

Ring net barriers made of high-tensile steel wire

**THE ECONOMICAL SOLUTION
TO DEBRIS FLOW**

FOR THE MOST VALUABLE ASSET IN LIFE: OUR SAFETY.

Millbach, Hasliberg, Switzerland: Installation work on an UX barrier, 2009.

Due to climate change, torrential rainfall and other meteorological events are increasingly being observed in our regions. These and other natural phenomena are resulting in a global increase in debris flows and hence the need to mitigate their destructive potential. Our flexible ring net barriers made of high-tensile steel wire provide innovative and efficient protection for both people and infrastructure in at risk regions across the globe. These systems are characterized by their simple designs, short installation times and the discreet way they blend into their surroundings.

WE CAN PROVIDE YOU WITH THE COMPLETE SAFETY PACKAGE.

At your request we can take on the role of **consultant**, **planner** and even **project manager**. Both the solutions we offer and the quality of our customer service is valued by our customers. For us excellent service is an integral part of every single project. No matter which phase of the project you are in, we will provide you with the support and expertise required to achieve the best results – saving you both time and money.

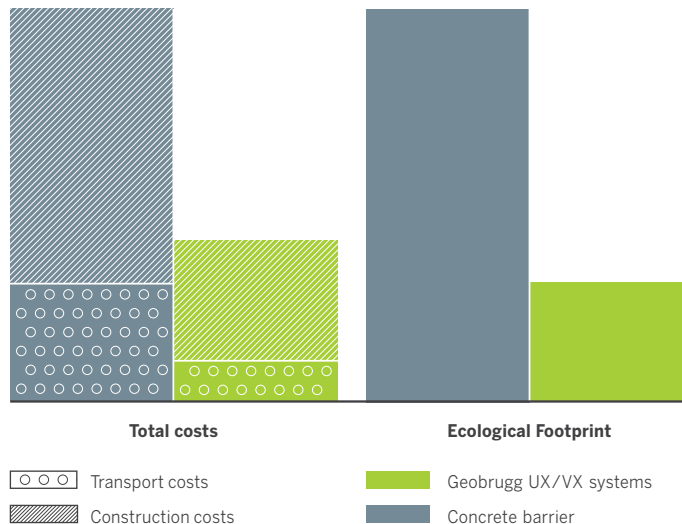


SIMPLE DESIGN, FLEXIBLE FUNCTION.

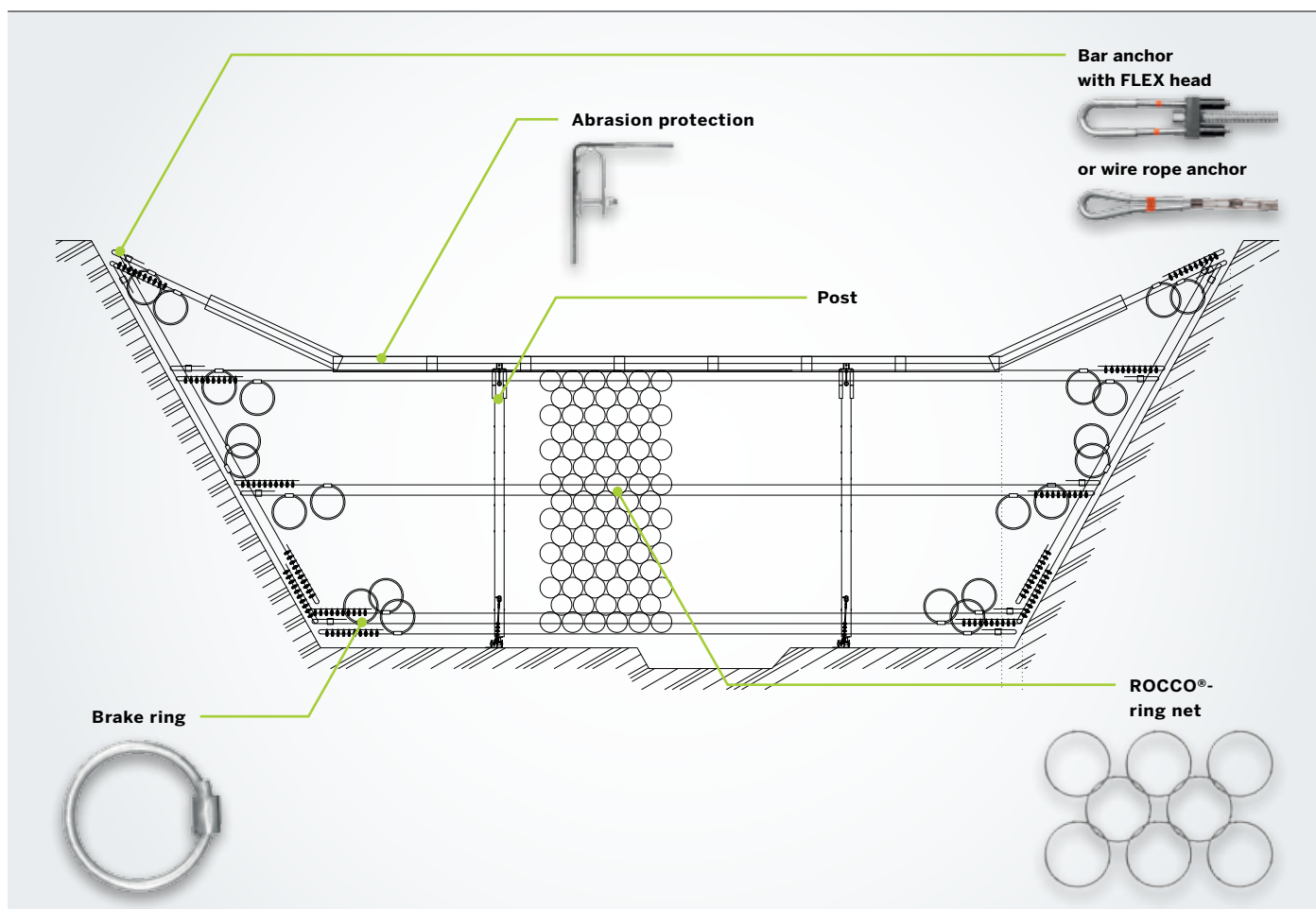
Comparison of conventional channel structures and flexible ring net barriers

