

DYWIDAG Soil Nails

Basic Concept

DYWIDAG Soil Nailing is a passive system for stabilizing slopes and sidehill cuts or rock as well as for stabilizing construction pit walls if deformations are irrelevant.

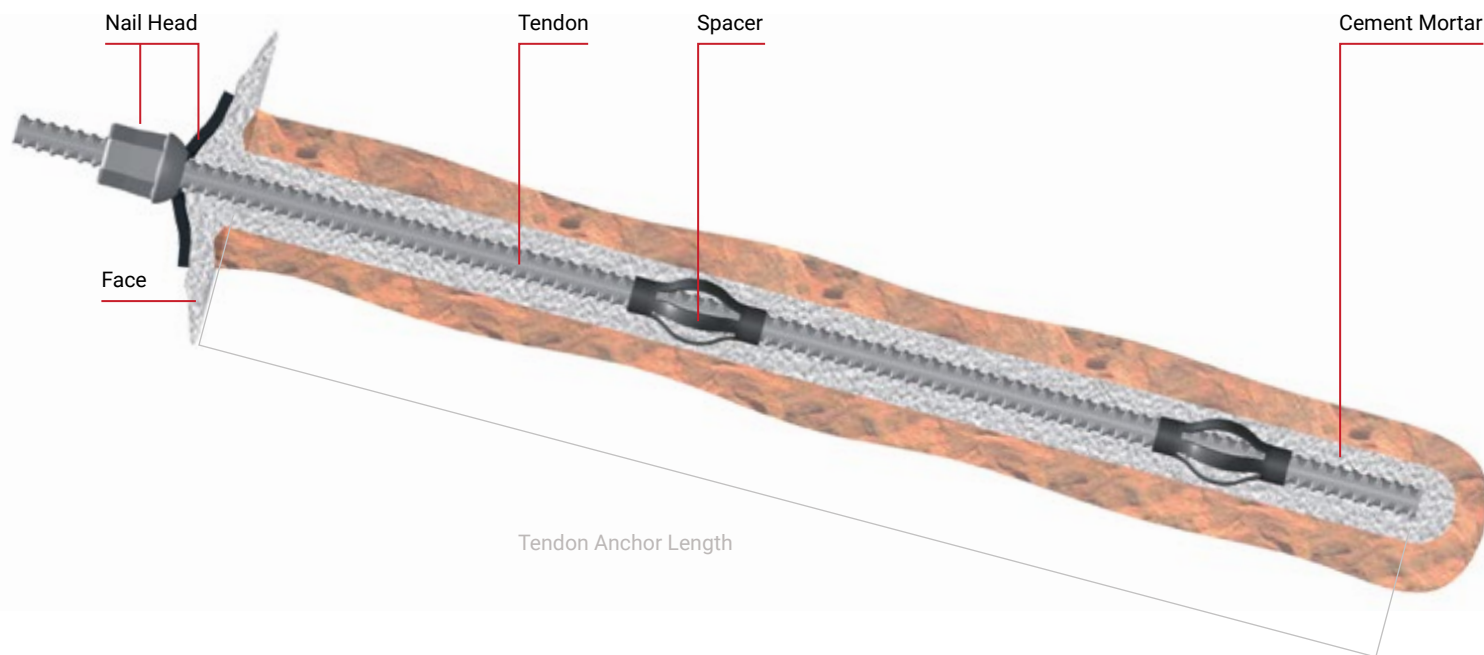
The load-bearing system significantly differs from ground anchors (actively tensioned) and tensile piles. In the case of soil nailing, the load-bearing capacity of the complete soil is increased because it is consolidated by the soil nails.

The soil is nailed into secure areas of the slope located further inside the hill. Consequently, tensile and shear forces act on the nails. In order to achieve this effect, the nails can only be placed at certain, limited distances towards each other. The nails do not act individually, but as a complete nailing system.

