



ANIMAL FRIENDLY ANTI-BURROWING SOLUTIONS

Date

November 18, 2021

MACCAFERRI

Webinar Agenda?



10' Burrowing Animals and potential threats

20' Managing the problem with non-invasive solutions

Live Q&A Session

Speaker: *Paolo Di Pietro – DT Senior Specialist, HQ Corporate*





CAN THIS BE CAUSED BY RODENTS?



BURROWING ANIMALS

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BURROWS

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How do those animals turn into a threat



A burrow is a tunnel or hole that an animal digs for habitation (a place to live) or as a temporary refuge (a place of protection). Burrows can also be the byproduct of locomotion—moving from one place to another. Some burrows function as “larders,” where animals keep food.

Burrows provide shelter from predators and extreme temperatures. For these reasons, animals have used burrowing behavior for a very long time.

National Geographic

THE THREAT

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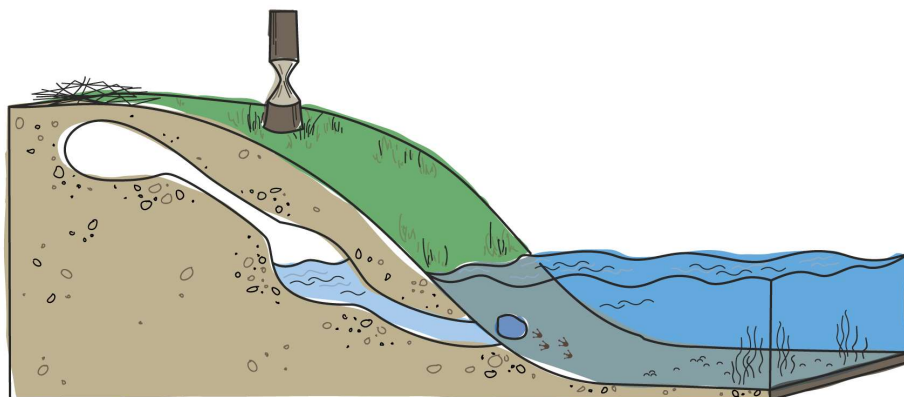


“Burrowing mammals are considered threats to levee integrity, and their burrowing activities have been implicated as a cause of numerous levee failures”

Dixon 1922, Fitzgerald and Marsh 1986, Hegdal and Harbour 1991, Federal Emergency Management Agency 2005, Bayoumi and Meguid 2011

DAMAGES CAUSED BY ANIMAL BURROWS

Burrows with underwater entrance

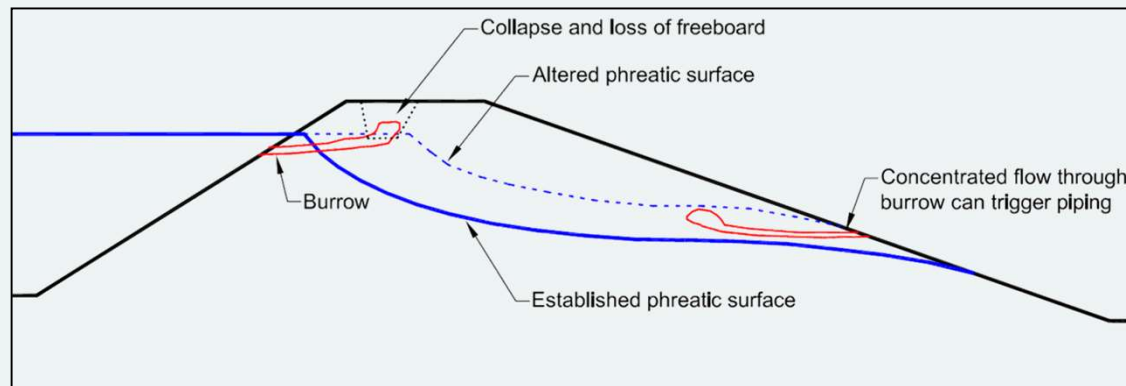
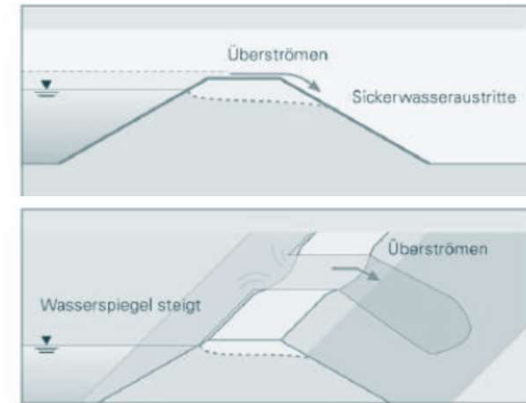


Among burrowers, beavers create a peculiar type of burrow.

All their burrows have **underwater entrances**, making it difficult for other animals to invade.

DAMAGES CAUSED BY BURROWING ANIMALS

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DAMAGES CAUSED BY BURROWING ANIMALS

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DAMAGES CAUSED BY BURROWING ANIMALS

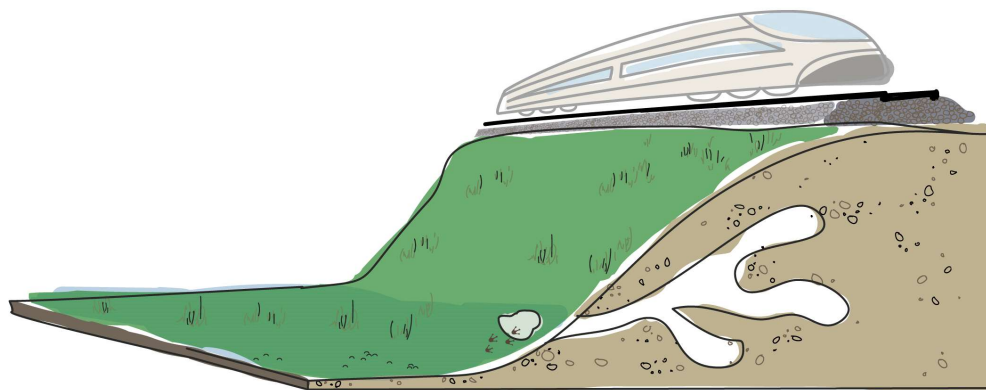
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Burrowing animals can undermine riverbanks