Our ring net barriers are able to withstand **high static and dynamic loads**. They can be installed with minimal materials and effort, offering considerable savings in terms of cost and construction time.

Compared against conventional solutions, which require large-scale earthwork and concrete work on rough terrain, our flexible systems really deliver particularly when it comes to efficiency. Concrete structures are highly susceptible to damage from the high forces that are generated when boulders are dislodged during debris flow.



Example: Components of the UX debris flow barrier



QUALITY YOU CAN RELY ON.

In addition to great durability **our flexible ring net barriers ensure that water flows unimpeded**. They can also be **implemented in several levels** behind one another. Ensure to this and the drainage effect of the net, the retention capacity of the solution increases significantly should an event occur, allowing solid material such as scree and drift wood to be reliably held back.

Depending on the channel properties we will recommend one of two different types of debris flow barrier systems. **The UX series offers debris flow barriers for wider channels**. Whereas narrow-cut torrents use **the VX system, which span the channel without the need for posts**. All our barriers have one thing in common; they have been tested in several 1:1 large-scale field tests and have demonstrated their functional capability.

UX/VX debris flow barriers provide the following features:



Ring net made of high-tensile steel wire

Optimum combination of stability and flexibility. The barrier absorbs high dynamic and static loads, allowing the net to retain its protective effect even when full of debris.



Complete systems tested

Our barriers are the only debris flow protection solutions to have been tested in large-scale field tests under an extremely wide range of conditions.



Simple to install

Lightweight components reduce the amount of work required during transport and construction. Difficult earthworks are not required and the barriers are easy to adapt to any terrain, offering both time and cost savings.



DEBFLOW dimensioning tool

Thanks to the quick and efficient dimensioning provided by our special tool, reliable functioning is guaranteed, even with multilevel barriers.



Corrosion and abrasion protection

Our corrosion protection concept ensures a long lifetime and low system maintenance costs. At exposed points the ropes are fitted with abrasion protection, which can easily be replaced as necessary.

WE DON'T LEAVE SAFETY TO CHANCE.

In order to match our debris flow barriers to anticipated events and channel types, we have worked together with the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) to carry out extensive laboratory and field tests. These tests have demonstrated that our VX/UX ring net barriers are able to withstand significant debris flow loads. Based on these test results and practical experience in natural environments, we have developed our **DEBFLOW dimensioning software**. As part of the project specific consultation process, we work with **calibrated simulation programs**, which allow both the effects of debris flow on a system as well as the loads caused by rockfalls, avalanches, and snow slides to be mapped.

Test site in Illgraben, Switzerland: 1:1 field test of a VX barrier.

TECHNICAL DATA:

BARRIER TYPE WITHOUT POSTS	VX060L-H4	VX080-H4	VX140-H4	VX100-H6	VX160-H6
Debris flow pressure	60 kN/m/h _{fl}	80 kN/m/h _{fl}	140 kN/m/h _{fl}	100 kN/m/h _{fl}	160 kN/m/h _{fl}
Standard installation height*	4 m	4 m	4 m	6 m	6 m
Standard span width*	10 m	15 m	15 m	15 m	15 m
Ring net type	ROCCO 7/3/300	ROCCO 12/3/300	ROCCO 16/3/300	ROCCO 16/3/300	ROCCO 16/3/300

BARRIER TYPE WITH POSTS	UX060L-H4	UX100-H4	UX160-H4	UX120-H6	UX180-H6
Debris flow pressure	60 kN/m/h _{fl}	100 kN/m/h _{fl}	160 kN/m/h _{fl}	120 kN/m/h _{fl}	180 kN/m/h _{fl}
Standard installation height*	4 m	4 m	4 m	6 m	6 m
Standard span width*	25 m	25 m	25 m	24 m	24 m
Post profile	HEB 160	HEB 200	HEB 220	HEB 240	HEB 260
Ring net type	ROCCO 12/3/300	ROCCO 12/3/300	ROCCO 16/3/300	ROCCO 16/3/300	ROCCO 16/3/300

*Other dimensions can be measured on a project-specific basis.



Explanation of the type designation:

- UX160-H4:** Barrier type with posts
- VX160-H6:** Barrier type without posts
- VX160-H6:** Resistance to debris flow pressure during stopping, filling, and overtopping process
- VX160-H6:** Standard installation height in meters
- UX060L-H4:** Lightweight construction

We reserve the right to make technical changes.



Our DEBFLOW dimensioning tool is available here:
applications.geobrugg.com



Your local GeobruGG specialist:
<http://www.geobruGG.com/en/contacts>

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