

TENSAR INTERNATIONAL CORPORATION STATEMENT OF QUALIFICATIONS



Tensar[®]

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Company Overview

Tensar International Corporation (Tensar) is the leading developer and manufacturer of high-performance geosynthetic products and engineered site solutions for common civil engineering applications and infrastructure development. Our capabilities are focused on providing solutions for site development, which are based on 30 years of design expertise and material science, as well as thousands of successful installations around the world. These solutions merge site evaluations, conceptual engineering, design drawings, construction assistance and system installations (based on geographic constraints) for primarily foundations, earth retention and grade separation systems (walls and slopes), pavement design optimization and paved/unpaved surfaces and working platforms over challenging soil conditions.

- ▶ Established in 1982
- ▶ 40+ North American offices. The Tensar corporate office is located in Alpharetta, Georgia with three regional offices located in Davidson, North Carolina, Broomfield, Colorado and Frisco, Texas.
- ▶ Five global manufacturing facilities located in Morrow, Georgia, Blackburn, England, Wuhan, China, Centre, Alabama and Poseyville, Indiana.
- ▶ Engineering technologies
- ▶ High performance materials
- ▶ Design services
- ▶ Site assistance

Tensar develops and manufactures high performance materials that Tensar promotes and sells as components of its engineered systems. These products are primarily



polymeric grids. Tensar can also provide, subject to contract, expert technical services to owners, engineers and contractors to assist in site planning, engineering design, architectural design and installation advice with respect to its materials and systems.

The engineered solutions provided by Tensar can be considered, designed and utilized during any phase of a project. Ideally, our clients recognize the greatest value of our systems during the project layout phase so that land and construction material usage may be optimized. We can package a variety of solutions that will provide one or all of the following:

- ▶ Reduce costs – Initial and Life Cycle
- ▶ Reduce construction time
- ▶ Improve the value of the land
- ▶ When real estate is expensive and difficult to develop, maximize space utilization of clients' land, making the developers' investment feasible
- ▶ Provide a variety of engineered systems to suit a client's needs and budget constraints

Tensar's site solutions deliver value relative to traditional materials and practices employed in earthwork construction. Our systems can effectively increase the availability of feasible building sites or more efficient utilization of difficult building sites. The systems we offer can often use a broader range and/or a reduced quantity of construction fill materials. This can allow for more efficient use of site labor and equipment, while improving the structural performance, thus satisfying difficult or otherwise unachievable permitting or regulatory requirements. Tensar assists its customers in dealing with four simple trends:

- ▶ Increasing scarcity of quality building sites
- ▶ Increasing scarcity and escalating cost of high quality construction fill materials
- ▶ Increasing labor and equipment costs
- ▶ Increasingly stringent permitting and regulatory requirements

The bottom line is that Tensar's site solutions are proven to be reliable, cost-effective and efficient, often resulting in reduced construction time.

Overview of Professional Personnel

Tensar's personnel represent a wide range of complementary technical disciplines and diverse professional experiences. Widely published, academically active and extensively involved in professional societies, Tensar's key personnel are leaders in the geotechnical engineering and consulting industry, as well as environmental and solid waste management. The Tensar professional staff currently consists of over 40 engineers, most with advanced degrees in the areas of civil engineering and geotechnical engineering.

- ▶ In-house design engineering
- ▶ Over 40 engineers on staff and in the field
- ▶ Expertise in:
 - Specialty Site Development Services
 - Earth Retention Structure Design
 - Pavements
 - Paved and Unpaved Roads and Working Surfaces
 - Foundation Improvement Design
 - Erosion Control

A table showing the educational and work history of the principals of the firm, as well as key Tensar professionals, is provided in the Appendix. Personnel from Tensar have authored numerous technical papers on geosynthetics, construction over soft soils and landfill design. Complete resumes, a bibliography of publications and copies of selected publications are available upon request.