DAMAGES CAUSED BY ANIMAL BURROWS

Burrows with underwater entrance



Some burrowing animals, such as badgers, dig lairs with multiple entry points. Those extensive tunnels are often dug under road/railway embankment



DAMAGES CAUSED BY BURROWING ANIMALS

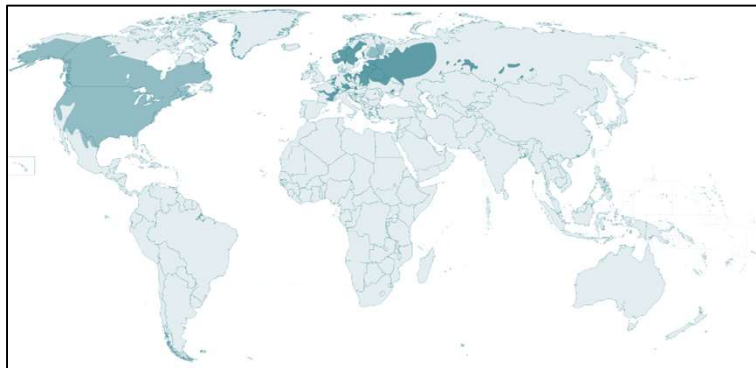
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Damages to railway infrastructure

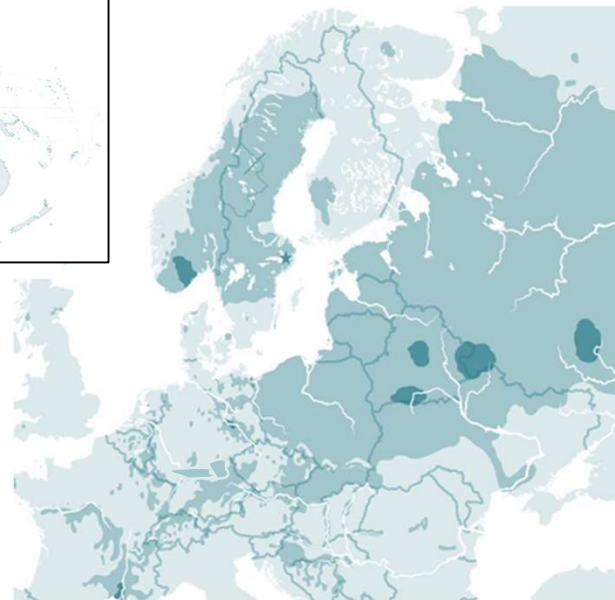
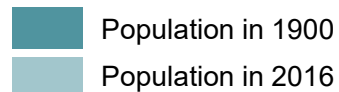


A GROWING POPULATION

The increase of burrowing animals in the Northern Hemisphere



BEAVER POPULATION IN CENTRAL EUROPE



Studies and researches conducted in North Europe and North America shows a huge increase in burrowing animals' population.

An overabundance of rodents increases the chance of animal burrowing therefore the risk of **damages to riverbanks.**

Image Source: International Union for Conservation of Nature's Red List; National Geographic.

TRADITIONAL RODENT CONTROL ACTIONS

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How the risk is mitigated

Traditional damage reduction methods for rodents (in general) involves lethal approaches to reduce the densities.

- Rodenticides - pesticides that kill rodents
- Baiting - using treated grains to poison rodents
- Introducing Predators
- Traps
- Fumigation
- Shooting
- Burrow exploder devices



INVESTIGATION ON BEAVER BEHAVIOUR

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Water Authority Province of Rovigo/ISPRA

Trial area

Channels nearby Rovigo (Italy)

Tested solutions

- RENOMESH
- RENOMESH covered with 10 cm top soil layer
- RENOMESH GREEN



11 beavers
tracked to assess
changes in their
burrowing behaviour
after installation of
beaver nets



A NON INVASIVE SOLUTION – DEMO PRJS IN GERMANY

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Proven barriers against burrowers

It is proved that digging animals relocate to a new area if they find an undiggable obstacle in their way: double twist wire mesh has proven to be effective against burrowing, preventing any damage to the river bank due to burrowing



Odra Dyke, Sophienthal, Brandenburg - 2013



A NON INVASIVE SOLUTION – DEMO PRJS IN GERMANY

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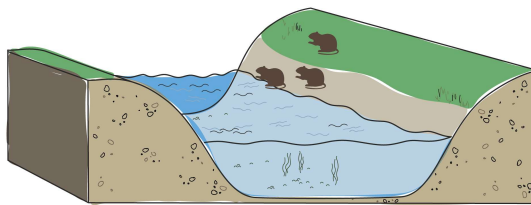
Proven barriers against burrowers

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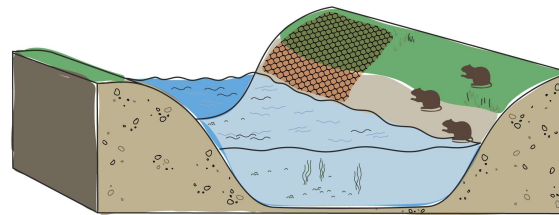
THE BEHAVIOUR OF BURROWING ANIMALS

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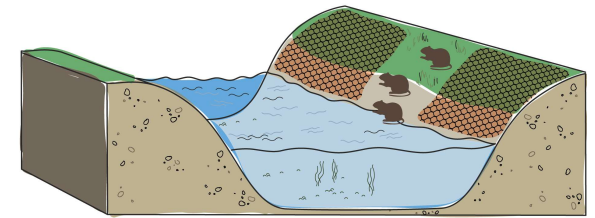
UNPROTECTED STRECTH

Beavers, badgers and other burrowing animals are free to burrow the riverbank or the earth filled embankment.



