MACCAFERRI

CASE HISTORY

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EROSION CONTROL MEASURES ON RAILWAY EMBANKMENT, RAJASTHAN

PALI, RAJASTHAN, INDIA

Slope Protection

Problem

The site was a railway embankment in state of Rajasthan constructed using silty sand with slope height upto 18m. The embankment slope was at risk of eroding or failing due to reasons such as heavy precipitation during the rainy season, steep gradient, absence of vegetation cover, drainage issues, etc. Denudation of vegetation from soil slopes or the lack of vegetative cover on embankment slopes was often responsible for formation of rills and rain-cuts, eventually leading to a surficial slide or undermining of the edges of the railway embankments.

There was a need identified to protect the railway embankment slope from erosion by growing sustainable vegetation. Aspects such as extremely high temperature in range of 45 degree celsius, absence of organic content in soil, long slopes, etc. made the project very challenging.

Client: Dedicated Freight Corridor Corporation of India Limited (DFCCL)

Designer / Consultant: Maccaferri Environmental Solutions Pvt Ltd

Contractor: Larsen & Toubro Constructions Ltd

Products used (Qty.)

- MacMat	7,866 sqm
- Biomac natural	2,401 sqm
- Other Biomaterials	MacFlex, Macganics & other soil amendments

Date of construction: 04/2019 - 06/2019

Solution

To prevent the soil erosion on the embankment slopes, Maccaferri offered different solutions based on the slope height to be protected against erosion. Initially, tests were carried out for required soil amendments (nutrients, pH balancing agents, etc.) and seed selection considering the challenging soil and environmental conditions existing at site.

For slope height upto 4m, Hydraulically Applied Erosion Control Products (HECPs) solution in form of MacFlex and Macganics along with necessary soil amendments in combination with seeds were sprayed on the slope surface.

For slope height more than 4m and upto 7m, HECP was first applied on the slope surface followed by installation of biodegradable erosion control mat (BioMac CCW) for erosion protection and vegetation growth.

For slope height more than 7m, HECP was followed by installation of unreinforced 3-dimensional geosynthetic mat (MacMat 9.1) for erosion protection and vegetation growth.

Photo 1: Site before application of erosion control products

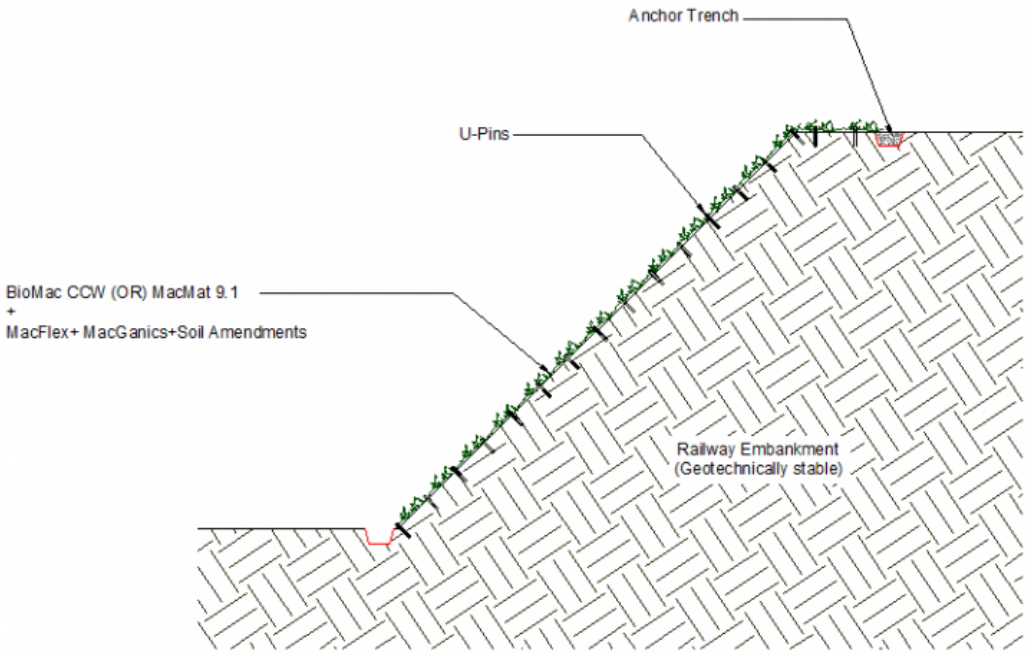
Photo 2: Application of MacGanics

Photo 3: Application of MacFlex

Photo 4: Laying of MacMat and fixing of U-pins over HECP surface

Photo 5: Establishment of vegetation on Biomac CCW and HECP system

Photo 6: Vegetation establishment on slopes installed with MacMat



TYPICAL CROSS SECTION

Typical cross-sectional drawing

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