

BRIDGE PROTECTION WORKS FOR RIVER YAMUNA NOIDA, UTTAR PRADESH, INDIA

Revetment Protection

Problem

The Delhi Administration had proposed a Road Bridge across the river Yamuna for the Mass Rapid Transport System. The proposed Bridge was about 2km upstream of the existing Okhla barrage and had a waterway of 554.4m. Because of the construction of this proposed bridge, it was anticipated that the velocity would be very high and hence the piers of the bridge and the bed has to be protected.

The bridge was to meet certain project specific requirements concerning installation of river training works with safety on one side, and cost effectiveness on the other, and also with minimal afflux. The original design of the river training works viz for the approach roads (u/s and d/s) and guide bunds (rear side & front side) all provided for massive apron and slope protection, using 1 m thick stones by way of pitching. This envisaged rather costly works for which the original tendered estimate was about INR 275 millions.

Solution

The river training works were designed for a design discharge of 14866 cum/s and a maximum velocity of 3.3 m/s. The solution offered made use of 1 single layer of 0.5 m thick Gabions. Zinc Coated Gabions of Mesh type 10x12 and wire dia 3.0 mm was used. The decision of Maccaferri Gabion and renomattress was well accepted by the Noida Administration, CWPRS etc. since there was a reduction in the apron thickness by 50% against the conventional stone protection.

The main factor that contributed to the adoption of Reno mattress technology is the usage of stones of smaller diameter on one side, and ease of construction and maintenance of reduced quantum of material on the other. It was experienced that since there was a reduction in the proposed pitching from 1m to 0.5m, there was 50% reduction in the quantum of stones. Recourse to only turbing in certain reaches of approach roads also contributed to the saving in cost. Immediately after the completion of works, the Gabions and the mattresses have successfully withstood some reasonably high velocities in the deep channel flow. Therefore, it can be argued without doubt that application of this technology to this bridge made it techno-economical.

The structure proves to be stable even after 19 years.

Client: NOIDA TOLL BRIDGE CORPORATION LIMITED

Designer / Consultant: S.B.KULKARNI

Contractor: M/S ORIENTAL STRUCTURES

Products used (Qty.)

- Reno Mattress 1,00,000 CUM

Date of construction: 12/1999 - 05/2001



Photo 1: During construction



Photo 2: After Construction



Photo 3: After Construction



Photo 4: Completed Structure after 19 years



Photo 5: Completed Structure after 19 years