

TEINCO

GEOSYNTHETICS-ENVIRONMENT



<http://teinco.com.vn/>



THANK YOU!

CONTENTS

INTRODUCTION

A. GEOSYNTHETIC SOLUTIONS

- PVD, PHD + Vacuum Consolidation
- Geotextile
- Geogrid
- Geotube – Geobag

B. ENVIRONMENTAL SOLUTIONS

- Silt protector
- HDPE Geomembrane
- Geosynthetics Clay Liner
- Geocell
- Geocomposite

C. OTHER SOLUTIONS

- Gabion
- Rubber dam

TYPICAL PROJECT LIST

PAGE

3

4 - 5

6

7

8

9

10 - 11

12 - 13

14

15

16

17

18 - 19



TEINCO

GEOSYNTHETICS-ENVIRONMENT

“ Dear Valued Customers,

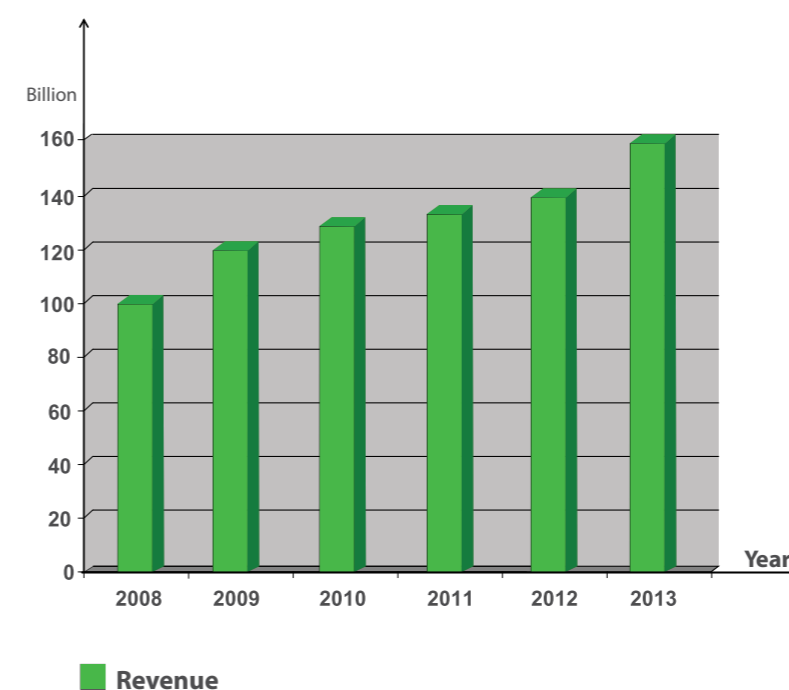
For nearly 15 years of experience and prestige, TEINCO is proud to be the leading company in Vietnam, specialized in Geosynthetic – Environment products, services and solutions, which are successfully introduced to numerous priority infrastructure projects over the country.

By our great expertise and ambition, we truly look forward to cooperating with our Valued Customers. We commit to bring you the most effective and competitive solutions!

Best regards! ”

TEINCO REVENUE CHART

TEINCO revenue gradually increased year by year.



For the past 15 years, TEINCO has experienced in supply, installation of PVD, PHD as well as vacuum consolidation for soft soil treatment.

Prefabricated Vertical Drains (PVD) and Prefabricated Horizontal Drains (PHD) consist of a polypropylene core extruded into a configuration to transmit a maximum water flow on both sides of the core. The core is wrapped in a non-woven filter with high permeability, small opening size to prevent soil from extruding to the core.



Pore water in soft soil shall be carried by PVD to the upper medium soil layer (or replaced by PHD) and then be discharged outside to accelerate the soft soil consolidation process.

Advantages

- Reduced construction time, simple installation.
- Elimination of the risk of slip plane failure.
- Maximum efficiency in discharging pore water.
- PVD core and filter are environmental friendly.
- Installation depth: over 50m

APPLICATIONS OF PVD, PHD

PVD, PHD have been successfully used for soft soil treatment in different work types:

- Roads, Railways, Dikes and Airports
- Land Reclamation
- Harbor Construction
- Urban and industrial sites



PVD, PHD INSTALLATION

TEINCO has owned specialized stitchers imported from Holland, Korea, showing excellent functions compared to locally-assembled stitchers.

