

GEOARME Solutions

Istanbul Teknik offers unique and special solutions, own ForTex polyester geogrid products, for economic, convenient and many infrastructure engineering structures.



Istanbul Teknik is a company with 100% Turkish capital for building material production, sale, engineering solutions and applications, which was established in order to meet the needs of the construction sector where it has been operating since 1998 and to contribute to the industry of the country.

Istanbul Teknik, which ensures the production and sale of the products that offer maximum benefit for the construction sector, attracts the attention with its solutions fit for the purpose in all projects in which it is involved.

Istanbul Teknik, which has a wide range of products and engineering applications from infrastructure to dwelling, from insulation to asphalt applications, becomes forefront with its quality in the sector and the confidence that it gives to its customers because of the experience of long years.

A Turkish company produces the polyester and glass fiber braided geogrids at the international standards and provides these products to the domestic and foreign projects for the first time.

Istanbul Teknik is also the manufacturer of TeraGrip that is the first domestic anti-skinning additive of Turkey.

Istanbul Teknik, which uses all innovations offered by the modern technology on the production lines, carries on its R&D activities with the support of the accredited laboratory and qualified personnel.

Istanbul Teknik provides services to the insulation, marble, asphalt, and landscaping and geosynthetic sectors with its wide range of products.

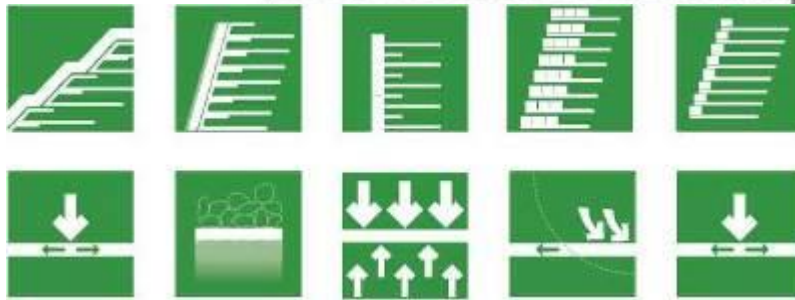
It exports to more than 50 counties, mainly the Middle East and Turkic Republics. It has approximately 1000 sales points for the insulation products throughout Turkey. It offers solutions fit for the project for all of its customers with the engineers and the expert personnel within its body.

Istanbul Teknik carries on its works under EN ISO 9001:2008 Quality Management System. Furthermore, it has CE certificates that demonstrate the availability of its products within the boundaries of the European Union.

Istanbul Teknik maintains its leadership position in the areas where it operates without compromising on the customer satisfaction with its motto "For improving the life".

-   **Geosynthetics**
-  **Asphalt Products**
-   **Insulation Products**
-  **Concrete Products**
-  **Marble Products**
-  **Green Roof Products**
-  **Dilatation Products**





Istanbul Teknik has been offering engineering solutions for the diverse applications of the construction sector since the day when it was established. Istanbul Teknik, which has carried out numerous projects since 1998, provides services to its customers with its wide range of products the production and sale of which are performed by it.

The geogrid products of Istanbul Teknik are the high strength materials that are used in various application of civil engineering. ForTex geogrids of Istanbul Teknik, which are produced by the method of braiding the polyester fibers in the form of rectangular and coating the top of the with PVC, are resistant, long-lasting and reliable.

Istanbul Teknik ensures that its customers save both time and cost with its stabilization, ground reinforcement and asphalt reinforcement solutions based on the experience of long years and the characteristics of its geosynthetic products. The geogrid solutions of Istanbul Teknik provide solidness, quick application, saving and aesthetic appearance.



Emaar – Tuscany Valley



GeoArme

Geogrid Reinforced Retaining Building System

GeoArme structures are the entire system that is composed of in-wall structural fill, reinforcement, face elements and backfill.

GeoArme walls provide aesthetic, ergonomical and functional solutions by using different face elements.

GeoArme structures provide saving as they contain less materials such as concrete and iron than the conventional solutions and they can be applied more quickly.

Applications with perpendicular concrete blocks are made in the areas where the area is restricted on the bridge approaches.

In the road expansion projects, they provide retaining wall solutions with the perpendicular or angular face options according to the conditions such as expropriation limit etc.

They allow for the applications of the slope and wall structures which are more compatible with the deformation effects such as ground and earthquake with their flexible face options.

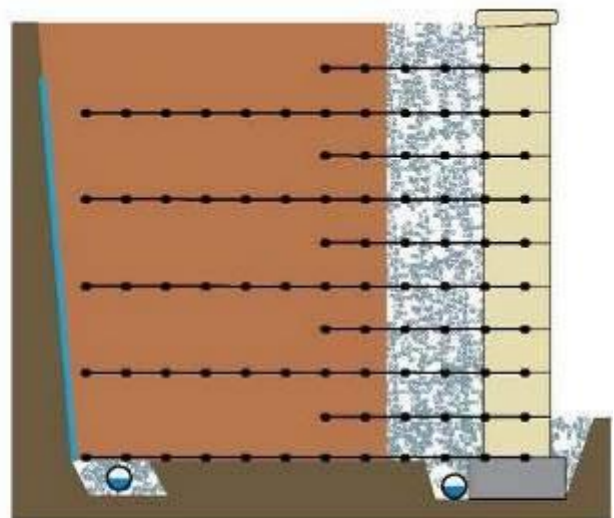
They provide aesthetic appearances which are alternative to the stone or reinforced concrete walls which can be architecturally greened in the structures such as dwelling, factory etc.

