

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

## SUSTAINABLE SLOPE PROTECTION





# FOR THE MOST VALUABLE ASSET IN LIFE: OUR SAFETY.

Rheinfall Scharfhausen, Switzerland: Installation of the TECCO® system 2010

More and more regions around the world are being developed for infrastructure and are being opened up by transport routes. The sustainable stabilization of adjacent slopes is in many cases unavoidable for safety reasons, as these often become unstable due to natural events such as heavy rain.

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



# 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 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.

Waldaschaff, Germany: Installed TECCO® system.

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® 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.



# OUR SOLUTIONS: SAFE, SUSTAINABLE, EFFICIENT.

The RUVOLUM® tool offers a complete solution. You benefit from components that are perfectly matched to each other. Key benefits are the efficient installation process combined with a dimensionable solution which is both visually appealing and durable.



## **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® 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.

# SOLUTION FOR HIGHLY CORROSIVE AREAS.



## **Above and right: TECCO® 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® systems. Stainless steel is well suited to applications in coastal areas.

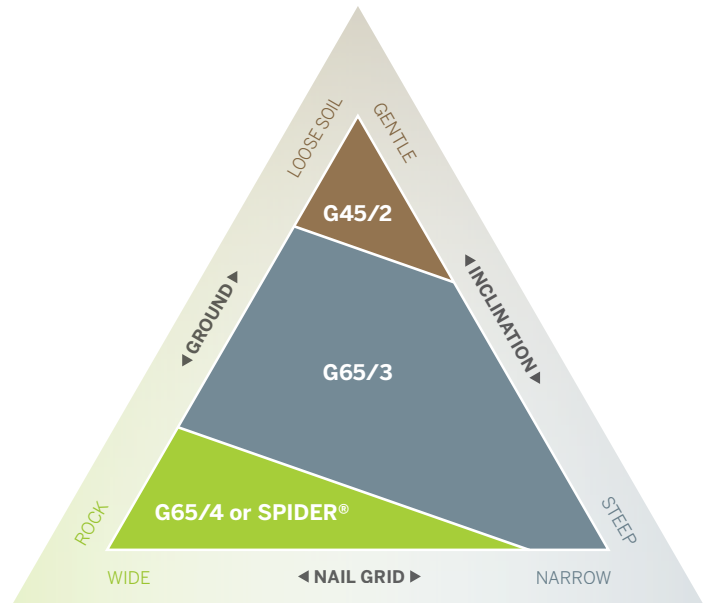


