Natural Hazard Protection

Safety without Compromise
SAFE
EFFECTIVE
ECONOMICAL
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About Us
Who we are

TRUMER Schutzbauten is your competent and experienced partner regarding barriers to protect from natural hazards. The company was established in 1991 in Obertrum near Salzburg (Austria). Our teams in Austria, Germany, Canada and the United States consist of experienced engineers, geologists and technicians. They develop innovative solutions that are implemented at our production in Obertrum.

We offer solutions for protection from natural hazards like:

✔ Rockfall
✔ Instable slopes
✔ Shallow landslides
✔ Debris flows
✔ Bank erosion
✔ Avalanches

Following our motto:

Safety by Competence - Safety without Compromise

TRUMER develops and manufactures safe, effective and economical solutions.

Our Mission

With our development and production of protective systems we support worldwide the efforts of geologists, engineers and installation companies to protect habitats, buildings and infrastructure from natural hazards.

Our Vision

TRUMER strives to advance the safety and reliability of mitigation structures for natural hazards beyond standard certification, to meet your highest expectations.
What we do

Our products are the result of intensive research and development, as well as many years of experience in the field of protection from natural hazards.

With the establishment of our test and development facility at Erzberg (Austria) in the year 2000, we laid the foundation for trend-setting developments in the area of protective structures.

Here, engineers, technicians, construction companies and universities work together to ensure the continuous development of TRUMER products.

The patented components, which characterize our systems as unique are:

- Omega-Nets
- AVT and GDV brake systems
- Middle rope solutions for limited deflection
- Integrated rope guides

Full scale tests of protective structures and individual components are the basis of our product development.

TRUMER rockfall protection systems were tested in 1:1 scale field tests in accordance with the Austrian WLV guideline. Since 2008 they have been tested, verified and certified to meet or exceed the requirements of the European guideline ETAG 27.
Debris flow barrier with Lambda-Frame
» What we do for you

For the following areas of application we offer standard and special solutions for protective structures from natural hazards:

✓ Residential and commercial areas
✓ Public facilities
✓ Railways
✓ Roads
✓ Construction sites
✓ Mines
✓ Coast and river embankments
✓ Tourist areas

Our products are produced in the modern production facilities of TRUMER Schutzbauten in Obertrum, Austria. We are ISO 9001:2008 certified and so implement an extensive and efficient quality management program to ensure the highest quality and durability of our protection structures.

We provide advice on an individual basis, whereby customer satisfaction is our goal. Regardless of the project size, our product and service benefits will put you a step ahead of your competitors.

» Your advantages

■ Comprehensive customer care
■ Technically correct solutions
■ Simple to install
■ Easy to maintain

■ High-quality material
■ Unmatched safety standards
■ High life expectancy
■ Cost efficient solutions
Natural hazards and their effects

- Human habitats are often endangered by natural hazards. Due to climate change and the increasing settlement in vulnerable areas it can be assumed that the number of natural hazards will increase.

- Damage and destruction for buildings and infrastructure are in many cases avoidable. The same can be said for secondary costs such as social and economic factors that may not be as evident at first glance.

- In addition, questions of political and juristic responsibilities are often asked after the fact.
TRUMER Schutzbauten offers safe, effective and economical solutions to minimize the negative effects of natural hazards before, during and after an event.
Rockfall protection
Rockfall protection systems are used as technical protection at possible deposit and transit zones to mitigate the risk of debris and rockfall.

For this purpose TRUMER offers certified protection systems in accordance with the ETAG 27 and Austrian WLV guidelines. Standard as well as special solutions are available even for the most demanding terrain.

The well proven design of bearing elements, the modular construction, as well as the unique flexibility of the TRUMER Omega-Net allow the perfect adaptability of TRUMER rockfall protection systems to the local topographical conditions.

TRUMER rockfall protection systems are available as:

- Hinged mounted rockfall catchment fences with upslope anchored retaining ropes
- Fixed-rotation rockfall catchment fences without upslope anchored retaining ropes

**Technical advantages**

- Tested in 1:1 scale field tests in accordance with the ETAG 27 and Austrian WLV guidelines
- Perfect adaptability to terrain and individual requirements
- Low deflection due to middle rope technology
- Easy handling due to compact units
- Easy and quick installation
- Installation optimized components
- Optional remote monitoring
- Extremely long-lasting corrosion protection due to Zn or ZnAl galvanizing according to EN ISO 1461 and EN 10244-2

**Cost advantage**

- Low transport costs due to compact units
- Low installation costs due to optimized construction
- Robust components reduce maintenance costs
- Cost efficient clearing after an event due to TRUMER curtain technique
- Often no need for secondary mesh layer due to small mesh openings of the Omega-Net
- Optional remote monitoring reduces inspection costs
- Premium quality lowers overall costs
Slope stabilization
Rockfall protection nets and wire meshes are primarily used as a preventative step against the release of a single block or unstable area. Stabilized areas can then be recaptured through a new cover of vegetation.

