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ROCK FENCE[®]





It efficiently absorb rock fall energy be utilizing flexible Cable and steel made Post.

It is a structure absorbing rock fall energy by plastic deformation of Wire Netting Cable, and Post. It is generally installed together with a concrete foundation and catches rock falls before they reach the road. In addition to the standard type ROCK FENCE, we offer a BASEPLATE TYPE ROCK FENCE that can be installed on existing retaining walls, and the ROCK GUARD with enhanced functions.



ROCK FENCE

Height: 1.5~6.0m Post Spacing: 3.0m
Absorbable Energy: 50kJ



BASEPLATE TYPE ROCK FENCE

Height: 1.5~3.0m* Post Spacing: 3.0m
Absorbable Energy: 50kJ



ROCK GUARD

Height: 1.5~3.0m* Post Spacing: 6.0m
Absorbable Energy: 150kJ



*Please contact the person in charge in case of fence height exceeding 3.0 m.

SURFACE TREATMENT

Standard Specification Galvanizing

Hot-dip galvanizing is applied to each member.

Environmental Measures Specification Zinc Plating + Powder Coating after Plating

Post and Space Keeper are subjected to powder baking finish after plating.
The wire mesh is color galvanized and the other parts are galvanized.

Environmental Measures Specification Toff-Coated Specification

High corrosion resistance and acid / alkali resistance by heavy anti corrosion treatment combining plating and modified saturated polyester resin coating is realized. The expected life is 35 years in high salt damage area and more than twice in normal area than the salt damage area.



Toff-Coated Product

CHARACTERISTICS OF THE ROCK FENCE

1 It is a logical and safe design.

It is a logical structure to absorb rockfall energy by plastic deformation of wire mesh, wire rope, and pole. For possible absorbable energy, refer to the technical data sheet.

2 The Cable is Connected with the Space Keeper.

Space keeper material prevents "slip through" phenomenon in which Cable spreads out by rock fall.

3 Abundance in Fence Height.

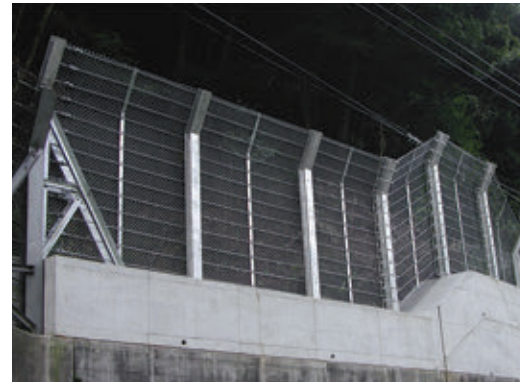
Fence height range from 1.5 m to 6.0 m as the standard specification, and can be selected from straight Post or curved Post.

4 Easy Construction and Economical.

Installation / assembly work is easy. There is also a BASEPLATE TYPE that facilitates replacement work and post-installation work. The construction costs as well as the material costs are cheap and economical.



RF-10



RF-13

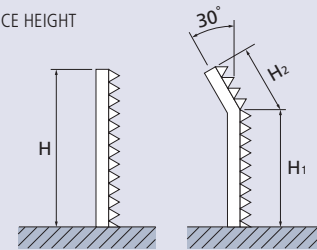


RF-7

MODEL/SPECIFICATION

MODEL	RF-5, RF-7, RF-8, RF-10, RF-12, RF-13, RF-15, RF-17, RF-18, RF-20
FENCE HEIGHT(m)	1.5~6.0
POST SPACING(m)	3.0
CABLE(WIRE ROPE)	3×7 G/O 18φ (Conforming to JIS G 3525) Break load: 160kN
WIRE NETTING	Chain link wire netting 3.2φ×50×50 (Conforming to JIS G 3552)
END POST·MIDDLE POST	Rolled Structural Steel(SS400)(JIS G 3101)
SPACE KEEPER	Material-A:4.5t×65×680 Material-B:4.5t×65×980 Material-C:4.5t×65×382 Rolled Structural Steel (SS400) (JIS G 3101)
U-BOLT	M12×40×60
ROPE END BRACKET	25φ×500 Strength: 160 kN or more

