Spiral rope anchor and FLEX Head

FLEXIBLE AND RELIABLE ANCHORING
The flexibility of the whole system is crucial for both rockfall barriers and other protection systems. Why? The drilling axis and the angle of the anchor ropes are rarely the same, and during rockfall or debris flow events, the direction of loading can change. In both cases, a flexible anchor connection enables an optimal load transfer.

Flexible spiral rope anchors or FLEX Heads are not sensitive to impact and retain complete load-bearing capacity, even if the active forces are not aligned with the drilling axis. This is in contrast with rigid bar anchors, where the transmitted bending moments from non-linear loading can significantly reduce the capacity.
FLEXIBLE ANCHORS - BECAUSE NATURAL HAZARDS ARE UNPREDICTABLE.

When anchoring systems for protection against natural hazards, our spiral rope anchors and FLEX Heads are the first choice:

- The rope on the region of the head remains intact thanks to its special protection against impacts and bending
- Full load-bearing capacity is retained even if the tensile direction is +/- 30° to the drilling axis
- Long operating life due to double corrosion protection
- The rope can be directly fixed to the anchor head without weakening the rope loop
ALWAYS PERFECTLY ANCHORED.

Geobrugg spiral rope anchor
Our standard spiral rope anchor 1 can be adapted for every composition of the ground. We recommend using spacers 2 when installing in rock or unconsolidated soil for centering the anchor in the borehole during mortar grouting. This ensures load transfer between the rope and the subsoil as well as optimal corrosion protection.

Geobrugg FLEX Head
If the drill holes are unstable, the use of self-drilling anchors together with our FLEX Head 3 is the best solution. It can be screwed onto commercially available bar anchors or self-drilling anchors. The FLEX Head coupled with the bar absorbs the tangential bending forces and transfers the load to the bar anchor according to the same principles as the Geobrugg spiral rope anchors. The FLEX Head consists of a typical spiral rope loop with all the advantages of flexibility. There are also heavy-duty versions 4 available for larger anchor diameters.

Geobrugg anchorages can be bent up to 30° - without losing any of their load-bearing capacity or corrosion protection.
Our anchorages have been tried and tested thousands of times - just like our protection systems against natural hazards. There are good reasons for institutes including the Technical University (TU) Munich /Germany, the Federal Institute for Snow and Avalanche Research (SLF) Davos /Switzerland and the Japanese Railway Research Institute (JR), Tokyo/Japan recommending the use of Geobrugg spiral rope anchors.

Our spiral rope anchors and FLEX Heads provide the following features:

**Flexible**
The anchor heads are resistant against impacts and retain their load-bearing capacity even for tensile directions that are oblique to the drilling axis. Their flexibility also simplifies transportation.

**High-tensile**
The spiral ropes are made from high-tensile steel wire with a tensile strength of 1770 N/mm² and enable high load capacities to be achieved in spiral rope anchors with low rope diameters.

**Approval**
ETA approval with CE mark according to EAD 331852-00-0102.

**Protected bar anchor**
Bar anchors are subjected to less loading in the head region with a FLEX Head than with rigid solutions, which significantly increases the operating life of the anchor bar.

**First-class corrosion protection**
The rope loop is doubly protected by an internally and externally hot-dip galvanized pipe. Critical places are protected against corrosion by the pipe and the mortar in the ground.

**Easy to assemble**
The FLEX Head enables the use of bar anchors or self-drilling anchors. These can be adapted to heterogeneous ground conditions and allow great flexibility.
## TECHNICAL DATA:

### SPIRAL ROPE ANCHOR

<table>
<thead>
<tr>
<th>Ø Rope [mm]</th>
<th>10.5</th>
<th>14.5</th>
<th>18.5</th>
<th>22.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working load [kN]</td>
<td>100</td>
<td>195</td>
<td>315</td>
<td>470</td>
</tr>
<tr>
<td>Breaking load [kN]</td>
<td>210</td>
<td>350</td>
<td>525</td>
<td>765</td>
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<tr>
<td>Recommended borehole diameter min. [mm]</td>
<td>55</td>
<td>70</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Weight [kg], L = 1 m</td>
<td>1.8</td>
<td>3.8</td>
<td>6.6</td>
<td>10.5</td>
</tr>
<tr>
<td>Weight [kg] / meter additional length</td>
<td>1.0</td>
<td>2.0</td>
<td>3.3</td>
<td>4.8</td>
</tr>
<tr>
<td>A [mm]</td>
<td>83</td>
<td>104</td>
<td>138</td>
<td>180</td>
</tr>
<tr>
<td>B [mm]</td>
<td>40</td>
<td>50</td>
<td>70</td>
<td>95</td>
</tr>
<tr>
<td>Shackle size for connection min.</td>
<td>5/8&quot;</td>
<td>3/4&quot;</td>
<td>7/8&quot;</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

### FLEX HEAD* + BAR ANCHOR TITAN

<table>
<thead>
<tr>
<th>Ø Rope [mm]</th>
<th>14.5</th>
<th>18.5</th>
<th>22.5</th>
<th>22.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working load [kN]</td>
<td>170</td>
<td>315</td>
<td>345</td>
<td>470</td>
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</table>

### FLEX HEAD* + BAR ANCHOR IBO

<table>
<thead>
<tr>
<th>Ø Rope [mm]</th>
<th>IBO R32N</th>
<th>IBO R32S</th>
<th>IBO R38N</th>
<th>IBO R51N</th>
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<tbody>
<tr>
<td>Working load [kN]</td>
<td>150</td>
<td>185</td>
<td>265</td>
<td>425</td>
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</tbody>
</table>

### FLEX HEAD* + BAR ANCHOR GEWI

<table>
<thead>
<tr>
<th>Ø Rope [mm]</th>
<th>GEWI 25</th>
<th>GEWI 28</th>
<th>GEWI 32</th>
<th>GEWI 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working load [kN]</td>
<td>165</td>
<td>195</td>
<td>270</td>
<td>420</td>
</tr>
</tbody>
</table>

*Safety factor min. 1.5 depending on the connection part

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### FLEX Head standard design

- Anchor rod
- Borehole with mortar
- Ribbed tube
- Installation depth marking

### FLEX Head extra corrosion protection

- Reinforced concrete foundation
- Anchor rod
- Borehole with mortar
- Ø 14.5 ≥ 270mm
- Ø 18.5 ≥ 370mm
OUR ANCHORS AND FLEX HEADS PROVE THEMSELVES IN ALL PROTECTION SYSTEMS.

- Rockfall Protection Systems
- Avalanche Prevention with Spiral Rope Nets
- Shallow Landslide Barriers
- Rockfall Drapes (Anchorage of Support Rope)
- Debris Flow Barriers
- TECCO®-Slope Stabilisation (Anchorage of Border Rope)

More information and projects on our website: www.geobrugg.com/projects