# SUSTAINABLE SLOPE PROTECTION

## TECCO<sup>®</sup>/SPIDER<sup>®</sup> systems made of high-tensile steel wire

With the TECCO<sup>®</sup> and SPIDER<sup>®</sup> systems we offer worldwide proven solutions. Already in the planning phase, a project-specific, efficient solution can be developed with the free RUVOLUM<sup>®</sup> software, which makes the slopes significantly safer.



Safety is our nature

## Our solutions: safe, sustainable, efficient

**TECCO® mesh** is made of high-strength steel wire. It can be used to stabilize almost any kind of slope, whether it consists of rock or loose soil. Combined with three different sizes of spikeplates, TECCO® mesh enables a variable soil nail grid, making installations more cost-effective. The **SPIDER**<sup>®</sup> **system** with a spiral ropenet reliably secures loose blocks, weathered rock, rock outcrops and overhanging blocks. Together both systems offer maximum flexibility in planning and an attractive price/ performance ratio in execution.



#### TECCO<sup>®</sup> system on a soil slope

The mesh surface is easily clipped together without the need to overlap panels which results in efficient use of mesh material without any waste.



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.



TECCO<sup>®</sup> STAINLESS installed at the coast Our stainless steel mesh is made out of high-tensile steel and offers the same advantages as our other TECCO<sup>®</sup> systems. Stainless steel is well suited to applications in coastal areas.



#### Solution for highly corrosive areas

# High-tensile steel wire for stabilization

### TECCO<sup>®</sup> and SPIDER<sup>®</sup> 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**<sup>®</sup> meshes are complemented by the **SPIDER**<sup>®</sup> spiral rope net.

With the specially developed freely available dimensioning tool **RUVOLUM**<sup>®</sup>, you can quickly determine the best system configuration, within the entire range from rock to loose soil.



#### Slope stabilization with the TECCO® or the SPIDER® system



## Quality you can rely on

Our TECCO<sup>®</sup> system offers a range of three different wire diameters along with different types of spike plates to optimize the solution for every kind of slope. As an option, we offer our SPIDER<sup>®</sup> 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.

### Our TECCO<sup>®</sup> und SPIDER<sup>®</sup> system your advantages

#### **High-tensile steel wire**

One single wire has a tensile strength of more than 1770 N/mm<sup>2</sup> limiting elongation and keeping the mesh highly pre-tensioned, providing reliable stability for the slope and minimizing deformations.

#### **Complete system tested**

Our meshes are the only slope stabilization systems to have been tested in large-scale field tests and carry a CE mark in accordance with EAD 230025-00-0106.

#### **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.

#### Light and unobtrusive

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 CO, footprint.

#### **Corrosion protection**

The corrosion protection of our systems will last for generations. So that our customers will benefit from low maintenance costs. For particularly demanding environments we offer our products in stainless steel.

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 RUVOLUM® ONLINETOOL

RUVOLUM® ONLINE TOOL

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The RUVOLUM<sup>®</sup> 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.

## **RUVOLUM®: The dimensioning software** for instabilities near the surface

For determining the forces acting within a stabilization system, Geobrugg developed the RUVOLUM<sup>®</sup> online tool to assist engineers and planners.

### **RUVOLUM®** 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 RUVOLUM<sup>®</sup> considers the following load cases:

- ► Earthquake
- Streaming ground water pressure



# The dimensioning base of the RUVOLUM® model

#### Local instabilities between the nails

Where local slope instabilities occur between the soil nails, RUVOLUM<sup>®</sup> 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.





#### Global instability

Soil nailing for deep seated slope failures is additionally dimensioned with slope stability methods and compared with the RUVOLUM® results.



#### **Cost-optimized solution**

The TECCO<sup>®</sup> and the SPIDER<sup>®</sup> 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 RUVOLUM® free of charge on: www.mygeobrugg.com



# WE DON'T LEAVE SAFETY TO CHANCE

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**° **system** 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.



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