NOTE1) FENCE HEIGHT



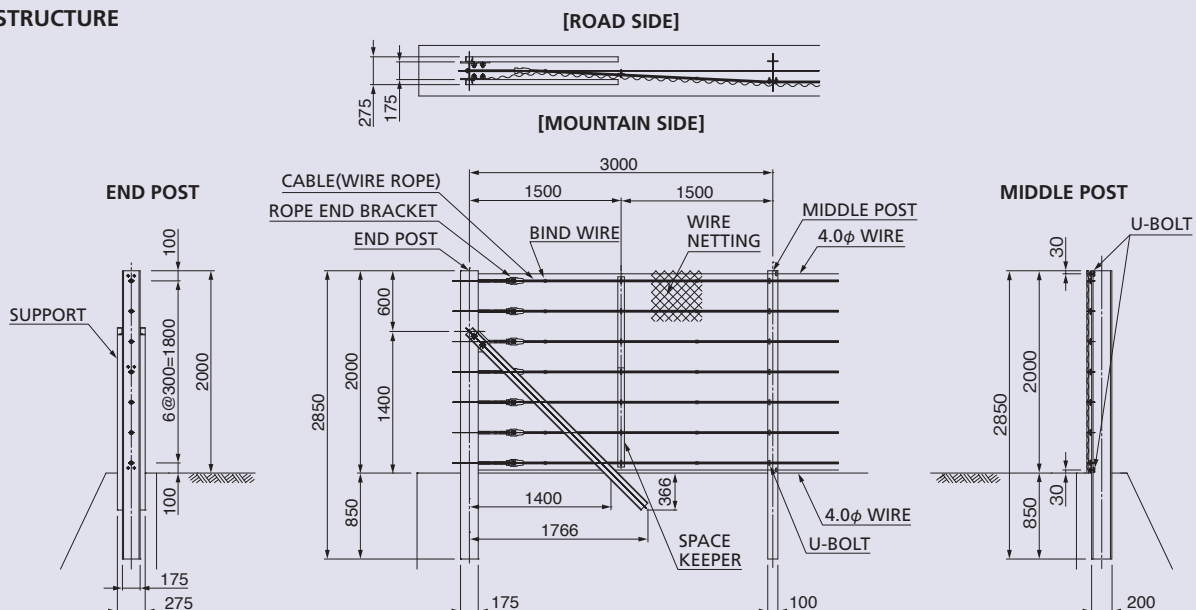
NOTE2) When the fence height is 3.5 m or more, if the influence on the road side due to deformation of the support is a concern, attaching the stay rope is effective to prevent excessive deformation.

NOTE3) The Post Spacing of the gradient section shall be the oblique distance.

MODEL	FENCE HEIGHT(m)			NUMBER of CABLE (PCS)	MATERIAL CROSS SECTION (mm)			NUMBER USED on SPACE KEEPER*					
	STRAIT POST H	CURVED POST			MIDDLE POST	END POST		STRAIT POST		CURVED POST			
		H ₁	H ₂			POST	MAIN SUPPORT	A	B	A	B	C	
RF-5	1.5	—	—	5	H-200×100×5.5×8	H-150×150×7×10	[-100×50×5×7.5	2					
RF-7	2.0	—	—	7	H-200×100×5.5×8	H-175×175×7.5×11	[-100×50×5×7.5		2				
RF-8	2.5	1.6	0.9	8	H-200×100×5.5×8	H-200×200×8×12	[-150×75×4.5	2	1	3			1
RF-10	3.0	2.1	0.9	10	H-200×100×5.5×8	H-200×200×8×12	[-150×75×4.5		3	1	2		1
RF-12	3.5	2.6	0.9	12	H-200×100×5.5×8	H-200×200×8×12	[-150×75×4.5	1	3	2	2		1
RF-13	4.0	3.1	0.9	13	H-200×200×8×12	H-200×200×8×12	[-150×75×6.5×10		4	1	3		1
RF-15	4.5	3.3	1.2	15	H-200×200×8×12	H-200×200×8×12	[-150×75×6.5×10	1	4	2	3		1
RF-17	5.0	3.8	1.2	17	H-200×200×8×12	H-200×200×8×12	[-150×75×6.5×10	2	4		5		1
RF-18	5.5	4.3	1.2	18	H-200×200×8×12	H-200×200×8×12	[-150×75×6.5×10	1	5	2	4		1
RF-20	6.0	4.8	1.2	20	H-200×200×8×12	H-200×200×8×12	[-150×75×6.5×10	2	5		6		1