- GeoArme RetainBlock GeoArme PotBlock
- GeoArme WrapGrid - WrapMesh - WrapBag
- GeoArme CellFace
- GeoArme HexMesh
- GeoArme HexBox
- GeoArme Panel
- GeoArme Combine
- GeoArme AnchorLink



GeoArme RetainBlock Concrete Block Retaining System

RetainBlock is used as the face of the geogrid reinforced walls. It is also used for coating various types of existing retaining walls or for building architectural retaining walls such as garden wall by using reinforcement. For the structures built at the waterfront, it is possible to create various solutions with the large block elements produced with wet concrete as precast at the construction site. The elements of RetainBlock system can be selected in very diverse shapes and colors.



Block Face GeoArme Construction Method



Foundation of the reinforced wall

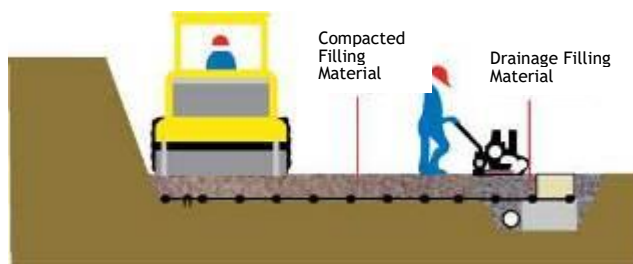
I. The wall area is excavated and levelled according to the elevation indicated in the project and is made ready by compacting. A trench at the height of 0,30m and at the width of 0,70m is excavated. Concrete is poured into the trench at the height of 0,20-0,25m.

The trench is filled with granular material by placing a drainage pipe onto the interior side of the concrete.



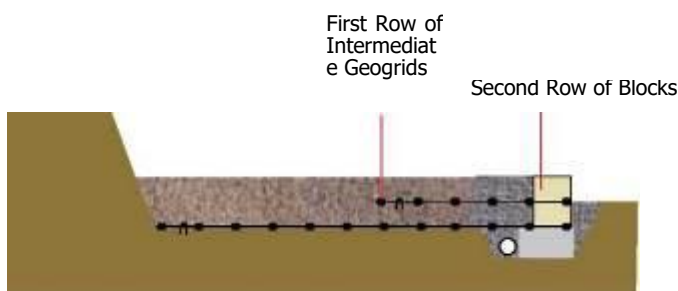
Laying the first row of geogrid and placing the blocks for the reinforced walls

II. The first row of geogrids is laid backwards from the block face line. The frequency and length of the geogrids are determined in accordance with the project. The first row of blocks are aligned onto it. The drainage material is poured into the rear of the block at the width of -50 cm. The granular structural filling material is laid and levelled. The fill grades on the block walls are the same with the block height. (20-25 cm]



Placing and compacting the filling material for the reinforced walls

III. The fill grade is compacted with the cylinder. (As the compaction criterion, Standard Proctor should be >95%) The compaction around the block (up to 1 m) should be made with hand compactor.



Placing the second row of geogrids and blocks for the reinforced walls

IV. Geogrids are placed at the intervals of 1,00-2,00 m at every block depending on the project and the second row of blocks are placed. The fill grade is compacted as indicated in the item II and III.



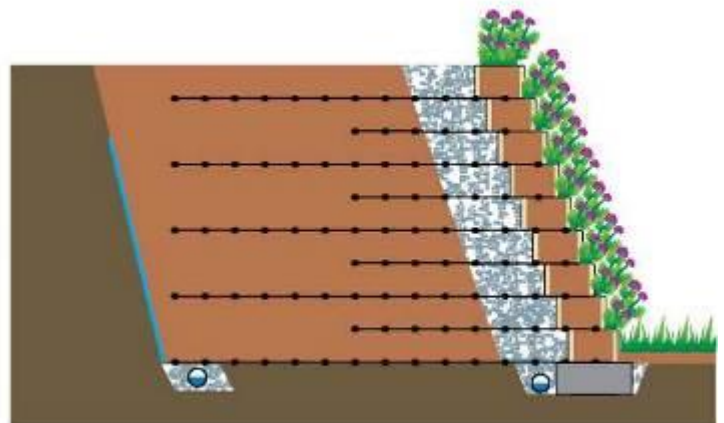
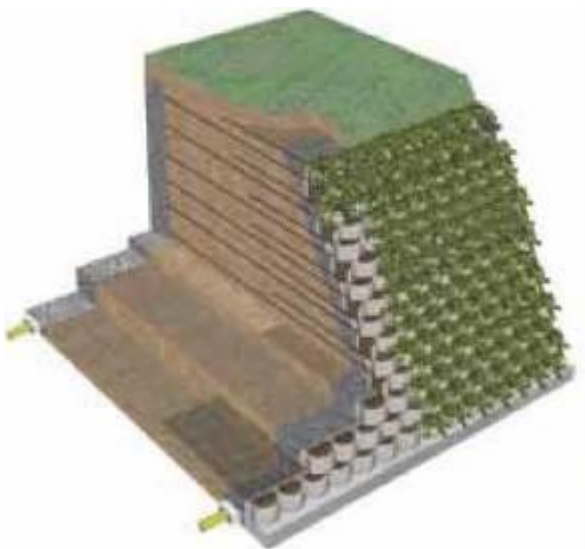
Continuing the rows of reinforced walls

V. The same processes (II, III, IV) are repeated by placing the main grids in accordance with the project.



GeoArme PotBlock – Pot Block Retaining System

Angular walls can be constructed by the method of using as the face element of the pot-shaped concrete blocks and placing by pushing back. It is ensured that the pot cavities of these blocks are greened by hand planting or through insemination by placing vegetable soil. The circular wall rotations can be formed as required by the forming and jointing method of the blocks.



