

The background image shows a landscape of a burned area. In the foreground, there are dark, charred rocks and some sparse, thin, blackened tree trunks. In the middle ground, a single, dark, coniferous tree stands prominently against a hazy, smoke-filled sky. The overall atmosphere is somber and desolate, with a muted color palette of greys, browns, and dark greens.

Rehabilitation and Restoration of Burned Areas

Solutions

MACCAFERRI

Wildfire

Fire is an ever present force in our forests and rangeland and is an important natural process in the renewal of ecosystems.

However, as human populations expand, people and their homes, businesses and public infrastructure are not only threatened by the incidence of natural and man-induced wildfires, but ultimately areas affected by fire can succumb to a secondary disaster resulting from the erosion of barren soils.

Mudslides, ash and debris flows and landslides commonly occur along the urban interface when heavy rains fall on burned ground devoid of vegetation.



The Challenge

The challenge following wildfires is to prevent a secondary disaster by stabilizing ash and soil while at the same time diverting or collecting debris and sediment that may impact downslope resources and human health and safety.

As wildfires generally occur on a large scale - thousands of acres are typically affected - a related challenge is to identify and prioritize the areas to be treated and maximize the efficient use of labor and economic resources.

The Solution

Maccaferri has been a leading provider of Civil Engineering and Environmental solutions for over 130 years. Maccaferri can provide solutions for temporary surface erosion control and long-term solutions for the toughest problems associated with burned areas.

Maccaferri's technical department can assist you with geotechnical, hydraulic and bioengineering techniques to deal with; erosion control, slope stability, sediment control, storm water management and watershed protection. Our unique blend of products, experience and technical expertise allows us to develop complete long-term solutions for your most challenging situations.

We use a combination of natural and man-made materials to stabilize fire-damaged and erodible slopes and stream beds. We can also develop plans to control and contain or divert storm water and mudflows. Our stabilization methods and erosion control techniques support natural revegetation and regeneration of burned areas while mitigating or preventing surface erosion and the devastating effects of mudflows, landslides and sediment laden runoff.



TEMPORARY SOLUTIONS



CHALLENGE: Ash & Fine Sediment Control

Pre-existing rills and gullies can rapidly conduct soil and ash down slope, accelerating erosion and increasing the impact of the wildfire on downstream resources such as homes and infrastructure.

SOLUTION: 01

MacDams™ are a cost-effective, functional equivalent to check structures constructed of straw bales or sand bags with some very distinct advantages when installed in gullies or drainage channels following fires.

Those advantages include:

- Lower installation costs
- High level of effectiveness
- Ease of installation
- Longevity
- Operation and Maintenance



CHALLENGE: Accelerated Runoff

Wildfires can create a condition in the soil known as “hydrophobicity” whereby a water-repellent layer is created in the soil, leading to accelerated runoff and flows of mud and ash.

SOLUTION: 02

Straw wattles are engineered composites of straw fibers, man-made fibers and performance-enhancing polymers encased in a heavy-duty, knitted cylindrical tube. They are used after wildfires as a Slope Interruption Device (SID) to slow down overland flow, filter ash and sediment from runoff and to break up slope length, thus reducing the erosion potential of burned slopes. Straw wattles can be used in conjunction with hydraulic mulch applications, BioMac® Soil Blankets and for storm drain inlet protection and perimeter sediment control around homes.