*Number Used Per Place

RF-7 STRUCTURE



BASEPLATE TYPE ROCK FENCE

It is most suitable for replacement due to rockfall deformation, damage or aging or to the existing retaining wall top end.

CHARACTERISTICS OF BASEPLATE TYPE ROCK FENCE

1 Concrete Foundation Work is Unnecessary.

Since anchors are fixed to existing retaining walls or stable rock masses, large-scale retaining wall construction and excavation are unnecessary.

2 Excellent Workability.

By fixing the Posts with anchor bolts, large-scale tools and equipment are unnecessary and can be constructed easily in a short period of time.

3 High Impact Resistance is Secured.

By adopting an anchor that can withstand the load until the support is plastically deformed, it exhibits the same performance as a normal embedded type ROCK FENCE.

4 Construction is Possible Even in Slopes.

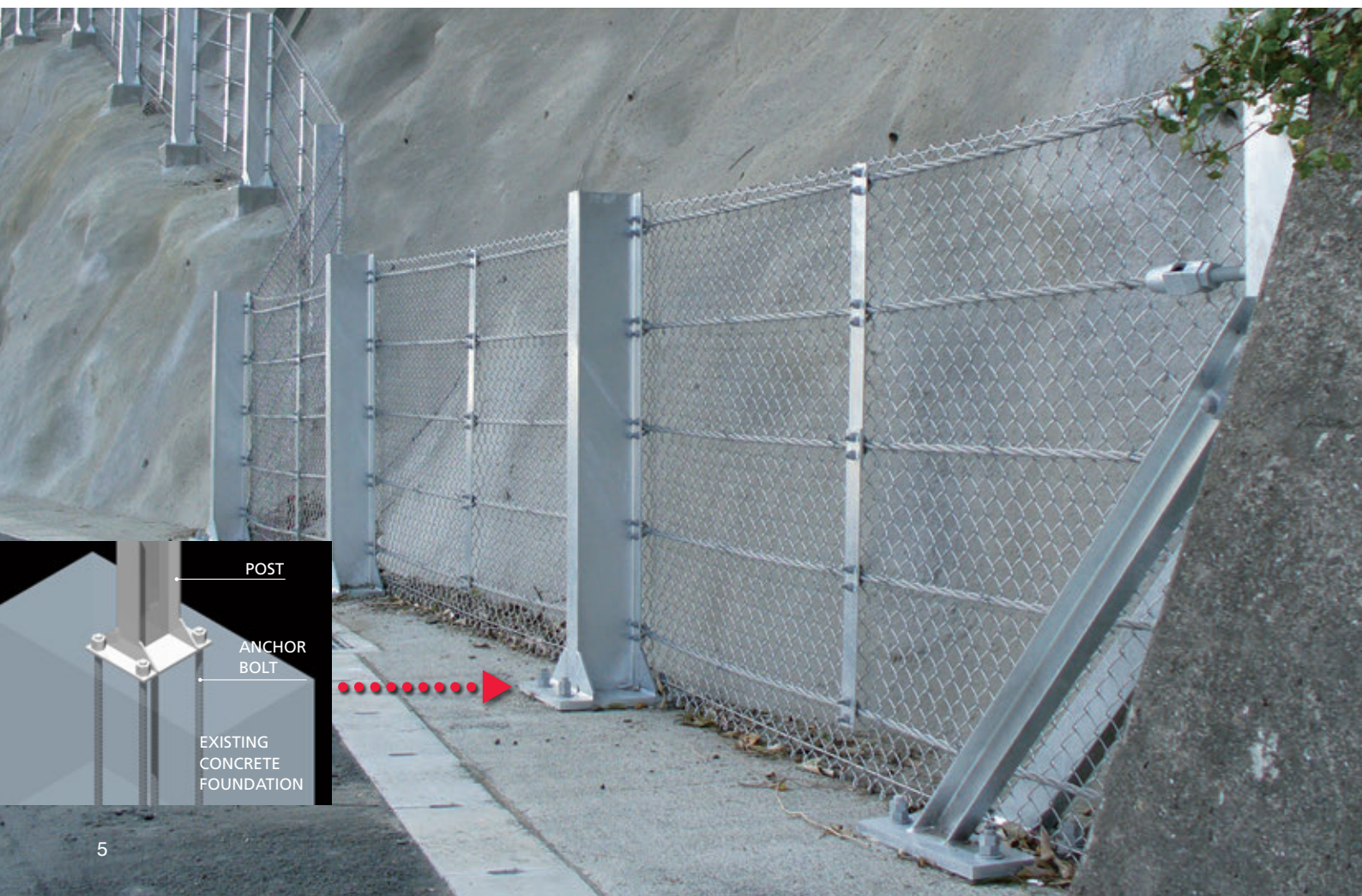
It is possible to manufacture a baseplate type support post adapted to the gradient of the construction point, even if the retaining wall etc. is inclined.



