

PARAMESH WALL AT KALIAPANI CHROMITE MINES KALIAPANI, JAJAPUR , ODISHA, INDIA

Reinforced Soil Walls and Slope Reinforcement

Problem

Kaliapni Chromite mines of Balasore Alloys Ltd. is situated in the state of Odisha and performs extraction of chromite. At present it has two plants with a total capacity of 160,000 MTPA.

In open cast mines, the excavated waste material is dumped on the slopes. Hence, slope stability of overburden dumps is integral to the mine operations. Waste dumps have steep slopes due the waste being tipped over from the top of the dump. These unstable slopes along the roads to the mines are prone to subsidence, which can become a safety hazard and affect accessibility to mines. The heavy machinery and dumping trucks implanted for the extraction and transportation of materials add to the slope instability.

Client was looking for innovative solutions for stabilizing the OB dump with suitable slope protection/retention system.

Solution

Reinforced soil wall was considered as an ideal solution. Paramesh wall system consisting of Terramesh (gabion fascia units with an integrated double twist mesh) fascia and ParaLink (geogrid) as a reinforcing element was installed.

The Paramesh wall is built around the OB dumps for the stabilization purpose. The maximum height of the wall is 31m. The wall is designed to support the live load of the heavy trucks used at the facility. The truck's payload exceeds 22kPa.

The main advantages for selecting the above solution were:

- 1) Flexibility- Flexibility of system helps the structure to accommodate differential settlement without any compromise in structural integrity.
- 2) Simplicity in construction- The construction is simple and fast. It does not involve deep excavation, dewatering of trenches and erection of formwork.
- 3) Cost-effectiveness-The total cost of gabion fascia solution is less than rubble wall and R.C.C. wall. Also, minimum foundation is required.
- 4) Permeability- The ability to combine drainage and retention functions makes it an ideal structure.
- 5) Environmentally friendly- The system allows vegetation to grow through it. This further stabilizes the slope.

Client: Balasore Alloys Ltd.

Designer / Consultant: DGMS

Contractor: Z-Tech India

Products used (Qty.)

- Terramesh	2,415 no (3x2x0.5, Zn+PVC)
- Green Terramesh	4,325 no (3x2x0.79, Zn+PVC)
- ParaLink	150- 63,900 sqm;200- 1,60,200 sqm;300- 35,270
- MacDrain N	N1571- 16,500 sqm
- Biomac natural	1,000 sqm

Date of construction: 04/2015 - 07/2018



Photo 1: During construction



Photo 2: During construction



Photo 4: During construction

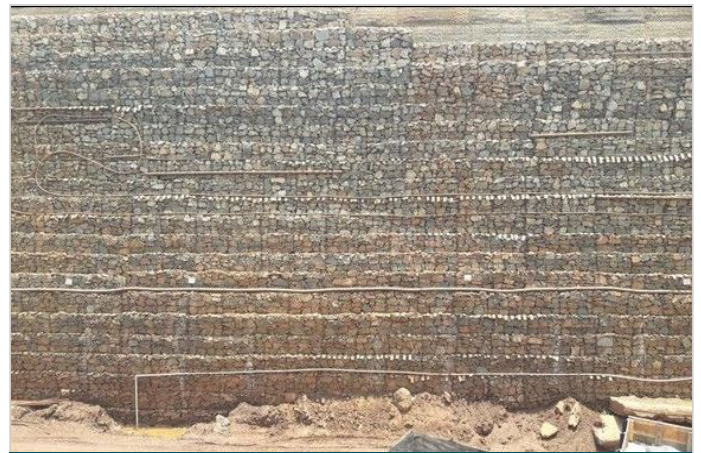


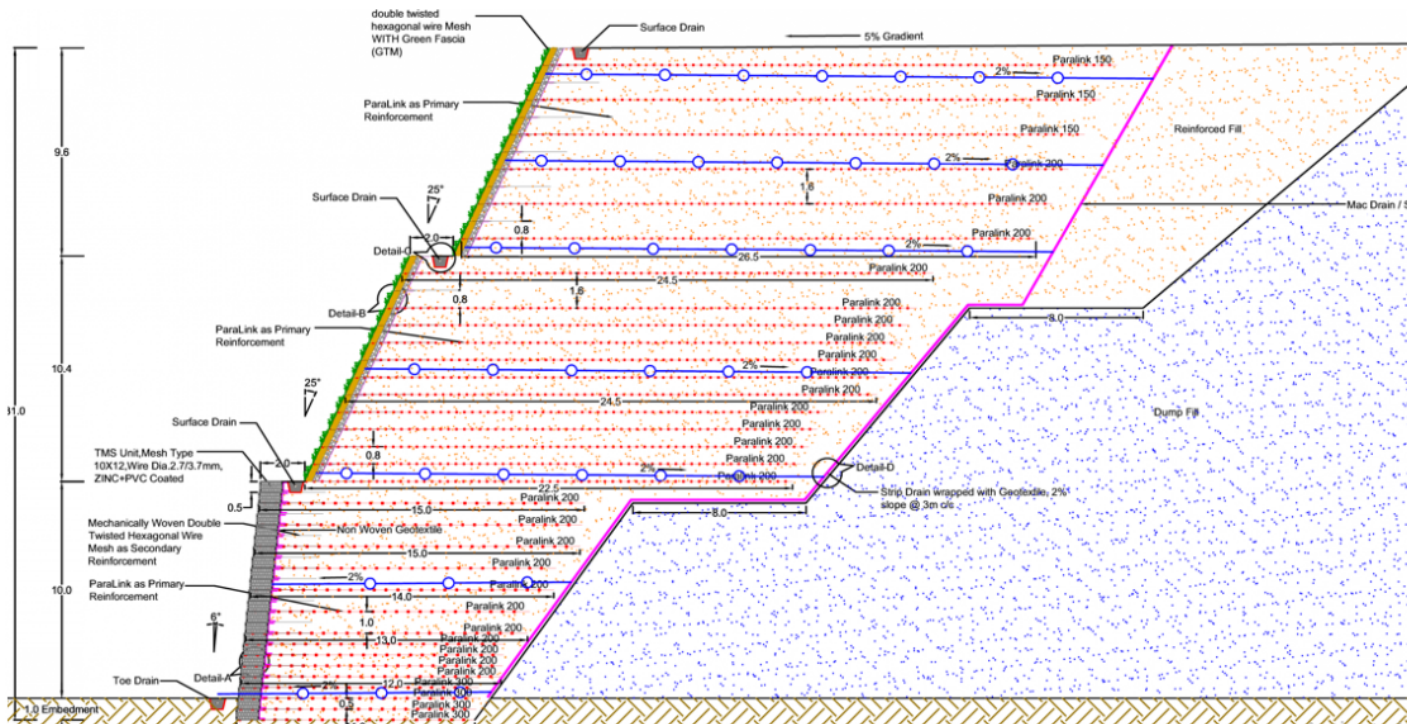
Photo 4: During construction



Photo 5: Completed structure



Photo 6: Completed structure



Cross sectional drawing