN level crossing system

1 Internal panel IP 	2 External panel AP 750 	3 External panel AP1470 	4 Internal external panel 	5 Edge beam Ri-BORD 
7a Final edge beam ASTH-E 	8 Foundation beam 	9 Drainage element 	10 Rubber profiles 	11 Rubber stripes 

level crossing with BODAN system



clear static solution as a bridge

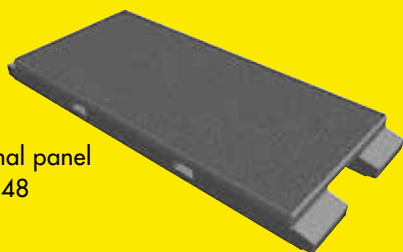
5a Final edge beam Ri-BORD-E 	5b S-BORD 	6 Edge beam ASTHD 	6a Final edge beam ASTHD-E 	7 Edge beam ASTH 
12 Distance stripe 	13 Deflector plate 	14 Clamping slab retainer 	15 Slab retainer angle 	16 Fixing bolt for edge beam 

17 Grout C50/60

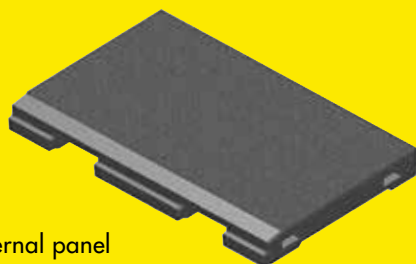


BODAN PANELS

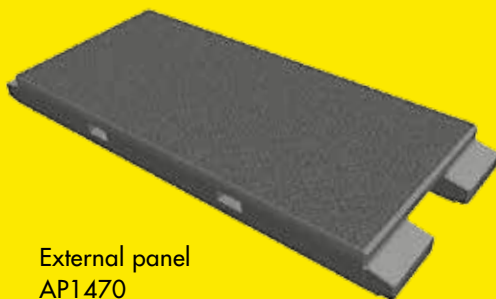
Internal panel
IP 1448



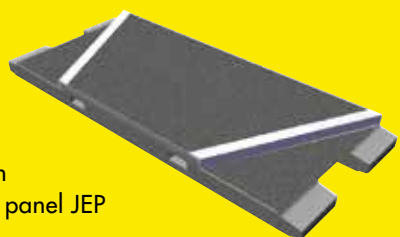
External panel
AP750



External panel
AP1470



Japan
Entry panel JEP



BODAN – Internal panel IP1448

Dimensions: 1448 x 600 mm
Weight: approx. 245 kg

BODAN – External panel AP750

Dimensions: 750 x 1200 mm
Weight: approx. 224 kg

BODAN – External panel AP1470

Dimensions: 1470 x 600 mm
Weight: approx. 249 kg

Easy installation of panels using the special **BODAN** installation tools. Normally, the spacing between sleepers is 600 mm for the **BODAN** level crossing system. Special dimensions are possible on request.

BODAN - special panels

- ♦ Special production according to customer requirements for specific track gauges and sleeper spacings
- ♦ Special panels for special requirements – e.g. end-panels for the Japanese market
- ♦ Customer-specific products for turn-outs and similar
- ♦ Adaptation to the existing road situation with short or long external panels
- ♦ Easy removal and reinstallation for track maintenance work
- ♦ Bridge-type execution also at the external panels



BODAN level crossing in Austria (turn-out section)



BEDDING

Rubber profiles

- ◆ **BODAN** internal and external panels are bedded with rubber profiles onto the rail foot resp. edge beam
- ◆ Elastic bedding of the **BODAN** panels
- ◆ Rubber profiles for all common rail types



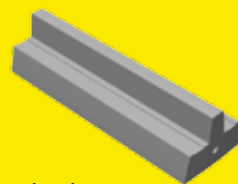
Rubber profiles



Laying of edge beam

Edge beam

- ◆ Connection to road by polymer concrete edge beam
- ◆ Bedding of external panel onto rubber profile wedge and edge beam
- ◆ Transition from elastic bedding of rail to fixed road connection by external panel and edge beam



Edge beam

Foundation beam - WUB

- ◆ Fast installation through ready-made prefabricated foundation beams
- ◆ Laying of foundation beams onto a clean subbase layer



Foundation beam



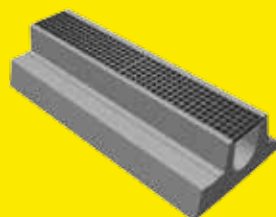
Laying of foundation beam



DRAINAGE



BODAN-Ri-BORD



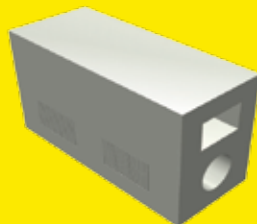
BODAN-Ri-BORD

BODAN-Ri-BORD

- ♦ **BODAN-Ri-BORD** is a **BODAN** edge beam with gutter channel for drainage of the surface water from the connected sections of road
- ♦ Soiling of the ballast bed and moisture penetration of the track foundation are prevented
- ♦ The **BODAN-Ri-BORD** is produced from polymer concrete



BODAN-Drain-BLOCK



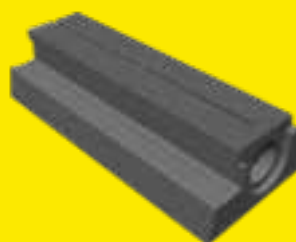
BODAN-Drain-BLOCK

BODAN-Drain-BLOCK

- ♦ Drainage element for the efficient drainage of the rail track structure
- ♦ Cable conduit is integrated in the Drain-BLOCK
- ♦ Moisture penetration of the track foundation is prevented
- ♦ Foundation for edge beam and **BODAN-Ri-BORD**