Areas of Professional Activities

Tensar provides unique, synergistic, technically advanced, timely and cost-effective solutions for its clients' most challenging geotechnical problems. The firm provides services in a number of complementary areas summarized as follows:

I. Transportation, Industrial and Commercial Site Development and Design Services

- Earth Retention Systems
- Pavement Design
- Paved and Unpaved Surfaces over soft soils
- Foundation Improvement Systems
- Reinforced Embankment and Load Transfer Platforms
- Landfill and Containment Dikes
- Erosion Control

II. Geosynthetic Laboratory Testing and Polymer Testing

- Polymer Testing
- Geosynthetics Testing
- Soil-Geosynthetic Interaction Testing

III. CADD and Database Management

- Computer-Aided Design and Drafting
- Networking Capabilities and Data Transfer

Geographic Areas of Professional Practice

Tensar has provided products and professional services worldwide for both civil and environmental related projects in: Australia, Canada, China, Czech Republic, Dubai, France, Germany, Indonesia, Malaysia, Honduras, Panama, Guatemala, Netherlands, Poland, Russia, Saudi Arabia, Spain, Sweden, The United Kingdom and The United States among many others. This geographical breadth has served to familiarize the Tensar staff with the regulatory initiatives of federal, state and municipal agencies throughout the world.

Overview of Corporate Experience

Since its inception in the early 1980s, Tensar has worked on thousands of projects worldwide. These projects include construction applications utilizing geosynthetics and civil construction of pavement systems, earth retention systems (including retaining walls and reinforced slopes), and coastal and waterway systems. In the waste management industry, our projects have included systems for municipal, industrial, and hazardous landfills, as well as erosion protection systems, foundation systems, expansion systems, leachate collection and detection systems, lining support systems, closure systems, surface-water management systems and foundation improvement systems.

Tensar research and development laboratories are located in Morrow, Georgia and Blackburn, England and include complete testing facilities for polymers, as well as the highest precision testing equipment in the world for geosynthetics. Specialty tests can be conducted by Tensar on virtually any soil/geosynthetic system if required.

Roadway Improvement System



Tensar® TriAx® Geogrids significantly enhances the stiffness of unbound granular fills commonly used for stabilizing unsuitable subgrades and aggregate base course flexible pavement. The Spectra® Roadway Improvement System can extend pavement life and reduce costs for the end user.

The Spectra System is designed to improve flexible pavement systems by providing mechanical stabilization of granular materials to enhance the stiffness and durability of the pavement section. Our AASHTO compliant and independently validated design methodology is based on the data from our extensive, full-scale accelerated pavement testing program. The result is a pavement section that's more economically designed, better performing and more durable and predictable – as proven with more than one billion square yards of installations to date.

The Spectra System consists of five primary components:

1. Tensar® TriAx® Geogrid: Tensar's TriAx® Geogrid is the backbone of the Spectra System. The triangular shape of TriAx Geogrid allows the mitigation of radial stress throughout an entire 360°; interacting with aggregate to create a Mechanically Stabilized Layer (MSL). The result – a stronger composite structure that significantly improves roadway performance.

2. Site Assessment: Tensar can partner with any member of your team at the beginning of your roadway project to assess the site conditions and recommend a Spectra System solution to meet your needs. With over 25 years of industry experience, we know how to get projects running efficiently for a variety of site conditions.

3. Design Assistance: Tensar design engineers, regional sales managers, and distributors will develop proposals, complete with budget estimates, to help you evaluate your best construction options and determine the most cost-effective approach. And with our SpectraPave4-PRO™ software, you have your own personal tool for evaluating design and cost options.

4. Specification: Tensar can help the designer to set appropriate performance-based specifications to meet the needs of the end-user to ensure the design integrity of the mechanically stabilized layer.

5. Site Support: A Tensar representative can be on site when needed to advise on proper installation procedures.

With the Spectra Roadway Improvement System, you get not only a product, but also confidence that your project is being supported from start to finish by the leaders of the geogrid industry.

Pavement Reinforcement System



Reflective cracking in pavements is typically caused by traffic loading, age hardening or temperature cycling of asphalt. Traditional responses have included the application of thicker asphalt overlays – a solution that addresses the problem only at the surface.

The GlasGrid® Pavement Reinforcement System provides additional support to resist the migration of reflective cracks in roadway applications, reducing maintenance costs and extending pavement life up to 200%. Manufactured by Saint-Gobain ADFORS and distributed in the Americas exclusively by Tensar, the GlasGrid System has been used on thousands of highways, parking lots, airport aprons and runways throughout the world.