- Statical installation, no affection to soil structure.
- Average capacity: 2000 – 3000m/hour
- Installation depth: over 50m
- Automatic operated stitcher, no need of supportive equipments



Advantages

- Significant construction time reduction
- Minimization in surcharge quantity
- Controlling soft soil treatment process by electronic devices.

Applications

Applied in projects of high technical requirements and short construction period
Railway station, airport, harbour, industrial zone, transportation road...



VACUUM CONSOLIDATION METHOD

The vacuum consolidation is designed to accelerate the consolidation for soft and very soft saturated fine-grained soils.

Advantages of Vacuum Consolidation compared to traditional surcharge method:

- Flexible configuration due to the absence of a liner
- No border trench required, which could cause instability or horizontal deformation.
- Isotropic consolidation reduces the risk of failure under additional loading
- Controlled rate and magnitude of loading and settlement
- Large reduction in secondary

In Vietnam, Vacuum Consolidation has been successfully applied to the project of HCM – Long Thanh – Dau Giay Expressway



Ceteau Vacuum Consolidation for North - South Expressway Vietnam

We are authorized distributor of various geotextile types such as: non-woven, Polypropylene, composite geotextile with tensile strength up to 200 kN/m. Polyester woven geotextile, geogrid with tensile strength up to 1000kN/m, which are used for many construction fields.

ARITEX Non-woven Geotextile

Produced from high quality PP fibers, UV resistant by needle punched and thermal compressed technology with modern, automatic production lines, quality control system ISO 9002, non-woven geotextile has wide product range from 130-2000g/m², which are used for soil filtration, separation and stabilization.



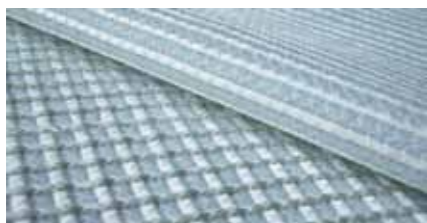
Polypropylene Woven Geotextile

Tensile strength up to 200 kN/m, low elongation, high puncture resistance, UV resistance, PP geotextile made by Phuong Nam (Vietnam), Taian (China) are applied in many infrastructure projects in Vietnam.



Polyester Woven Geotextile

With high tensile strength up to 1000 kN/m, elongation below 12%, low creep factor, high long-term design strength, Polyester woven geotextile provided by TEINCO is highly recommended and well introduced to Client's projects.



Composite geotextile

A product of needle punched non-woven geotextile and reinforcing polyester fibers with outstanding advantages of both woven and non-woven geotextile.

Applications

The wide range of woven and non-woven geotextile products supplied by TEINCO are commonly used in key projects such as:

- Roads, airports, railroads, etc.
- Land Reclamation, harbour
- Industrial zones, factory
- Landfills, waste depots
- Embarkment, canal lining and irrigation basins.



Geogrid is a geosynthetic material which made from Polypropylene (PP), Polyester (PE), or coated with Polypropylene Terephthalate (PET) by vertical compressing and stretching method. It proves its high efficiency and environmental friendly in modern infrastructure construction.

Its structural solutions (retaining wall and slope, soft soil improvement, road stabilization...) is considered a perfect replacement of traditional solutions.