Construction on existing retaining walls



Construction on slopes

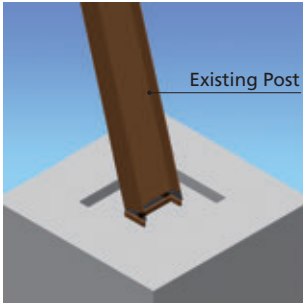


POST

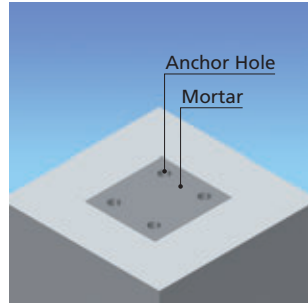
ANCHOR
BOLT

EXISTING
CONCRETE
FOUNDATION

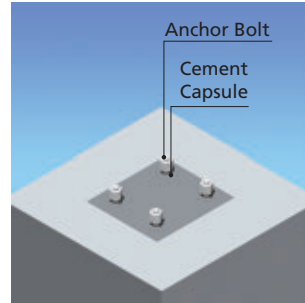
PROCEDURE FOR REPLACING THE POST



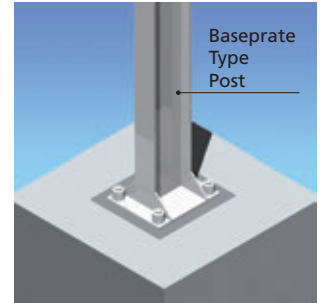
1 Drill the foundation around the pole and cut the Post at a position lower than the foundation.



