

BANK PROTECTION WORKS ALONG RIVER GANGA NEAR DAKHINESHWAR TEMPLE KOLKATA, WEST BENGAL, INDIA

Longitudinal Protection

Problem

Dakhineswar temple is located on the banks of River Hooghly, in district of North 24 Paraganas. The district lies within the Ganges-Brahmaputra delta.

Tidal bore phenomenon is prevalent in Hooghly river. During the tidal bore, the incoming tides are funneled into a shallow narrowing river (estuary zone), causing the river to flow in opposite direction. Due to the large tidal variation in the river, there was a turbulence at the base of the existing embankment structure. This caused excessive and continuous erosion damage to the bank portion of Dakhineswar temple. During the heavy rains, the water level in the river would rise, resulting in flooding of adjacent areas.

Bank erosion is often caused by natural processes but it can also be due to human intervention especially livestock management, vegetation management and river engineering. Bank erosion can result in a loss of land and threaten properties or structures. The deposition of eroded bank material further towards downstream also causes damage, both to structures and environment.

Solution

Maccaferri proposed a gabion toe wall along with a gabion mattress revetment over the slope. MacBags (geotextile bags) were used as filling material beneath the gabion mattress.

The solution proposed helped in controlling and reducing the successive erosion caused due to the tidal variation and flowing action of river.

The construction of protective structures is usually coupled with carrying out transversal/longitudinal hydraulic cum geotechnical works, in order to guarantee their protection against the cyclonic action which causes erosion.

Advantages of gabions:

1. Cost Effectiveness.
2. Simplicity in construction.
3. Flexibility.
4. Durability.
5. Drainage and permeability.
6. Environmental compatibility.

Client: Central Public Works Department, Kolkata

Designer / Consultant: Maccaferri Environmental Solutions (Designer)

Contractor: K.K. Shaw Engineers & Contractors

Products used (Qty.)

- Gabion	321 nos
- Reno Mattress	375 nos
- MacBag	10,036 nos
- MacTex Non-woven Geotextile	963 sqm

Date of construction: 01/2017 - 05/2017



Photo 1: Severe erosion observed on the banks of river Ganga



Photo 2: Site before construction



Photo 3: Placement of geotextile bags behind gabions



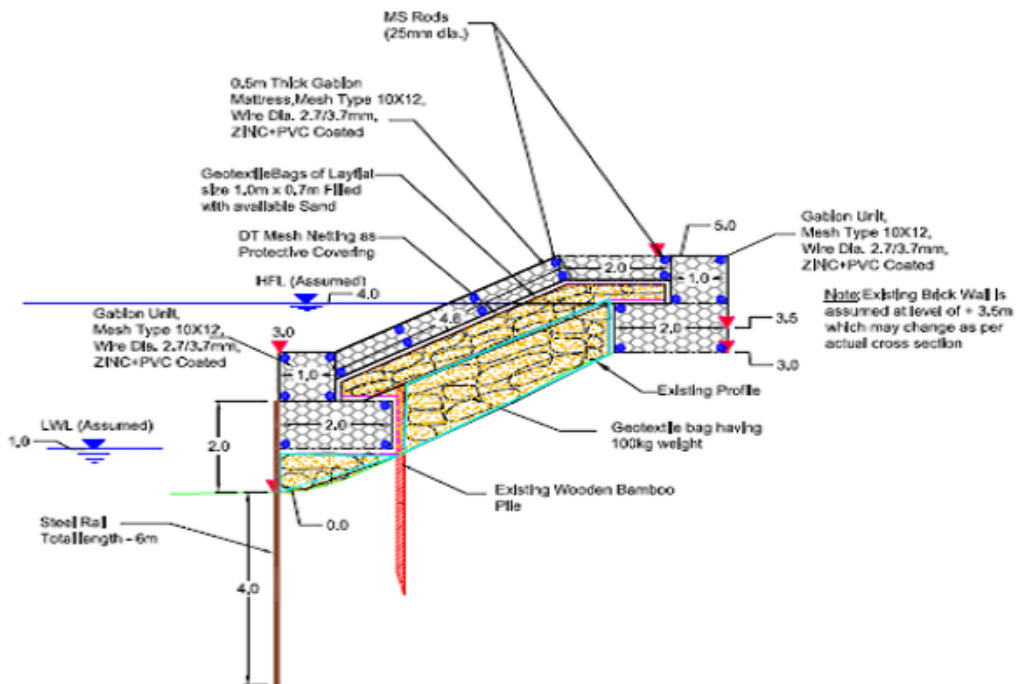
Photo 4: Installation of geotextile bags



Photo 5: Gabion mattress installed over geotextile bags



Photo 6: Completed structure



Cross sectional drawing