Geogrid's strength and geometric structure allows for the absorption of shear loads, which avoid destabilization of soft soils, and transmit only the vertical loads to the soft soil. Geogrid has been supplied by TEINCO to numerous projects:

- Retaining wall with slope of 90%, height up to 17m
- Slope with height over 30m
- Bridge approach
- Soft soil treatment
- Asphalt-concrete road stabilization for airport, expressway

APPLICATIONS



Retaining wall



Slope protection



Bridge approach reinforcement

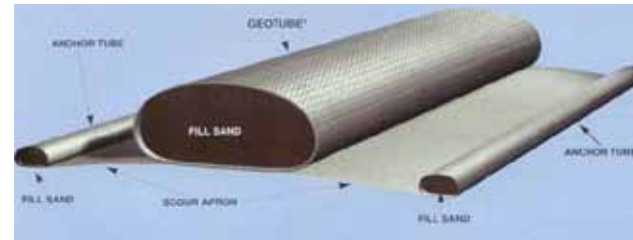


Asphalt road reinforcement

Geotube is a large tube (up to 3m circumference) are fabricated from a high-strength, specially engineered, woven textile with special high-strength seaming techniques to resist pressures during pumping operations and often filled hydraulically with a slurry of sand.

Properties:

- High durability, high strength, resist against sea wave impact.
- Fast drainage but small opening size to keep sand inside.
- Time saving construction, cost effectiveness



Applications:

- Effective erosion control system for river bank and sea shore.
- Land reclamation, beach restoration
- Offshore breakwater
- Mini dam.

Construction:

- Take Geotube to the location of preparation of Geotube
- Geotube is laid out and inspected
- Geotube is lift and placed in position
- Pumping of sand slurry and deposition of sand inside Geotube
- When the filling of Geotube with sand is completed, all filling ports are then closed.

GEOBAG - GEOCONTAINER



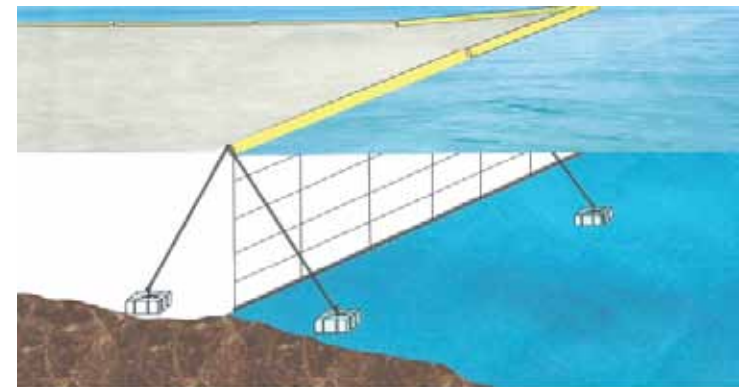
Properties:

- Geobags technology consists of a very large geotextile bag (manufactured from high tenacity polypropylene woven geotextiles or geocomposite geotextiles) hydraulically filled with soil before placement into the water.
- Custom design in various sizes
- High accuracy and easy to installation
- Durable and flexible

Applications:

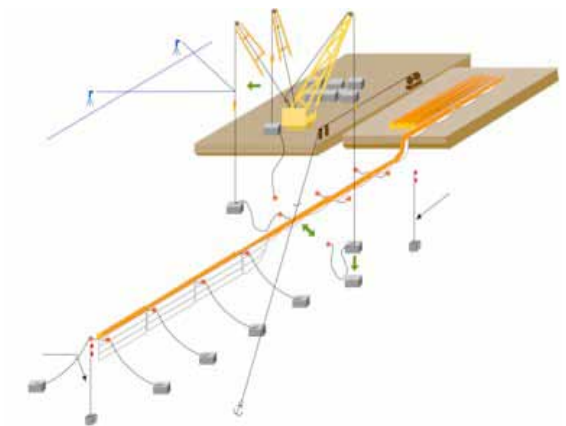
- Shoreline Protection/Marine Structure Construction
- Wetland/Island Creation.
- Breakwaters
- Sand dune core

Silt protector is a silt fence (a special membrane composed of high strength synthetic fiber) installed in water for preventing spread of environmental contaminants induced by coastal and riverside construction.



Functions:

- Isolating contaminated materials and minimizing their pollution to the surrounding environment. Increasing the deposit of sediment by lowering the water flow velocity inside the isolated area.
- Decreasing the sediment deposit area so that minimizing pollution to the outside.



