

FLOOD MITIGATION & RIVER BANK PROTECTION TECH GEOMATTRESS ALONG BRAHMOUTRA REIVER BANK, NORTH LAKHIMPUR, ASSAM

NORTH LAKHIMPUR, ASSAM, INDIA

Coastal Protection

Client:

WATER RESOURCE DEPARTMENT, ASSAM

Products used:

Contractor:

M/S. STAR CONSTRUCTION

- TECHFAB GEOMATTRESS – 9400 SQM.

Manufacturer & Supplier:

TECHFAB (INDIA) INDUSTRIES LTD.

Year of Construction:

2022

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 cases in recent times has increased the importance of flood protection works and the raising of embankments in urban and rural plains. The high shear force 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 caused by the river Brahmaputra. Some northern plains of Assam like Dhemaji, North Lakhimpur, Dhakuakhana and a few places of Barak Valley experience significant damage due to floods in the Brahmaputra Basin very frequently. 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 Lakhimpur were required to be protected at a few stretches while providing sustainable anti-erosion measures.

Solution:

We, at TechFab India, suggested using Tech GeoMattress (A Uniform Tubular Green Mattress) filled with sand (100mm post filling) on the river bank side slope. 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 12.0m.



TECH GEOMATTRESS:

TECH GEOMATTRESS is a double layered three-dimensional tubular green mattress which is used to form a protection system on the bed and side slopes of a water channel. Tech GeoMattress is a well-established eco-friendly flexible solution which can cater for the needs of various flood control applications. It is fabricated from two layers of geotextile; the upper layer is a green coloured composite fabric having green cut fiber on the top for UV and abrasion protection and the bottom layer is made up of high strength woven fabric which provides a base and adequate filter properties to the mattress system.

Photo 1 : Shore line Protection Site at Neware, Ganpatipule

The attractive green fabric on the top blends with the surroundings and helps in developing vegetation growth by entrapping the sediments within the grooves of the sausages. The tubular shape of the mattress helps in dissipating the energy of the longitudinal currents and wave action of the streams which in turn controls the erosion and development of scour holes.

Tech GeoMattress was anchored on the top by providing an anchor trench at the top. A toe trench was provided at the low water level of the embankment slope by bending the mat into the trench of size 1.0 m x 0.75 m and filled with locally available earthen materials.

The infill soil should be preferably coarse sand and free from organic material. The materials available in the northern plains of the Brahmaputra River are sandy & silty soil, which often do not possess adequate cohesion and internal stability. However, these materials provide excellent filler properties to be used in Tech GeoMattress. Therefore, locally available soil was used as infill material.