ANIMALS RELOCATION

The use of polymer coated wire mesh in critical areas induces burrowing animals to **move away from the protected stretch**. The animals relocate to an area where they can dig their lodges.

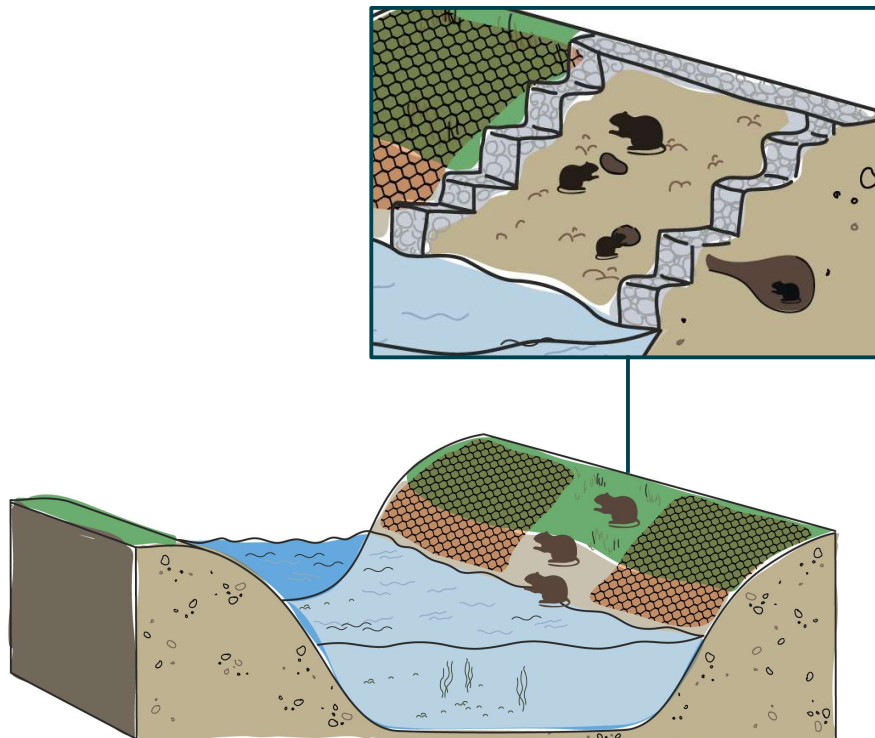


The **alternation of protected and unprotected bank portion** is an effective solution in managing the risk of bank damages due to beaver burrowing

DEDICATED AREAS FOR THE ANIMALS

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Unintrusive solutions for wildlife



Environmentally friendly solutions such as Gabion walls can be used to create dedicated areas where beavers, badgers and other burrowing animals can dig their lodges without affecting the stability of the riverbank.



RENOMESH

ANIMAL FRIENDLY ANTI-BURROWING SOLUTION

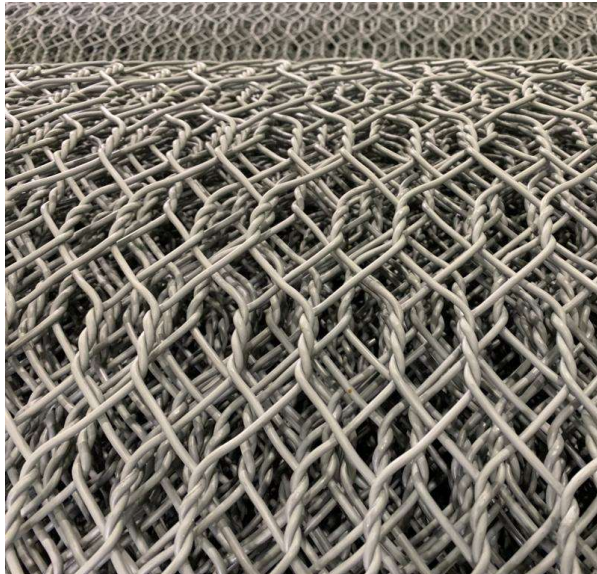
Our goal is to deliver safe solutions that **integrates into in the environment**, in a way that **considers wildlife** already living around it.

OUR PORTFOLIO

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Solution to prevent burrows

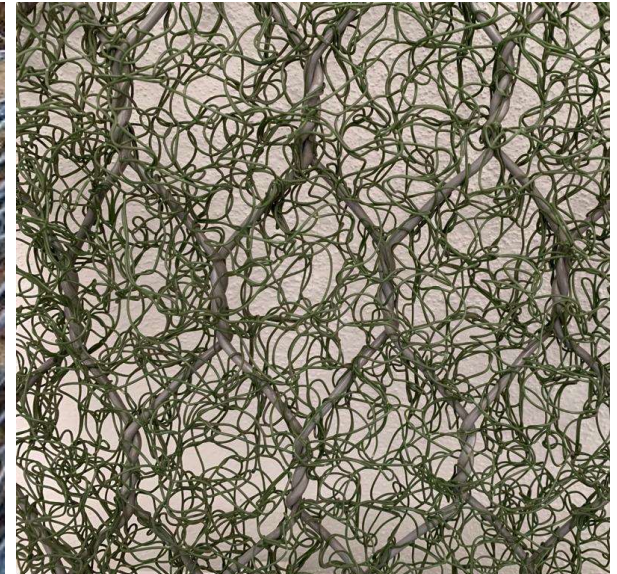
We offer a wide portfolio of solutions that dissuade animals from burrowing, inducing those animals to dig their lodges in non-critical areas