Applications:

- Protection of sea farming and swimming beach from nearby coastal construction
- Protection of dumping at sea
- Protection of dredging work
- Protection of reclaiming work



Nghi Son Port dredging project in Thanh Hoa province



We are distributor of HDPE, LDPE geomembrane from GSE Lining technology Co., Ltd (USA) and SOLMAX International (Canada), ARITEX (Vietnam) with geomembrane thickness of 0.3 – 3mm, roll width of 8m.

HDPE geomembrane is produced from virgin resin in modern production lines, strictly following the quality control system ISO 9002, 14001.

Properties

HDPE geomembrane is made of 97,5% virgin resin and 2,5% black carbon, 1% UV resistant additive, no poisonous additives, having prominent advantages as follows:

- Non-toxic: HDPE geomembrane is certified to be safe for water containing purposes.
- High durability (more than 100 years) and no aged in normal temperature condition.
- Chemical resistance to certain chemical substances.
- UV resistance
- No permeability in normal temperature and pressure conditions.
- Temperature stability from -70oC đến 80oC.

Product types

- Smooth, single textured and double textured HDPE geomembrane.
- White, green smooth/ textured HDPE geomembrane.
- Smooth/ textured LLDPE geomembrane.
- Stud liner
- Polylock
- 3D horizontal water absorbent.



APPLICATIONS



Landfills



Oil tanks, chemical tanks



WWT ponds, reservoir, shrimp farms



Ashponds



Canal, embankment lining



Biogas lining and covering

HDPE GEOMEMBRANE INSTALLATION

The quality of construction work mainly depends on the quality of HDPE geomembrane installation. HDPE sheets are connected by two welding methods.

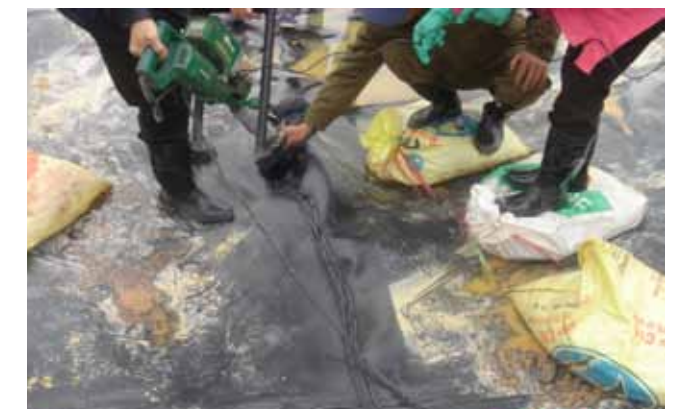


For the past 14 years, TEINCO has successfully installed more than 200 projects of landfills, wwt ponds, bio-gas, tanks, reservoirs... with quantity of 5 million sqm of HDPE geomembrane throughout the country



DOUBLE WELDING: used to weld HDPE sheets together (straight lines).

The seams will then be tested by destructive, non-destructive tests, vacuum test to assure being absolutely impermeable.



EXTRUSION WELDING: used to repair damages on HDPE liner such as holes, tears... or to connect HDPE liner to other structures such as pipes, polylock, concrete...

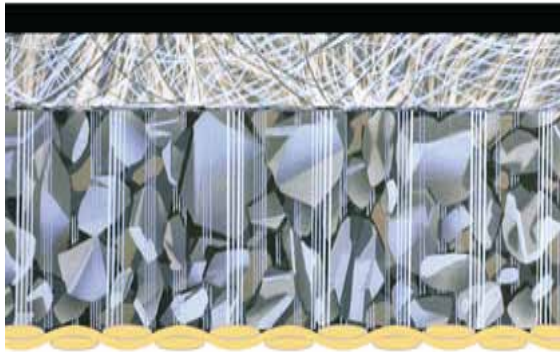
With specialized equipments and skillful, experienced technicians, TEINCO will meet the most strictly demands for construction quality of any project.

GCL is sodium bentonite with very low permeability encapsulated between two layers of non-woven and woven geotextile by needle-punch process and lined with an HDPE geomembrane that create a very good lining system.