Photo 2 : Laying of Tech GeoMattress on Dressed Slope

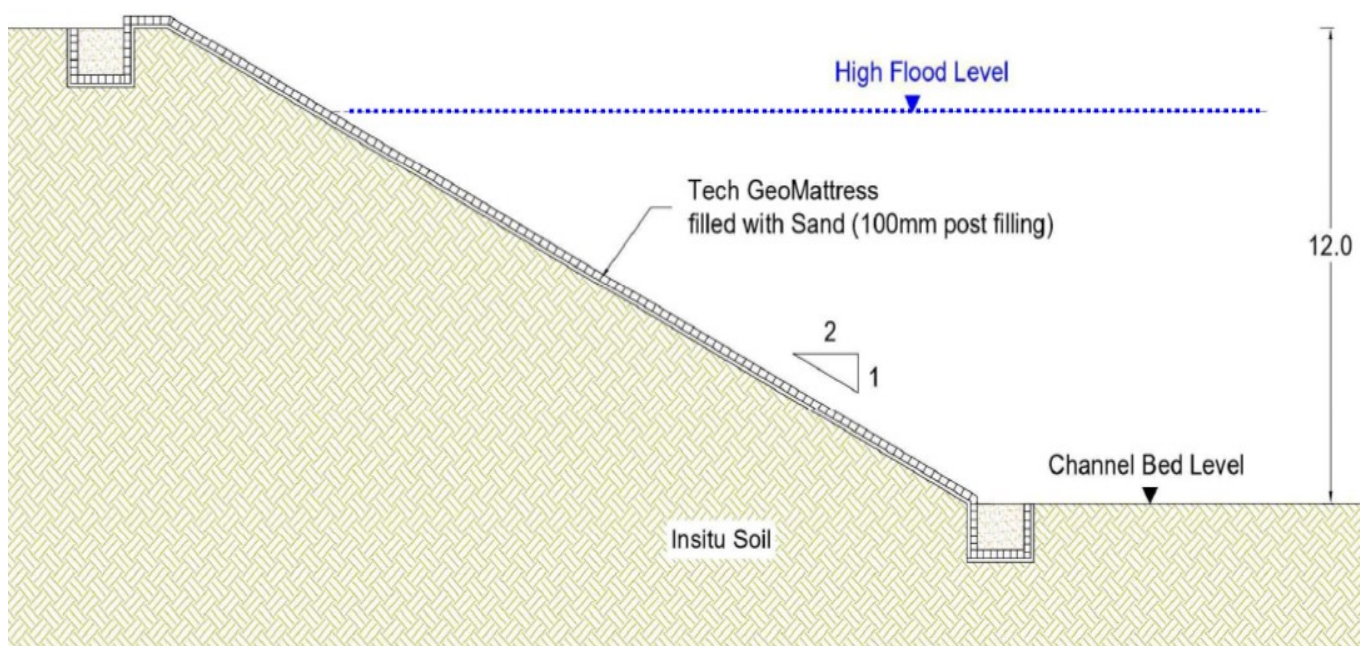
ADVANTAGES OF USING TECH GEOMATRESS :

- Tech GeoMattress is delivered in rolls which can be easily transported to the site.
- Tech GeoMattress systems utilize locally available sand for the construction of bank protection system. Therefore, It is economical and environment friendly as compared to conventional solutions.
- Installation is quick and uses simple equipment. They can be rapidly mobilized for emergency work at site.
- Tech GeoMattress system is economical and easy to install without the requirement of skilled labours. They are ideal solutions for areas with poor accessibility and handling of precast concrete units and rip-rap.
- Tech GeoMattress is a flexible system. Hence it usually attains the shape of the surface irregularities which Makes it easier to install at the site.
- These fabrics can be engineered to suit most site conditions in terms of mechanical strength. Its less Apparent Opening size helps to retain the finer soil particles and its high permeability ensures quick dissipation of pore water pressure.
- It is an effective erosion protection solution for the long run with high robustness and durability of the composite geotextile fabric with excellent abrasion and UV resistance properties.

INSTALLATION OF TECH GEOMATRESS :

The following sequence were adopted for the laying of Tech GeoMattress:

- Tech GeoMattress is easy to install at site and uses simple equipment without the requirement for skilled labour, installation can be done hydraulically, mechanically or pneumatically.
- At first, prepare slope surface as per approved drawings and project requirements. Remove debris, rocks, unacceptable soil from area where Tech GeoMattress is to be laid.
- Replace removed soil with acceptable soil and compact earthwork.
- Excavate top and bottom trench according to drawings provided.
- Tech GeoMattress should be laid along the profile of the slope from top to bottom. It enables easy filling of the mattress on site.
- In this direction, the seams between the tubes are under tension while filling which helps to achieve the desired thickness of the mattress after filling.
- Adjacent rolls of sand-filled mattresses are joined by seaming on site.
- Sand-filled mattress is anchored in the trenches at the top and bottom of the slope.
- The recommended size of the anchor trench should be 1.00 m x 0.75 m.
- The mat should be placed by bending it into the trench. The trench can be filled with earth fill, boulders or Geobags.



Typical Cross Section of Proposed SOLUTION



Photo 3 : After Completion Photograph

Conclusion:

The project was completed successfully and performing to the intended purpose, to the satisfaction of the client and contractor.

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