

CASE HISTORY

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RIVER BANK PROTECTION & COMPOUND WALL CONSTRUCTION WITH TECHFAB GABION RETAINING WALL AT THE PREMISES OF DIAMINES AND CHEMICALS LTD, NANDESARI, GUJARAT
NANDESARI, GUJARAT, INDIA



River Bank Protection

Client:	Products used :
DIAMINES AND CHEMICALS LTD	• TECHFAB METAL GABIONS • TECHFAB METAL GABION MATTRESS • TECHGEO NONWOVEN GEOTEXTILE PR20
Contractor:	
Manufacturer & Supplier:	Year of construction
TECHFAB (INDIA) INDUSTRIES LTD.	2021

Project brief & Problem description:

Diamines and Chemicals Ltd., the sole manufacturer of Ethyleneamines in India, operates a critical manufacturing unit in Nandesari, Gujarat. The facility is located adjacent to Mini river, exposing the site to severe erosion hazards, particularly during the monsoon season. With intensified water flow during rains, the erosive forces of the river become significantly aggressive, causing progressive land degradation along the riverbank. This ongoing erosion threatens not only the structural integrity of the adjoining infrastructure but also the operational safety of the plant.

The natural soil at the site has a high silt content, which is inherently weak in resisting erosive forces. Silt-laden soils tend to lose cohesion when saturated, making them highly vulnerable to surface runoff and subsurface water movement. Over time, this has led to the retreat of the riverbank, reduced land stability, and posed a critical risk to essential assets within the manufacturing facility. If left unaddressed, the erosion could compromise vital plant infrastructure, disrupt operations, and lead to significant maintenance and safety costs. Therefore, an urgent and robust erosion control solution was needed to stabilize the area and protect the long-term viability of the facility.



Photo 1 : During Construction Photograph

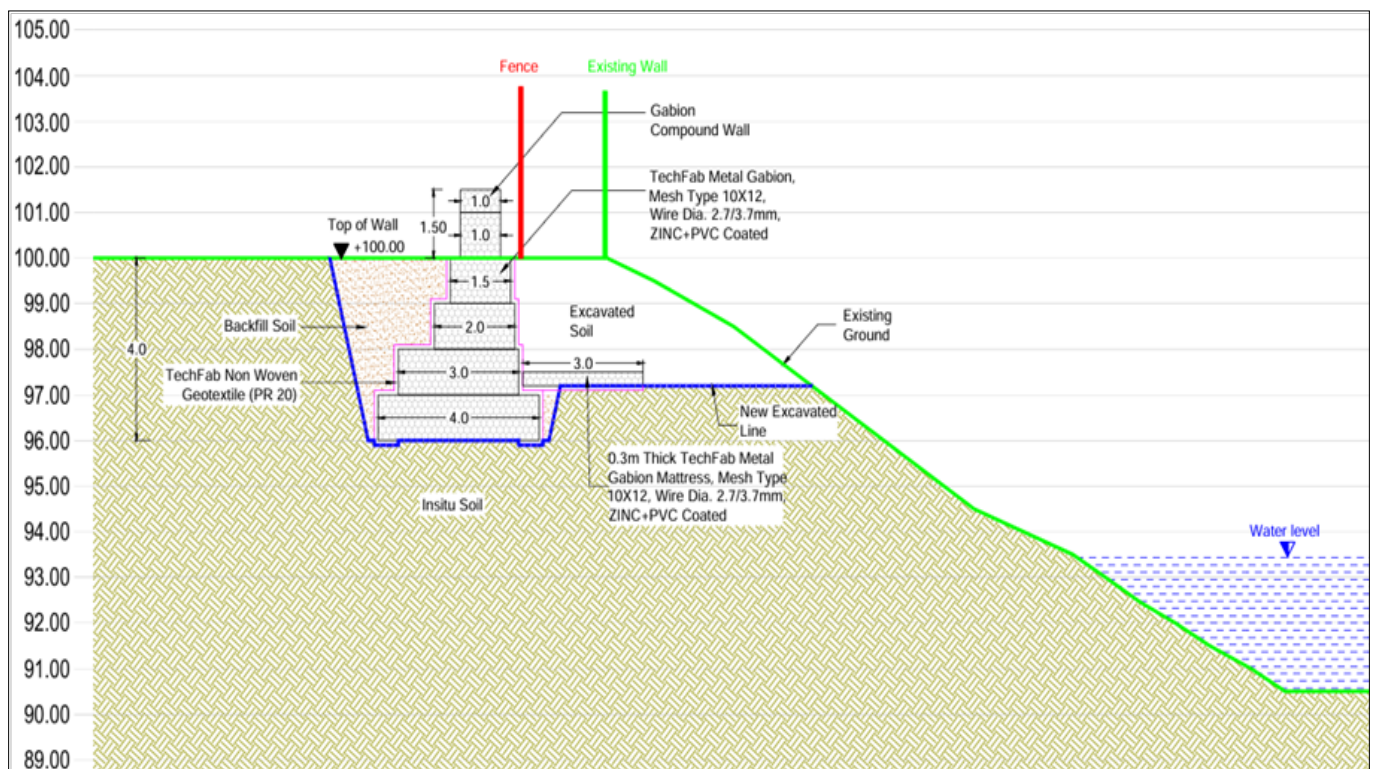
Solution Proposed:

