Organizational Overview

- INDIA MULTINATIONAL PUBLIC LIMITED COMPANY LISTED AT BSE & NSE
- INVESTMENT FROM INTERNATIONAL INVESTOR LIKE TPG AND IFC
- 200 Million USD (1,500 CRORE INR) TURNOVER (ISO 9001 CERTIFIED)
- WINNER OF HIGHEST EXPORTS AWARD FOR TECHNICAL TEXTILES – 2013-14
- 3 PLANTS IN INDIA, 1 AT UTTARANCHAL DEDICATED TO GEO BUSINESS AND OTHER TWO AT INDORE MP
- 3 FOREIGN PARTNERS FOR PRODUCT DEVELOPMENT SUPPORT
- IN-HOUSE STATE-OF-THE-ART ACCREDITED TESTING LAB
Our Manufacturing Plant
Our Manufacturing Plant
MANUFACTURING CAPACITY

- Largest Indian Geosynthetics Company, annual revenue from Geosynthetics Rs 250 Cr (US $ 40 million)
- Dedicated 400000 sqm factory in Northern India.
- Non-Woven Geotextile capacity of 800 MT per month.
- Woven Geotextile capacity of 2000 MT per month.
- Woven capacity includes:
  - PET High Strength geosynthetics
  - High strength tape x tape geosynthetics
  - Groundcovers
- Geocell capacity of 60 MT per month.
- More than a thousand stitching machines.
SERVICES OFFERED

- Detailed Survey & Problem Analysis
- Designing Solutions with Various Geosynthetics
- Technical Support & Site Supervision
- Turnkey Solution with Local Partners
- Product Sales & Supply from Sales/Marketing Offices Across the Country
ABOUT THE GEOFIL DIVISION

World Class Products
With Indian Expertise

The Versatile Spread Across Applications

let us grow together

Slope Stabilization
Embarkment Protection
River & Coastal
Erosion Protection
Canal Lining
Highway Pavements
River Cleaning
Landfill & Tunnel
SOME INNOVATIVE PRODUCTS

- **Embankment Protection**
  - GEOLFIL MAT - SANDFILLED TUBULAR MATTRESS
  - FLEXITURF - HIGHPERFORMANCE PP TURFING MAT

- **Toe Stabilization, Diversion, Embankment Construction**
  - GRW (GEOSYNTHETIC REINFORCEMENT WALL) SYSTEM
  - GEOLFIL TUBES - GEOTUBES (UPTO 200 Kn strength & 5 m diameter)
  - De-Watering Tubes for Containment and sludge handling

- **FLEXICELL - GEOCELLS**
- **GEOBAGS & GEOCONTAINERS**
SOME OF OUR KEY SOLUTIONS & PRODUCTS

GeoFIL Mat: Sandfilled Tubular Mattress

GeoFIL Tube: High Strength Geotextile Tubes

FlexiCells HDPE Geocells

GRW Barriers: Containment Barriers

Geo Containers
OUR CORE AREAS & PRODUCTS

1. Geobags
2. Geo-containers
3. Geotube
4. Geo-Mattress
5. GRW

Our Core Application Areas
- FLOOD PROTECTION WORKS USING INNOVATIVE GEOSYNTHETIC PRODUCTS & ENGINEERING.
- CANAL LINING WITH GEOCELLS
- DI-SILTING AND CLEANING IN LAKES & RIVERS WITH DUTCH TECHNOLOGY
Solutions For Flood Control & Bank Protection
Geo FIL Tubular Mattress
GeoFil Mattresses are an innovative material applied for Protection of Embankments and Slopes. Have wide usages in River, Highways and Railways.

WE HAVE TECHNOLOGY TIE-UP WITH PROFIX FROM NETHEARLAND, THE ORIGINAL INVENTERS OF THIS PRODUCT AND ENGINEERING FOR MANUFACTURING AND PRODUCT INSTALLATION.
What is GeoFil Matt System