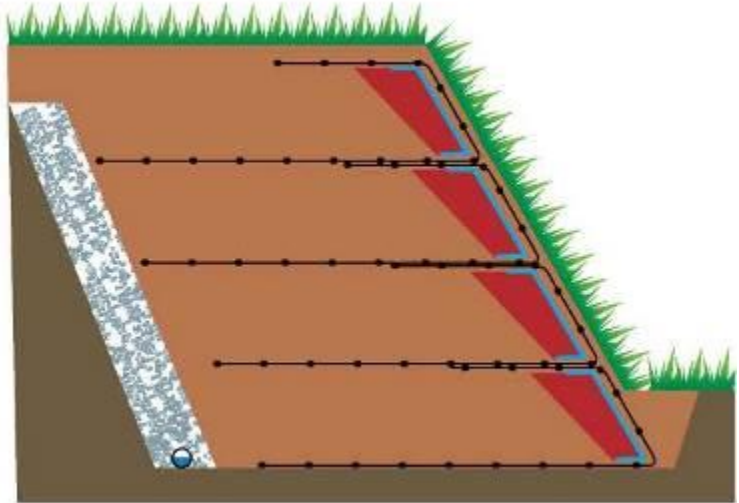
EAE Electric – Factory Project





GeoArme WrapGrid - Geogrid Wrap Retaining System

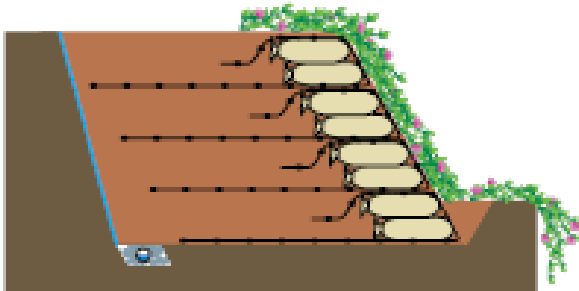
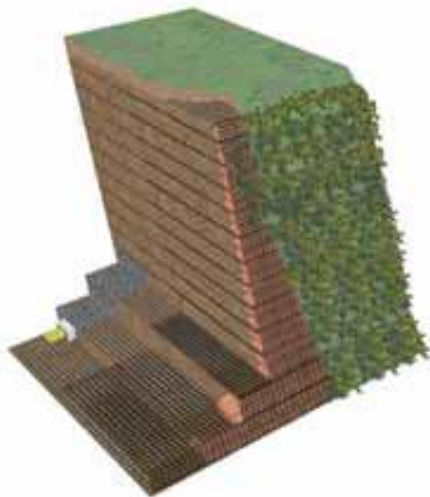
On this type of walls the face element of which is geogrid, the filling material remaining between two bearing geogrids is retained by wrapping the geogrid backwards. In order to retain the face during the filling process until the geogrid is bearing, welded wire fabric (Wrap Mesh), mold (Wrap Mold) or small geobags (Wrap Bag) filled with soil are used. The geogrid, soil retainer, geobag and similar elements allow for bushing out or hydro seeding. With the soil retainer or the plant retainer that is used in the interior part of the geogrid, the soil on the face is prevented from being exposed to erosion by the effects such as rain. Plant roots and green extensions along with the geogrid throughout the life of structure protect the face of these walls, which are also called as living wall.





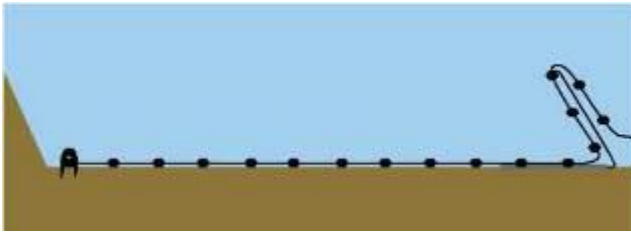
GeoArme WrapMesh

During the filling process on the face, the small geobags filled with vegetable soil are used as temporary support. The main geogrids of the wall are left long at a specific length and a wrap is formed by folding them backwards after the filling process. The material strength of the selected geobags is not long-lasting and their faces are degraded and become favourable for plant growth within a specific period of time. The soil retainer prevents the soil fluction from this area. This type of faces are more flexible and provide moveable surface appearance.



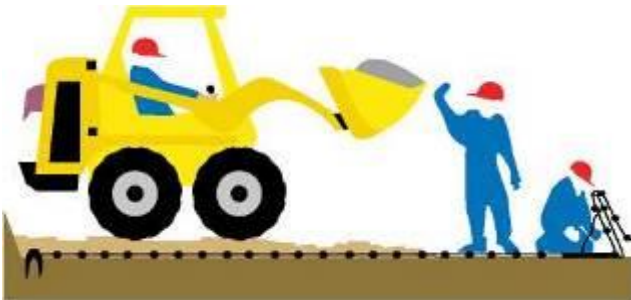
Aykon - Al Nour Villa Project

Geogrid Wrap GeoArme Construction Method



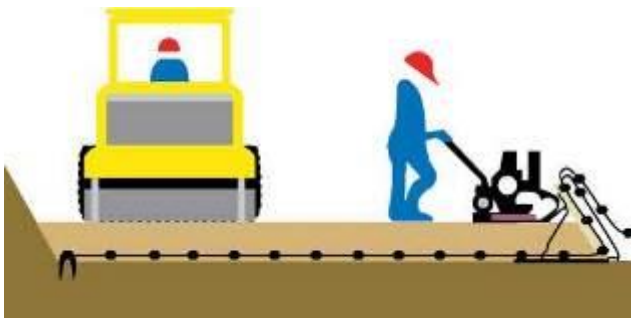
Preparing the wrap wall foundation and laying the first row of geogrids

I. The wall bottom is excavated up to the ground with a specific bearing capacity as much as the geogrid laying width. It is compacted with the cylinder. Welded wire fabric twisted at the project angle is placed to the front side. The geogrid with the wrapping margin left is laid and secured to the ground as shown in the figure.



