Abstract of test report no. 0204

System TS-150
Test V0304 / Eisenerz / 14.06.2004

General information

Energy class:	150kJ
Manufacturer:	Trumer Schutzbauten GmbH Maria-Bühel Straße 7 5110 Oberndorf bei Salzburg Austria
Product name:	TS-150
Test report number:	0204
Test report creation date:	16.08.2004

Specification of rock-fall protection kit TS-150

The tested rock-fall protection kit TS-150 of TRUMER SCHUTZBAUTEN GMBH is a flexible rock-fall protection system for energy impacts up to 150kJ.
The rock-fall protection kit TS-150 is characterised by a support structure which is connected to the underground by ground plates. The ground plates are supported by floating bearings. The structure is held in position by uphill retaining cables at the top of the posts and at the ground plates.
The interception structure of the tested rock-fall protection kit consists of a rectangular netting characterised by a small mesh- size, which makes an additional layer unnecessary.
The upper and lower longitudinal bearing rope are, just like the retaining cables, part of the connection components. They are arranged as single ropes and connected to the side foundations using energy dissipating devices.

Main components of rock-fall protection kit TS-150

INTERCEPTION STRUCTURE

PRIMARY NET	Type	rectangular netting
	Wire diameter	4.5mm
	Mesh-size	50mm x 50mm
	Tensile strength of wires	400 to 500 N/mm²
	Dimensions	2.25m x 20.00m
	Connection to bearing ropes	steel cable (Ø 4.0mm)
	Connection to side posts	none
	Net to net connection	none
ADDITIONAL LAYER	none	

SUPPORT STRUCTURE

POST	Type	HEA-100 (IPBI-100)
	Material	S 235 JR
	Length	2.22m
GROUND PLATE	Dimensions	300mm x 200mm x 15mm
	Material	S 235 JR
	Connection to post	welded
	Connection to underground	floating bearing
GUIDANCE OF ROPES	Bearing ropes	5/8" shackle

CONNECTING COMPONENTS

UPPER AND LOWER LONGITUDINAL BEARING ROPES (cp. DIN 3060, ISO 2408 and EN 12385-4)
Rope 16 / 6x19 Standard / DIN 3060 / steel core / galvanised / 1770N/mm²

Nominal rope diameter	16mm
Calculated breaking load	188kN

UPHILL RETAINING CABLES AND SIDE CABLES (cp. DIN 3060, ISO 2408 and EN 12385-4)
Rope 12 / 6x19 Standard / DIN 3060 / steel core / galvanised / 1770N/mm²

Nominal rope diameter	12mm
Calculated breaking load	106kN
Connection to posts and anchors	5/8" shackle

ENERGY DISSIPATING DEVICES IN LONGITUDINAL BEARING ROPES

Type	AVT-phx	Position	left and right rope foundation
	FLA 60x25mm	Connection to rope	3/4" shackle
	1.5 windings	Connection to anchor	3/4" shackle

Summary of test results

The tested rock-fall protection kit TS-150 of TRUMER SCHUTZBAUTEN GMBH was hit by a block of reinforced concrete with a mass of 545kg and a velocity of 24.75m/s. The impact was placed in a height of 1.27m. The angle of block trajectory was determined with 36.66°. The impact energy was determined with 167kJ. The maximum horizontal system elongation was 2.64m.
The block was stopped by the rock-fall protection kit and did not touch the ground during the test until the system reached the maximum elongation. The whole impact energy was absorbed by the tested rock-fall protection kit.
There were no visible damages in connecting components and the support structure. In the place of impact the primary net was deformed irreversibly.
The energy dissipating devices in the longitudinal bearing ropes were stretched, but still showed plenty of remaining deformation capacity after the test.
As a consequence of the impact the system was slightly inclined uphill, the inner posts were dislocated from their fixing pins and the vertical height of the rock-fall protection kit was reduced from 2.70m to 1.35m, which means a remaining height of the tested system of 65.22% of the original vertical height.

THE ROCK-FALL PROTECTION KIT **TS-150** OF TRUMER SCHUTZBAUTEN GMBH WAS TESTED SUCCESSFULLY.

Affirmation of test report no. 0204 by the University of Leoben

The department of Mining & Tunnelling of the University of Leoben approves that test report no. 0204 created by Christian Heiss is correct in respect of content and matter of fact.

