RUCONBAR
Rubberised Concrete Noise Barriers

# Absorptive concrete noise protection barriers

# RUCONBAR

Eco-innovation

www.ruconbar.com

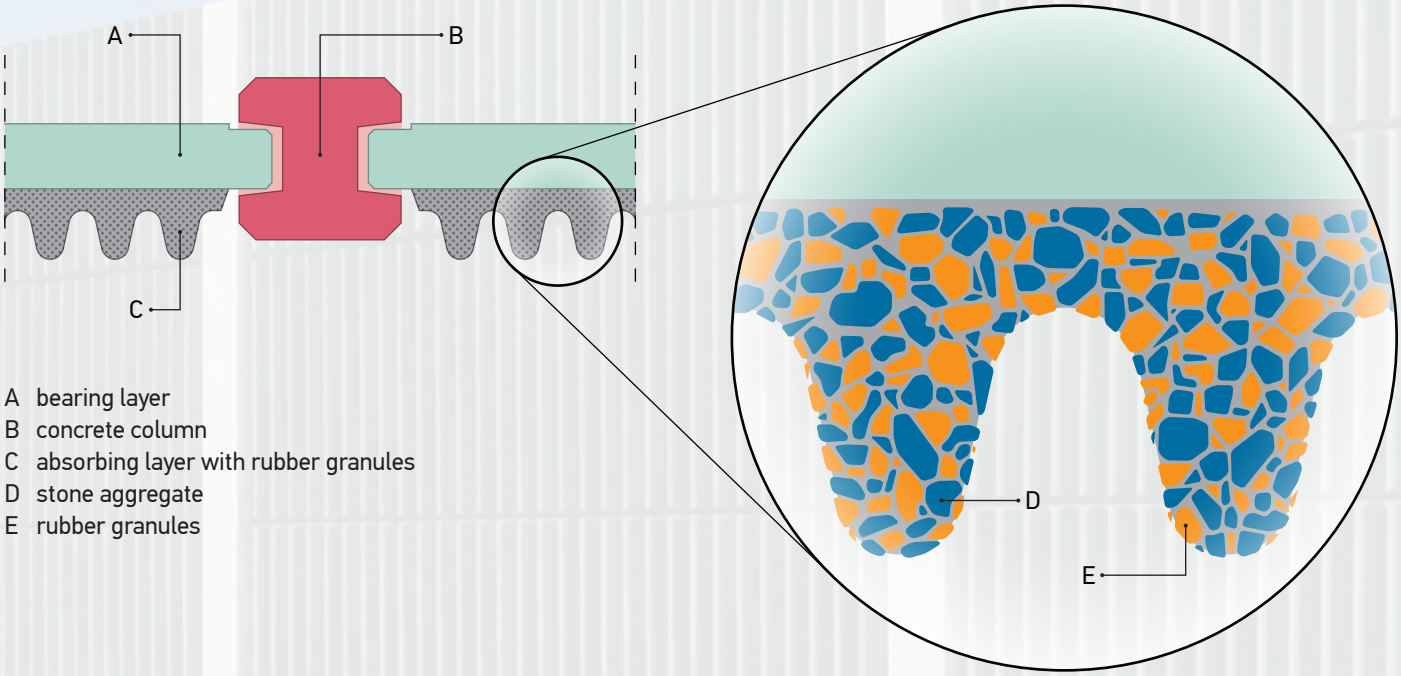
# Basic information

**RUCONBAR** is a highly absorptive environmentally friendly concrete noise barrier.

Its absorbing layer is made of recycled waste tyres and concrete. In its nutshell, it is a concrete based solution composed of an absorbing and a bearing layer. By incorporating in its absorptive layer 40 % of rubber granules recycled from old automobile tyres, an innovative product has been created, which is a novel solution in the sphere of noise protection, absolutely unique on the market.

**RUCONBAR** concept is an economical, easy to implement, and environmentally sound noise protection solution.

## RUCONBAR CROSS SECTION




A bearing layer
B concrete column
C absorbing layer with rubber granules
D stone aggregate
E rubber granules


## EUROPE-WIDE RECOGNITION

**RUCONBAR** noise barriers have been developed in the scope of the **RUCONBAR** PROJECT, which has been recognized and co-funded by the CIP Eco-Innovation Initiative, under the umbrella of the Executive Agency for Competitiveness and Innovation (EACI).

