CALENBERG INGENIEURE

CISILENT®-GRP

< dB *Noise protection on high-speed railway lines*

Noise has no chance

Introduction

A noise barrier on a high speed railway line must not only have excellent noise attenuation properties to protect people living and working alongside the line, it must also be able to absorb as much sound energy as possible across all frequencies to ensure the travelling comfort of the passengers.

Calenberg Ingenieure has successfully fulfilled both these requirements by developing the Cisilent® GRP lightweight flexible noise barrier system.

Behaviour under load

- The Cisilent® GRP element is flexible in torsion and stiff in bending
- Very low dynamic magnification factor due to high natural frequency with a large spacing related to exciting frequency

Constructive

- Lightweight: Weight per unit area approx. 45 kg/m²
- Low tensions = low stresses = long service life
- No corrosion

Vandalism, reparability, maintenance

- No maintenance required
- GRP-Elements are easy to repair: simply laminate a GRP (glass-reinforced plastic) layer on to damage site (standard GRP repair technique)
- Inside face repaired by patching
- Smooth surface means graffiti is easily removed

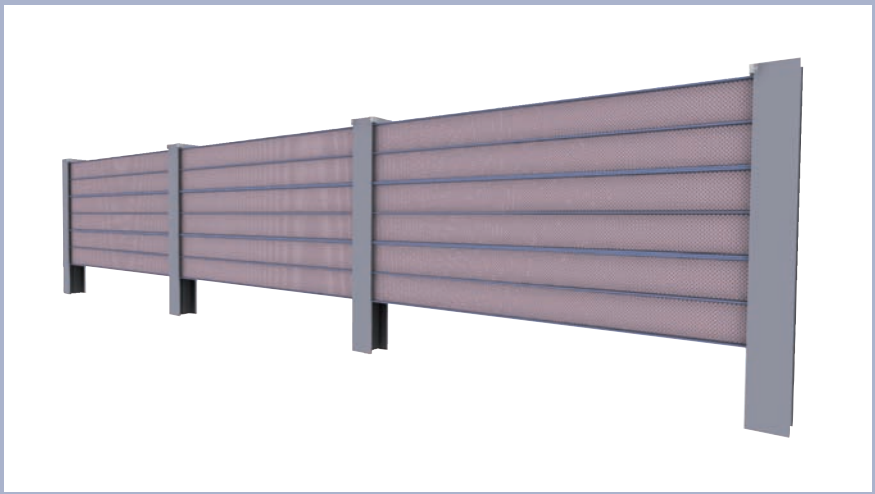

Figure 1: Cisilent® noise barrier, elevation of inside face

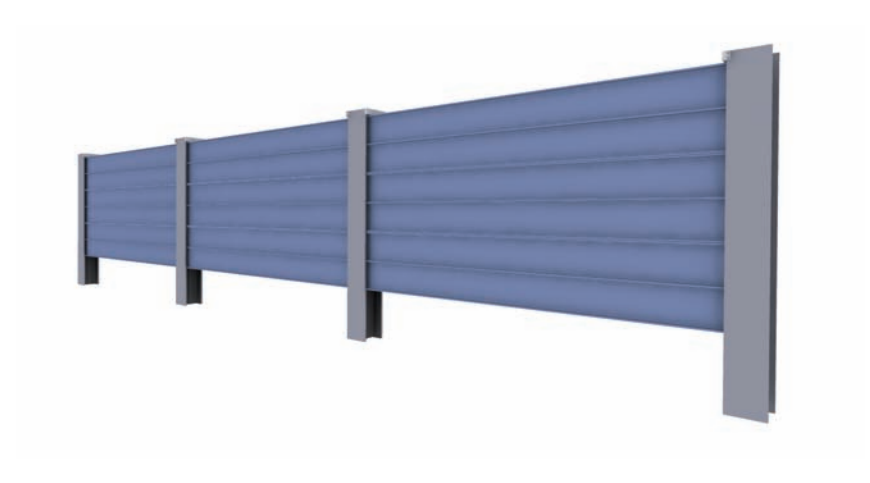

Figure 2: Cisilent® noise barrier, elevation of outside face

Figure 3: Cisilent® noise barrier GRP; element in plan

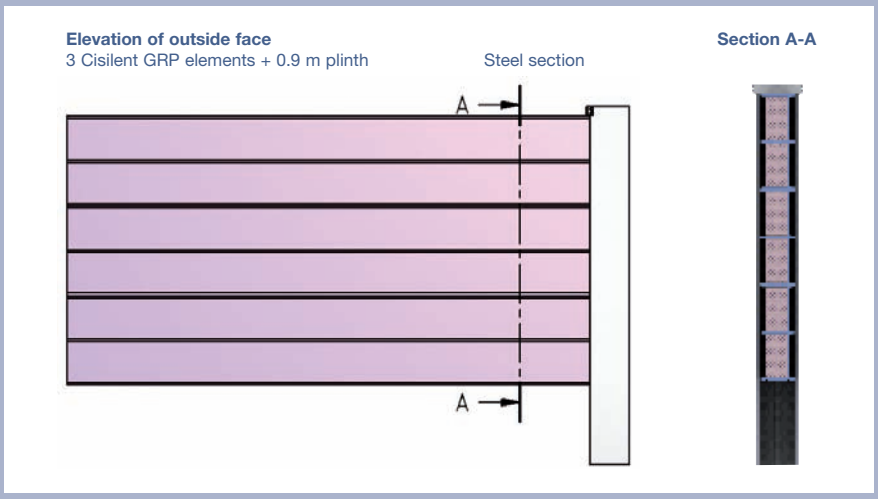

Figure 4: Noise barrier made of Cisilent GRP elements; elevation of wall side furthest away from noise source and cross section