2 Fill the mortar at the drilled point and pierce the four Anchor Holes.



3 Insert the Cement Capsule and push it while stirring with the Anchor Bolt.



4 Install the Baseplate Type Post and tighten and fix the nut.

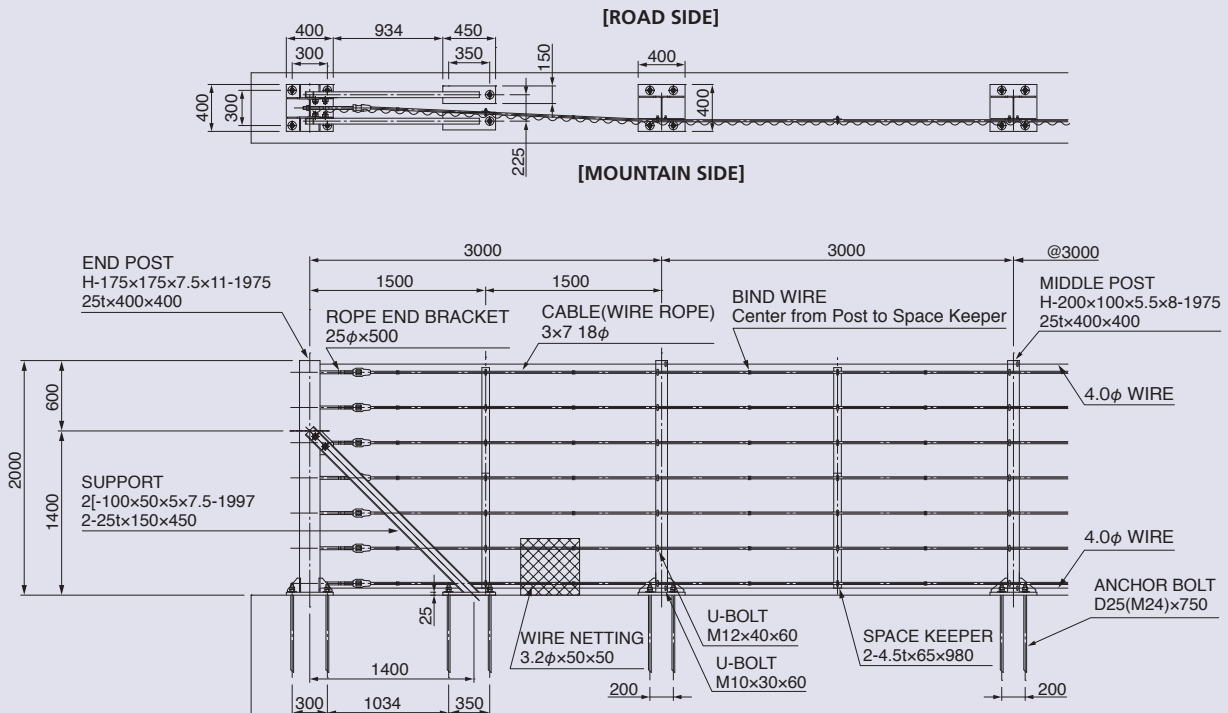
MODEL/SPECIFICATION

MODEL	FENCE HEIGHT (m)	WIRE NETTING (mm)	POST SPACING (m)	MATERIAL CROSS SECTION (mm)		NUMBER USED on SPACE KEEPER*			
				MIDDLE POST	END POST	MATERIAL DIMENSION (m)	A	B	
RF-5-BP	1.5	3.2φ×50×50	3.0	H-200×100×5.5×8	H-150×150×7×10	[-100×50×5×7.5	Material-A 4.5t×65×680	2	2
RF-7-BP	2.0				H-175×175×7.5×11	[-100×50×5×7.5			
RF-8-BP	2.5				H-200×200×8×12	[-150×75×4.5	Material-B 4.5t×65×980	2	1
RF-10-BP	3.0				H-200×200×8×12	[-150×75×4.5		3	

Please contact the person in charge in case of fence height exceeding 3.0 m.

*Number Used Per Place

RF-7BP STRUCTURE



CHARACTERISTICS OF THE ROCK GUARD

1 Excellent Capability of Absorbing Rockfall Energy.

By strengthening the Posts, it mainly absorbs rockfall energy with Wire Netting and cable. Therefore, the absorbable energy increased. For absorbable energy, refer to the technical data.

2 Increased Post Spacing and Set Auxiliary Middle Post.

We increased the span between the standard posts to 6m and provided an Auxiliary Middle Post not fixed to the foundation at the center of the standard post to reduce the probability of the rock fall hitting directly and reduce the external force to the post.