The GlasGrid Pavement Reinforcement System is designed to improve asphalt overlay applications by:

- ▶ Extending the pavement life by up to 200%
- ▶ Simplifying construction through easy installation procedures
- ▶ Offering an environmentally friendly and millable interlayer solution

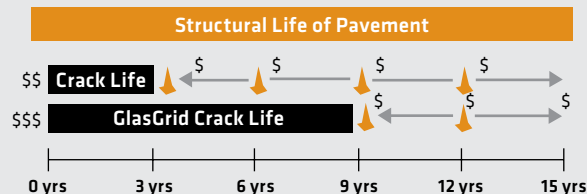
When used to reinforce asphalt concrete, the GlasGrid System creates a composite material combining the compressive strength of the asphalt mix with the tensile strength of glass fibers. By introducing a stiff tensile element at the base of an overlay, cracks propagating toward the surface are intercepted, which prevents them from immediately migrating further. And since it's made primarily from fiberglass, the GlasGrid product is easily millable and recyclable.

THE GLASGRID SYSTEM CONSISTS OF THREE PRIMARY COMPONENTS:

Component	Function
GlasGrid Pavement Reinforcement Grid	Fiberglass stress reducing interlayer
Full Engineering Services	A full range of design services to meet your site specific needs is available by contract
Site Assistance	Maximize time and minimize cost with project consultation available by contract

Life Cycle Cost Savings

Parameter	Life	Reference
Structural life of overlay	15 years	AASHTO 93
Thermal crack of overlay	3 years	National Science Foundation (1 in. per year)
Crack life of overlay with GlasGrid 8502	9 years	ArcDeso software
Maintenance Interval ⬇	3 years	Crack sealing



Waterproofing Paving Mat



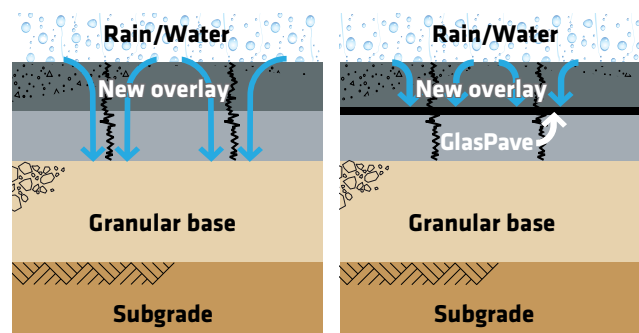
GlasPave® Waterproofing Paving Mats are among the strongest paving mats available on the market. GlasPave Mats are a geosynthetic paving material that combine fiberglass mesh with high performance polyester mats, resulting in engineered fiberglass paving mats that deliver the highest tensile strength at 2% strain on the market. Manufactured by St. Gobain ADFORS and distributed exclusively in the Americas by Tensar, GlasPave Mats create a longer lasting, better performing pavement while offering a cost-effective solution to tight paving budgets.

Advantages of the GlasPave Paving Mats include:

- **Higher Stiffness** – Their fiberglass fabric offers a high tensile strength compared to other paving fabrics to delay reflective cracking common to asphalt overlays. By delaying the onset of reflective cracking, the design life is also extended, further reducing repair costs.
- **Moisture Barrier** – Because of its non-woven matrix, binder is able to fill voids within the fabric to prevent moisture infiltration into the pavement structure. With minimal water infiltration, the structural integrity of the pavement is maintained.



Component	Function
GlasPave Waterproofing Paving Mat	Built-in fiberglass matrix strengthens pavements while also waterproofing
Full Engineering Services	A full range of design services to meet your site specific needs is available by contract
Site Assistance	Maximize time and minimize cost with project consultation available by contract



Cracks allow surface water to infiltrate the pavement structure, compromising the strength of the granular base and subgrade.

GlasPave Paving Mats prevent water penetration, preserving the strength of the pavement structure.

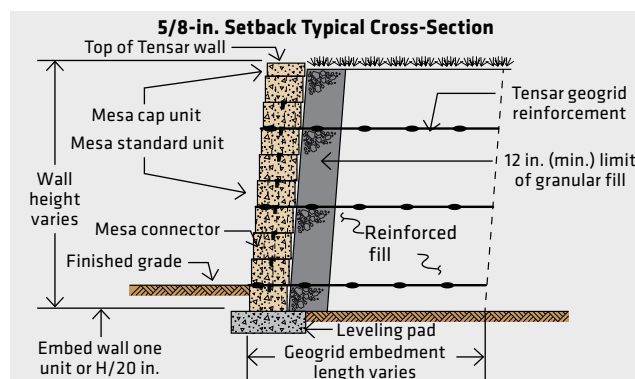
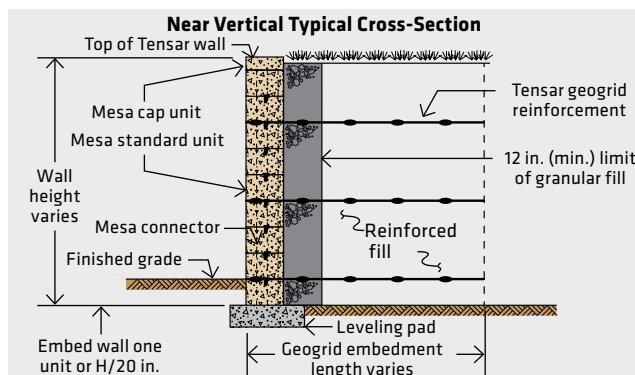
Retaining Wall Systems