Noise barrier made of Cisilent GRP noise barrier elements

A sound barrier in principle consists of a concrete plinth and sound-proofing elements put on it. These components are put into upright steel girders. The steel girders are fixed to the concrete base (picture 4).

Ordinary noise barrier elements usually are made from aluminium or concrete. Those elements can now be replaced by Cisilent GRP noise barrier elements.

Installation

- Transport to site possible with light-weight vehicles (advantage where access is poor).
- Comparatively low weight of approx. 120 kg.
- Extremely easy to handle, whether installing or removing: 3 – 4 workmen can move the elements by hand.
- Only small lifting device required.
- Due to small part sizes no conflicts with catenary or similar

Sound-proofing Membrane

- Membrane performance proven over many years, 10-year material warranty available.
- Mineral fibre filling supported by Cisilent membrane.
- Cisilent membrane with filling is flexible, moves with the shell.

Barrier construction

Shell Composition

Shell Composition

Shell material	Glassfibre-reinforced plastic (GRP)
Flange thickness	approx. 14 mm
Rib depth	approx. 175 mm
Height	approx. 500 mm
Length	to 5 m

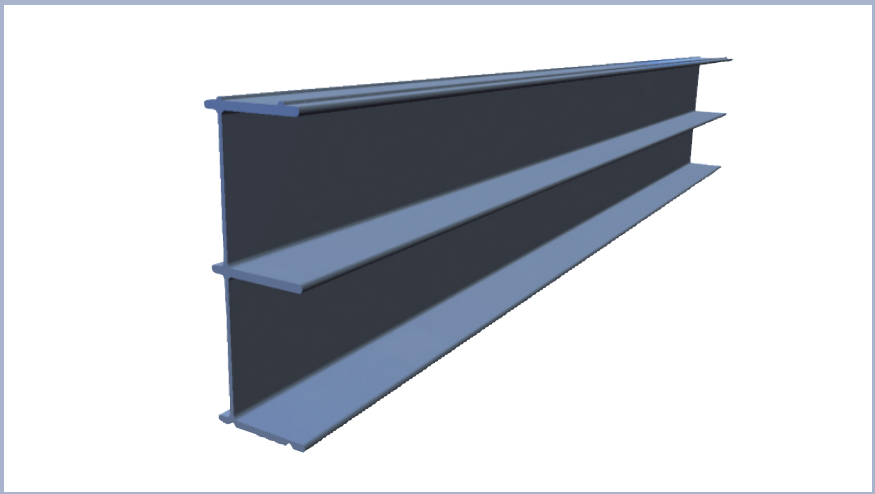

Figure 5: Cisilent GRP element

Cisilent GRP element

Cisilent GRP-elements consist of a GRP shell into which a suitably designed and dimensioned Cisilent noise insulation mat is glued (Figure 6)

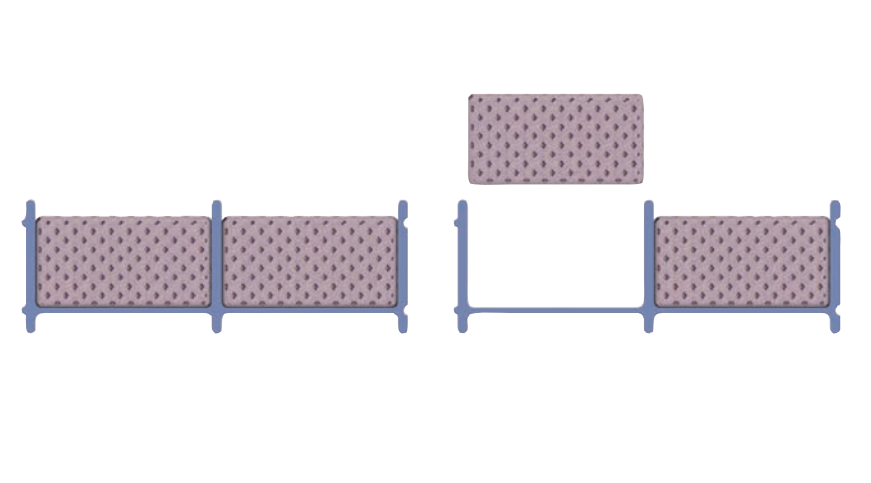

Figure 6: Construction with individual elements and brackets

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