After being completely hydrated, GCL's maximum permeability reaches 1×10^{-10} cm/sec, about 20 times lower than that of a normal compacted clay layer with thickness of 60-90cm.

Self-heal property:

Swelling sodium bentonite shall heal punctures, holes on the liner itself.



HDPE Liner

Non-woven geotextile

Sodium bentonite 0.75-lbs./SF

Woven geotextile

GCL Installation

Simple, no need of skillful technicians or specialized equipments. The advantages of GCL with its self-heal property are as follows:

- No need of additional sodium bentonite for edge connection
- No worry about the quality of overlapped seams.
- Simplifying the process of seam quality control.

Quang Ninh Thermal Power Plant



Advantages of GCL compared to normal compacted clay layer:

- Better water proof, less volume, higher safety factor.
- Better deformation
- Fast and simple installation
- Simple quality control
- Unbrittle under weather change.



APPLICATIONS



Landfill lining and covering



Ash ponds, mining ponds



Golf course ponds, wwt ponds lining



Embarkment, canal lining

Geocell is a cellular three-dimensional high density polyethylene honeycomb structure designed to physically confine infill material, this way the infill material is protected from migration due to hydraulic flows.

Geocell provides excellent protection for slopes against erosion control, stabilizes base material for load bearing purposes, reducing fill thickness and channel protection.

Geocell is placed above and protect HDPE geomembrane from long-term affection of environment. Besides, it can be filled with soil and grass to create green landscape.

TEINCOCELL IS TRADEMARK REGISTERED SINCE 2010.

- Bio - chemical resistance
- New product from new materials
- Improves the material shear strength and improves bearing capacity
- Slope protection, drainage and stabilization



APPLICATIONS

Soil reinforcement with cost effective



Loading improvement



Soil protection



Slope protection



Embarkment protection

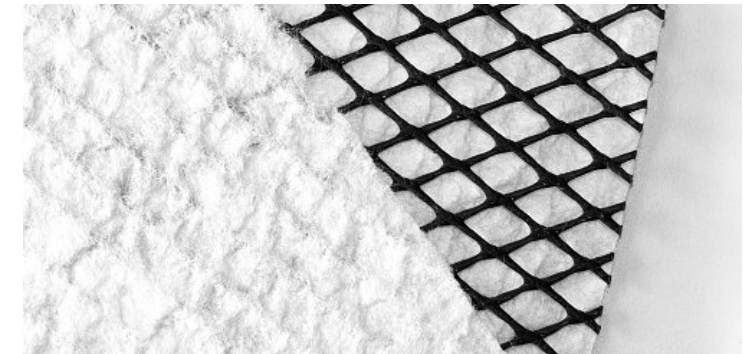
Advantages

- Cost effective
- Minimizing maintenance
- No loss
- Simple installation and more reliable.

Geocomposite drains are manufactured by bonding together geotextiles, membranes and nets in different combinations to create easier-to-install replacements for conventional granular layers with stable filter function.

Advantages:

- Chemical resistance
- Environment friendly
- Made from new materials
- Complete system " filtration – drainage – protection "



Installation:

- After the geomembrane has been installed, seamed, tested, the surface shall be cleaned and free of excess dirt and debris.
- The geocomposite roll should be installed in the direction of the slope. The geocomposite directs flow predominately in the machine direction (along the roll length) and thus should be installed in the intended direction of

flow or as specified by the Engineer.

- If the project includes an anchor trench at the top of the side slopes, the geocomposite shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite.
- Placement of the cover soil shall proceed immediately following placement and inspection of the geocomposite