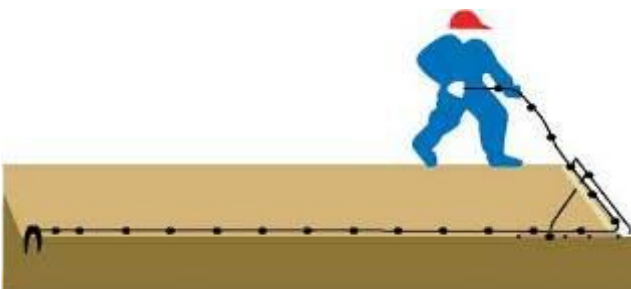
Forming the face of the reinforced wall

II. On the face, the welded wire fabric is tied with the tie spacer rods so as to maintain its form. The inside of the welded wire fabric and the geogrid is coated with plant retainer or unbraided geotextile. The top of the geogrid is covered with the filling material and it is filled up to ~0.50m to the face.



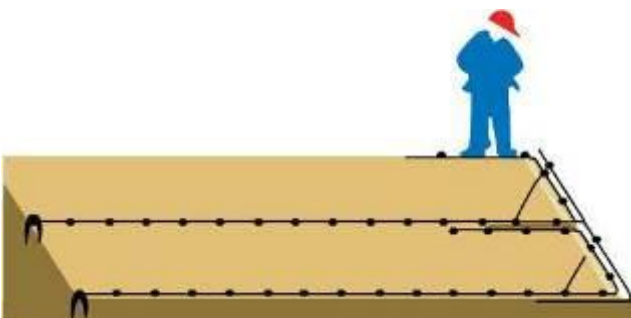
Laying and compacting filling material for the reinforced wall

III. Vegetable soil or filling material is placed to 0.5-1 m close to the surface according to the project and it is compacted with the hand compactor. The filling material that is far behind is compacted with the cylinder. The laying and compaction process should be performed according to the grade height at the intervals of 20-30 cm.



Closing the wrap for the reinforced wall

IV. The margin allocated for the wrap is collected back, stretched and secured to the ground. (As the compaction criterion, Standard Proctor should be >95%)



Laying and wrapping the 2nd row of geogrids for the reinforced wall

V. The same processes (II, III, IV) are repeated by placing the main grids in accordance with the project.



GeoArme CellFace – GeoCell Retaining System

Angular walls can be constructed by the method of using as the face element of the geocells and placing by pushing back. It is ensured that the pot cavities of these cells been green by hand planting or through insemination by placing vegetable soil. The geocell that is used forms a flexible and resistant face with the material.



Aksoy Holding - EPIQUE Villa Project



GeoArme HexMesh System

When GeoArme walls are required to have a pleasant appearance as of the moment when their construction is completed and to be greened subsequently, an element which is made with welded wire fabric, soil retaining (net, geotextile, GeoComposite, GeoMAT, CoconutMat) layer and hexagonal twisted-pair wire braid mesh is used as the face element.

This element functions together with the geogrid and ensures that the fill grade is retained during and after the filling stage. The wall face serves to various landscaping purposes by being constructed as either single or gradual.



Izmir Metropolitan Municipality - Park Project



14th Regional Directorate for Highways – Golkiyi Junction Project

GeoArme Panel

As another method of constructing perpendicular GeoArme, it is the application of the classical reinforced earth panels as the face element and the geogrids or polymer strips by combining them. This system is an application that is alternative to the steel strips and generates the solution for the corrosion problems caused by the active grounds. The production of the panels at the construction site may be a good option for the construction sites where the concrete block production is at a long distance.



GeoArme HexBox

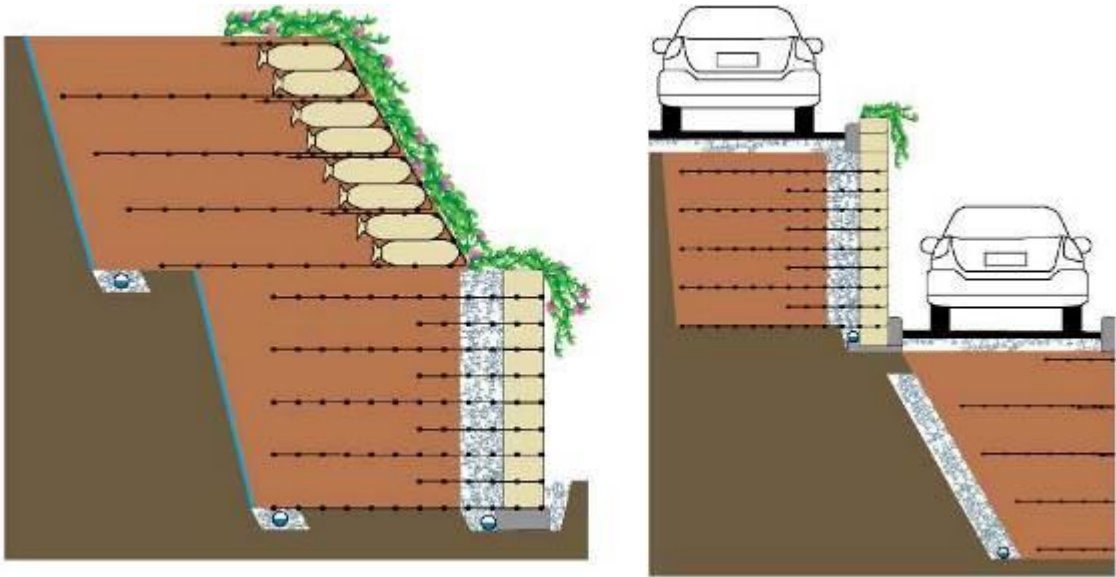
The face elements are constructed by putting the hexagonal twisted-pair wire braid meshes which are also known as Gabion into box form and filling the inside of them with rock blocks at appropriate dimensions. These boxes are constructed as tailed for them to be able to function with the geogrid in compliance with GeoArme structures.