3 The Cable is Connected with Space Keeper.

Space Keeper prevents "slip through" phenomenon in which cable spreads by rockfalls.

4 No Post Deformation would Occur Within the Reference Fence Length

In the basic design, the post strength is set based on the fence length of 30m. Within that range the post would not deform. Also, even if it is longer than the standard fence length, the deformation of the pillar is small.



BRG-25



BRG-35



BRG-25

MODEL/SPECIFICATION

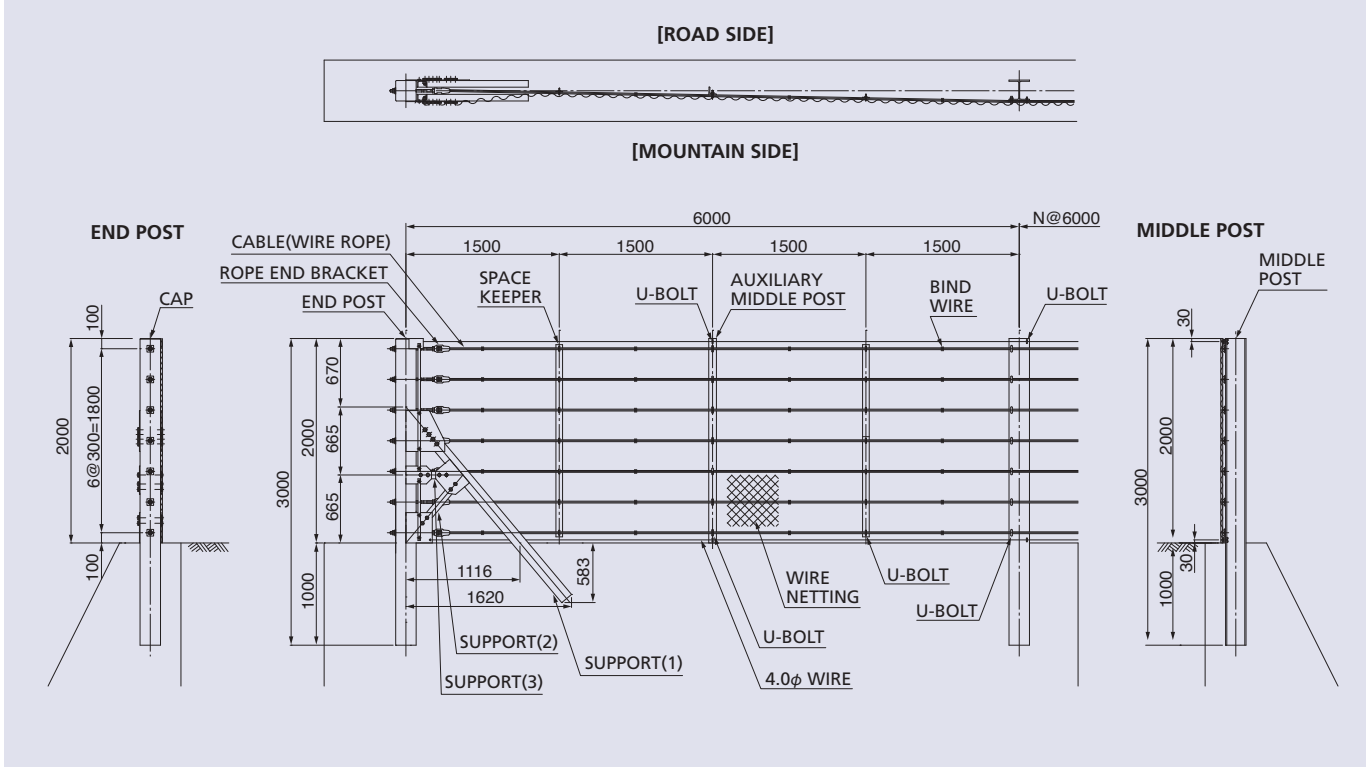
MODEL	BRG-15, BRG-20, BRG-25, BRG-30
FENCE HEIGHT(m)	1.5~3.0
POST SPACING(m)	6.0
CABLE(WIRE ROPE)	3×7 G/O 18φ (Conforming to JIS G 3525) Break load:160kN
WIRE NETTING	Chain link wire netting 4.0φ×50×50 (Conforming to JIS G 3552) Z-GS4
MIDDLE POST / AUXILIARY MIDDLE POST	Rolled Structural Steel (SS400) (JIS G 3101)
END POST	Rolled Structural Steel (SS400) (JIS G 3101) Structural Steel Pipe (STKR400) (JIS G 3466)
SPACE KEEPER	Material-A:4.5t×65×680 Material-B:4.5t×65×980 Structural Steel (SS400) (JIS G 3101)
U-BOLT	M12×40×60
ROPE END BRACKET	25φ×500 Strength: 160 kN or more

