

STABILISATION OF OVERBURDEN DUMPS IN SINGRAULI SINGRAULI, MADHYA PRADESH, INDIA

Mass Gravity Retaining Walls

Problem

The Northern Coal Fields, Singrauli in India comprises of a number of open cast mines which produce large quantities of waste through its mining activities year on year. Continuous deposition of wastes resulted in the creation of large unstable dumps. During monsoons, the unstable slope along the roads to the mines used to subside, causing poor access to mines and thus affecting the mining activities.

The height of dump ranged from 30m -100m with slope angles of about 40°- 60°. The dump material comprised of loose earth and had a cohesion of about 20 kN/cum and friction angle = 38°.

Solution

The slope was divided into fragments with berms in between. Gabion toe walls were placed at the toe of each slope fragment and mulching (to promote vegetation) was done. A non-woven geotextile was provided as a filter and separator behind gabion walls. Additional French drains at c/c spacing of about 3-5 m were proposed across the slope to ensure drainage and thus preventing erosion. The mulching and natural jute blanket provided on slope prevents local erosion.

Maccaferri's solution was adopted for the following advantages:

- 1) Speed of construction: Large quantity of earthwork was involved and limited time was available for construction. It was necessary to carry out restoration work before the onset of monsoons to prevent collapse of dumps.
- 2) Cost-Effectiveness: The cost of Gabions structure was low.
- 3) Simplicity in construction: Execution of stabilization work using gabion technology was simple.
- 4) Environmental Friendliness: The solution not only proposed to stabilize dumps but also to establish vegetation along the slope.

Client: Northern Coal Fields Corporation

Designer / Consultant: Maccaferri
(Designer)/M.R.MADHAV & IIT KANPUR

Contractor: Many contractors

Products used (Qty.)

- | | |
|------------|--------------|
| - Gabion | 2,50,000 cum |
| - MacTex N | 1,00,000 sqm |

Date of construction: 05/2000 - 03/2007



Photo 1: During construction



Photo 2: During construction



Photo 3: After construction



Photo 4: Stabilized slope



Photo 5: Structure after 15 years

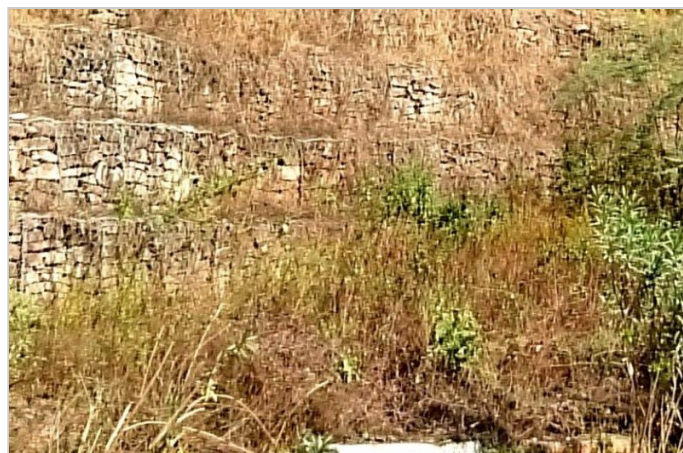
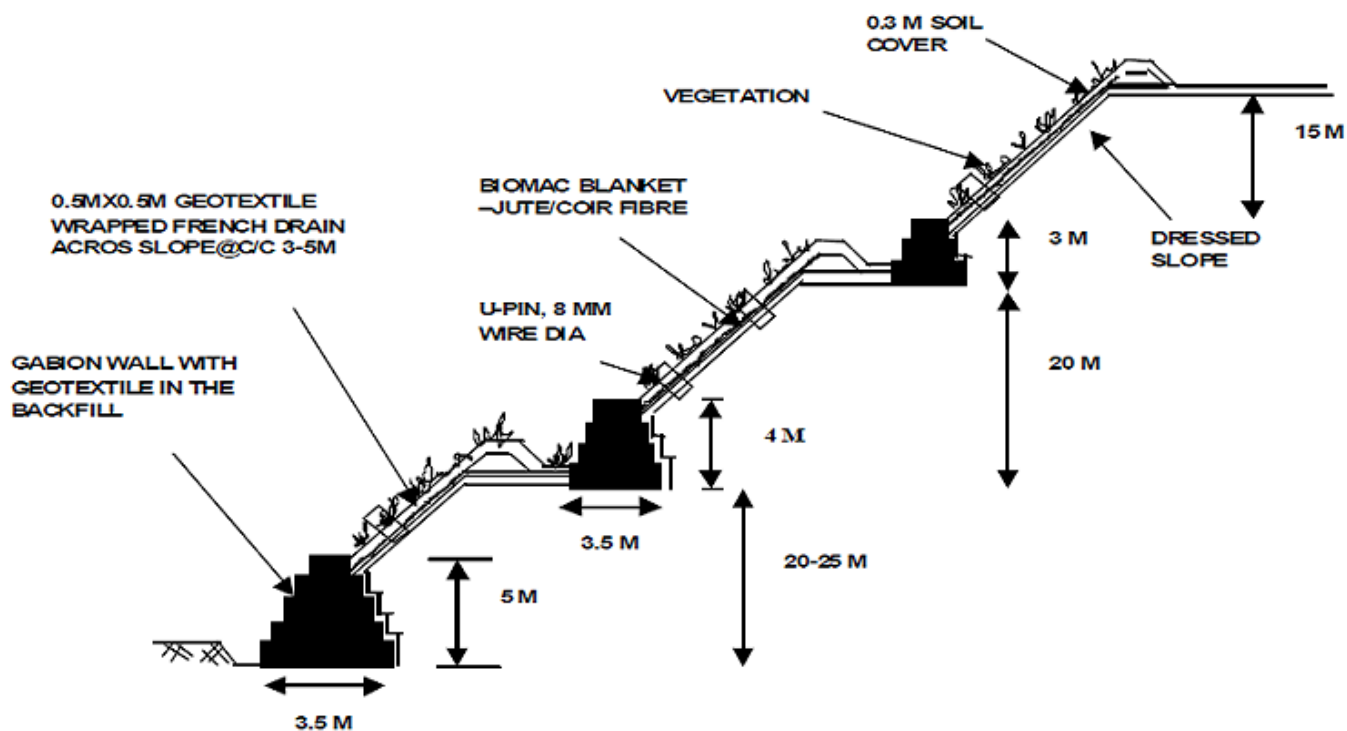


Photo 6: Structure after 15 years



Cross sectional drawing