Ochrona przed obrywami skalnymi

OBRE BIEL, MATTERHORN
GOTTHARD BAHN, CH
**OBRE BIEL, MATTERHORN GOTTHARD BAHN**

_Ochrona przed obrywami skalnymi_

<table>
<thead>
<tr>
<th>Projekt</th>
<th>Obre Biel, Matterhorn Gotthard Bahn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lokalizacja</td>
<td>Zermatt</td>
</tr>
<tr>
<td>Kraj / region</td>
<td>Szwajcaria</td>
</tr>
<tr>
<td>Rok Instalacji / montazu</td>
<td>2016</td>
</tr>
<tr>
<td>Inwestor</td>
<td>Matterhorn Gotthard Bahn (MGB)</td>
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<tr>
<td>Projektant</td>
<td>geoformer igp AG (wasser/schnee/lawinen - André Burkard AG)</td>
</tr>
<tr>
<td>Wykonawca</td>
<td>ABA Bautec AG</td>
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**Opis sytuacyjny projektu**

The railway line Matterhorn Gotthard has a section called Obre-Biel that is being used by as many as ten passenger trains per hour, along with cargo trains. Over the years, this section of the railway has been inundated by snow slides and smaller avalanches. Consequently, railway traffic has been severely impaired and has also created the danger of possible trail derailment. The line was also endangered by rockfalls.

**Opis zastosowanego rozwiązania**

The solution shall protect the railway line against snow slides, snow avalanches and rockfalls. Choosing flexible rockfall barriers will decrease the amount of traffic disturbances.

Standard rockfall barriers are designed to deal with loads caused by rockfalls. So, to serve as a multi-hazard protection system, some special dimensioning has to be implemented.

Such special dimensioning is not possible without involving computer simulations. For this purpose, Geobrugg uses finite element simulation software called FARO. FARO was originally developed by the Swiss Federal Institute for Forest, Snow and Landscape Research, and WSL, in order to simulate rockfall barriers with ring nets.

Further software development financed by the Commission for Technology and Innovation CTI allows surface load simulations caused by debris flows, shallow landslides and avalanches.

By using FARO software, a total of 182 meters of rockfall barriers were correctly dimensioned to protect the railway line. They were finally divided into three lines of 112, 42 and 28 meters.

**Chroniony obiekt**

Railway

**Zabezpieczenie przeciwwkorozjne**

Galvanized, GEOBRUGG SUPERCOATING®

<table>
<thead>
<tr>
<th>Wytrzymałość systemu</th>
<th>1000 kJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wysokosc ochronna systemu</td>
<td>5.0 m</td>
</tr>
<tr>
<td>Długość systemu</td>
<td>28 m - 112 m</td>
</tr>
</tbody>
</table>

Ochrona przed obrywami skalnymi | Obre Biel, Matterhorn Gotthard Bahn, CH
Multi Hazard Barrier protecting Matterhorn Gotthard Railway line against rockfalls, snow slides and smaller avalanches

Finite elements based simulation software FARO allowed the correct barrier dimensioning according to the customer requirements

Drilling works using walking excavator equipped with drill rig
Drilling with casing was necessary due to poor ground conditions and thus unstable drill holes.

Multi Hazard Barrier during installation - visible already positioned posts with retaining and lateral ropes.

ROCCO® ring net installation using shackles.
W celu uzyskania dokładniejszych informacji skontaktuj się z naszym Przedstawicielem.

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Fully installed Multi Hazard Barrier with special gap filling adjustment