# HIGH-TENSILE STEEL WIRE FOR SUSTAINABLE STABILIZATION.

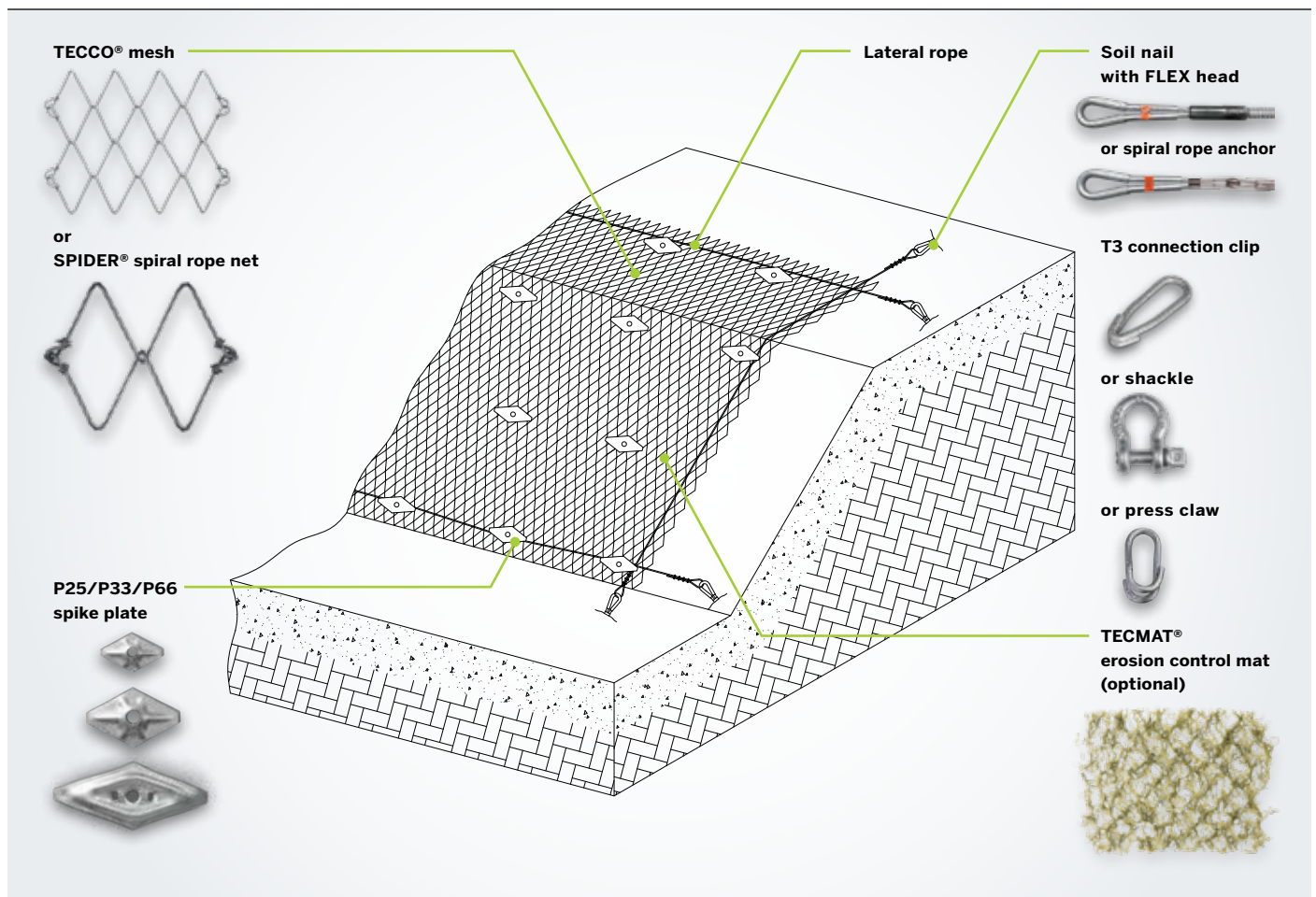
## TECCO® and SPIDER® system – the right solution for any slope

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 freely available dimensioning tool **RUVOLUM®**, 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.

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. Our **TECCO® 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® 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® and SPIDER® system provides the following features:



### 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 systems tested

Our meshes are the only slope protection systems that have been tested in large-scale field tests and bear a CE mark according to 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<sub>2</sub> 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.



# THE RUVOLUM® ONLINETOOL.

Gebrugg headquarters in Romanshorn, Switzerland; Dimensioning of the IFCCO® system

The **RUVOLUM® 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® 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® considers the following load cases:**