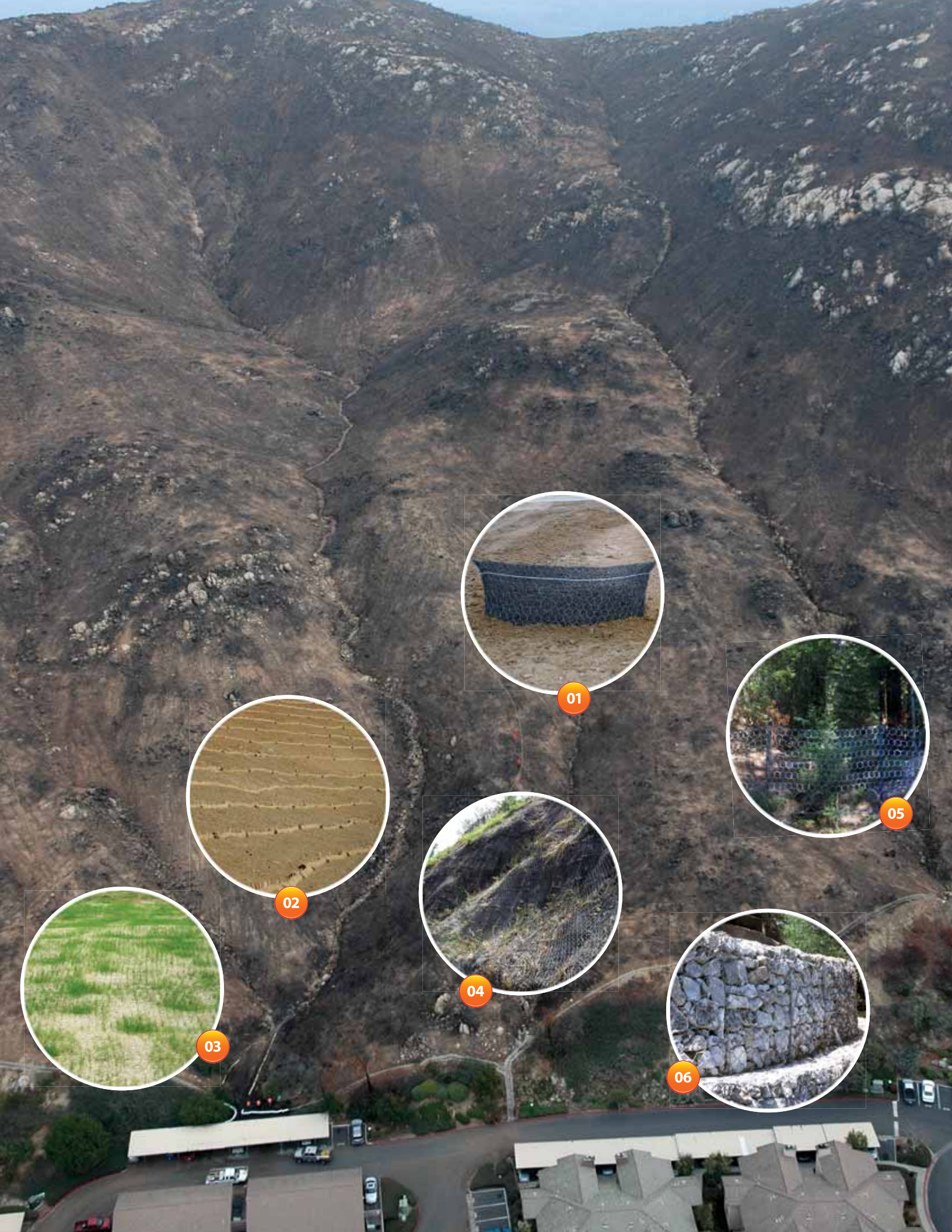


CHALLENGE: Bare Soil & Ash

Wildfires destroy the vegetation that protects the soil surface from the ravages of wind and rainfall. Accelerated erosion occurs until permanent vegetation can provide stabilizing cover.

SOLUTION: 03

BioMac® Soil Blankets are a natural and proven method for providing temporary erosion control while assisting nature in re-establishing vegetation after wildfires. The BioMac® group of products are fully biodegradable and constructed of straw, coconut or a combination of those two fibers securely stitched between two layers of fine, photodegradable, polymer netting. BioMac® Soil Blankets keep ash and mineral soil in place, reducing the impact of rain and wind on fire-ravaged slopes.



01



02



05



04



03



06

PERMANENT SOLUTIONS

CHALLENGE: Rockfall Protection

Wildfires can destroy the emergent portion of a plant as well as its stabilizing root system. On affected areas where loose rock predominates, the loss of vegetation can produce the potential hazard of rockfall, imperiling downslope homes, buildings, roads and other infrastructure.

SOLUTION: 04

MAC.RO rockfall protection is an active system which acts on the rock and debris detachment process by consolidating the slope surface. Maccaferri has developed Rock Mesh, a new double-twisted woven mesh into which steel cables are woven and draped across the slope face. Once installed, standard re-vegetation measures, such as the application of hydraulic mulches and/or aerial seeding can be applied over the Rock Mesh. The Rock Mesh does not inhibit the reestablishment of introduced or native vegetation. Also, MacMat® R can be used to stabilize surface rock and debris as well as control erosion.



Rock Mesh

CHALLENGE: Sediment & Debris Control

In some fire-prone environments, drainage areas are “pre-loaded” with destructive debris waiting to be mobilized by accelerated runoff created from the absence of stabilizing vegetation. Cost as well as accessibility makes collection or diversion of this debris on the upper slope areas impractical. Until stabilizing vegetation can be reestablished this debris needs to be retained at downslope structures for removal and safe disposal.

SOLUTION: 05

MAC.RO rockfall protection can also be installed as a passive debris flow barrier (DBF) system. Passive systems are those which do not affect the process of rock detachment, but rather focus on containing falling debris, thereby averting danger for infrastructure, buildings and homes.



Debris Control

CHALLENGE: Sediment Containment

More and more homes are being built in fire-prone areas and at the base of slopes adversely affected by wildfires and their destructive erosion and sediment deposits. To permanently protect these homes and their associated infrastructure, the design of structural measures to divert or contain sediment must be engineered with an eye towards long term solutions.

SOLUTION: 06

Maccaferri gabions and Reno mattresses can be designed to be placed at the base of fire-prone slopes to provide a more permanent base stabilization and sediment collection structure. Free-draining, gabions can be filled with a variety of source rock or re-vegetated as desired. The wire used in the construction of gabions is persistent and not subject to destruction by wildfires.



Gabions



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