

FLOOD MITIGATION & RIVER BANK PROTECTION USING TECHFAB GEOTEXTILE BAGS ALONG BRAHMAPUTRA RIVER BANK, TINSUKIA, ASSAM

TECHFAB INDIA

NORTH LAKHIMPUR, ASSAM, INDIA

At the Heart of Smart Water & Drainage Infrastructure

Coastal Protection

Client:

WATER RESOURCE DEPARTMENT, ASSAM

Products used:

Main Contractor:

M/S. SANJIB BARUAH

- TECHFAB GEOTEXTILE BAGS—50000 NOS.

Manufacturer & Supplier:

TECHFAB (INDIA) INDUSTRIES LTD.

Year of Construction:

2023

Project Brief & Problem Description:

Floods are one of the most frequent natural calamities in India. India witnessed several riverine floods historically that affected millions of people, caused loss of lives, and damaged infrastructure and agriculture. An increasing number of flood events in recent times has increased the importance of flood protection works and the raising of embankments in urban and rural plains. The high tractive shear stress of flowing water and migration of soil particles leads to the progressive erosion of river banks. The damage to the natural banks reduces the bund height and may let the flood water spill out of its banks which causes floods.

The river Brahmaputra has been the lifeline of northeastern Indian states for ages. This mighty river runs for 2880 km through China, India, and Bangladesh. Every year the Northeastern state of Assam experiences huge losses due to devastating floods in the river Brahmaputra. Tinsukia Town is located in the upper reaches of River Brahmaputra in the state of Assam which experiences significant damage due to the floods during monsoon season. The high intensity of floods in the Brahmaputra River and the steep topography of the region makes the problem more complex and severe.

To provide a safeguard against the frequent floods in the region, the banks of the river Brahmaputra near Tinsukia were required to be protected at a few stretches while providing sustainable anti-erosion measures.



Photo 1 : Unprotected river bank before installation of protection works during lean flow conditions

Solution

In river training projects, the conventional use of large boulders poses significant challenges. The mobilization of substantial quantities within a limited contract period proves difficult and expensive. Furthermore, the extraction of such vast amounts of stones adversely impacts environmental equilibrium. The transportation and handling of these materials to the work site necessitate heavy machinery, adding logistical complexities.

TechFab India's innovative approach offers a compelling alternative. Geotextile bags, filled with locally available sand, emerge as a cost-effective solution, particularly in soil erosion control. The work was carried out on the left bank of the Brahmaputra River for a total length of 700m (Approx.) where the river bank was dressed to a slope inclination of 2H:1V for the maximum protected bank height of 10m (Approx).

The Geotextile bags have been selected for river bank and bed protection. These structures, permeable in nature, not only prove economical but also effectively control sedimentation. By utilizing locally sourced materials, the project ensures sustainability while minimizing the environmental footprint associated with conventional methods. TechFab India's geotextile bags solution stands out as an efficient, eco-friendly and economically viable choice for river bank protection in Tinsukia, Assam.



Photo 2 : Laying of TechGeo Nonwoven Geotextile on Dressed Slope



Photo 3 : installation of Geotextile Bags on River bed (For Launching Apron)

INSTALLATION OF TECHFAB GEOTEXTILE BAGS :

The following sequence was adopted for the installation of Geotextile Bags:

- Setting out the area as per drawing
- Mobilisation of Geotextile bags and filling material to the project site.
- The excavated top soil was disposed of by tippers to a suitable distance from bank side to reduce overburden of bank.
- The slope formation was done with necessary ramming to remove any undulations and corrected to the desired slope before laying nonwoven geotextile.
- A layer of nonwoven geotextile was laid along the desired slope. The non woven geotextile acts as a separator and filter on the interface of embankment soil and protection works. The nonwoven geotextile layer also helps in releasing the pore water pressure by allowing the passage of water and entrapping the soil particles.
- Following the laying of geotextile layer, the geotextile bags were filled at site with the locally available sand; the sand used as filling material was as per standard technical specifications of the project.
- After sand filling the geotextile bags were measured to confirm the desired weight and filled thickness as per standard technical specifications.
- The bags were stitched by using high strength polypropylene multifilament (PPMF) yarns as per standard technical specifications.
- For the convenience bags were stored in batches or any suitable multiples as per available space at site.
- The laying of geotextile bags for launching apron was carried out when river was in the lean flow condition or with the help of small boats to complete the activity on time.
- Laying of bags was done under supervision of the site in charge. Laying work was inspected time to time by Authority.



Photo 4 & 5 : Laying of Geotextile Bags on Slope



Photo 6 : After Completion Photograph

Conclusion:

The project was completed successfully and performing to the intended purpose, to the satisfaction of the client and contractor. The implementation of TechFab Geotextile Bags successfully mitigated erosion, providing sustainable protection to Tinsukia's river banks. The project showcased the efficacy of innovative geotextile solutions in challenging environments, ensuring the long-term resilience of the region's vital ecosystems and infrastructure.

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