European Commission

Eco-innovation

eaci for competitiveness & innovation

Green Mark – Sign of Excellence

## AWARDS AND ACKNOWLEDGMENTS

**RUCONBAR** is the holder of **Green Mark – Sign of Excellence** label, representing a sustainable product and technology.
The innovativeness of the product has also been recognized and awarded by the Association for Energetics of the City of Zagreb where **RUCONBAR** received the **GREENOVATION** award for the best product of Croatia's green economy for 2011.
In addition, **RUCONBAR** has been awarded the **ARCA Prix** at the International Innovation Exhibition – ARCA 2012.

# Environmental benefits

**LIFE-CYCLE ANALISYS FLOWCHART**

1 materials acquisition

2 **RUCONBAR** manufacture

3 **RUCONBAR** placement & use

4 **RUCONBAR** recycling

## FROM WASTE TYRES TO CLEANER ENVIRONMENT

Waste tyres dumped in environment

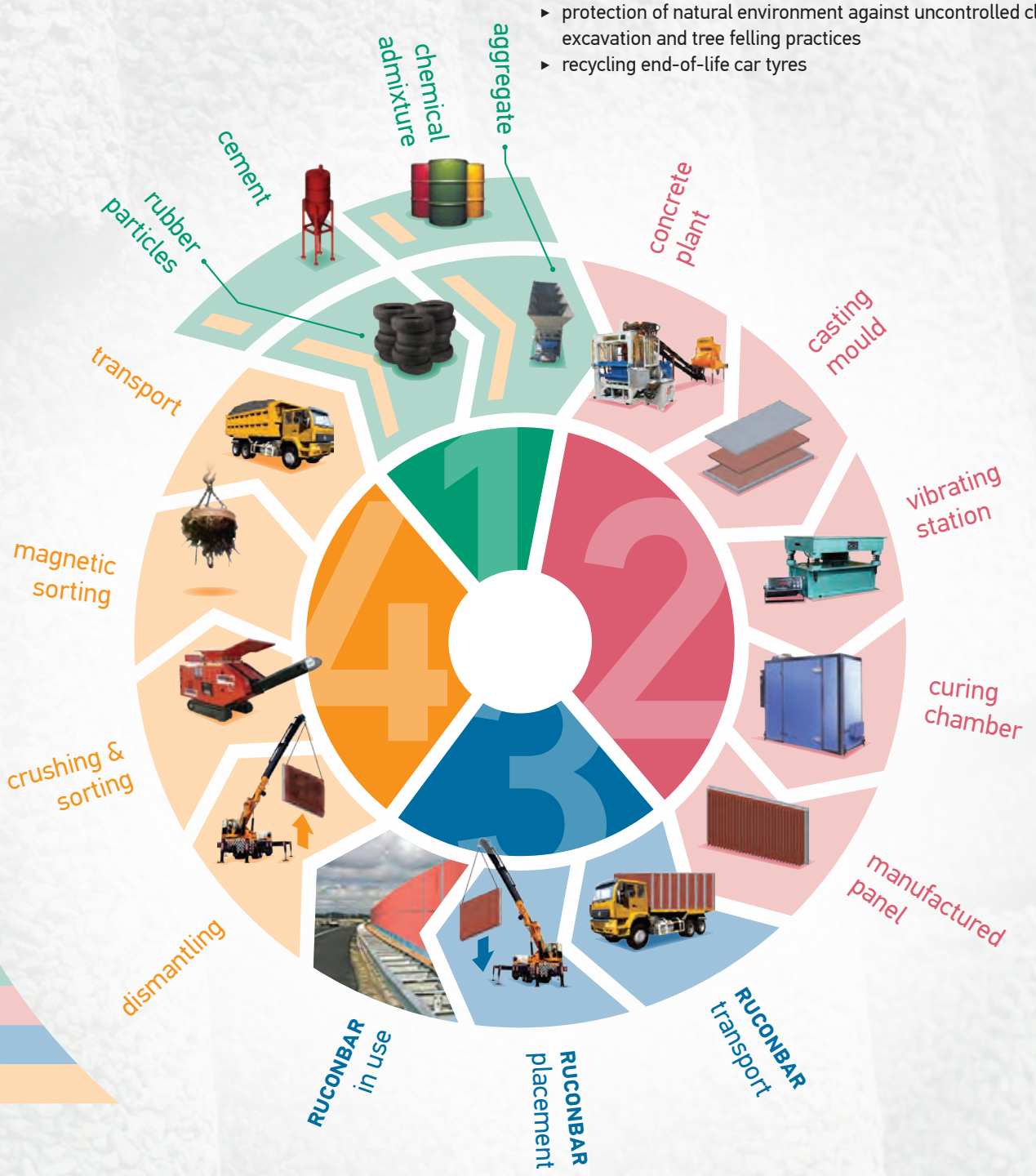
Waste tyre recycling

Rubber granules

