

GABION RETAINING WALL-MUMBAI PUNE EXPRESSWAY MAHARASHTRA,INDIA

ENVIRONMENTAL/SLOPE PROTECTION

Product: Gabions

Problem

Mumbai Pune Expressway Project involved the construction of new high speed highway connecting Mumbai to Pune. Gabion Walls were mainly used for retention in the Ghat portion of NH-4 between Adoshi to Lonavala. This hilly stretch is about 2 Km in length and is prone to heavy rains during monsoons. Under-ground waterflows needed large drainage areas. The hill cutting involved the generation of a lot of muck which needed to be disposed. (Muck means waste material obtained from tunneling and hill cutting) On the valley side, the main problem was the global slips. In some of the stretches, rock fall happened where rock ballasting was done.

Solution

Retaining were deemed necessary. Gabions were preferred because of its free draining nature and speed in construction. Another advantage of the effective use of stones which were generated from hill cutting were utilised for the filling of Gabion Walls on the valley side. Wide bases were adopted for Gabion Walls to push slip circles back from the valley edges. Dumped rubbles were used to provide the foundation in the valley side. In some stretches along the hill side, since the rock surface was undulating, it was difficult to excavate the foundation. It was levelled using concrete and some dowels were provided to get proper anchoring to the ground. Maccaferri, 10x12, PVC netting was used as rockfall protection measure. The netting was anchored at the top as well as nailed on the surface. The productivity observed was about 2 cum per man day. Lumpsum cost of labour was estimated as INR 100 for lacing, tying and stone filling operations.

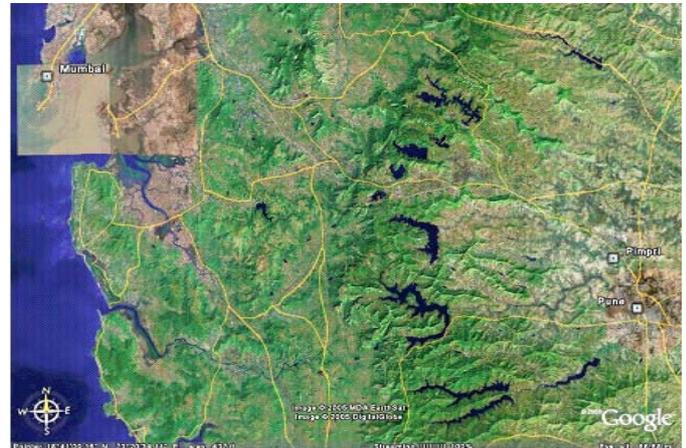


Photo 2. During construction



Photo 2. During construction



Photo 3. After construction

Client name:

MSRDC

Main contractor name:

SHAPOORJI PALLONCHI & CO, L&T

Consultant:

CONSULTING ENGINEERING SERVICES

Product used:

35,000 CUM OF GABIONS

Construction info

Construction date: JAN 1999

Construction info: MARCH 2000



Photo 6. Gabion Wall View



Photo 7: Gabions on the valley side

From aesthetic point of view, stepped rear face walls were adopted at this site as it also proved to have minimum rock cutting. They were placed on PCC leveled rocky strata or 95% compacted environment. To prevent the build up of hydrostatic pressure behind the backfill and to provide free drainage of water through the wall, drainage arrangements were made. This comprised of larger size material at the lower level of the fill and drains for collecting the water. At regular intervals along the walls, transverse drains were made of heavy duty PVC at a slope 1:15 to carry away water from the foundation.

It is gathered that the gabion retaining walls along the Ghat Portion of NH-4 have successfully withstood some reasonably heavy showers following the first monsoon after completion of works. As expected some degree of settlement of the sub grade was observed at locations where the gabion walls were constructed on large thick rock-fill deposits. Gabion walls lived to the expectations and withstood the settlement without any structural damage. They appear to have functioned as designed with little or no lateral movement taking up even the settlements that occurred in the lower layers of dumped rock-fill. In fact any other rigid retaining structure would have failed to perform under similar circumstances.



Photo 8: Gabions on the valley side where global stability was critical



Photo 9 & 10 : Showing the Vegetated Face



Photo 11 : Site After completion of 4 years

Project Status :

Project is successfully completed in the year 2000. Structure have withstood 10 monsoons and nice vegetation has grown making the structure more stable. After 10 years of construction, the gabion walls are still in great condition and maintained alignment and integrity of the structure.

Maccaferri Environmental Solutions Pvt. Ltd.

14th Floor, Vatika Professional Point, Golf Course Ext. Road—Gurgaon, Haryana - 122 001

Tel. +91- 124- 439 8400, Fax: +91- 124- 439 8444

Web site: www.maccaferri-india.com, Email: info@maccaferri-india.com