To address the severe erosion issues and ensure the long-term stability of the riverbank adjacent to the Diamines and Chemicals Ltd. facility in Nandesari, TechFab India proposed and implemented a robust solution comprising a gabion retaining wall with a total height of 5.5 meters. Of this, 1.5 meters was embedded below ground level to provide a strong and stable foundation, while the remaining 4.0 meters was constructed above ground to resist surface erosion and lateral earth pressure effectively.

Above this retaining structure, an additional 1.5-meter-high gabion compound wall was constructed, serving both as a protective barrier and a security perimeter for the facility. Gabion mattresses were laid at the base of the wall to prevent toe scouring, particularly during periods of intense water flow.

The retaining wall was built using double-twisted wire mesh, known for its exceptional tensile strength, flexibility, and durability - making it well-suited for challenging hydraulic environments. A non-woven geotextile was installed behind the wall to act as an effective filtration layer, allowing water to pass through while preventing soil migration, thereby enhancing drainage and structural integrity.

This integrated system provided a cost-effective, fast-to-install, and sustainable solution, significantly reducing erosion risks and ensuring the long-term protection of the manufacturing infrastructure.



Cross Section Drawing of Proposed Solution

Benefits of TechFab Metal Gabion over Conventional Retaining Wall on site:

TechFab Metal Gabion was suggested for retaining and erosion control purposes in lieu of the conventional Retaining Wall for achieving the following advantages:

- Flexible structure which can accommodate differential settlement.
- Free draining structure with no pore pressure development behind wall.
- Easy in construction, as it does not require skilled labourers.
- Eco-friendly, as the vegetation growth over it, is compatible with surrounding environment.
- Does not corrode under areas which are in constant / partial submergence.
- Cost incurred is very less compared to other retaining walls and depends only on the local availability of boulders.

Benefits of TechGeo Nonwoven Geotextile:

- Acts as a “Filter” by preventing the backfill material from being washed out through Gabion face.
- Acts as a “Separator” between the backfill material and the Gabion fascia and thereby prevents the mixing of the tow.



Photo 2 : During Construction Photograph



Photo 3 : Installation of Gabion Wall



Photo 4 : Installation of Gabion Mattress at the Toe of the Wall to prevent Scouring



Photo 5 : Completed Structure

Conclusion:

The project, successfully completed in 2021, provided a reliable and durable riverbank protection system for Diamines and Chemicals Ltd. The integrated use of gabion retaining walls, gabion mattresses, and geotextiles effectively controlled erosion, safeguarded critical infrastructure, and demonstrated a sustainable solution for challenging hydraulic environments. The work was executed within the scheduled timeframe, and the department expressed satisfaction with both the quality of materials used and the timely completion of the project.

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