- Earthquake
- Streaming ground water pressure

The dimensioning base of the RUVOLUM® model

## 1a Local instabilities between the nails

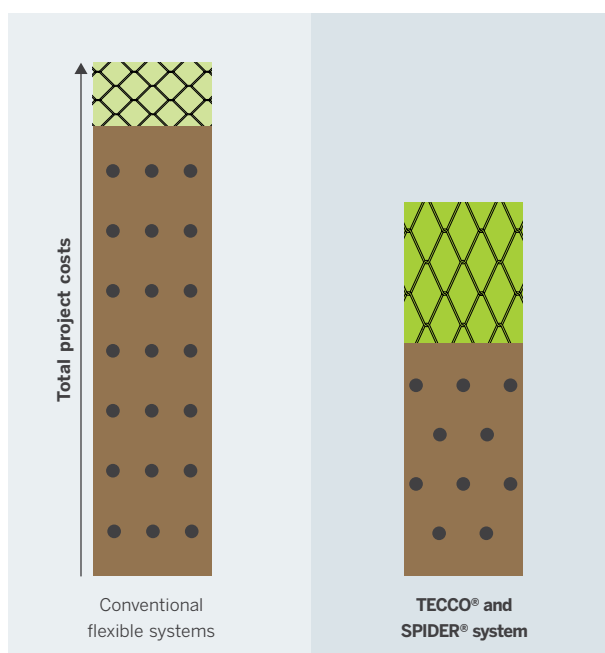
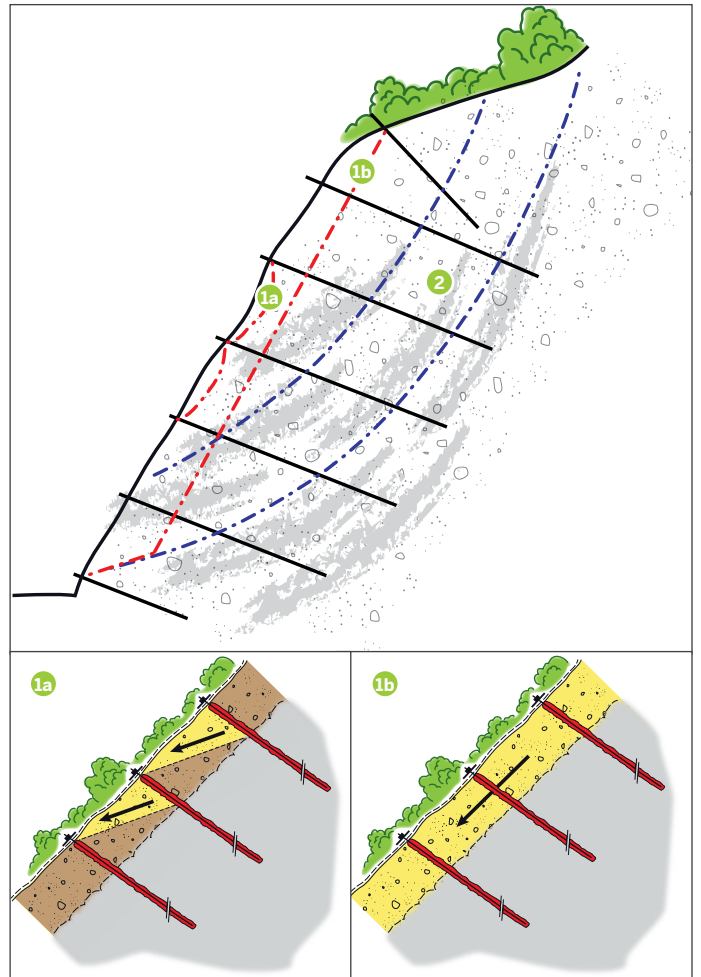
Where local slope instabilities occur between the soil nails, RUVOLUM® calculates the ability of the high-tensile steel mesh to resist shearing-off at the spike plate interface.

## 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 RUVOLUM® results.



## Cost-optimized solution

The TECCO® 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 RUVOLUM® free of charge on:  
[www.mygeobrugg.com](http://www.mygeobrugg.com)

# WE DON'T LEAVE SAFETY TO CHANCE.

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

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 **RUVOLOM®** dimensioning tool.

**GEOBRUGG®**  
Safety is our nature

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# PROVEN RELIABILITY WORLDWIDE.



Watch the video about our full-scale field test:  
[www.geobruigg.com/TECCO-fullscale](http://www.geobruigg.com/TECCO-fullscale)



Your local GeobruGG specialist:  
[www.geobruGG.com/contacts](http://www.geobruGG.com/contacts)

**GeobruGG AG**  
Aachstrasse 11 | 8590 Romanshorn | Switzerland  
[www.geobruGG.com](http://www.geobruGG.com)

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