GeoArme Combine

The solution that the project needs can be generated by using various types of GeoArme walls together. This solution is generated together with the Employer by taking into account the construction area, the structures below and above it, the aesthetic demands and functionality.



Bursa Osmangazi Municipality - Alacahirka Park Walls



OUR REFERENCE PROJECTS (Design, Supply & Apply)



Administration: Esenyurt Municipality, Istanbul

Work: Geosynthetic Reinforced Retaining Walls of Esenyurt City Park, 2012-2013

Application: GeoArme RetainBlock, PotBlock (Park project walkways, stairs and terracing walls were applied.)



Administration: Beylikduzu Municipality, Istanbul

Work: Geosynthetic Reinforced Retaining Walls of Yasam Valley Park, 2017

Application: GeoArme WrapMesh (The Japanese garden boundary walls were applied.)



Administration: Kent Konut, Kocaeli

Work: Geosynthetic Reinforced Retaining Wall of Yildiz Dwellings, 2013

Application: GeoArme RetainBlock (The landscape and elevation raising walls were applied.)



Administration: 15th Regional Directorate for Highways, Kastamonu

Work: Geosynthetic Reinforced Retaining Walls of Ihsangazi Vehicle Road, 2017-2018

Application: GeoArme WrapMesh (Walls were applied instead of high embankment slopes at the valley passages.)



Administration: Aksoy Holding

Work: Retaining Walls Construction Work for Bodrum Epique A++ Villa Project, 2016-2017

Application: GeoArme CellFace and Retainblock (The higher ones of the exterior garden walls of the villas were applied as geocell front-face geogrid reinforced wall for the landscaping.)



Administration: 15th Regional Directorate for Highways, Kastamonu

Work: Geosynthetic Reinforced Retaining Walls of Ilgaz - Kastamonu Road, 2015-2018

Application: GeoArme WrapMesh - Combine (The road expansion and Junction approach walls were applied.)



Administration: 15th Regional Directorate for Highways, Kastamonu

Work: Geosynthetic Reinforced Retaining Walls of Bartın Amasra Road, 2013-2014

Application: GeoArme WrapMesh (The valley passage walls were applied instead of viaduct on the tunnel exit roads.)



Administration: 15th Regional Directorate for Highways, Kastamonu

Work: Geosynthetic Reinforced Retaining Walls of Bartın Arit Road, 2015

Application: GeoArme WrapMesh (Geoarme walls for road arrangement were applied onto the reinforced concrete toe wall.)



Administration: Osmangazi Municipality, Directorate of Technical Works, Bursa

Work: GeoArme Walls of Alacahirka Park, 2012

Application: GeoArme Combine (WrapBag, RetainBlock GeoArme walls were applied on the sports arena expansion walls.)



Administration: AYKON Elektrik Taah. San. Ve Tic. Ltd. Sti.

Work: Geosynthetic Reinforced Retaining Wall of AL NOUR Villas, 20U

Application: GeoArme WrapBag (Area gain was ensured with the site boundary walls.)



Administration: 10th Regional Directorate for Highways, Trabzon

Work: Bagisli Tunnel Flute Landscape Wall Work, 2017

Application: GeoArme Combine (WrapMesh and RetainBlock systems were applied for the tunnel portal landscape.)



Administration: EAE Elektrik

Work: Retaining Walls Construction Work for Dilovasi Factory and Warehouse Structures, 2015-2016

Application: GeoArme Retainblock and PotBlock (The retaining wall and the factory site boundary walls were applied as geoarme.)



Administration: 1st Regional Directorate for Highways, Istanbul

Work: Geosynthetic Reinforced Retaining Walls Construction Work for Hasdal Junction, Kemberburgaz-Yassiren Diversion, Tem Passage Tunnel Entry-Exit Portals and Approaches, 2011

Application: GeoArme RetainBlock (Perpendicular walls were applied in the graded road application.)



Administration: 14th Regional Directorate for Highways, Bursa

Work: Geogrid Reinforced Retaining Walls Construction Work for Balikesir-Akhisar State Road Replenishment Construction, 2012-2013

Application: GeoArme Retain Block (Perpendicular walls were applied for road expansion]



Administration: 1st Regional Directorate for Highways, Istanbul

Work: Adapazari-Bilecik Road Nuruosmaniye and Orence Junctions Approaches Construction Work, 2010

Application: GeoArme RetainBlock (The bridge approach walls, bridge pier foundation and pile front revetment walls were applied.)