RENOMESH



RENOMESH BIO

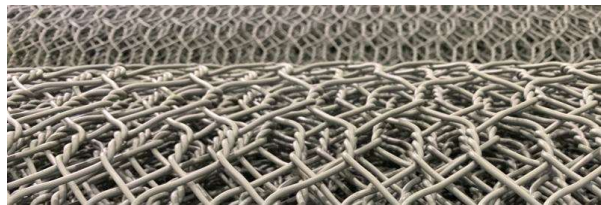


RENOMESH GREEN

OUR PORTFOLIO

Solution to prevent burrows

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RENOMESH

**M ANTI-BURROWING
SOLUTION**



RENOMESH BIO

**M ANTI-BURROWING
SOLUTION**

M EROSION CONTROL



RENOMESH GREEN

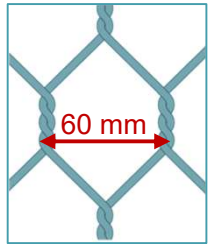
**M ANTI-BURROWING
SOLUTION**

**M LONG TERM
EROSION CONTROL**

RENOMESH

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The optimum opening size



6x8 mesh type

is suited to prevent the intrusion of **young rodents or small species** (e.g. ground squirrels) and, consequently the intrusion of medium/big size rodents such as beavers, muskrats, badgers.



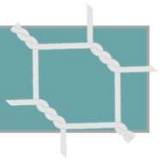
TESTED PERFORMANCE

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RESISTANCE TO BEAVER BITES



UNRAVELING

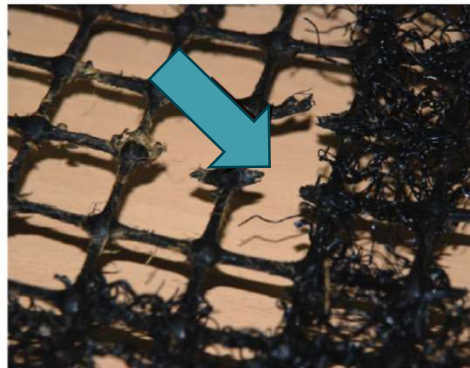


WIRE DURABILITY



RESISTANCE TO BEAVER BITES

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Steel nets are **impenetrable to beavers** as steel is resistant to their bites.

Test conducted at **Vienna University of Technology** on several types of barrier systems proven that steel mesh is the only way to create a barrier impenetrable to the strong bite of a beaver

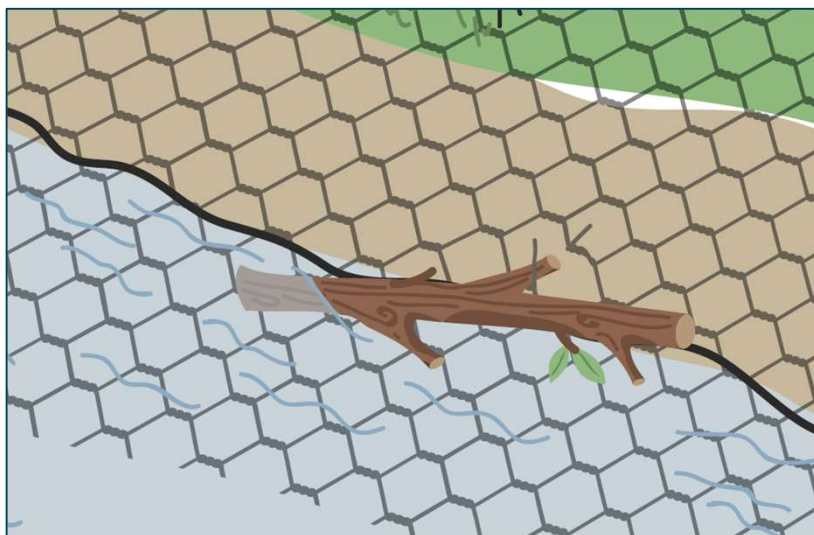


TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology

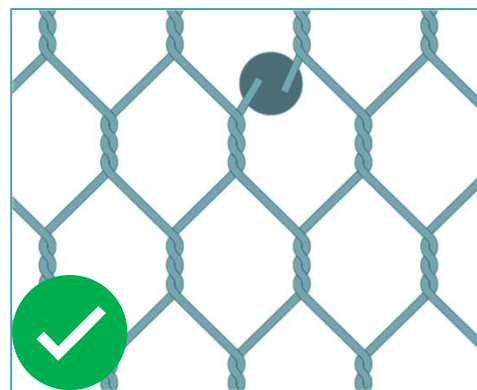
UNRAVELING

The power of our RENOMESH

Due to the characteristics of the RENOMESH, the steel wire mesh can withstand the tearing force of sediments carried by the flow **without unraveling in the event of wire breakage**



**WIRE BREAKAGE
PROPAGATION
IN SINGLE TWISTED
WIRE MESH**



**WIRE BREAKAGE
DOES NOT PROPAGATE
IN DOUBLE TWISTED
WIRE MESH**

WIRE DURABILITY

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Our products guarantee safety and long durability

Our double twisted wire mesh is made from high quality steel wire, which is heavily galvanised to provide long term corrosion protection. An additional protective polymeric coating is also applied for meshes that are to be used in more aggressive environments, or where a longer design life is required.