For stabilizing the slope front, a slope face must be realized that is connected to the nails guaranteeing tensile strength. Shotcreting construction, precast concrete elements, mesh or geotextiles can be used for this type of slope face. If the slope is only slightly inclined, it can be revegetated afterwards to achieve a pleasing appearance.

GEWI® Threadbars that are centered using spacers are installed into the boreholes. Afterwards, the borehole is filled with cement mortar from the bottom up along its complete length. The grout creates a force-fit connection via bond with the threadbar and skin friction inside the borehole.

Proof of this connection and the individual load-bearing capacity of a nail is provided by test loads and regular approval tests. Fabric tubes can be used for sealing the borehole walls in case of fragmented rock or if soil is extremely permeable.



Fields of Application

- Slope stabilization
- Embankment stabilization
- Excavations without special requirements
- Rock stabilization
- Fixation of rock fall mesh
- Avalanche barriers
- Fixation

Key Features

- Threadbars with proven coarse GEWI® Thread that is suitable for on-site use – threadability even in extreme conditions
- Thread along the entire length – lengths can be flexibly adjusted on site
- Excellent force / borehole ratio
- Various steel grades
 - Robust, weldable GEWI® Bar
 - GEWI® Plus Bars for ultimate wear
- For increasing skin friction, GEWI® and GEWI® Plus Piles can be equipped with a posterior grouting system
- The system permits flexible adaptation to different embankment and slope face conditions

Additional Information

Approval DIBt Z-20.1-106

DYWIDAG Soil Nails

Technical Data

GEWI® Soil Nail / Rock Bolt, B500B & S555/700 Threadbar

Nominal diameter \varnothing	Yield strength / tensile strength $f_{0,2k}/f_{tk}$	Cross- sectional area A	Load at yield F_{yk}	Ultimate load F_{tk}	Weight	Weight DCP	Approval
[mm]	[N/mm ²]	[mm ²]	[kN]	[kN]	[kg/m]	[kg/m]	
16	500/550	201	101	111	1.58	5.2	○
20	500/550	314	157	173	2.47	5.9	○
25	500/550	491	245	270	3.85	7.0	○
28	500/550	616	308	339	4.83	8.6	○
32	500/550	804	402	442	6.31	9.5	○
36	500/550	1,018	510	560	7.99	11.9	
40	500/550	1,257	628	691	9.86	13.6	○
43	500/550	1,452	726	799	11.40	19.8	
50	500/550	1,963	982	1,080	15.41	21.0	○
57.5	555/700	2,597	1,441	1,818	20.38	27.1	
63.5	555/700	3,167	1,758	2,217	24.86	32.4	○
75	500/550	4,418	2,209	2,430	34.68	42.8	

GEWI® Plus Soil Nail / Rock Bolt, S670/800 Threadbar

Nominal diameter \varnothing	Yield strength / tensile strength $f_{0,2k}/f_{tk}$	Cross- sectional area A	Load at yield F_{yk}	Ultimate load F_{tk}	Weight	Weight DCP	Approval
[mm]	[N/mm ²]	[mm ²]	[kN]	[kN]	[kg/m]	[kg/m]	
18	670/800	254	170	204	2.00	5.4	
22	670/800	380	255	304	2.98	6.5	
25	670/800	491	329	393	3.85	7.0	
28	670/800	616	413	493	4.83	8.6	
30	670/800	707	474	565	5.55	9.0	
35	670/800	962	645	770	7.55	11.3	
43	670/800	1,452	973	1,162	11.40	15.8	
57.5	670/800	2,597	1,740	2,077	20.38	30.0	
63.5	670/800	3,167	2,122	2,534	24.86	32.4	
75	670/800	4,418	2,960	3,534	34.68	38.0	