APPLICATIONS



Landfills



Poisonous waste treatment

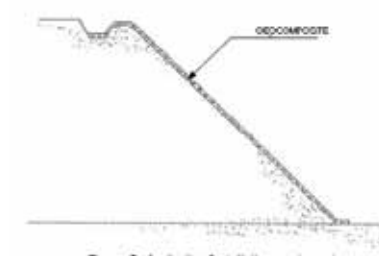


Figure 2: Application Installation on steep slope

Slope application

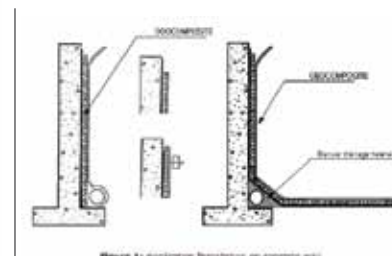


Figure 1: Application Installation on concrete wall

Concrete wall application

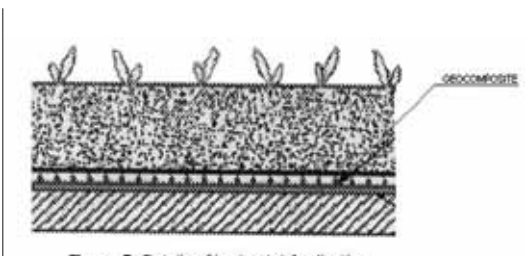


Figure 3: Details of horizontal Application

Horizontal drainage application

Protector gabion (triple twist hexagonal mesh filled with natural stone) are produced both galvanized and galvanized PVC coating with mesh sizes of 60x80, 80x100 and 100x120mm in modern production lines according to VN-2503 Standard and BS-443 Standard.



Advantages

- Ability to deform without cracking allowing the structure to withstand any unpredictable movement or settlement without loss of stability.
- High drainage
- Fast and Simple installation
- Machined produced, ensure the delivery schedule, tensile strength and harmonization of products.
- Easy for transportation, filled with site gravel
- Galvanized PVC coating gabion are salty-water resistance.

Standards of PVC gavalnized coating steel wire

- Tensile strength > 380N/ mm², diameter 2.2, 2.4, 2.7mm.
- Thickness of the gavalnized layer according to BS EN 443 (>240g/m²) or TCVN 2053-93 (>450g/m²)
- PVC coating layer is 0.5mm

APPLICATIONS



Bridge approach



Slope construction for river embarkment, canal...



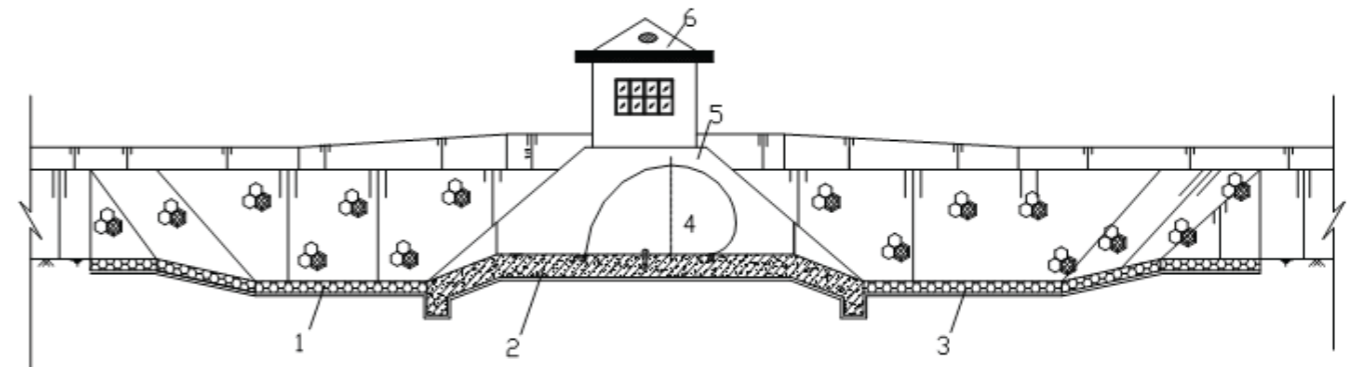
Retention dam



- Rubber dam is a new type of hydraulic structure compared with steel sluice gate, and made of high-strength fabric adhering with rubber, which forms a rubber bag anchoring on basement floor of dam.
- Light weight, flexible structure, according to the area with weak geology.
- Construction are quick and simple
- Low operation and maintenance costs
- Total invest cost is 30-40% lower than that of conventional gated regulating structure.