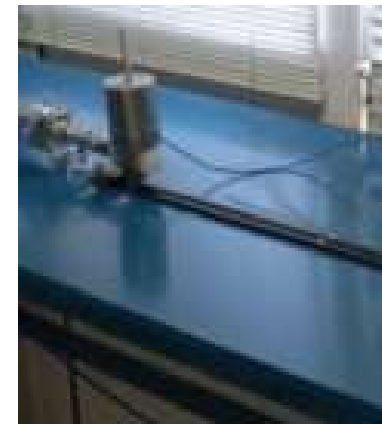
*Salt Spray testing
ISO 9227*



*Kesternich
ISO 6988*



*UV Testing Machine
ISO 4892-3*



*Abrasion Resistance
ISO 4892-3*

WIRE DURABILITY

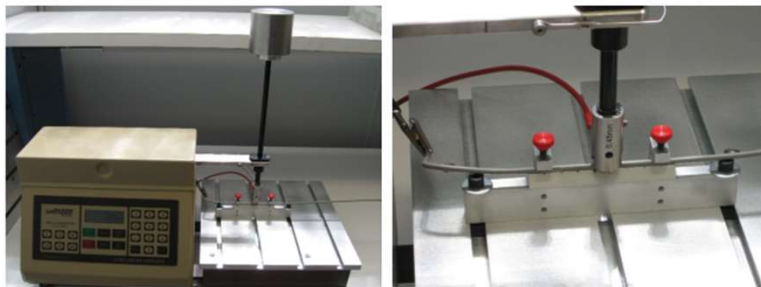
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Proven abrasion resistance

Wire Mesh coated with **PoliMac®** is harder and more resistant than other systems with traditional polymeric coatings thus preventing damages during product unrolling operations.

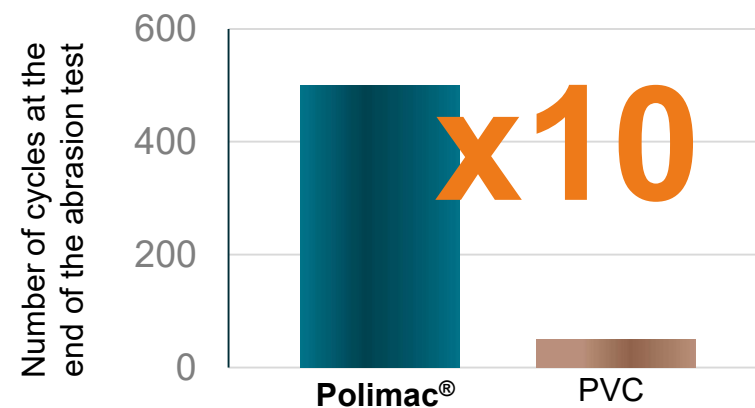
PoliMac®

WIRE PROTECTION FOR A CHANGING WORLD



ABRASION TEST - ASTM A975-21

10x

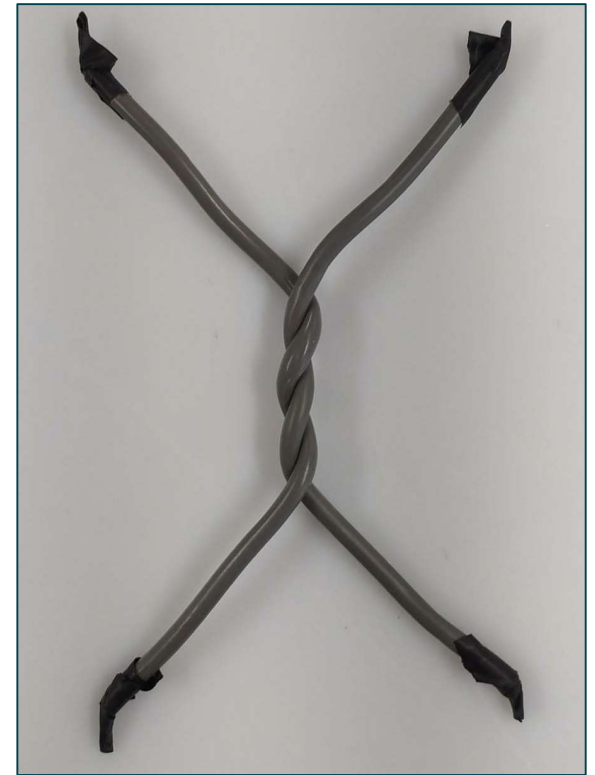


Wire Mesh coated with **PoliMac®** offers 10x better abrasion resistance than traditional polymeric coating.