Administration: 10th Regional Directorate for Highways, Trabzon
Work: Bridge Walls of Ovit Tunnel Entry and Exit Junctions, 2017

Application: GeoArme RetainBlock (The bridge approach walls and walls under the bridge piers were applied.)



Administration: Balikesir Metropolitan Municipality, Balikesir
Work: Bahcelievler - Pasaalani New Route and Junction Arrangements Work, 2017

Application: GeoArme RetainBlock (The bridge approach walls and bridge pier revetment walls were applied.)



Administration: Republic of Turkey Ministry of Transportation, 4th Regional Directorate for Highways, Ankara
Work: Retaining Walls Construction Work for Duzce Ring Road, Kazukoglu ve Akcakoca Junctions, 2011

Application: GeoArme RetainBlock (Perpendicular walls were applied at the bridge approaches.)



Administration: 1st Regional Directorate for Highways, Istanbul

Work: Geogrid Reinforced Retaining Walls Construction Work for the Lodgements of the 17th Regional Directorate for Highways, 2010

Application: GeoArme WrapMesh, PotBlock (They were applied on the embankment boundaries of the lodgement gardens.)



Administration: 4th Regional Directorate for Highways, Ankara

Work: Geosynthetic Reinforced Retaining Wall Construction Work for Eskisehir City Transition, 2009

Application: GeoArme RetainBlock



Administration: 1st Regional Directorate for Highways, Istanbul

Work: Hasdal-Kemerburgaz-Yassioiren State Road Gokturk Junction Work, 2007

Application: GeoArme RetainBlock



Employer: Emaar Turkiye

Work: Tuscany Valley Project, Retaining Walls Construction Work, 2008

Application: GeoArme RetainBlock, WrapMesh



Administration: Duzce University

Work: Geogrid Reinforced Retaining Wall Construction Work for the Faculty of Science and Letters of Duzce University, 2012

Application: GeoArme RetainBlock

(It was applied as security and landscape wall in the rock falling area in front of the rock slopes behind the buildings.)



ForTex GG UX

Uni-directional Geogrid

ForTex GG Unidirectional Geogrids are the high strength materials developed for the unidirectional geogrid needs in various applications of civil engineering. They are produced by the method of braiding the polyester micro fibers in the form of rectangular and coating the top of them with PVC. ForTex GG Unidirectional Geogrids are the unidirectional braided type geogrids the tensile force in one direction of which is significantly higher than the tensile force in the opposite direction. They provide high performance by means of a stitching method specifically designed for it to be able to be more solid at the nodal points.

Application and Usage areas

ForTex GG Unidirectional Geogrids are used in the applications which require unidirectional strength such as reinforced slope and reinforced retaining building systems (GeoArme).

The general usage areas of the reinforced retaining building systems (GeoArme) which have quick and economic application opportunity, safe earthquake behavior, flexible structure, tolerance against settlements and also aesthetic appearance:

- In the divided road expansion works
- On the approach walls of the bridge crossings
- In the cases where the expropriation area is required to be reduced
- In the works for space gaining purpose
- On the bridge edge pier walls
- On the park garden walls
- In the establishment of high embankments instead of viaduct

Advantages

ForTex GG Unidirectional Geogrids: When filling or granular material is laid onto the geogrid, the grains of the filling material provide coupling by entering into the pore openings of the geogrid and become a composite building material together with the ground.

Products

ForTex GG 35/20 P [35 kN/m / 20 kN/m]

ForTex GG 40/20 P (40 kN/m / 20 kN/m)

ForTex GG 55/20 P [55 kN/m / 20 kN/m]

ForTex GG 60/20 P [60 kN/m / 20 kN/m]

ForTex GG 80/30 P [80 kN/m / 30 kN/m]

ForTex GG 100/30 P (100 kN/m / 30 kN/m)

ForTex GG 110/30 P (110 kN/m / 30 kN/m)

ForTex GG 120/30 P (120 kN/m / 30 kN/m)

ForTex GG 150/30 P (150 kN/m / 30 kN/m)

ForTex GG 150/50 P (150 kN/m / 50 kN/m)

ForTex GG 200/30 P (200 kN/m / 30 kN/m)

ForTex GG 200/50 P (200 kN/m / 50 kN/m)

Different products can be produced according to the need of the project.

Packaging and Storage

ForTex GG is produced as a roll at the width of maximum 6 m and generally at the length of 50-100 m. Each roll is shipped in a package protected against UV effects.

In the event that they are stored one on the top of the other, it is recommended to place the rolls in 6 rows at most; in the event that the width of the rolls is shorter (up to 2 m), it is recommended to load and store the rolls vertically.

The material should be covered with filling material as quick as possible and no construction equipment should be moved on the material without covering with filling material.



ForTex GG BX Bi-directional Geogrid

ForTex GG Bidirectional Geogrids are the high strength materials developed for the bidirectional geogrid needs in various applications of civil engineering. They are produced by the method of braiding the polyester micro fibers in the form of rectangular and coating the top of them with PVC. ForTex GG Bidirectional Geogrids are the bidirectional braided type geogrids the tensile force in one direction of which is very close or equal to the tensile force in the opposite direction.

They provide high performance by means of a stitching method specifically designed for it to be able to be more solid at the nodal points.

In certain projects, the need of the work might be the unidirectional geogrids. The unidirectional geogrids are used in the cases where the required strength is necessary as perpendicular to the road axis.

Packaging and Storage

ForTex GG is produced as a roll at the width of maximum 6 m and generally at the length of 50-100 m. Each roll is shipped in a package protected against UV effects.