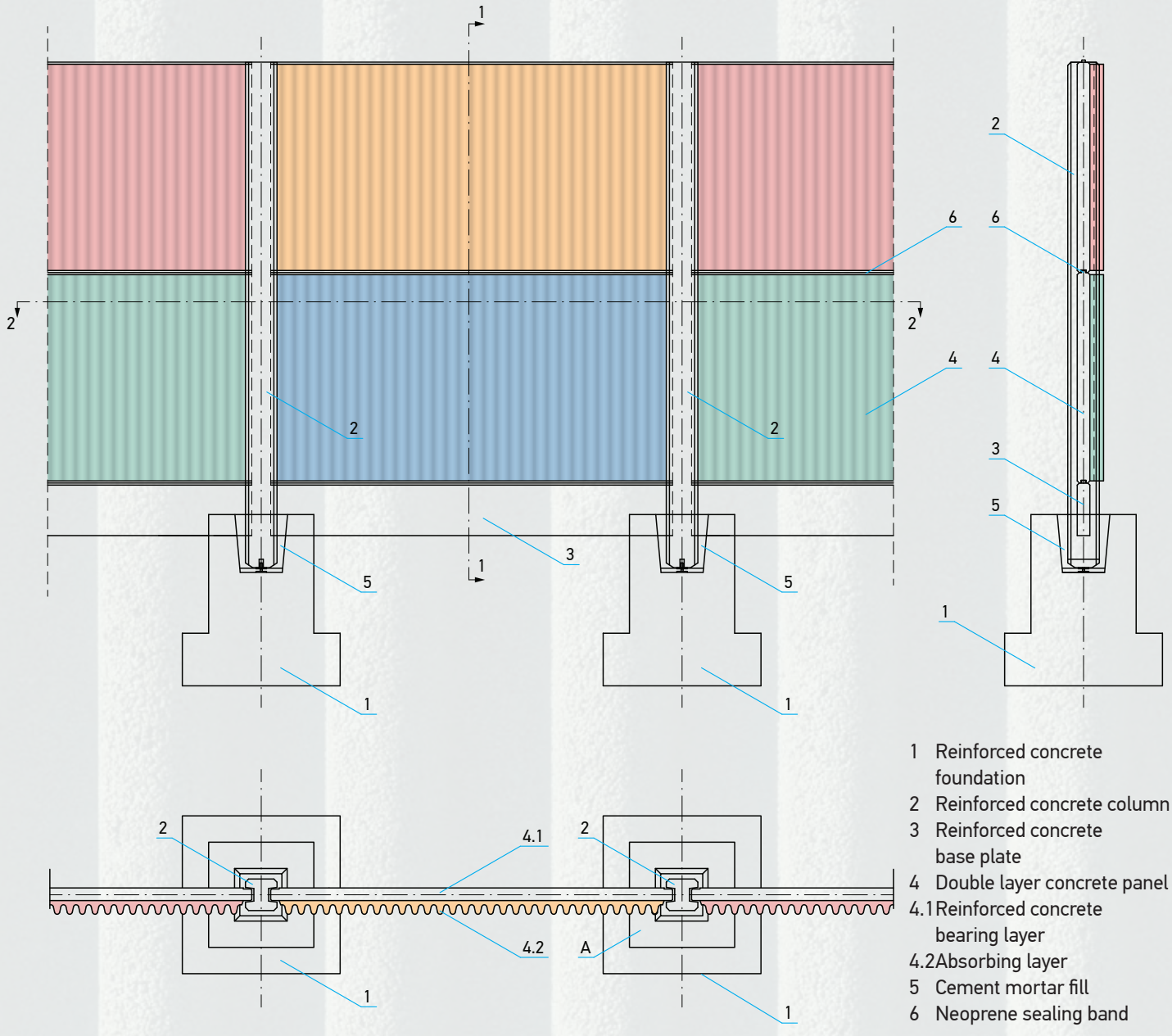
Cleaner environment

For orientation, **46,4 t of recycled rubber granules**, obtained by recycling **7.800 waste car tyres**, can be used for manufacturing 1 kilometre of noise barriers 3 m in height (3.000 m² of barriers).

- 31% reduction in GHG emissions compared to similar solutions available on the market
- reduced consumption of non-renewable resources (gravel or crushed stones, natural clay and tree felling)
- protection of natural environment against uncontrolled clay excavation and tree felling practices
- recycling end-of-life car tyres

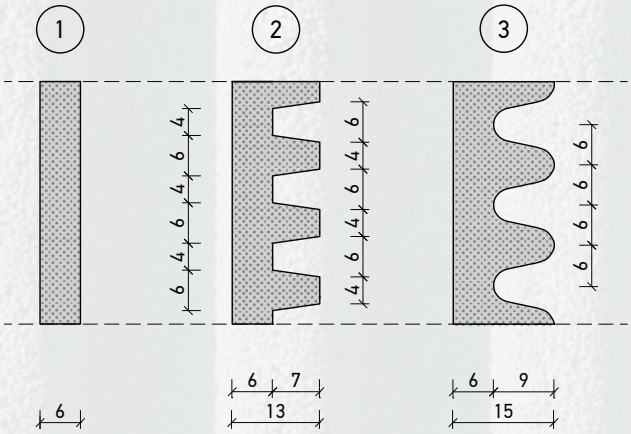


# Sound-absorbing




1 Reinforced concrete foundation
2 Reinforced concrete column
3 Reinforced concrete base plate
4 Double layer concrete panel
4.1 Reinforced concrete bearing layer
4.2 Absorbing layer
5 Cement mortar fill
6 Neoprene sealing band

# wall panels




## TECHNICAL SPECIFICATION FOR PANELS

Standard panel dimensions