MODEL	FENCE HEIGHT (m)	NUMBER of CABLE (PCS)	MATERIAL CROSS SECTION (mm)				NUMBER USED on SPACE KEEPER*	
			MIDDLE POST	AUXILIARY MIDDLE POST	END POST		A	B
					POST	MAIN SUPPORT		
BRG-15	1.5	5	H-175×175×7.5×11	L-75×75×9	□-175×175×6	[-100×50×5×7.5	2	
BRG-20	2.0	7	H-200×200×8×12	L-75×75×9	□-200×200×6	[-125×65×6×8		2
BRG-25	2.5	8	H-200×200×8×12 (With Reinforcement Plate)	L-75×75×9	□-200×200×6	[-125×65×6×8	2	1
BRG-30	3.0	10	H-350×175×7×11	L-75×75×9	□-200×200×6	[-150×75×6.5×10		3

Please contact the person in charge if the fence height exceeds 3.0 m.

*Number Used Per Place

BRG-20 STRUCTURE



PRECAUTIONS ON CONSTRUCTION

In order to fully demonstrate the rockfall prevention function of the Rock Fence and the Rock Guard, plan with the following points in mind.

Step 1 | Post Installation

- **END POST**
Install so that the support faces inside of fence.
- **MIDDLE POST**
Set U-bolt mounting hole facing the mountain side.
When installing in the slope, pay attention to the hole position of the U-bolt fixing the 4φWire and install it so that the hole will not be buried.

Step 3 | Wire Netting Installation

- Thread the round bar at the end of one Wire Netting, fix it to the End Post with the angle U-Bolts.
- Pass the 4.0φwire through the other rope end and secure with angle U-Bolts.
- Pass the 4.0φwire through the upper and lower ends of the Wire Netting, and fix the End Post to the U-Bolts at the corners.