WIRE DURABILITY

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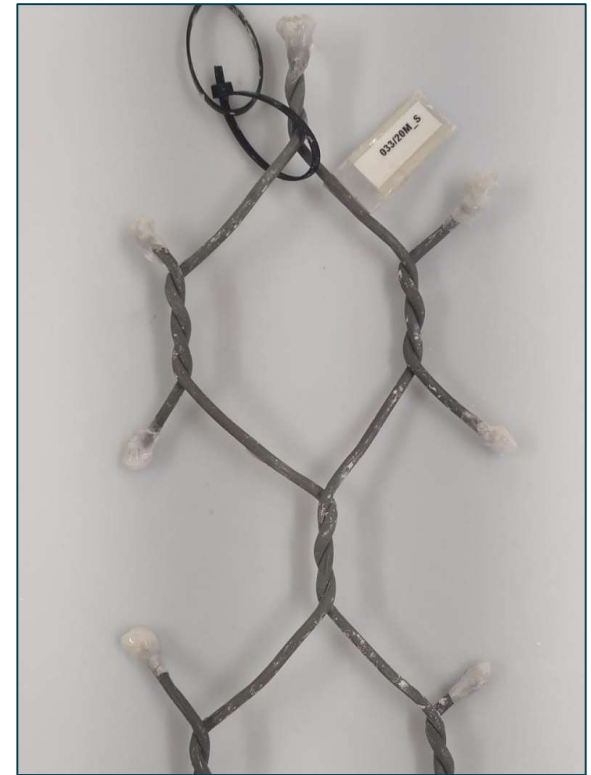
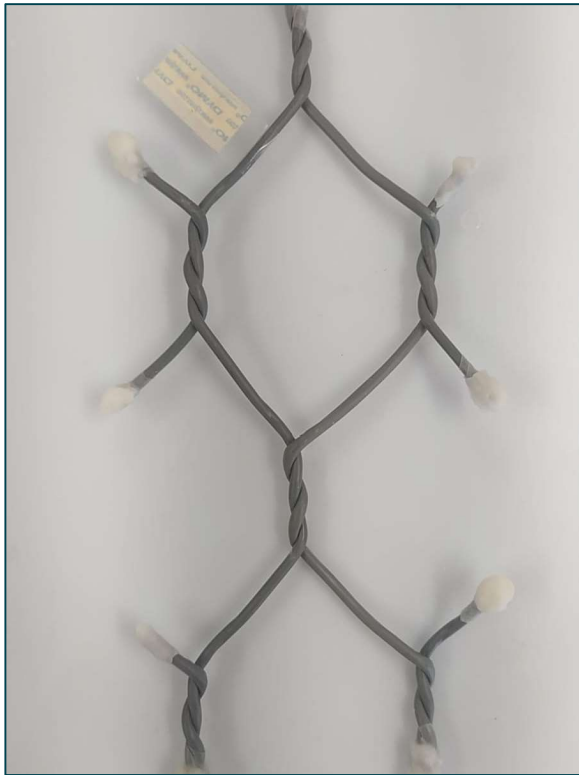
UV Test (ISO 4892-3): initial, middle and final stage of the specimen



WIRE DURABILITY

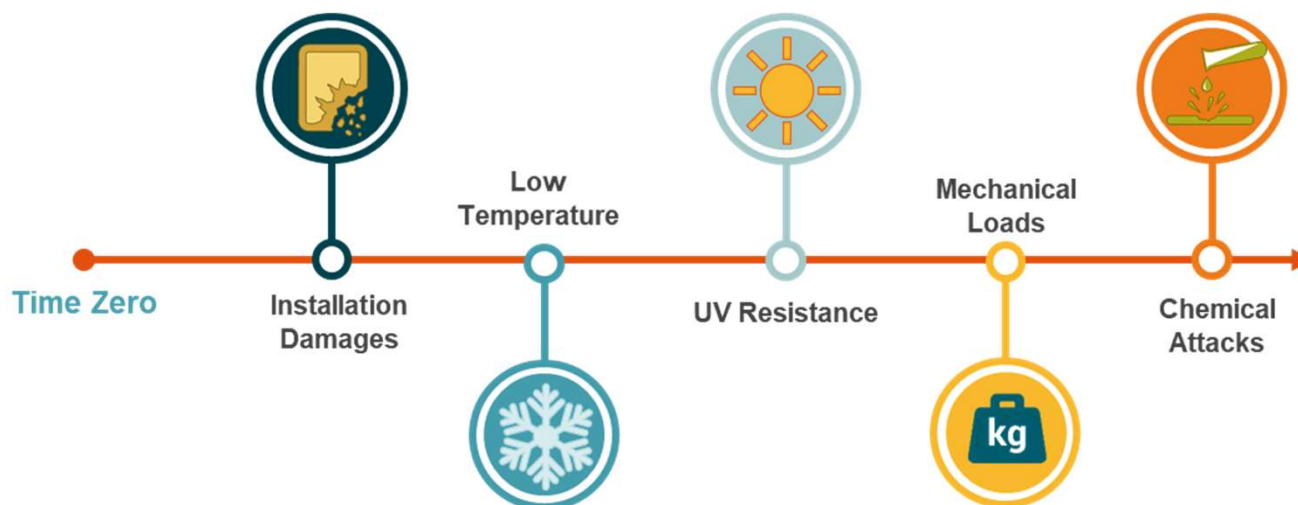
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Salt Spray Test (ISO 9227): initial, middle and final stage of the specimen



THE IMPORTANCE OF POLYMER COATING

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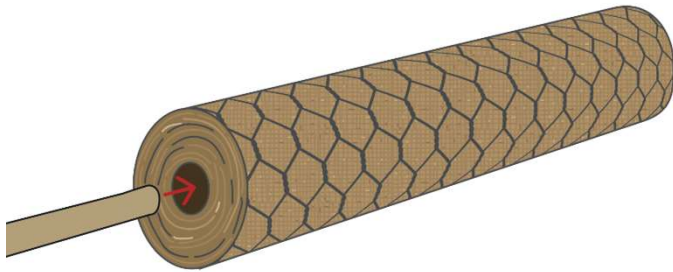
EN14475

As prescribed in international standards (**FHWA-NHI-10-024**, **EN 14475**), steel wire meshes installed in soil require a protective polymer coating to prevent corrosion and loss of mass; alternatively, in absence of outer polymer coating, minimum steel wire dia. of 8 mm should be used.