STRUCTURE

- | | |
|----------------|---------------------|
| 1 – Upstream | 4 – Rubber body |
| 2 – Base board | 5 – Side wall |
| 3 – Downstream | 6 – Operation house |



APPLICATIONS



- River closed to make running water, irrigation, generation.
- Increasing the reservoir capacity in last flood season.
- Emergency dam at the headwork in the



- irrigational, hydroelectric constructions.
- Water stair, waterfall in the natural landscape areas.
- Seawall dam, retention dam.

Project name	Material	Quantity	Year
HDPE-GCL GEOMEMBRANE			
Mong Duong Thermal Power Plant	HDPE 1.5mm	200.000 m2	2013
Luong Hoa landfill, Nha Trang	HDPE, GCL, geotextile...	350.000 m2	2013
Son Tay Landfill, Hanoi	HDPE 1.5mm	40.000 m2	2012
Phuoc Hiep solid waste treatment complex, Cu Chi, HCMC	HDPE - GCL	620.000 m2	2007, 2012
Lam Dong Bauxite- Aluminium Complex	HDPE 1.5mm	168.000 m2	2011-2012
Binh Phuoc Bio-Ethanol Plant	HDPE 1.5mm	47.000 m2	2011
Shirmp farms in Hue, Quang Binh province	HDPE 0.3mm	1.000.000 m2	2009-2010
Haiphong Thermal Power Plant	HDPE 1.5mm	632.000 m2	2009-2010
Quang Ninh Thermal Power Plant	HDPE - GCL	840.000 m2	2008-2009
Dung Quat Oil Refinery Plant	HDPE 2.0mm	70.000 m2	2007-2008
PRE-FABRICATED VERTICAL/HORIZONTAL DRAIN			
Duyen Hai 3 Thermal Power Plant, Tra Vinh province		6.000.000 m	2013
Thai Binh 2 Thermal Power Plant, Thai Binh province		1.000.000 m	2013
Ha Dong Railway Station, Hanoi		1.600.000 m	2013
Formosa Steel Plant, Hatinh province		5.000.000 m	2012

Hanoi – Haiphong Expressway, EX10		6.000.000 m	2012
Hanoi – Haiphong Expressway, EX5		3.200.000 m	2012
Hanoi – Haiphong Expressway, EX4		2.000.000 m	2012
IPEM Port in Dinh Vu IZ, Haiphong		5.000.000 m	2012
Long Thanh – Dau Giay Expressway, Package 3		2.800.000 m	2012
Dinh Vu PE Plant, Haiphong		1.200.000 m	2009
Cau Gie – Ninh Binh Expressway		1.500.000 m	2007, 2013
SILT PROTECTOR, GEOTEXTILE, GEOTUBE			
Nhan Co Red clay pond	ART 400	670.000 m2	2014
Nghi Sơn Port dredging project, Thanh Hoa	Silt protector	2.300 m	2013
Lach Huyen port, Haiphong	Silt protector Geotube	680 m 1.300 m	2013
Noi Bai – Lao Cai Expressway	ART 12 GML 20	110.000 m2	2013
Formosa Steel Plant, Hatinh province	DM08A GM 7	260.000 m2 332.000 m2	2013
Ninh Binh railway station	ART 10	120.000 m2	2012
Tan Rai Red clay pond	GM 10	250.000 m2	2010
Project of Tam Hai beach, Quang Nam	Geotube	360 m	2009
Thanh Tri bridge, Hanoi – Package 3	GML 20	235.000 m2	2008

TEINCO

GEOSYNTHETICS-ENVIRONMENT

<http://teinco.com.vn/>

CÔNG TY TNHH VẬT TƯ THIẾT BỊ KỸ THUẬT HẠ TẦNG

Head Office: Room 3606, Building A Keangnam,
Me Tri, Tu Liem District, Hanoi
Email: hung.teinco@gmail.com

Office: Room 1303, 25T1 Building, Trung Hoa
Nhan Chinh, Cau Giay District, Hanoi
Tel: 04. 3858 5959 **Fax:** 04. 3858 3939