○ Z-20.1-106 DYWIDAG Soil Nailing System

Additional Information

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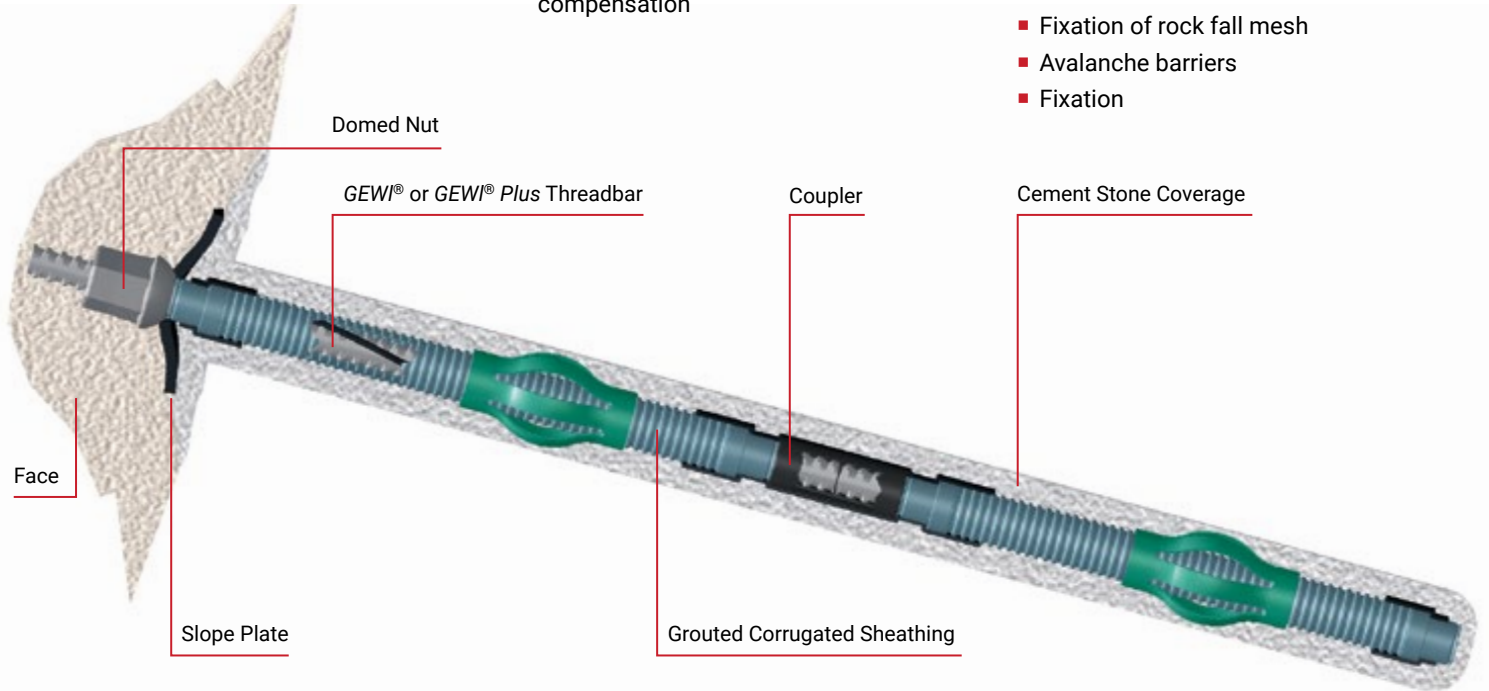
DYWIDAG Soil Nails

DCP Soil Nail / Permanent Soil Nail

- Permanent use (more than 100 years)
- Double Corrosion Protection (DCP) achieved by factory grouted corrugated sheathing along the entire soil nail length with controlled crack width
- Different slope faces are possible such as shotcreting construction, precast concrete elements, mesh or sheet pile walls
- Different designs are available for angle compensation