- 400 cm (length) × 200 cm (height)
- panel thickness: 18 – 27 cm (depending on the absorbing layer area)

**Reinforced concrete bearing slab**
- concrete C30/37 XF4, VDP2, XC4, XC3, XC2, XC1, XC0
- concrete density: 2.400 kg/m³
- minimum slab thickness: 12 cm
- maximum slab lenght: 600 cm

**Absorbing layer with recycled rubber**
- porous concrete density: 1.700 kg/m³
- thickness: 1 – 6 cm
- thickness: 2 – 13 cm
- thickness: 3 – 15 cm

**Danger of falling debris**
- class 3 – according to HRN EN 1794-2:2011
- class 5 – according to HRN EN 1794-2:2004

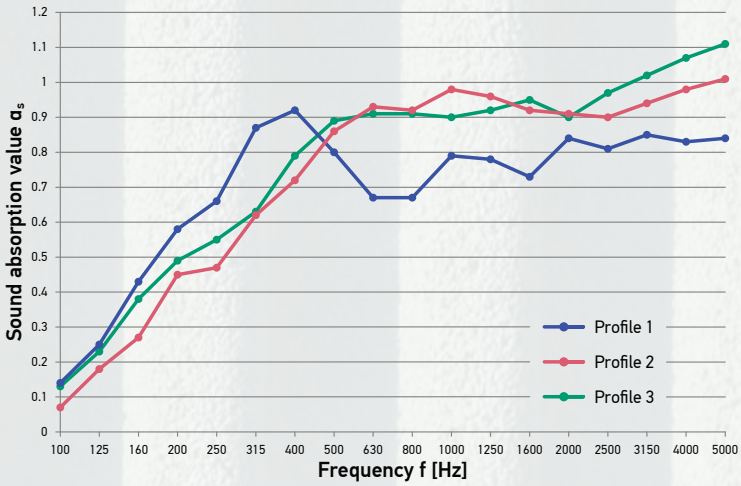
**Resistance to brushwood fire**
- class 3 – according to HRN EN 1794-2:2011

## ABSORPTIVE PROPERTIES OF PANELS

Desired sound absorption properties can be achieved by varying the thickness and shape of absorbing layer of the noise protection panel. Absorption properties have been tested according to HRN EN ISO 354 and HRN EN 1793-1.