Depending on the load scenario, TRUMER wire meshes or Omega wire-rope nets can be used as a mitigation measure. The facing is fixed either at defined points using spike plates or by horizontal and/or vertical ropes according to the estimation of the static design.

Regardless of the topographical situation TRUMER offers proven solutions, which consider the technical challenges as well as the often limited budget of these projects.

» Technical advantages
- Isotropic force absorption of the wire mesh and the Omega-Nets
- Customized solutions by choice of different mesh openings, wire and wire rope diameters
- Simplest application due to the high elasticity of the Omega-Net
- Installation optimized components
- Easy and quick installation
- Extremely long-lasting corrosion protection due to Zn or ZnAl galvanizing according to EN ISO 1461 and EN 10244-2

» Cost advantage
- Isotropic force absorption minimizes installation and project costs
- Optimised material usage by precise manufacturing of the Omega-Nets
- Optimised material usage due to choice of various mesh roll lengths and widths
- No costs for special tools
- Robust components reduce maintenance costs
- Longevity reduces overall costs

Isotropic: same tensile strength in both directions
Shallow landslide protection
Due to the increase in intense rain events, the protection of humans and their infrastructure in populated and utilized areas from landslides is essential.

TRUMER meets this challenge with the consequent development of flexible barriers, which offer maximum protection that is technically feasible, but without affecting the quality of life in the involved areas.

The flexibility and high retention capacity of the Omega-Net allows the TRUMER shallow landslide systems to absorb the impact of incoming debris material, to hold it back and to drain it.

TRUMER shallow landslide protection systems were tested and certified in realistic 1:1 scale tests under the supervision of the international ETAG27 licensing office TSUS.

» Flexible barriers for protection from near-surface landslides.

» Technical advantages

- System design in accordance with valid 1:1 scale tests
- Optimised adaptability, also in complex topographical terrain
- Easy handling due to compact units
- Easy and quick installation
- Installation optimized components
- Optional remote monitoring
- Extremely long-lasting corrosion protection due to Zn or ZnAl galvanizing according to EN ISO 1461 and EN 10244-2

» Cost advantage

- Cost efficient solution compared to the entire mesh coverage of the unstable slope
- Low transport costs due to compact units
- Low installation costs due to optimized construction
- Robust components reduce maintance costs
- Cost efficient clearing after an event due to TRUMER curtain technique
- Optional remote monitoring reduces inspection costs
- Longevity reduces overall costs
Debris flow protection
Authorities, planners and those affected in the hazardous areas are again and again confronted with new challenges of the destructive effects caused by debris flows.

The main triggering factors of such water-laden mass movements are temporary intense rain events or long lasting precipitation.

Debris flows moving downhill in streams and gullies do not only threaten roads and infrastructure, but also the loss of life for the inhabitants.

The flexible TRUMER debris flow barriers offer protection to this end, stopping debris masses in the channel. This factor extremely minimizes the risk of danger for affected residents. Furthermore the easy installation allows a reliable and economical design of individual or combined barriers.

» Technical advantages

✓ Quick implementation of projects in comparison with conventional reinforced concrete torrent structures
✓ Application for temporary or permanent protection
✓ Natural sediment transport and bed load budget is not disturbed under normal flow conditions
✓ Optional warning or monitoring system
✓ Wildlife portals and passage for river life are possible
✓ Low CO₂ footprint compared to traditional reinforced concrete torrent structures

» Cost advantage

✓ Low material costs compared to rigid reinforced concrete structures with same absorption capacity
✓ Low installation costs and saving of time due to optimized construction
✓ Robust components reduce maintenance costs
✓ Easy and quick clearing after an event due to TRUMER curtain technique
✓ Optional remote monitoring reduces inspection costs
Bank erosion control
Gabion boxes are found all over the world for decades as rockfall and slope erosion protection.