Mesa® Retaining Wall Systems combine the economy and versatility of segmental units with proven geogrid technology to create a new generation of structural block walls. Based on over three decades of engineering experience in the design of earth retention structures, Mesa Walls were developed to meet and exceed the industry standards for Segmental Retaining Wall (SRW) systems. Mesa Systems offer one source for materials and engineering with construction assistance available by contract.

Unlike other modular walls that mix and match components from different sources, the Mesa Systems are true systems, as every mechanical component has been specifically designed and detailed to work together for optimum efficiency and performance. The success of Mesa Systems are based on the combination of Tensar® Geogrids, high compressive strength (> 4000 PSI) concrete units, and a unique “locking connection” that creates a positive, mechanical, end-bearing connection between both the block and the geogrid.

Mesa Systems are the only single-source, fully integrated, geogrid-reinforced wall system available today. Our unique combination of quality materials, compatible components and design expertise creates a wall system that exceeds all standards in the industry.



Mesa® Systems Components

Component	Function
Tensar Geogrids	High-Density Polyethylene (HDPE) structural geogrids internally reinforce the fill materials. Inert to chemical degradation, they can be used with non-select fill or even recycled concrete.
Mesa Segmental Units	High-strength concrete block with a compressive strength that exceeds the National Concrete Masonry Association (NCMA) standards (>4,000 psi) (27.6 MPa).
Mesa Connectors	Unique locking connectors are designed to mechanically connect the Tensar Geogrids to the Mesa Units. Provide a low-strain, end-bearing connection that is not dependent on friction for structural integrity and allow walls to be built near vertical or with a 5/8 in. (1.6 cm) setback.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each Mesa project upon request.

Retaining Wall Systems



ARES® Retaining Wall Systems offer a variety of options depending on your particular site needs and applications. Available with modular or full-height facing panels, ARES Systems offer non-metallic earth reinforcement and are especially suited for conditions where salt, chemically active soils, or stray currents are a concern.

The inert properties permit the use of reinforced backfills such as reclaimed concrete, untreated ash and certain other non-select fills that cannot be used with metallic soil reinforcement systems. And because all ARES Panel Walls incorporate a proven, mechanical connection, you are assured long-term structural integrity.

Differential settlement is also addressed with a panel design that tolerates some movement between adjacent panel columns without compromising structural integrity. ARES Systems with Tensar integral HDPE reinforcement takes advantage of the natural geometry and junction strength to give owners and contractors a user-friendly and cost-effective alternative.

As with all of our systems, Tensar offers a complete package including materials, specifications and engineering with other technical assistance available by contract.

ARES® Systems Components

Component	Function
Tensar Geogrids	High-Density Polyethylene (HDPE) structural geogrids internally reinforce the fill materials. Inert to chemical degradation, they can be used with different backfill materials, even recycled concrete.
Precast Panel Facing	Available in standard 5 ft x 5 ft (1.5 m x 1.5 m), 5 ft x 9 ft (1.5 m x 2.75 m), 5 ft x 10 ft (1.5 m x 3 m) or can be customized for full height construction.
Bodkin Connector	HDPE Connector for high connection efficiency without the concern for corrosion.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each ARES Wall project upon request.

Retaining Wall System



WIRE-FORMED APPLICATIONS

Engineers and architects are always under pressure to find cost-effective alternatives to traditional concrete retaining wall systems. In a range of applications, they often find the best solution, in terms of appearance, performance and value, is with the SierraScape® System. The SierraScape System is the only geosynthetic reinforced wire-formed retaining wall system with a positive, mechanical connection assuring long-term structural integrity and reliability. This system better withstands differential settlement and offers exceptional performance in areas where seismic activity or heavy external loads are a concern. In addition, the design versatility and ease-of-installation can make SierraScape Walls 30% to 60% less expensive than comparable concrete systems.