The following sound absorption classes can be achieved by varying the shape of the noise absorbing surface:

| Profile | Shape of noise absorbing layer | $DL_\alpha$ [dB] | Sound absorption class |
|---|---|---|---|
| 1 | Flat | 6 | A2 |
| 2 | Trapezoidal | 8,6 | A3 |
| 3 | Undulating | 8,7 | A3 |



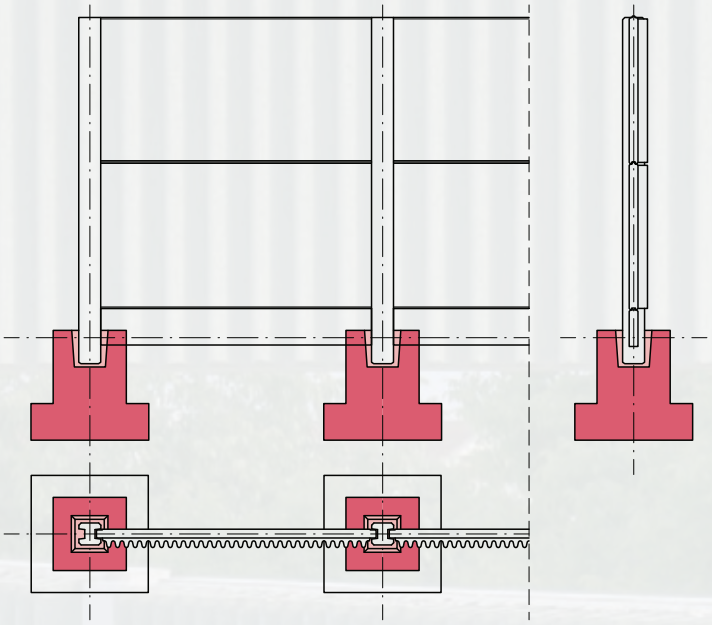

**Panel insulation properties**
Insulation properties were tested according to HRN EN 1794-1. The sound insulation class B3 ($DL_R$ = 47 dB) was obtained.

# Production and installation options

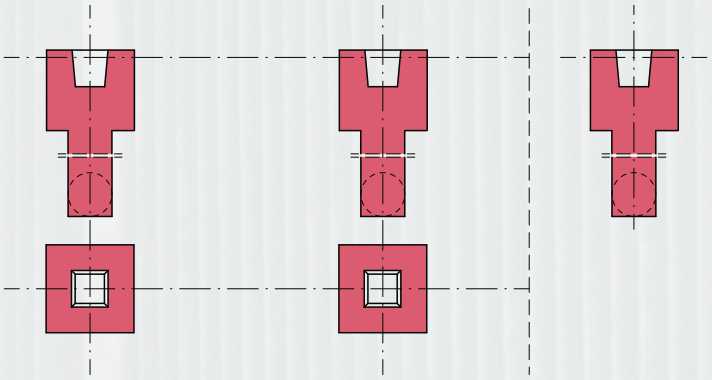
## FOUNDATIONS

Depending on terrain configuration, foundation soil properties, wind zone, and project requirements, the following types of foundations can be constructed:

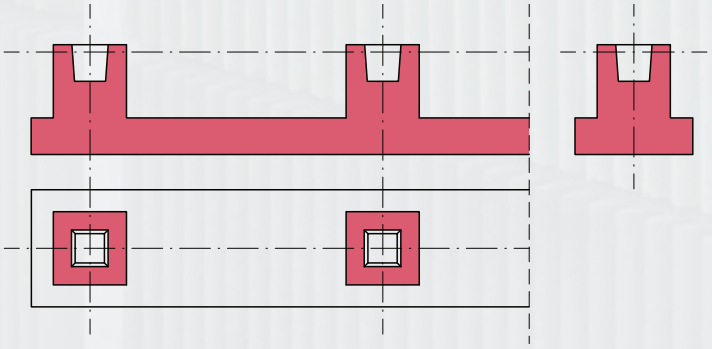
- **prefabricated foundation blocks with a base and prefabricated base plates**



