

**EROSION CONTROL MEASURES ALONG GANDAK RIVER BANK,
BIHAR
VALMIKI NAGAR, BIHAR , INDIA**

Slope Protection

Problem

River bank protection works have been carried out along Gandak river near Valmiki nagar, Bihar. River Gandak carries a high flow during monsoon. Due to high flow of water in the river, the left river bank has suffered severe erosion endangering its stability. In-situ soil is found to be cohesionless. The side slope was at the risk of eroding or failing due to reasons such as precipitation during rainy seasons, high flow rate of river and the absence of vegetation. The deposition of eroded bank material further towards downstream can change the path of the river resulting in meandering. This scouring of bank is observed due to the high hydraulic forces present at the site. Protection work of 1080 m length in upstream of Gandak Barrage on left bank has been initiated and suitable solutions including bank side protection measures, retention measures and erosion control measures are required to be provided to protect the bank from erosion.

Solution

Maccaferri has proposed the erosion control system consisting of rolled erosion control products (RECP)-MacMat R (Steel reinforced synthetic geomat) and hydraulically applied erosion control products (HECP) - MacFlex and MacGanics. The erosion control measures are adopted on soil slopes of max.12m high of max.45 deg inclination over the surcharge slope above the Paramesh wall. On some slopes away from river back, application of hydromulching (with MacFlex, MacGanics, soil amendments, seeds and water) alone are done on the slope based on the applicability. These solutions are conforming to MoRTH - Specifications for Road & Bridge Works (5th Revision) and IRC: 56. MacMat R, which is a turf reinforcement mat (TRM) create an environment to develop vegetation, reduces the velocity of water on the slope surface, absorbs the impact of raindrops reducing the "splash" effect, and acts as a reinforcement for the roots of the vegetation.

Other retention measures and mitigation measures also been adopted additionally based on site suitability.

Client: WATER RESOURCES DEPARTMENT BIHAR & HYDROLOGICAL PROJECT PLANNING

Designer / Consultant: MACCAFERRI ENVIRONMENTAL SOLUTIONS PVT. LTD.

Contractor: NNT DEVELOPERS PVT. LTD.

Products used (Qty.)

- Geosynthetic Accessories 19000 sqm(MacFlex, MacGanics)
- MacMat R - Steel 19000 sqm

Date of construction: 03/2021 - 05/2021



Figure 1-Slope preparatory works



Figure 2-Application of MacGanics



Figure 3-Application of MacFlex



Figure 4-Vegetated surcharge slope covered with MacMat R (Paramesh wall)



Figure 5-Vegetation establishment over MacMat R installed slope



Figure 6-Vegetation establishment over MacMat R installed slope



Figure 7-Vegetation establishment over slopes