- The GeoFil Matt system is flexible Erosion Control system meant for Flood Mitigation and Slope Protection
- It is composed of Strong and Robust Geotextile filter Fabric and locally available granular fill materials.
- It is made of green colour composite fabric (Nonwoven + Woven) having Green Cut fiber on top, and Woven Fabric at Base.
- This pre-fabricated mattress available in customized lengths can easily be installed on slopes and Embankments for Protection.
- These Mats can be filled with suitable material that can be found nearby and equipment or tools are mostly small and easy to mobilize.
- The upper layer provide long lasting UV protection and enhancing natural vegetation growth and gives attractive look of the protected bank.
- GeoFil Matt provides stable mat system that is able to withstand currents and wave action.
- This also helps in covering the irregularities on banks and bed, this also helps in controlling the scouring and soil erosion.
GEOMATTRESS (EMBANKMENT PROTECTION & EROSION CONTROL)
GEOMATTRESS (SLOPE PROTECTION)
Application Areas

- Embankments of Rivers
- As Soft Linning Systems in Canals
- Landscaping over Slopes
- Protection of Slopes in Railways & Highways
Advantages

- Quicker Installation and better appearance
- Durable and low or almost no maintenance
- Environmentally Safe and Chemically Inert
- Cost Saving upto 10% compare to Conventional solutions
FLEXICELL
(GEOCELLS)
Geocells are an Innovative Product that can be applied over Slopes for Protection and Stabilization.

Another area where these can be used are in **Lining of Canals**. In canal lining they ensure durability, better finish and lesser maintenance.
Functions of Lining

- SEEPAGE CONTROL
- PREVENTION OF WATER LOGGING
- INCREASED HYDRAULIC EFFICIENCY
- INCREASED RESISTANCE TO EROSION/ABRASION
- REDUCTION IN CROSS SECTION AREA
- SMALLER STRUCTURES
- LOW OPERATION AND MAINTENANCE COST
Requirement of Lining

- Economy
- Structural Stability
- Strength and Durability
- Repairability and Easy Maintenance
- Maximum Hydraulic Efficiency
- Impermeability
- Resistance to Erosion
- Ability to Prevent Weed Growth
- Resistance Against Burrowing Animals
- Reasonable Flexibility
Limiting Velocity

- STONE PITCHED LINING - 1.5 m/sec
- BRICK LINING - 1.8 m/sec
- CEMENT CONCRETE LINING – 2.7 m/sec
Cellular confinement provides many benefits from construction and long term maintenance standpoints.

1. During construction, the cellular structure retains the concrete/Stabilized fill and prevents it from migrating down to the bottom of the channel.

2. The network of cells in the cellular confinement system provides a method to maintain a consistent depth of concrete across the channel bed slope and side walls.

3. Additional construction benefits include the ability to use a thinner, “poured-in-place” cross section of concrete.

4. An easier to install, lower slump concrete due to the network of HDPE reinforcement strips that outline each cell.

5. The cellular network is beneficial to long term maintenance because the system flexes, allowing the concrete to crack in a controlled manner along the cell walls, much like a contraction joint.

6. The cell walls are perforated and textured which provides reinforcement and prevents the concrete from “popping out”.
RIVER MANAGEMENT TECHNOLOGY
GRW Containment Systems
The GRW flood protection barrier is designed for rapid and low-cost deployment to control floodwater, mudslide prevention, erosion control and infrastructure protection.

The GRW system is a continuous cellular barrier of pentagon-shaped, vertical bags with a common flexible portion separating each individual cell.

Each cell is sloped on one side, vertical on the other, and open on top for filling. They are connected side by side like an accordion, typically in 100-foot-long segments, as tall as 6 feet and up to any height when stacked.

Each segment comprises 34 common-partitioned bags. These segments are linked together to create barriers of any length from 100 feet to many miles.

Once linked together the segments are filled with one of a multitude of products such as sand, river silt, gravel, crushed stone or concrete.

How GRW System Works
GRW CONTAINMENT SYSTEM- DESIGN BASIS

- STABILITY AGAINST OVERTURNING
- SLIDING STABILITY
- FAILURE DUE TO OVERTOPPING
- GLOBAL & LOCAL STABILITY ANALYSIS
- FOUNDATION STABILITY
- SCOUR PROTECTION
- DRAINAGE
- LONG TERM DURABILITY AND MAINTENANCE REGIME
- ECOFRIENDLINESS
- TIME FACTOR COMPARE TO CONVENTIONAL SOLUTION
PROJECT REF : COOCH BEHAR PROJECT WB
SECTION AT A:

- Whole structure wrapped with PPMF 430 GSM.
- At scour apron placed 430 GSM PPMF at bottom and 5 layers of geotextile over it. Also one nos. of geotextile at the toe of scour apron in 3m C/F. In longitudinal direction.
- Apron width varies as per site requirements.

