TECCO®/SPIDER® systems made of high-tensile steel wire

SUSTAINABLE SLOPE PROTECTION
FOR THE MOST VALUABLE ASSET IN LIFE: OUR SAFETY.

Natural hazards such as torrential rain and earthquakes increase the threat of unstable slopes. More and more regions worldwide are being developed and transportation routes are extended at an enhanced rate. The sustainable stabilization of slopes is essential to assure a safe and economic development.

For over 20 years, we have been a pioneering developer and manufacturer of slope stabilization systems made of high-tensile steel wire nets and meshes. Today we offer with the TECCO® SYSTEM® and SPIDER® system a solution range that has proven itself over and over around the world. Starting in the planning phase your project can be developed specifically with our RUVOLUM® dimensioning software. This leads to an efficient solution and significantly safer slopes.
WE CAN PROVIDE YOU WITH THE COMPLETE SAFETY PACKAGE.

At your request we can take on the role of **consultant, planner** and even **project manager**. Both the solutions we offer and the quality of our customer service is valued by our customers. For us excellent service is an integral part of every single project. No matter which phase of the project you are in, we will provide you with the support and expertise required to achieve the best results – saving you both time and money.
THE FITTING SOLUTION FOR EVERY SLOPE.

TECCO® mesh is made out of high-tensile steel wire with a diameter of 2, 3, or 4 mm. It can be used to stabilize virtually any kind of slope, whether it consists of rock or loose soil. Combined with three different sizes of spike plates, TECCO® meshes offer variable soil nail grids. By dimensioning nail spacings, the installation becomes more cost-efficient. The SPIDER® system with a spiral rope net, reliably secures loose blocks, weathered rock, rock outcrops and overhanging blocks. Together, these systems offer maximum flexibility when planning and an attractive price/performance ratio in execution.
OUR SOLUTIONS: SAFE, SUSTAINABLE, EFFICIENT.

Three TECCO® mesh types and the SPIDER® spiral rope net, combined with spike plates and the RUVOLUM® dimensioning tool offer a complete solution. You will benefit from the result of components working in harmony, with decisive advantages compared to conventional solutions such as shotcrete walls, gabion hexagonal meshes and heavy gauge wire nettings. Key benefits are the efficient installation process combined with a system-wide dimensionable solution that is both visually aesthetic and long lasting.

Above: SPIDER® on rock slopes
The spiral rope made of three twisted, high-tensile steel wires is characterized by its high puncturing resistance. At the same time it is unobtrusive and can be tightly secured around protruding rock boulders.

Right: TECCO® SYSTEM3 in soil
The mesh surface is easily seamed together without the need to overlap panels which results in efficient use of mesh material without any waste.

Above and right: TECCO® SYSTEM3 installed on rock slopes
Pretensioning the mesh helps it adapt closely to the topography and prevents unwanted material accumulations. The soil nail grid is dimensioned based on the geotechnical parameters.

Find more projects and pictures: www.geobrugg.com/projects
HIGH-TENSILE STEEL WIRE FOR SUSTAINABLE STABILIZATION.

TECCO® SYSTEM³ and SPIDER® system – the right solution for any slope

Our systems are particularly characterized by their adaptability: parameters such as slope angle, geological conditions or aspired nail pattern can be ideally balanced and optimized. To secure rock blocks and boulders, our TECCO® meshes are complemented by the SPIDER® spiral rope net.

With the specially developed dimensioning tool RUVOLUM®, you can quickly determine the best system configuration, within the entire range from rock to loose soil.

Example: Slope stabilization with the TECCO® SYSTEM³ or the SPIDER® system
QUALITY YOU CAN RELY ON.

Compared with conventional protection methods, our systems use the highest strength-to-weight ratio possible to create solutions that are guaranteed to be exceptionally stable and visually appealing. The TECCO® SYSTEM³ offers a range of three different wire diameters along with three different types of spike plates to optimize the best solution for every kind of slope. As an option, we offer the SPIDER® System based on a spiral rope net. Both solutions can be adapted to suit local site conditions and thus meet the high requirements for securing surface instabilities as a complete system.

The TECCO® SYSTEM³ and the SPIDER® system provide the following features:

**High-tensile steel wire**
One single wire has a tensile strength of more than 1770 N/mm² limiting elongation and keeping the mesh highly pre-tensioned, providing reliable stability for the slope and minimizing deformations.

**Harmonized system**
Each system element is designed to work in perfect harmony with the rest, ensuring that the forces are transferred efficiently over the entire system. The dimensioning is carried out with our free dimensioning software RUVOLUM®.

**Rhomboid mesh wire structure**
Our unique mesh shape transfers forces to the nails very efficiently, preventing deformation within the system. The mesh provides the best possible stability for the geological conditions on site and can be tightly secured even on irregular terrain.

**Knotted ends**
These ensure that maximum stability is retained right up to the border edges, removing the need for overlap and allowing the mesh and netting to be unrolled easily and independently.

**Lightweight**
The high-tensile steel wire’s outstanding strength-to-weight ratio makes transport and installation easier. Unstable slopes are given long-term stability with minimal impact on nature and with low CO₂ footprint.

**Smaller mesh width for soil**
TECCO® G45/2 with a smaller opening size and 2 mm wire diameter is unobtrusive and stabilizes slopes with fine material structure. The mesh parameters synchronize with the P25 spike plate and the other components of the TECCO® product family.