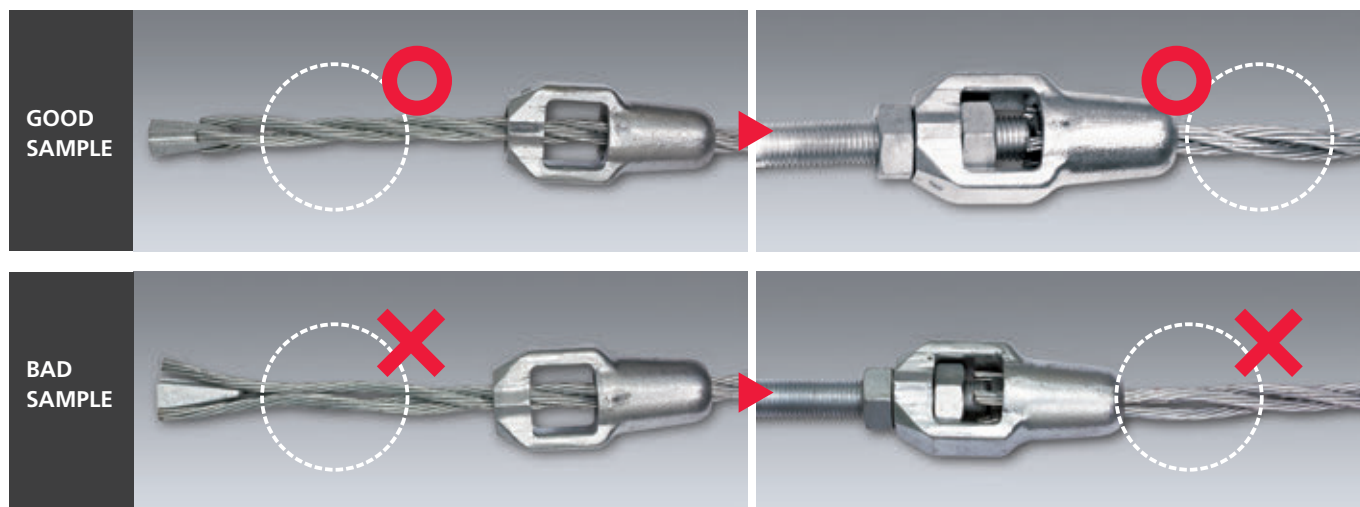
Step 2 | Cable installation

- Cut the cable to a specified length and attach the Rope End Bracket to the end. Refer to the example below for the installation method of the Rope End bracket.
- Mount and fix the Rope End Bracket to the End Post. For introduction of initial tension at this time, refer to the explanation below.
- After fixing both cables, fix them with U-Bolts to each Middle Posts.

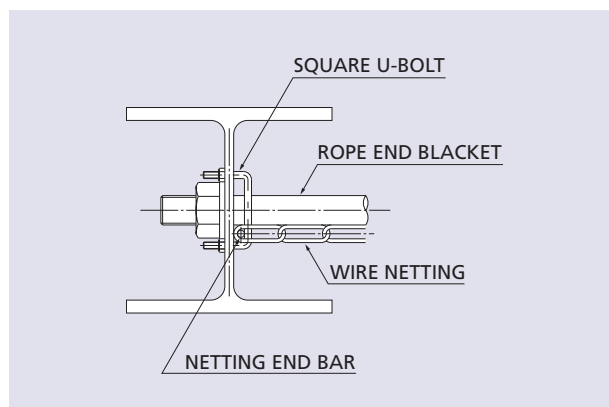
Step 4 | Space Keeper Installation

- Mount the spacing material from the roadside at the center between each Post and secure it to the Cable with U-Bolts inserted from the mountainside.
- Bundle the Cable and Wire Netting with a Bind Wire basically at intervals of 1.5 m (0.75 m at the end) according to the Post spacing.

Examples of Rope End Bracket fitting installation



Detailed View of End Post Installation Part



On Initial Tension of Cable

In "Rockfall Countermeasure Handbook", the initial tension of the Cable used for the falling roof protection fence is set to $TO = 5 \text{ kN}$, but this value is a measure to ensure that the fence surface is formed without sagging on the Cable, and it does not necessarily require $TO = 5 \text{ kN}$ or more as initial tension. When initial tension is set to 5 kN or more, the available energy absorption becomes slightly small.

The initial tension is targeted 3 to 5 kN, and do not become excessive above this.

When the initial tension is 3 to 5 kN, the drooping amount when loading a mass of 60 kg to the center with respect to the spacing of 3.0 m is about 15 to 9 cm, so please refer to this.

S. Shield



With its newly designed cushioning mechanism, it protects rockfalls from slope intelligently. Rope mounting ring at the terminal pole slides while absorbing collision energy.



Practfence



This is a universal-type small rock fall guard fence, offering cost efficiency, workability, and ease of maintenance. It enables environment-friendly, economical rock fall protection by being optimally placed to suit the slope topography without using concrete foundations (which destabilize the slope) or scaffolding (which increases construction time).



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