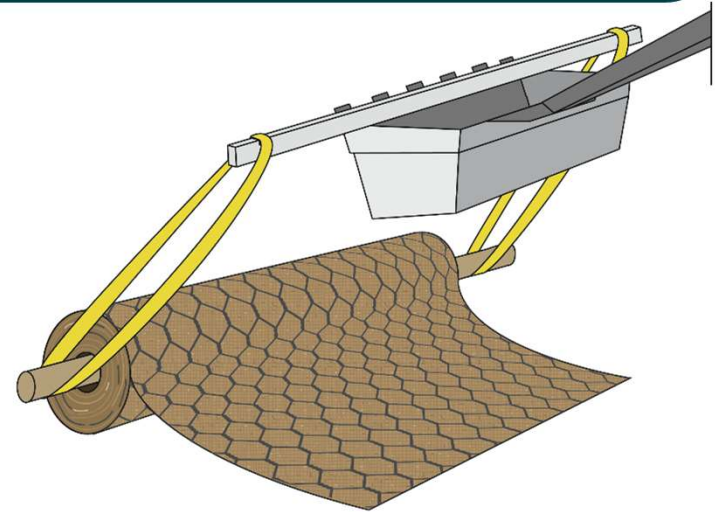
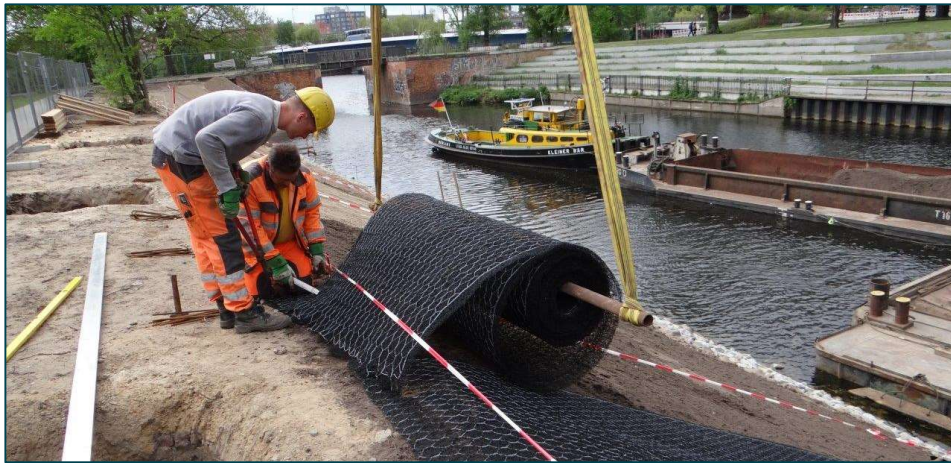
STEEL REINFORCEMENTS		Strips,				Welded meshes, ladders, rods		Woven wire meshes	
Criteria based on corrositivity		Non-coated "black" steel	Continuously hot-dip galvanised (35 µm)	Hot dip galvanised (70 µm)	Zinc/Aluminium coated (Zn85Al15, thermal spray coated 70 µm)	Non coated black steel	Hot dip galvanised (70µm)	Zinc/Aluminium coated (Zn85Al15, hot dip coated 35µm)	Zinc/Aluminium coated (Zn85Al15, hot dip coated 35µm) + polymer coated (PVC/PU or PE, 0.5 mm)
Notes									
Commonly used sizes		3 to 6 mm	3 mm thick	4 to 6 mm thick		bars Ø8 mm to 12 mm		Wire φ 2 mm to 3 mm	
Usual field of application – Class of structure (related to design life)		(1) Class 3 or 4	Class 4	Class 4 or 5	Class 4 or 5	Class 4	Class 4 or 5	Class 1	Class 4 for steep slopes up to 70°

INSTALLATION BENEFITS

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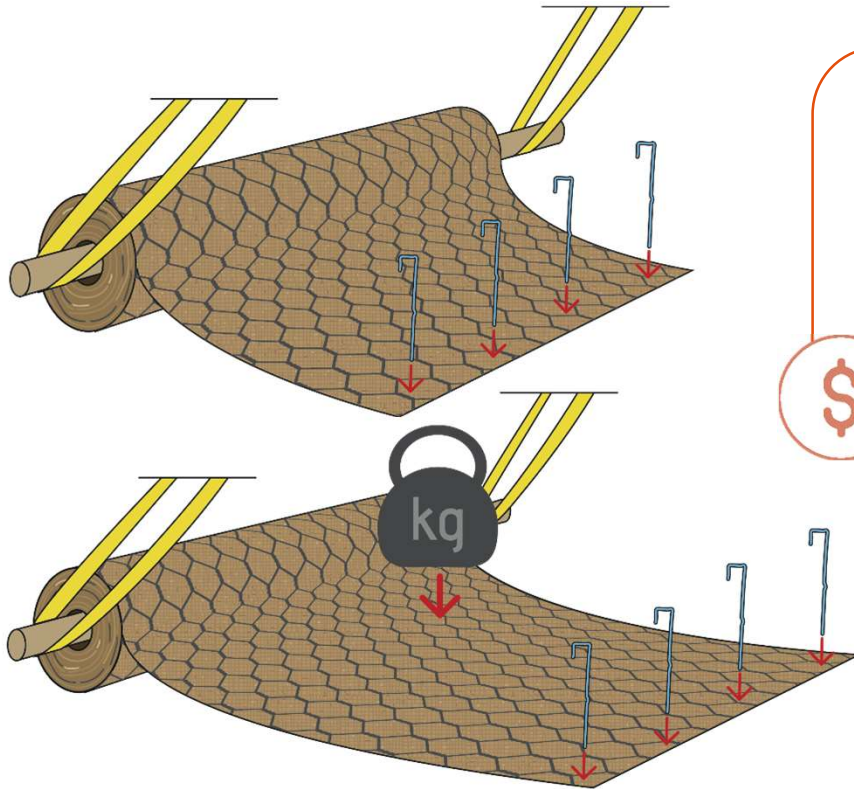