**Corrosion protection**
With GEOBRUGG SUPERCOATING® or GEOBRUGG ULTRACOATING® our systems are designed to last for generations and require very little maintenance. For particularly demanding environments we offer our products in stainless steel or with PET coating.
The RUVOLOM® online tool is the free dimensioning software for our slope stabilization systems. Depending on geotechnical parameters implemented, this tool determines the forces and loads acting on the mesh and at the anchor points. As a result it provides reliably the static verification for the overall solution.
RUVOUM®: THE DIMENSIONING SOFTWARE FOR INSTABILITIES NEAR THE SURFACE.

For determining the forces acting within a stabilization system, Geobrugg developed the RUVOUM® online tool to assist engineers and planners.

RUVOUM® provides the static verification of the system:
- Puncturing of the mesh
- Combined loads on the nails and anchors
- Shearing of the mesh on the upper edge of the spike plate
- Forces parallel to the slope which can be transmitted from the mesh onto a nail

If necessary RUVOUM® considers the following load cases:
- Earthquake
- Streaming ground water pressure

The dimensioning base of the RUVOUM® model.

1a Local instabilities between the nails
Where local slope instabilities occur between the soil nails, RUVOUM® calculates the ability of the high-tensile steel mesh to resist shearing-off at the spike plate interface.

1b Instabilities near the surface and parallel to the slope
The nails must detain the material from mobilizing. The number and layout of the nails can be dimensioned according to the forces calculated based on soil properties, slope angle, seismic loading and streaming pressure.

2 Global instability
Soil nailing for deep seated slope failures is additionally dimensioned with slope stability methods and compared with the RUVOUM® results.

The TECCO® SYSTEM³ and the SPIDER® system provide a higher level of protection as conventional protective covering, at the same time requiring significantly reduced numbers of nails. This lowers the total project costs and shortens the installation time.

We provide you RUVOUM® free of charge on http://applications.geobrugg.com
WE DON'T LEAVE SAFETY TO CHANCE.

Test setup in Winterthur, Switzerland: full-scale field test, TECCO® SYSTEM³.

Our systems are developed at our headquarters in Romanshorn, Switzerland. They are tested in collaboration with independent research institutes and under the supervision of accredited certification bodies. In a worldwide unique real-scale test setting with varying layouts, it has been proven that our TECCO® SYSTEM³ transmits the forces of the slope to the soil nails perfectly.

We have used the results of these tests to verify and further develop our RUVOLUM® dimensioning tool.
**TECHNICAL DATA:**

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>TECCO® G45/2</th>
<th>TECCO® G65/3</th>
<th>TECCO® G65/4</th>
<th>SPIDER® S3-130</th>
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<tbody>
<tr>
<td>ETA approval no.</td>
<td>Pending</td>
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<tr>
<td>Wire diameter</td>
<td>2.0 mm</td>
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<td>Mesh width</td>
<td>48 mm</td>
<td>65 mm</td>
<td>63 mm</td>
<td>143 mm</td>
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<tr>
<td>Steel wire tensile strength</td>
<td>≥ 1770 N/mm²</td>
<td>≥ 1770 N/mm²</td>
<td>≥ 1770 N/mm²</td>
<td>≥ 1770 N/mm²</td>
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<tr>
<td>Deformation/maximum tensile force (in acc. with test reports)</td>
<td>6.5%/85 kNm⁻¹</td>
<td>6.5%/150 kNm⁻¹</td>
<td>7%/250 kNm⁻¹</td>
<td>8%/220 kNm⁻¹</td>
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<tr>
<td>Roll edge (mesh ends)</td>
<td>knotted</td>
<td>knotted</td>
<td>knotted</td>
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</tr>
<tr>
<td>Roll dimensions (width x length)</td>
<td>3.9 x 30 m</td>
<td>3.9 x 30 m</td>
<td>3.5 x 20 m</td>
<td>3.5 x 20 m</td>
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<tr>
<td>Total area per roll</td>
<td>117 m²</td>
<td>117 m²</td>
<td>70 m²</td>
<td>70 m²</td>
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<tr>
<td>Weight per roll</td>
<td>135 kg</td>
<td>193 kg</td>
<td>231 kg</td>
<td>182 kg</td>
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<td>Weight/m²</td>
<td>1.15 kg/m²</td>
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<td>Corrosion protection</td>
<td>SUPERCOATING</td>
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<tr>
<td></td>
<td>ULTRACOATING</td>
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<td></td>
<td>Stainless steel</td>
<td>PET coating*</td>
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**LOAD-BEARING RESISTANCES**

<table>
<thead>
<tr>
<th></th>
<th>P25/P33 SPIKE PLATE</th>
<th>P33/P66 SPIKE PLATE</th>
<th>P33/P66 SPIKE PLATE</th>
<th>P33/P66 SPIKE PLATE</th>
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</thead>
<tbody>
<tr>
<td>Bearing resistance of the mesh against puncturing (2xPᵣ)</td>
<td>80 kN/110 kN</td>
<td>180 kN/240 kN</td>
<td>280 kN/370 kN</td>
<td>230 kN/300 kN</td>
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<td>Bearing resistance of the mesh against slope-parallel tensile stress (Zᵣ)</td>
<td>10 kN/10kN</td>
<td>30 kN/45 kN</td>
<td>50 kN/75 kN</td>
<td>45 kN/70 kN</td>
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</tbody>
</table>

*Not available in all markets. Please contact your local representative.

We reserve the right to make technical changes.