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Federal Department of the Environment,
Transport, Energy and Communications DETEC

Federal Office for the Environment FOEN

Type approval of safety nets for protection against rockfall

Test Certificate No. S 04-7

System description

• **System designation**		**ROCCO RXI-200**
• **Address of designer**		GEOBRUGG Fatzer AG Schutzsysteme, Hofstrasse 55, 8590 Romanshorn
• **System description**		
– Energy class		2000 kJ
– Posts:	profile	HEB 180
	length a_l	5.24 m
	interval a_s	10 m
– Support ropes:	type	6 x 36 W-Seale + SE, DIN 3064
	diameter	22 mm
– Net:	type	ROCCO ring net 16 windings
	diameter	Ring diameter 350 mm, wire diameter 3 mm
	mesh	-
	height h_v	5.11 m

– System drawings

Description	No.	Date
System handbook RXI-200	102-N-FO/02	20.08.2004
Technical documentation RXI-200	10/2004	20.10.2004
Maintenance handbook RXI-200	104-N-FO/03	20.10.2004

Basic documentation

- **Field test**

WSL test report	Date 15 July 2004	Report no. 04-7

- **Overall assessment**

Overall assessment of the EKLS (FECAR)	Date 15 December 2004	Report no. S 04-7

Test results

- **Preliminary test of outer part**
  - Penetration of test body: yes ☐ / no ☒
  - Additional observations: none

• **Preliminary energy test (50%)**	1000 kJ
– Penetration of test body	yes ☐ / no ☒
– Braking time t_s	0.33 s
– Braking distance b_s	5.60 m
– Sum of the tensile forces in the 3 upper cables	305 kN
– Sum of the tensile forces in the 2 lower cables	238 kN
– Maximum of the tensile forces in a stay cable	117 kN
– List of damaged elements	
No damage to load-bearing parts of the structure. 16 out of 40 braking components were deformed.	
– Assessment of repairs	
13 braking components were replaced. This work took 28 man-hours. The repairs necessary after the test were assessed as normal.	
• **Main energy test (100%)**	2000 kJ
– Penetration of test body	yes ☐ / no ☒
– Braking time t_s	0.40 s
– *Maximum permissible braking distance b_s*	*10.0 m*
– Measured braking distance b_s	6.70 m
– *Minimum permissible residual braking height h_n*	*2.50 m*
– Measured residual braking height h_n	3.18 m
– Sum of the tensile forces in the 3 upper cables	360 kN
– Sum of the tensile forces in the 2 lower cables	227 kN
– Maximum of the tensile forces in a stay cable	235 kN
– List of damaged elements	
No damage to load-bearing parts of the structure. On one pole, the foot bent, which bent the metal of the ground plate. The fixing screws bent at the head and foot of the pole. 30 out of 40 braking components were deformed.	
• **Assessment of special criteria**	
– Comments on assembly and on the assembly instructions	
No particular difficullties were encountered with assembly.	
– Comments on adaptability to the terrain	
Adaptability to the terrain is normal.	
– Comments on design complexity	
The documentation enables safe, simple assembly.	
– Comments on anticipated life cycle	

The parts of the installation are supplied with corrosion resistance corresponding to the service life requirements. The net has an aluminium-zinc coating (150 g/m2).

The anticipated service life is ascertained to be adequate.

Overall assessment

☒ **Test passed** ☐ **Test passed with reservations**

Examined based on the following guidelines: GERBER, W. 2001: Guideline for the approval of rockfall protection kits. Environment in practice. Swiss Agency for the Environment, Forests and Landscape (SAEFL), Swiss Federal Research Institute WSL. Berne, 39 pages. Revised June 2006.

RESERVATION: Should deficiencies arise following certification of the safety net, FOEN may revoke product release and delete it from the type approval list.

Date	Name, position	Signatures
19.05.2006	**Andreas Götz, Vice Director**	

Replaces the Certificate No. S 04-7 of 16 December 2004

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