- Easy to handle
- Fast handling and installation
- Comes in rolls long up to 100 m this helps optimizing loading plan



INSTALLATION BENEFITS

MACCAFERRI

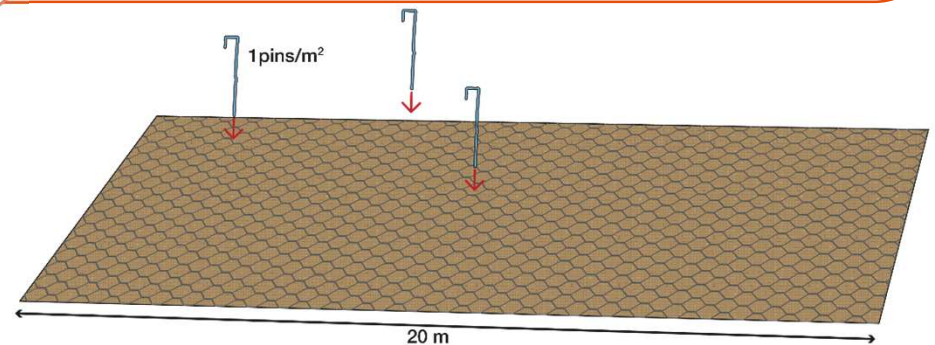


Simplicity and effectiveness are two key concepts that drive us when designing our solutions.

Our solutions doesn't require specialized personnel to install and fix to the ground and just an excavator



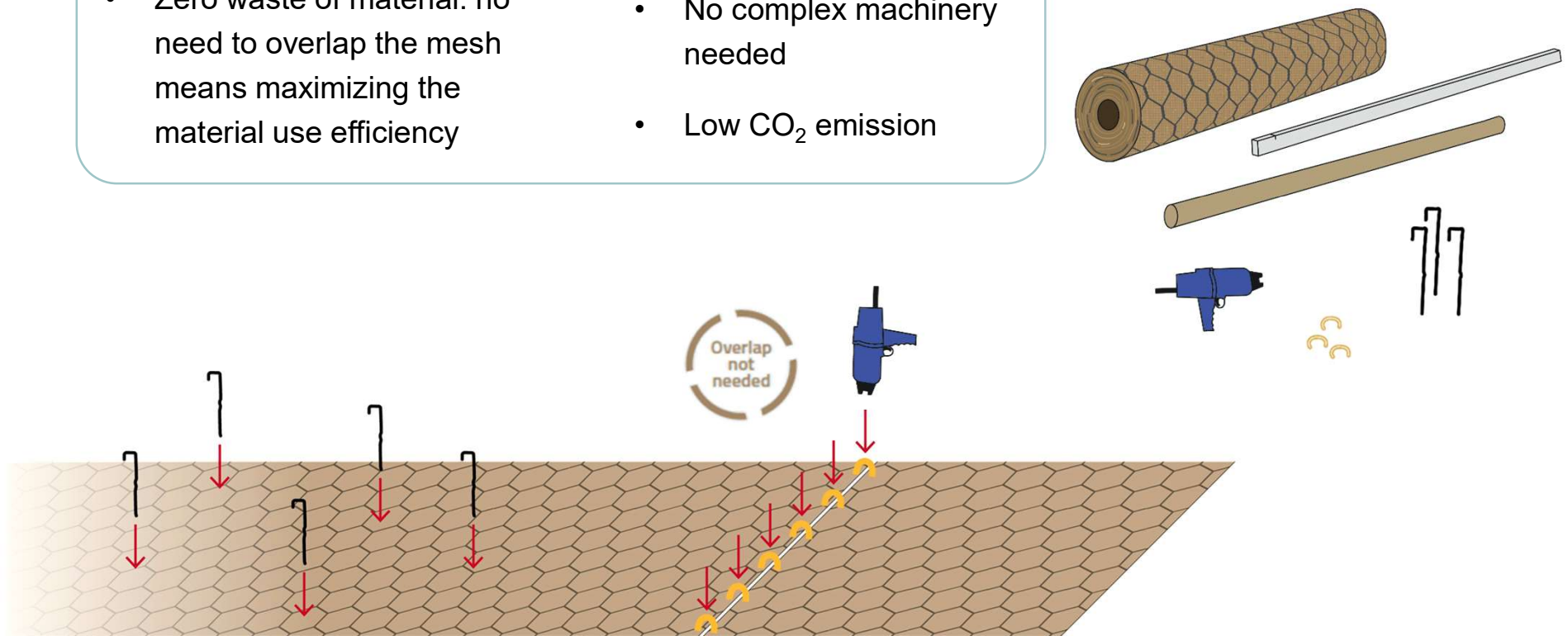
This led to a considerable cost and time saving compared to other equivalent solutions.



INSTALLATION BENEFITS

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- Zero waste of material: no need to overlap the mesh means maximizing the material use efficiency
- No complex machinery needed
- Low CO₂ emission



EROSION CONTROL AND REVEGETATION

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Beyond Burrowing Animals Management



RENOMESH BIO



RENOMESH GREEN

2 in 1

**ANTI BURROWING
+
EROSION CONTROL**



We use recycled steel
Recycled steel means less CO₂ emissions



Greener solution - the benefit of the natural integration
The growth of vegetation through the solution will
facilitate its integration in the river environment

“While there is a growing recognition that biological diversity is a global asset of tremendous value to future generations, the number of species is being significantly reduced by certain human activities”

United Nations

MACCAFERRI AROUND THE GLOBE

MACCAFERRI



TEXT «**PROJECT**»
IN THE CHATBOX
FOR DEDICATED
ASSISTANCE ON
YOUR DESIGN
PROJECT!



LIVE Q&A