DRAWING NOT TO SCALE

ALL DIMENSIONS ARE IN MM EXCEPT MENTIONED.
GRW SYSTEM (RIVER BANK CONSTRUCTION)
GRW SYSTEM - RIVERBANK CONSTRUCTION (PRE-FABRICATED CELLULAR CONTAINMENT FOR EMBANKMENT)
GRW SYSTEM - RIVERBANK CONSTRUCTION (CELLULAR CONTAINMENT FOR TRE-FABRICATED BANK)
GRW SYSTEM (RIVER DIVERSION)
AFTER COMPLETION OF WORK

DURING FLOOD
GRW SYSTEM (RIVER DIVERSION)

SILTATION POST FLOOD
GeoFil Tubes
For Spur/ Embankment
GEOTUBE (BANK PROTECTION)
GEOFIL TUBE (RIVER TRAINING & BANK PROTECTION)
GEOFIL TUBE for SPILL CLOSURE AT BADAYUN O.P.
Geobags and Geo-containers
FILLING AND STITCHING FOR MOUTH CLOSURE OF GEOBAGS
DUMPING OF GEOBAGS IN WATER USING BARGE AND GEOBAGS IN BAGGING YARD
EMBANKMENT EROSION PROTECTION AT RIVER JHELAM HAJIN, KASHMIR USING NONWOVEN GEOBAGS
CONSTRUCTION LAUNCHING APRON USING GEOBAGS IN RIVER GHAGRA U.P.
GEOBAG INSTALLATION AT TEZPUR ASSAM ON BRAHMAPUTRA RIVER
Filling of Mega Containers
Laying & Placement of Mega Containers
GeoFIL Tubes For Coastal Erosion Control & Beach Nourishment
Geotextile Tube System generally comprised of

a) Main tube
b) Anchor Tube – smaller dia.
c) Scour Apron
Design Geotubes
Calculation shape and strength

Circumference = 15.0 [m]
Pumping pressure = 0.8 [kPa]
Cross-sectional area of tube = 13.5 [m²]
T-ult (circumferential) = 20.2 [kN/m]
T-ult (axial) = 14.8 [kN/m]

Unit weight of lower slurry = 12.0 [kN/m³]
Unit weight of upper slurry = 12.0 [kN/m³]
Unit weight of outer lower fluid = 10.0 [kN/m³]
Unit weight of outer upper fluid = 0.0 [kN/m³]

Desin Analysis using Leshchynski’s GeoCops
Geotextile tube for construction of embankments

Geotextile Tubes is an Innovative Technology that brings Speed of Construction at Economic cost using locally available soil. This technology ensures protection of environment and superior quality of workmanship at lesser cost compare to conventional solutions.
Geotextile tube as Scour Protection Apron

- Geotube
- Local soil fill
- Soil to be protected
- Scour apron (optional)
- Water forces causing erosion
a) Circumferential tension distribution around a filled geotextile tube

Circumferential tension distribution around filled geotextile tube

Filled geotextile tube

Location of maximum circumferential tension

10%–15% \( [T_{\text{max}}]_c \)

b) Approximation of circumferential tension distribution in terms of \( [T_{\text{max}}]_c \)

50%–70% \( [T_{\text{max}}]_c \)

100% \( [T_{\text{max}}]_c \)
The Green Technology of

DEWATERING TUBES

SEWAGE TREATMENT, DESILTING & RIVER/LAKE CLEANING
Rivers are a self-cleansing systems. It is the external human interference that disturbs the natural ecosystem leading to near death of rivers. The largest and most prominent of these adverse human interferences is the introduction of sewage and industrial wastes to the rivers besides silting and sedimentation.

If suitable mechanisms are put in place to check, reuse, and treat these waste streams and clean water is released in the river ecosystems the target of keeping rivers ever-flowing will be achieved – the real challenge being finding mechanisms to achieve intended output water quality cost-effectively within the shrinking land resources including shorelines.
Dewatering Tubes for Sludge Handling and River Cleaning

De-Watering is originally conceptualized and invented by Dutch. Flexituff has technological tie up with Geopex Netherlands.
The Problems & Challenges associated with the Slugde/Dredged Sediments
Sludge/Dredged Sediments Problems and Issues ...