BODAN S-BORD



BODAN S-BORD

BODAN-S-BORD

- ♦ **BODAN S-BORD**: polymer concrete
- ♦ Edge beam with integrated slit drainage gutter
- ♦ Prevention of soiling of the ballast bed and moisture penetration of track foundation
- ♦ Frost and de-icing salt resistant
- ♦ High skid resistance due to grain-rough surface



BODAN-REFLO

Properties of the system

- ♦ The purpose of the special **BODAN-REFLO** surface is to enhance safety at level crossings
- ♦ The reflective properties of the **BODAN-REFLO** level crossing panels are the result of an admixture of reflecting glass beads in the panels' surface.
- ♦ Durability is ensured by strong grain adhesion in the polymer concrete
- ♦ No surface maintenance is required
- ♦ High skid resistance due to grain-rough surface analogous with standard panel

Benefits of the system

- ♦ Driver's awareness is raised when approaching the level crossing in darkness
- ♦ The speed in the level crossing area is reduced
- ♦ The carriageway over the level crossing is indicated
- ♦ Train/tram driver is not affected in any way



BODAN worldwide

Partners and dealer network

Gmundner Fertigteile has distributors or partners in its most important export markets who will record the local needs and requirements and can provide for system-compatible solutions in close cooperation with the technical and sales staff at the company's parent plant in Ohlsdorf (Austria).

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USA

www.transpo.com



GERMANY



AUSTRIA



SWITZERLAND



JAPAN

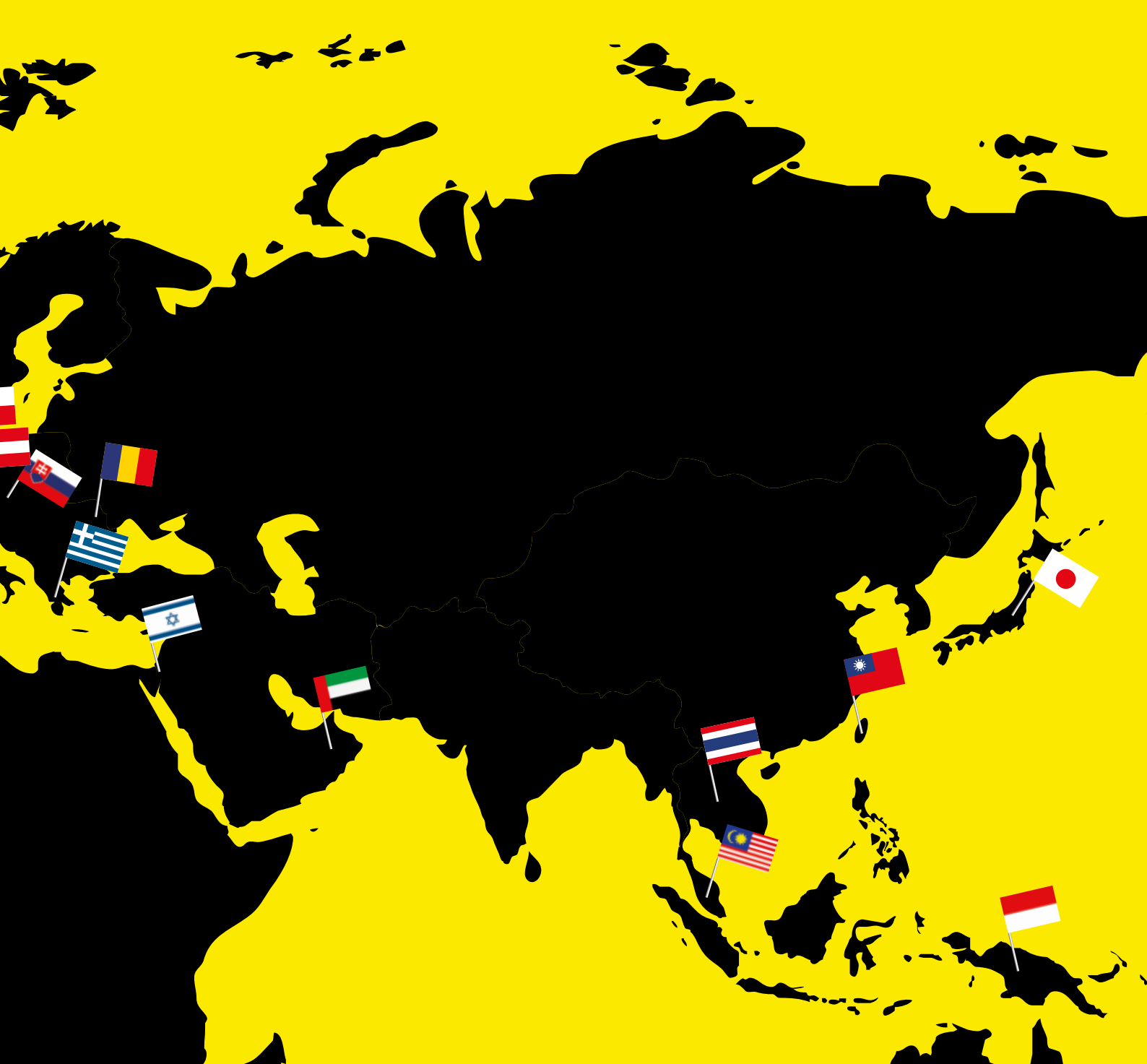


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