# Rockfall Protection System

## TSC-250-ZD

### Classification

| | | |
|---|---|---|
| Model | TSC-250-ZD | |
| Style | Hinged system | |
| Energy Class | 1 | |
| Certified/Tested MEL Energy Level [kJ] | 250 | 260 |
| SEL Energy Level [kJ] | 108 | |
| Approved Heights EOTA [m] | 2.5 - 3.0 | |
| Approved Heights BAFU [m] | - | |
| Verification | Full Scale Tested | |
| Consequence Class (max.) | CC3 | |

**Application Area:**
TRUMER rockfall protection systems were developed to protect infrastructure, buildings, and human life from rockfall and block impact. They are installed in the transit or deposition zone close to the object to be protected. The rockfall protection system TSC-250-ZD can be used for projects subject to consequence class CC3 in EN 1990 according to ONR 24810.

**Material and Quality:**
The steel components and steel wire ropes used by TRUMER meet the highest standards, which are ensured through a rigorous quality management system. The product has been assessed in accordance with EAD 340059-00-0106 and is manufactured in compliance with the issued ETA. In addition, TRUMER SCHUTZBAUTEN is an ISO 9001-certified company.

**Execution and Anchoring:**
The proposed design of the rockfall protection system is based on the construction specifications of ONR 24810. Support spacings between 8 m and 12 m are recommended. The positions and inclinations of the supports should be chosen so that maximum retention capacity is provided for potential rock and block impacts in the direction of the slope as well as at an angle to it, and so that the system is not bypassed. Post positions in areas with a high probability of direct impact on the post should be avoided. According to the recommendations of ONR 24810, fence sections should not be longer than 60 m or should be tensioned every 60 m.

### Test Summary

| | |
|---|---|
| Test Height [m] | 2.5 |
| Maximum Elongation [m] | 4.6 |
| Remaining usable height [%] | ≥50 (A) [1] |
| Openings in the Net | No |
| Secondary Mesh | No |

1 Class of remaining usable height according to EAD 340059-00-0106

### European Technical Assessment

| | |
|---|---|
| ETA Number | ETA-12/0204 |
| Issuing Body | Austrian Institute of Construction Engineering (OIB) |

### Certificate of Constancy of Performance

| | |
|---|---|
| Certificate Number | 1379-CPR-022/14 |
| Issuing Body | TVFA TU Graz, TVFA-ZERT |

Trumer Schutzbauten GmbH • Landstrasse 244 • 5424 Bad Vigaun • Austria
Tel.: +43 6219 2023340 • office@trumer.cc • www.trumer.cc

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## Primary Net

| | |
|---|---|
| Model | Omega-Netz 6.0/135 |
| Type | Wire Rope Net |
| Type | 1x7 |
| Diameter [mm] | 6.0 |
| Corrosion Protection | Zn-galvanized / ZnAl-galvanized [1] |
| Mesh Size [mm] | 135 x 135 |
| Weight [kg/m²] | 4.0 |
| Connection to the suspension cable | Threaded |
| Connection of the mesh panels | Shackled |

[1] in accordance with European standard EN 10244-2 (Class A or Class B)

## Ropes

| | | |
|---|---|---|
| Bearing rope | Quantity | 2 |
| | Rope Diameter [mm] | 16 |
| | Corrosion Protection | Zn-galvanized / ZnAl-galvanized [1] |
| | Brake Elements per Rope | 2 |
| | Brake Element Model | AVT phx 60/30-1,5 |
| Middle Rope | Quantity | - |
| | Rope Diameter [mm] | - |
| | Corrosion Protection | - [1] |
| | Brake Elements per Rope | - |
| | Brake Element Model | - - |
| Retaining Rope | Quantity | 2 |
| | Rope Diameter [mm] | 12 |
| | Corrosion Protection | Zn-galvanized / ZnAl-galvanized [1] |
| | Brake Elements per Rope | - |
| | Brake Element Model | - - |
| Lateral Anchorage | Quantity | 1 |
| | Rope Diameter [mm] | 12 |
| | Corrosion Protection | Zn-galvanized / ZnAl-galvanized [1] |
| | Brake Elements per Rope | - |
| | Brake Element Model | - |

[1] in accordance with European standard EN 10244-2 (Class A or Class B)