- Issues with storage and Disposal of Waste having High Liquid or Semi solid volume, that has tendency to flow
- Very little solid content makes conventional systems costlier.
- Require much bigger space to keep and difficulty in handling because of more liquid percentage
- Long drying cycle and risk of wetting in between due to rains cause health hazard and unhygienic environment
- Issues with disposal and containment, need of expensive land for disposal
- Limited Re-use of the semi liquid dredged sludge.

DE-Watering Tube System can effectively solve the above issues
De-Watering Tubes accomplishes flowing objectives with regard to the treatment and disposal of slurry-like waste and contaminated sediments.

1. A large reduction in volume of the slurry-like material is achieved as water is removed from the waste to the extent of 90%.
2. The consistency of the waste or contaminated sediment is changed from a liquid to a semi-solid or solid material that can be easily handled, transported and disposed of in waste storage facilities.
3. Disposal of Dried waste is always easier and does not pose any environment hazard.
4. Less space requirement and low degree of mechanization makes the technology economic and quick to implement compare to conventional STPs.
In simple words, the De-Watering Tube technology works as below:

1. Separate clear water from everything else and release it to the river

2. Contain all the sediment recovered from the sewerage without wasting much of already scarce land resources

3. Effectively treat the sediment recovered so that it ceases to remain a health hazard as the untreated sediment would contain coliforms, ova, other protozoans and organic matter which can supply nutrients to many other pathogens and pathogen vectors

1. So if the water is filtered through a system which allows coagulation, flocculation before filtration in decentralized manner saving the requirement of huge lands, pumping and transmission costs, then it should be a solution of choice. That is what all GeoFIL De-Watering tube technology does.
Dewatering Tubes are one of the most efficient Technology of Liquid Waste Cleaning and Containment

Volume Reductions can be as high as 90% with high solid levels that make removal and disposal easy.

The Tubes Can be Customized Designed as per the Project need, Simple to operate and give efficiency and Cost Economy compare to Conventional Sludge handling systems

Dewatering Tubers are Manufactured from Specially Engineered Woven Fabrics designed for Higher Flow Rate and Inert Behavior to Chemical and Bio degradations
GEOFIL D-TUBE
Dewatering Technology

- Dewatering
- Separation
- Cleaning
- Disposal
1. **Filling**
Sludge is pumped into the Geotube® container. Environmentally safe polymers are added to the sludge, which make the solids bind together and water separate.

2. **Dewatering**
Clear effluent water simply drains from the Geotube® container. Over 99% of solids are captured, and clear filtrate can be collected and recirculated through the system.

3. **Consolidation**
Solids remain in the bag. Volume reduction can be up to 90%. When full, the Geotube® container and contents can be deposited at a landfill, or the solids removed and land-applied when appropriate.

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**Graph:**
- **Graph:**
  - **Initial filling**
  - **Refilling**
  - **Dewatering**
  - **Consolidation**
  - **Drying (optional)**

**Graph Notes:**
- **Y-axis:** Contained volume
- **X-axis:** Time

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12/26/2017
Our solution:

- Dewatering the flow of the river by using geotextile tubes
- To protect the area against the backflow of the Gomti river, we construct a dike by using the filled tubes
- Building dewatering plants with geotextile tubes, where the dewatered sludge, after chemical analysis, can be used as fertiliser
The Conceptual Plan

Waterflow turbines to generate energy for the pumps (on sufficient flow)
Few Ref Projects Cases
PROJECT 1

GEOBAG INSTALLATION AT TEZPUR ASSAM ON BRAHMAPUTRA RIVER
EMBANKMENT EROSION PROTECTION AT RIVER JHELAM HAJIN, KASHMIR USING NONWOVEN GEOBAGS

PROJECT 2
- River Embankment Protection using Geobags
- Client- Various WRD /Irrigation Departments in Assam, U.P and Bihar
GEOBAG - SMALL (RIVER BANK PROTECTION - TOE KEY)
MEGABAG (RIVER BANK PROTECTION)
Project Ref-3- COASTAL PROTECTION WORK AT ALLEPPY KERALA

...NOW AFTER A YEAR
THANK YOU