PRESSURE RELIEF APPLICATIONS

Below-grade construction traditionally requires large cast-in-place foundations to support soil and building loads. The SierraScape System for pressure relief applications provides a faster, more affordable solution for addressing this critical construction requirement. Because the system effectively reinforces surrounding fill, lateral soil loads against the below-grade structure are eliminated. Therefore you can design lower cost foundations that are structurally equivalent to the conventional methods.

SierraScape® System Components

Component	Function
Tensar Geogrids	High-Density Polyethylene (HDPE) structural geogrids internally reinforce the fill materials. Inert to chemical degradation, they can be used with non-select fill or even recycled concrete.
SierraScape Facing Elements	Galvanized wire-form baskets that provide permanent facial stability during placement and compaction of fill material, and simplify facing alignment.
Locking Tail Strut	Locking struts secure the geogrid to the SierraScape basket tail, and help stiffen the facing element to maintain alignment.
Geotextiles	Separation filter fabric provides a barrier between the backfill material and the stone fill at the face.
Turf Reinforcement Mats	Permanent, erosion-control products that aid in vegetation establishment and provide long-term turf reinforcement. Only used in vegetated face applications.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each SierraScape project upon request.

Slope Retention System



The Sierra® Slope Retention System replaces conventional concrete retaining walls with natural, landscaped sloping structures. Proven in thousands of projects over the past three decades, the Sierra System offers design professionals structurally stable, natural-looking earth retention structures. Because of its economic and aesthetic appeal, the Sierra System is routinely specified to replace retaining walls for a variety of applications such as commercial, industrial and retail developments, single and multi-family developments and transportation infrastructure. Sierra Slope structures typically cost 30% to 60% less than concrete retaining walls, and they're not subject to typical wall problems such as cracking, leaning, bulging or graffiti.

The Sierra System is based on Tensar's experience and success in the earth retention market. Each component of the system has been specifically designed for optimum performance and aesthetic appeal. From preliminary design to project completion, our team of experts can assist you in every phase of construction. With one source for engineering, construction assistance and materials, the Sierra System offers unsurpassed reliability and performance.

Sierra® System Components

Component	Function
Tensar Uniaxial (UX) Geogrids	Primary reinforcement that internally reinforces the soil structure and fill materials.
Tensar Biaxial (BX) Geogrids	Secondary UV-stabilized reinforcement that provides surficial stability of the slope structure.
Site-Specific Facing System	Provides aesthetic value by offering multiple facing options, including bioengineering.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each Sierra project upon request.

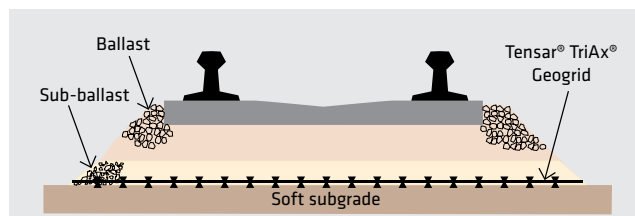
Railway Improvement System



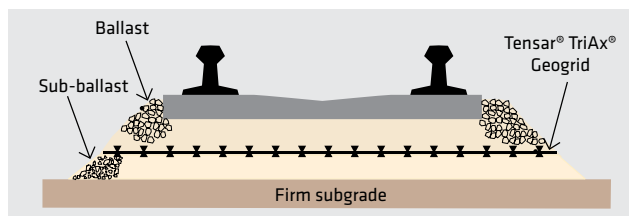
For more than two decades, Tensar® Geogrids have successfully stabilized ballast and sub-ballast layers under a wide range of soil and loading conditions – from light rail to heavy Class 1 rail structures. The American Railway Engineering and Maintenance of Way Association (AREMA), the nation's foremost authority on industry practices, has also recognized the value of geogrid technology for trackbed stabilization by including a chapter on geogrid in its 2010 Manual for Railway Engineering. Indeed, the benefits of using geogrid over soft and firm subgrades have been demonstrated in a number of laboratory and field tests as well as on hundreds of actual installations around the world.