In the event that they are stored one on the top of the other, it is recommended to place the rolls in 6 rows at most; in the event that the width of the rolls is shorter (up to 2 m), it is recommended to load and store the rolls vertically.

The material should be covered with filling material as quick as possible and no construction equipment should be moved on the material without covering with filling material.

Products

ForTex GG 20/20 P (20 kN/m / 20 kN/m)
ForTex GG 30/30 P (30 kN/m / 30 kN/m)
ForTex GG 40/40 P (40 kN/m / 40 kN/m)
ForTex GG 60/60 P (60 kN/m / 60 kN/m)
ForTex GG 80/80 P (80 kN/m / 80 kN/m)
ForTex GG 100/100 P [100 kN/m / 100 kN/m]
ForTex GG 110/110 P [110 kN/m / 110 kN/m]
ForTex GG 120/120 P [120 kN/m / 120 kN/m]
ForTex GG 150/150 P [150 kN/m / 150 kN/m]

Different products can be produced according to the need of the project.

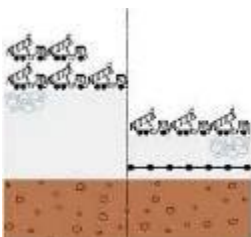
Composites with NW Geotextile

ForTex GC 20/20 P + NW
ForTex GC 30/30 P + NW
ForTex GC 40/40 P + NW
ForTex GC 60/60 P + NW
ForTex GC 80/80 P + NW
ForTex GC 100/100 P + NW
ForTex GC 110/110 P + NW
ForTex GC 120/120 P + NW
ForTex GC 150/150 P + NW

Different products can be produced according to the need of the project.

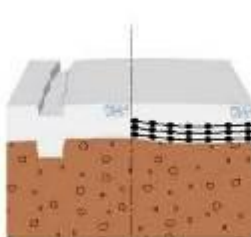
Advantages

Reducing the fill layer thickness



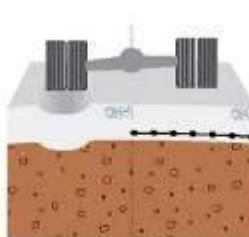
It allows for laying the filling material layer to be laid onto the weak ground at a thinner thickness and reduces the excavated soil amount of the existing ground which is not at the required quality

Controlling the different settlements

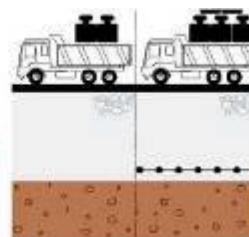


A platform is formed with the embankment constructed onto the weak grounds and it prevents different settlements and local settlements.

Improving the weak embankment

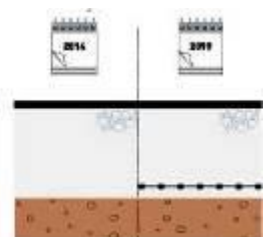


Increasing the Bearing capacity



It is applied in layers onto the weak grounds and thus increases the bearing capacity of the ground.

Increase of life



It provides saving in the maintenance costs by extending the life of the base and subbase embankments constructed on the roads.

Application and Usage Areas



- In providing higher bearing capacity at the foundations of the runways, aprons and taxiways at the airports



- In reducing or preventing the local settlements in the applications to be made on the weak ground on the highways
- In interoperating the new and old embankments in the expansion projects for highways
- In preventing the collapses that occur at the edges of the roads



- In preventing the settlements that might occur due to the weak ground in the railway and highway applications
- In reducing and retarding the dissemination that will occur on the ballast layer in the railway applications



- On the transition platforms to be formed for the loads of the embankments, which will be constructed onto the applications such as jet grout, stone column, deep mixing etc., to act homogeneously



- In supporting the embankment in order to ensure the compaction in the cases where the material under the embankment is weak



- In increasing the bearing capacity of the heavy foundations and preventing the local settlements at the foundations of the container storage areas and the industrial structures



- In meeting the increasing loads under the structures with variable load such as treatment plant and water tank



- In forming the platforms on which the heavy construction equipment will be operated
- In forming the roads through which the heavy construction equipment will pass in the Wind Power Plant (WPP) and Geothermal Power Plant (GPP) projects



GeoCell

Erosion Control Products

GeoCell is produced by jointing the strips that are made from PE raw material at specific intervals by ultrasonic welding. It is applied as the opening of the formed product at the site and the filling of the inside of it with material. The opened product is in diamond-embossed form.

Application and Usage Areas

It is used for preventing erosion on the slopes and for greening by keeping the vegetable soil. It is fixed to the grounds which are compacted properly on the slopes and which are smooth (which are not rough and protruding) with the retaining elements. In certain applications, it is placed into the anchor trenches above and below the slope. It is filled with materials such as soil, granular material and concrete depending on the area of application.

- On the highway and railway slopes
- As erosion control or membrane protection on the pond slopes
- On the channel bottom and slopes
- On the high inclined or variable inclined green roofs

The product is also used for the improvement and reinforcement purpose in the embankments under the road by being laid horizontally. It is also used as GeoArme face element. It can be used in the gravity wall applications.

- In forming platform under the highway
- In reducing the use of the high-cost filling material
- In reducing the road embankment thickness
- In preventing the collapses that occur at the road edge
- As GeoArme face element
- On the airport aprons and taxiways
- In the gravity wall applications

Advantages

- It ensures workmanship saving as its application is simple.
- It has long life thanks to the raw material used and the production technology.
- It prevents erosion and forms infrastructure for greening.
- It is suitable for the applications in various geometric shapes as it is flexible.
- It can be used with very diverse filling materials depending on the type of the application.
- It is a product which is easy to carry and apply under the extreme field conditions.