## Post Structure

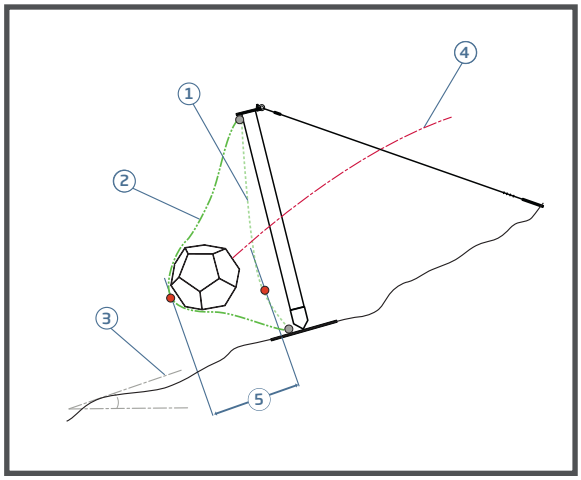
| | |
|---|---|
| Post Type | HEA 100 |
| Ladder | integrated |
| Rope Guidance | removable/integrated |
| Post weight at height 2,5m [kg] | 64,5 |
| Connection to Base Plate | Hinged with Pin |
| Dimensions base plate [mm] | 650 x 200 x 15 |
| Weight Baseplate [kg] | 29 |
| Number of Anchors per Base Plate | 2 |

## Characteristic anchor forces

| | [1] | [2] |
|---|---|---|
| Lateral Anchor, max [$F_{k,lat}$] [kN] | 186 | - |
| Upslope Anchors [$F_{k,ret}$] [kN] | 88 | - |
| Base Plate [$F_{k,schub}$] [kN] | 98 | - |
| Bending Moment at Support Base [3] [kN/m] | - | - |

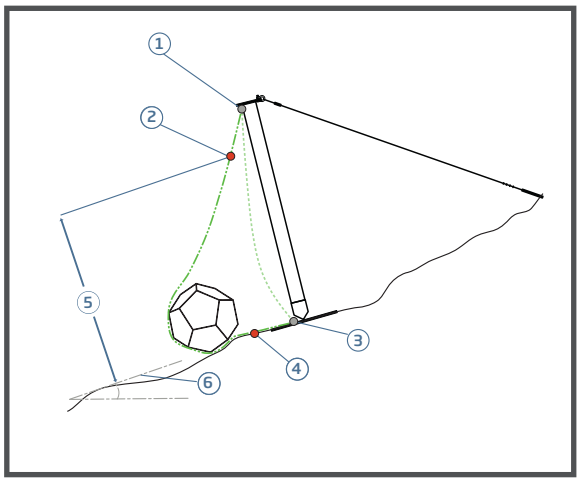
[1] Guideline values according to ONR 24810. Further design details available upon request.
[2] Guideline values in accordance with the specified BAFU guideline. For further design details, please refer to our anchor force data sheet.
[3] Test height

## Maximum Elongation



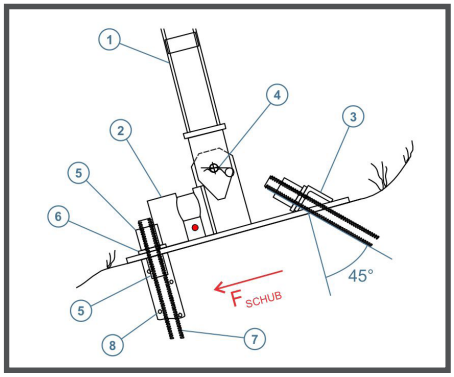

1.Primary Net before impact, 2.Primary Net after impact, 3.Reference slope, 4.Block trajectory, 5.Maximum Elongation

## Remaining usable height



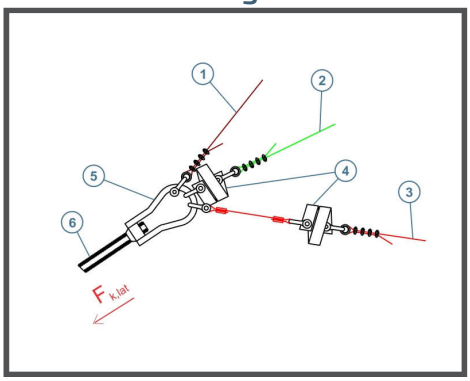

1.oberes Tragseil vor Impakt, 2.oberes Tragseil nach Impakt, 3.unteres Tragseil vor Impakt, 4.unteres Tragseil nach Impakt, 5.Restnutzhöhe, 6.Referenzböschung

## Base Plate/Foundation



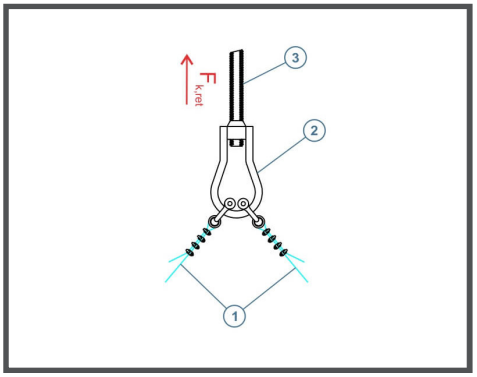

1.Post, 2.Rope Guidance, 3.Base Plate, 4.Bolt, 5.Anchor Nut, 6.Washer, 7.Anchor, 8.Micropile Tube