**TRUMER offers the following gabion products:**
- Gabion boxes made from double twisted hexagonal mesh
- Gabion boxes made from spot-welded mats

Gabion boxes nowadays are used in the following areas:
- Retaining structure, e.g. at the slope toe
- Bank erosion protection
- Undercutting protection
- Structural hydraulic engineering
- Noise control and blinds
- Landscaping

TRUMER gabion boxes are made of high-quality wire and have an extremely resistant corrosion protection.

**» Technical advantages**
- Flexible and lasting solution
- In contrast to traditional support structures, they are capable of drainage over the entire period of operation
- Easy and quick installation
- Aesthetic appeal
- Extremely long-lasting corrosion protection due to Zn or ZnAl galvanizing according to EN ISO 1461 and EN 10244-2
- Low CO₂ footprint compared to traditional reinforced concrete torrent structure

**» Cost advantage**
- Lower material costs than for conventional concrete structures
- Low installation costs
- No costs for special tools
- On-site material for filling can be used
- Low transport costs
- Longevity reduces overall costs
Avalanche protection
TRUMER avalanche protection is a permanent technical solution that guarantees maximum safety. The combination of a well thought-out frame with the unique properties of the TRUMER Omega-Net leads to a premium quality product without affecting the landscape.

TRUMER avalanche protection systems are designed in accordance with the Austrian ONR 24806 and the Swiss guideline “Defense structures in avalanche starting zones”. These structures represent an aesthetic alternative in sensitive scenic areas to conventional steel supporting structures.

In addition, TRUMER offers the Snowcatcher, which has similar functionality to the TRUMER debris flow barriers. In contrast to structures in the starting zone, where the supporting effect of the snow pack is necessary, the Snowcatcher is installed in the run-out or deposition areas to stop avalanches already in motion. Through the subsequent reduction of run-out length, infrastructure, buildings or touristic areas (e.g. ski slopes) are protected.

### » Technical advantages
- Designed in accordance with the Austrian ONR 24806 and the Swiss “Defense structures in avalanche starting zones” guidelines
- Weather independent reliable protection
- Additional rockfall protection
- Better adaptability even in difficult terrain compared to conventional avalanche steel structures
- Easy and quick installation of the compact units
- Avalanche protection in the starting zone offers the possibility of reforestation
- Extremely long-lasting corrosion protection due to Zn or ZnAl galvanizing according to EN ISO 1461 and EN 10244-2

### » Cost advantage
- No additional costs compared to ongoing costs of controlled avalanche blasting
- Low transport costs due to compact units
- Low installation costs due to optimized construction
- Robust components reduce maintenance costs
- Premium quality lowers overall costs
Research and Development

Full scale rockfall test
The highest level of safety occurs only given the correct testing environment and when tests are carried out again and again under the toughest conditions, which leads to the development of protection structures having safety without compromise.

Since 2000, TRUMER owns a modern equipped research and development center. Here, TRUMER products are tested and certified on their reliability considering the state-of-the-art.

In cooperation with leading scientists, engineers, as well as with the involvement of end clients and installation companies, new products are developed and proven products optimized. For this purpose the newest equipment, instrumentation and technical documentation is available.

TRUMER rockfall protection systems are developed, tested and certified at Erzberg (Austria) on the most modern and efficient inclined test site in the world. Almost all rockfall barriers are installed on slopes between 30° to 45° and not on vertical walls. For this reason, TRUMER guarantees a maximum protective effect due to the realistic conditions of the test.

The range of application and performance of individual components of a TRUMER system is verified with different test procedures:

- Tension tests
- Puncture tests
- Shear force tests
- Tree-trunk tests

» Certified Safety for your project

TRUMER is your reliable partner in terms of safety: before, during and after your project. Not only the TRUMER products are tested and certified to the highest standards, also the entire business processes meet the highest quality requirements according to ISO 9001:2008.
Support and Services

Project: Ōmiš/Croatia 2012

On-site support

Installation of the net-post packages

... ready for installation!
» Your qualified partner from the very beginning!
TRUMER - more than just a system supplier.

TRUMER Schutzbauten is not just a system supplier, but helps you design, implement and maintain your project from the beginning to the completion.

Even after installation and long years of use, we supply support regarding maintenance, clearing as well as replacement or modification.

» Services

✓ Support for project development and planning
✓ Support for creation of safety concepts
✓ Development of special solutions
✓ On-site support in all stages of project
✓ Qualified final inspection of the structure
✓ Assistance with questions on maintenance and clearing
✓ Assistance with questions on repair and replacement
✓ Modification and upgrade after long years of use
✓ Sales support
✓ Installation support and training
✓ Training of maintenance teams
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