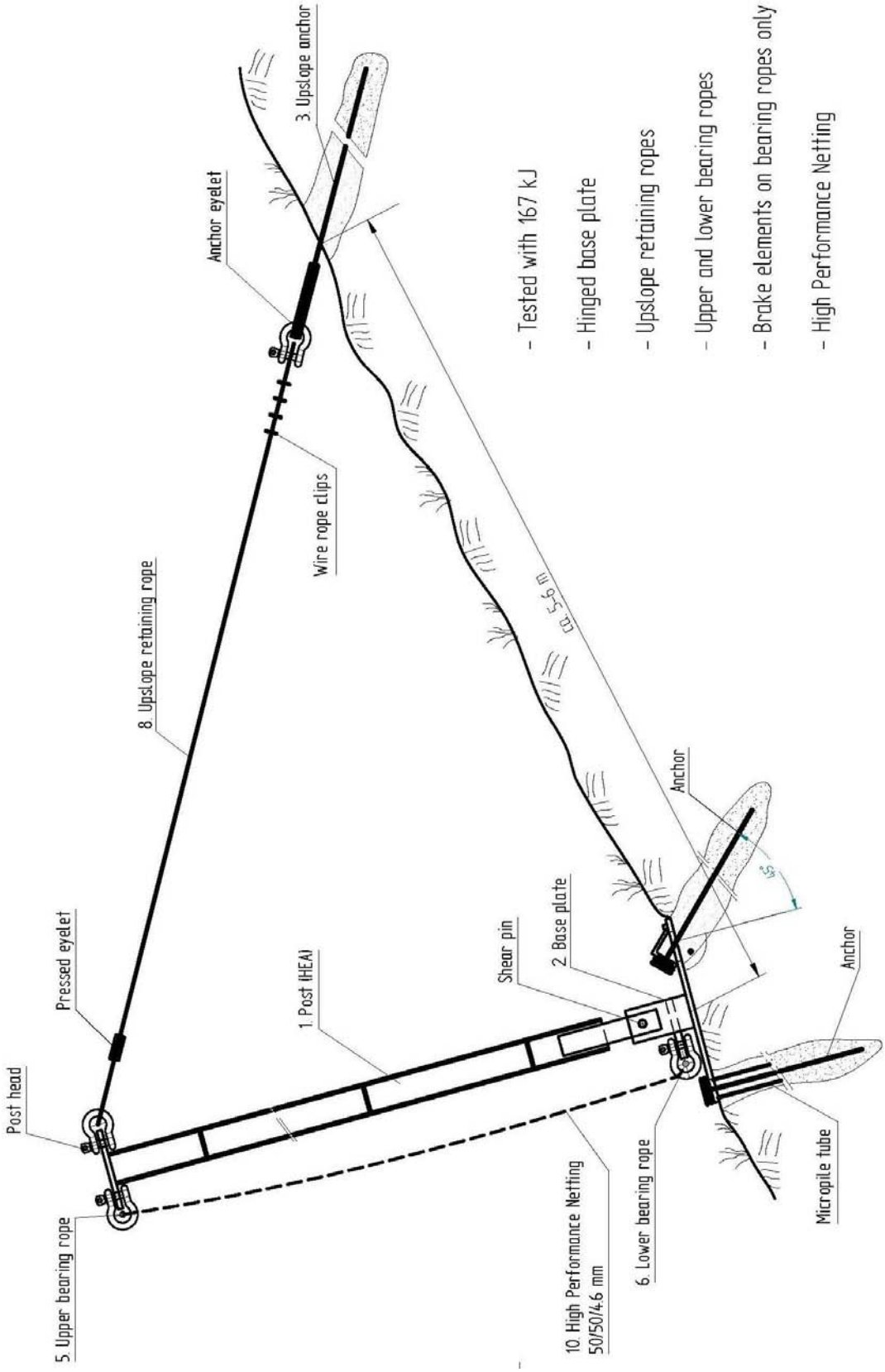
Leoben, 25.07.2005

MONTANUNIVERSITÄT LEOBEN
LEHRSTUHL FÜR BERGBAUKUNDE

(a.o.Uni.Prof.Dipl.-Ing.Dr.mont. Peter Moser)

(Dipl.-Ing. Hannes Blaha)

Rockfall Protection System TS-150 · Lateral View



Rockfall Protection System TS-150 · Plan View