## Lateral Anchoring



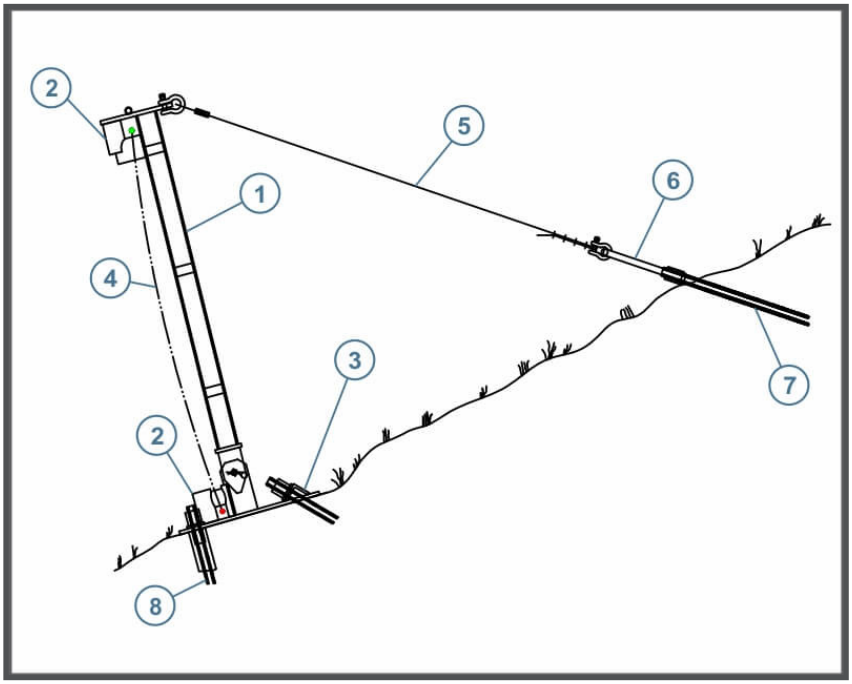

1.Lateral Anchoring, 2.Upper Bearing Rope, 3.Lower Bearing Rope, 4.Brake Element, 5.Anchor Bracket, 6.Anchor

## Upslope Anchoring



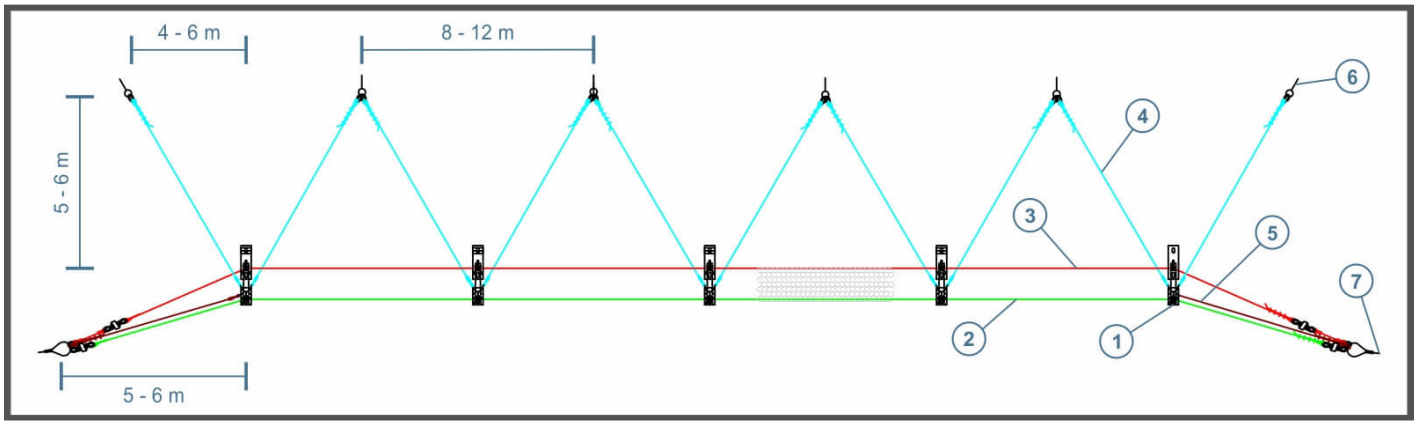

1.Retaining Rope, 2.Anchor Bracket, 3.Anchor

## Detail Side View




1.Post, 2.Rope Guidance, 3.Base Plate, 4.Primary Net, 5.Retaining Rope, 6.Anchor Bracket, 7.Upslope Anchoring, 8.Anchor

## Plan




1.Post, 2.Upper Bearing Rope, 3.Lower Bearing Rope, 4.Retaining Rope, 5.Lateral Anchoring, 6.Upslope Anchoring, 7.Lateral Anchoring

We reserve the right to update or change specifications, technical information, and product-related adjustments at any time and without prior notice based on new test results or further testing. In addition, our General Terms and Conditions (GTC) in their latest version shall apply.