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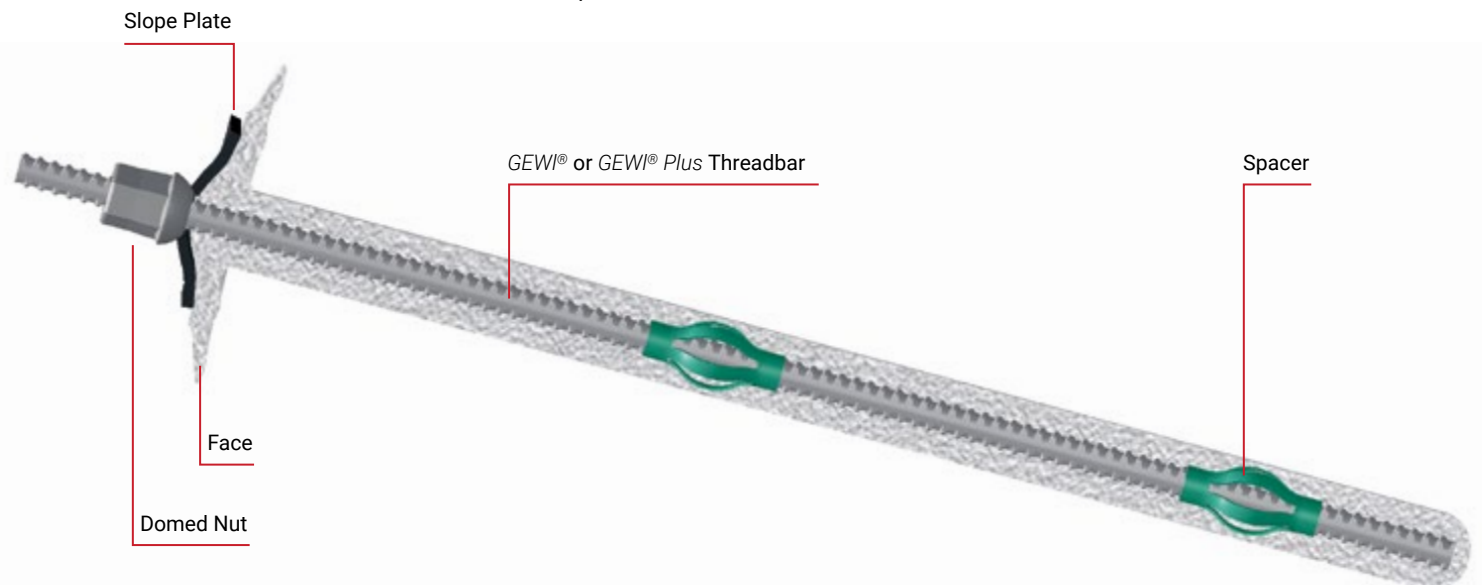


Short Term Soil Nail / Temporary Soil Nail

- Temporary use of up to two years
- Extended use after prior agreement of involved experts
- Galvanized version available
- Different slope faces are possible such as shotcreting construction, precast concrete elements, mesh or sheet pile walls
- Different designs are available for angle compensation

Fields of Application

- Temporary slope stabilization
- Temporary embankment stabilization
- Stabilisation of states of construction
- Excavations without special requirements



Additional Information

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Summer Holidays without Traffic Jams: DYWIDAG Systems stabilize Autostrada Adriatica, Italy



i Owner Autostrade per l'Italia Spa, Italy +++ Contractor Pentapoli S.c.a.r.l. – Imola, Italy +++ Consulting Engineer SPEA Ingegneria Europe, Italy

DYWIDAG Unit DYWIT S.P.A., Italy

DYWIT Services Production, Supply and Technical Support

DYWIT Products double corrosion protected \varnothing 26.5mm DYWIDAG Soil Nails; \varnothing 36 and 40mm DYWIDAG Bar Anchors; rental of equipment

Brenner Expressway - Slope Protection using Double Corrosion Protected GEWI® Soil Nails, Austria



i Owner ASFINAG, Austria +++ Main Contractor Grund- Pfahl und Sonderbau GmbH, Austria

DYWIDAG Unit DYWIDAG-Systems International GmbH, Austria

DYWIDAG Services Production and Supply

DYWIDAG Products supplied 12,000m, permanent GEWI® Soil Nails with double corrosion protection; 400 pcs. in lengths varying from 25 to 38m