Packaging and Storage

GeoCell material is shipped on palettes. The materials should be stored on a smooth ground and in a closed area if possible. It should be applied and covered with filling material at the site within a short period possible. After it is filled, vehicles and construction equipment are allowed to move on it.



CHECKLIST FOR SUPERVISION OF REINFORCED SOIL WALL

No.	CHECKLIST ITEMS	CONTRACTOR CHECKED BY	YES	NO
1.00	SURVEY/SETTING UP	SIGNATURE	YES	NO
1.01	The initial survey and setting out of the wall alignment survey shall be carried out by a licensed surveyor with the presence of Engineer's representative.			
1.02	The initial survey drawings showing the levels and alignment of wall shall be endorsed by licensed surveyor before submitted for Engineer's approval.			
1.03	The wall alignment shall be pegged at every 10,0 meter intervals at site.			
1.04	Wherever there are curves or cornering of the wall, the wall alignment shall be pegged at every 2,0 m intervals or closer at site.			
2.00	EXCAVATION/ REMOVAL OF UNSUITABLE MATERIAL	SIGNATURE	YES	NO
2.01	Carry out Mackintosh Probe (MP) at the foundation of the wall at every 5m intervals or as directed by the Engineer.			
2.02	Submit Mackintosh Probe results to the Engineer no longer than 24 hours after the MP tests.			
2.03	Engineer to issue instruction on depth of excavation and removal of unsuitable material based on MP results.			
2.04	Carry out soil replacement with approved material after removal of unsuitable material.			
2.05	Cover base of wall foundation with plastic sheets to avoid softening if soil replacement is not carried out immediately after excavation. If the contractor fails to provide the plastic sheet at site, the soft material should be stripped out prior to the placement of suitable material or quarry dust.			
3.00	WALL ERECTION	SIGNATURE	YES	NO
3.01	Brace externally the initial row of panels.			
3.02	Connect steel reinforcements to panels, backfill and compact before next row of panels are erected.			
3.03	Insert joint fillers into all the joints between the panels with the help of a wooden edge.			
3.04	Place cushion pads at the slots on the top edge of each panel before the installation of subsequent rows of panel.			
3.05	Check alignment and verticality of wall during erection using a plumb bob.			
3.06	Check the reinforcement size and anchor block size (if applicable) at site before backfilling works.			
4.00	BACKFILL AND COMPACTION	SIGNATURE	YES	NO
4.01	Level backfill before placing of and bolting of reinforcement strips.			
4.02	Maximum loose thickness of every fill layer shall not exceed 375mm before compaction. Trial run should be carried out at site to determine the number of passes to achieve the required degree of compaction.			
4.03	Keep trucks and heavy vehicles 1.5m away from the back of the wall panel.			
4.04	Use hand-operated compacting machine (plate compactor etc.) with weight< 1.0 ton within 1.5m from the wall face for compaction.			
4.05	Carry out field density tests at site as instructed by the Engineer.			
4.06	Collect bulk sample of backfilling material and send for direct shear box test.			
5.00	TEMPORARY DRAINAGE	SIGNATURE	YES	NO
5.01	Provide and maintain the temporary drainage/pipes for effective drainage to divert any surface run-off away from the reinforced soil wall.			
5.02	Level any surplus backfill behind the reinforced soil wall at the end of each day at a gentle gradient so that any surface runoff could flow into temporary drainage.			
6.00	DOCUMENTS FOR SUBMISSION The following documents MUST be submitted to the Engineer for approval 2 weeks before the commencement of any works at site:	SIGNATURE	YES	NO
6.01	Method Statement for reinforced soil wall works.			
6.02	Construction drawings (plan and elevation view) of the reinforced soil wall endorsed by a Professional Engineer.			
6.03	Detailed calculations of reinforced soil wall endorsed by a Professional Engineer. (including maximum threshold on total and differential settlement of reinforced soil wall)			
6.04	Certificate of galvanizing works for steel strip reinforcement from factory. (At least 5% of steel reinforcements shall be tested according to BS729. At least 6 points shall be taken at the tested reinforcement to measure the galvanized coat thickness. Average coat thickness>86µm.)			
6.05	Steel reinforcement mill certificate from factory indicating the ultimate tensile stress of the reinforcement.			
6.06	Mix proportion, minimum cement content, water cement ratio of concrete for pre-cast wall facing panels, anchor blocks, etc.			
6.07	Concrete cube test results for the pre-cast wall facing panels.			
6.08	Sample of geotextile, slotted PVC pipe (300mm length) for subsoil pipe/drain.			
6.09	Source and type of material used for soil replacement at the wall base and backfilling behind the wall.			
6.10	Particle size distribution curve for material used for soil replacement and backfilling.			
6.11	Shear box tests results (at least 3 sets of results) for the backfilling material.			
6.12	Chemical test results showing the pH value, sulphate and chloride content of the backfilling material.			
6.13	Setup details for pull out test.			
6.14	Specifications and calibration certificates for hydraulic jacks, pressure gauge, load cell, dial gauges and strain gauges for pull out test.			
6.15	Machineries records (empty forms to be provided by G&P).			
6.16	Work force records (empty forms to be provided by G&P).			
6.17	No physical works shall be allowed to commence at site unless the Engineer has approved all above documents.			

NOTE: Once this copy is signed, the above guidelines have been clearly defined and understood by the contractor. Therefore, there shall be no problems in repeating the construction procedures for the soil nailing works without the presence representative



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