- **foundations on bored RC piles with a base and prefabricated base plates**



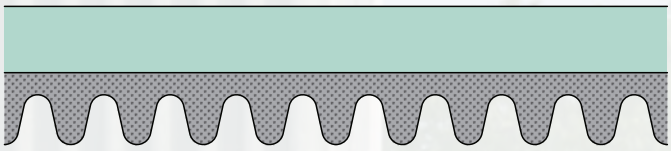
- **strip foundations with base blocks, the foundation cap and prefabricated base plates**



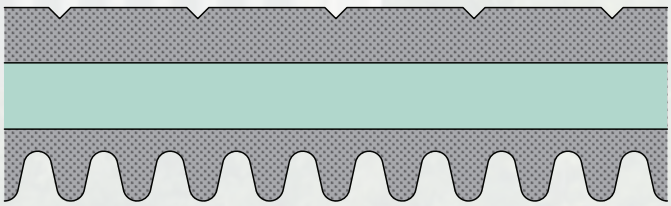
## ABSORBING LAYER

Panels can be produced with single-sided or double-sided noise absorbing layers, depending on project requirements:

- **single-sided absorbing panel**

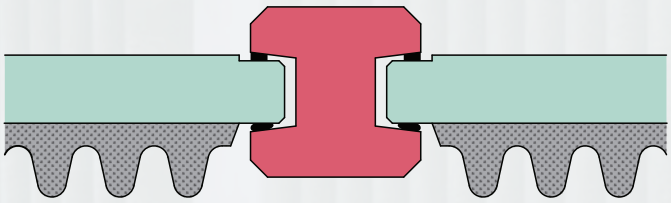


- **double-sided absorbing panel**



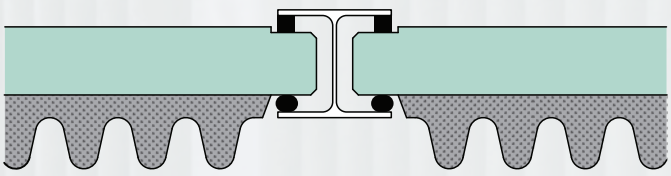
## COLUMNS

- **reinforced-concrete columns**



- H cross section
- concrete C30/37 XF4 VDP2 XC4 XC3 XC2 XC1 XC0
- column height 200 – 600 cm
- cross section 30 × 30 cm or 30 × 40 cm (depending on column height)
- surface finish – in colour as selected by architect

- **steel columns**



- type HEA or HEB, 120 – 280 mm
- column height 200 – 400 cm
- surface finish – sand blasted and varnished in colour as selected by architect

# Production process

**1** Mould preparation

**2** Rubber agregate pretreatment

**3** Absorbing layer concrete mixing

**4** Placing and compaction

**5** Reinforcement laying

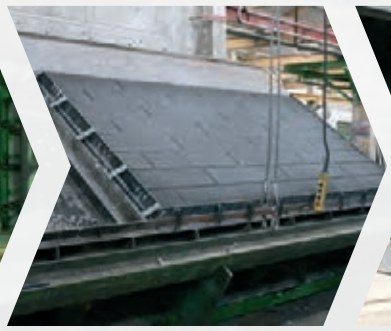
**6** Bearing layer concrete mixing

**7** Concrete placing and compaction

**8** Final surface treatment

**9** Concrete curing

**10** Demoulding



**11** Storing

**12** Transport and installation

**RUBBER GRANULE PRODUCTION PLANT**

- Gumiimpex-GRP, Varaždin, Croatia

**CONCRETE ELEMENT PRODUCTION PLANT**

- Beton Lučko LTD, Jastrebarsko, Croatia

# RUCONBAR

Rubberised Concrete Noise Barriers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