MACCAFERRI

CASE HISTORY

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SHORE PROTECTION OF RIVER MAHANADI

PARADIP, ORISSA, INDIA

Revetment Protection

Problem

The rivers Mahanadi and Debi were flooded following the devastating cyclone which hit the state of Orissa in the year 1999. The embankments and the river bank were severely eroded and required extensive reconstruction.
Since the site is close to the Bay of Bengal, small tidal waves (in the range of 0.2m-0.5m) are present in the river channel throughout the year. These waves, combined with the velocity generated (2-3m/s) have been instrumental in dislodging the existing protection work using rip-rap in some stretches and bamboo piling work in others. The average slope of the riverbank (after erosion) was observed to be in the range of 1:1.

The consultant wanted to provide a solution which is flexible and would eliminate extensive earth work.

Solution

This was a world bank aided project. The project involved launching of pre-filled gabion mattress in India. In the rehabilitation process, the eroded embankments and banks had to be reconstructed. The gabion mattresses were placed at a depth of 20m under water and at a distance of 12 meter from the bank.

Reconstruction of the embankment:
The embankment was reconstructed using locally available earth fill compacted to 90% of the maximum dry density as per Ministry of Surface Transport standards. The side slope of the embankment was protected with a 0.6m thick stone pitching.

Reconstruction of the eroded river bank:
The river banks which were at a very precarious and unstable slope were re-constructed as follows:
1. The slope was stabilized by loose dumping of rocks (rip rap) 30-40 kg weight to form a bank slope of 1:2.
2.Permanent protection of the formed bank slope using a gabion revetment.

Construction methodology:
1.The gabion mattresses (4x2x0.5) were filled with the required size boulders on the river bank.
2.The filled unit was lifted by a 10T Jib Crane, and is loaded on a 200 T capacity barge.
3. The barge was shifted into the placement location by a tug.
4.The units were raised by the frames to allow the barge to be removed and finally lowered into place below water.

Plant & Machinery used:
1. 10 T Jib Crane.
2. 200 T Barge– 3 no.
3. 100 T Pontoons- 2 no.
4. 165 bhp tug- 2 no.

Client: Irrigation Department of Orissa
Designer / Consultant: Maccaferri (Designer)/ Irrigation Dept Orissa
Contractor: M/S BAMDEV NAYAK & CO
Products used (Qty.)
- Gabion 87,000 cum

Date of construction: 03/2003 - 12/2003

Photo 1: Positioning of crane on the barge

Photo 2: Pre-filled units being lifted from the ground

Photo 3: Pre-filled mattress lifted and taken in the barge

Photo 4: Lowering the units for under water placement

Photo 5: Completed structure

Photo 6: Structure after 10 years

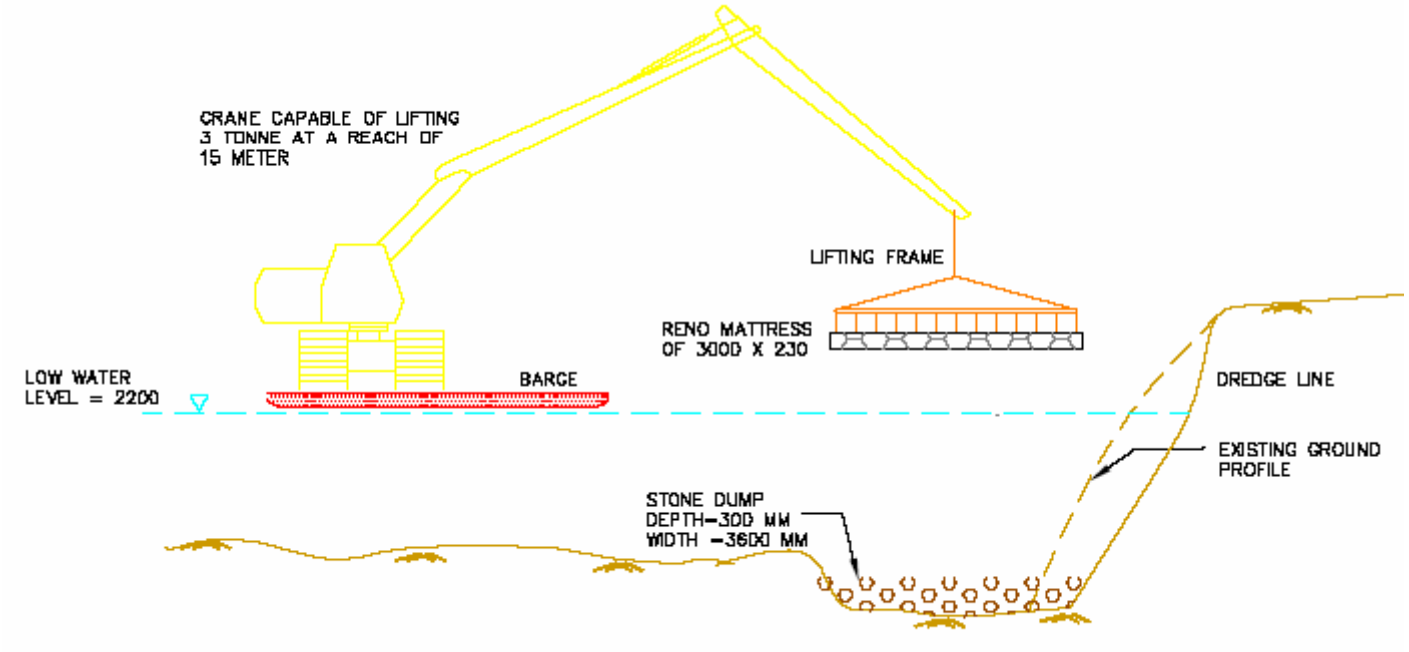

Diagram 1: Typical scheme of solution

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