With its unique triangular structure, TriAx Geogrid is a revolutionary advancement in geogrid technology as it outperforms BX Geogrids. Its multi-directional properties leverage its triangular geometric structure, one of construction's most stable shapes, to provide a new level of in-plane stiffness and aggregate confinement. The transition from a rectangular to a triangular grid aperture offers the rail industry a better alternative to conventional materials and practices. As part of the Spectra® Rail System, TriAx Geogrid provides a predictable, cost-effective solution for the stabilization of ballast and sub-ballast layers with many advantages:

- ▶ Lower up-front construction costs – mechanical stabilization of the sub-ballast layer reduces the amount of aggregate required to obtain a particular factor of safety against bearing capacity failure. Typically, savings of approximately \$30,000 per linear mile of track can be attained.
- ▶ Increase the speed of construction – less aggregate means less construction time.
- ▶ Minimize ballast settlement and lateral creep – the period between maintenance cycles can be extended by a factor of three to five times when TriAx Geogrid is used to stabilize the ballast layer.
- ▶ Maintain effective drainage of the trackbed – TriAx Geogrids help prevent aggregate and subgrade soil fouling and reduce the generation of fines through particle abrasion.
- ▶ Extend the life of mechanical rail line components (rails, ties, joints, etc.) – less vertical deflection during loading results in less wear and tear in the mechanical components of the rail structure.
- ▶ Improve performance and operational productivity by eliminating the need for speed restrictions on potentially troublesome sections of rail line.



Sub-ballast stabilization provides improved bearing capacity.



Ballast stabilization leads to extended maintenance intervals.

Foundation Improvement System



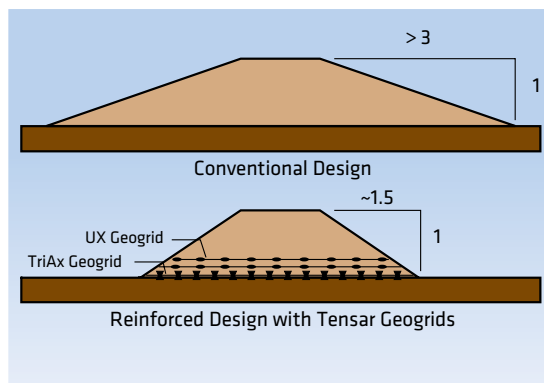
The construction of stable embankments, bridge approach fills, causeways, levees and dikes over weak soils (especially wetlands) can be challenging, time consuming and expensive. The Prism® System was developed to speed and simplify this type of construction.

The Prism System is a composite soil and geogrid structure that creates a reliable, cost-effective embankment foundation. The result is a structurally stable, cost-effective alternative to overexcavation and replacement with select fills, extensive surcharging, chemical stabilization or costly deep foundations.

The Prism System can be used when your project is characterized by:

- ▶ A need for overexcavation and replacement of soft soils
- ▶ A design calling for stone columns or other deep foundation methods
- ▶ Extensive surcharge loading to prevent long-term settlement
- ▶ The need for environmentally sensitive soil treatment techniques
- ▶ The potential of destabilizing existing embankments when excavating adjacent areas

In comparison to conventional options, which are generally more expensive, time-consuming, labor intensive, or difficult to employ, the Prism System can provide a reliable alternative at far less cost. The Prism System has saved DOTs as much as \$970,000 on a single project.



The Prism System minimizes the footprint of the embankment, as well as its fill requirements and settlement potential.

Prism System Components

Component	Function
Tensar Geogrids	Stiff geosynthetic reinforcement
Engineered Fill	Makes up the body of the embankment
Engineering Services	A range of design assistance provided by Tensar
Site Assistance	Helps to reduce costs and expedite the installation process

Foundation Improvement System



The Dimension® System was created to construct reliable foundations at lower cost than conventional foundations. It is a composite system of aggregate and Tensar® Geogrids that interact to create a stiffened platform over weak, compressible soils.

The Dimension System's grid-aggregate structure distributes loads uniformly over underlying soils. An alternative to deep over excavation, concrete slabs, chemical stabilization or cement grouting, and deep foundations, the Dimension System is used to:

- ▶ Increase the effective bearing-capacity of soil beneath shallow spread footings
- ▶ Reduce differential settlement by forming a stiffened mat beneath the foundations
- ▶ Mitigate the effects of seismic liquefaction
- ▶ Provide a load transfer platform when used with traditional deep foundation techniques

In comparison to conventional options, which are generally more expensive, labor intensive, or environmentally unsound, the Dimension System can provide an economical solution to potentially costly problems. In fact, it has saved developers as much as \$1,000,000 on a single project.

Dimension System Components

Component	Function
Tensar TriAx Geogrids	Stiff geosynthetic reinforcement
Cohesionless Backfill	Combines with TriAx® Geogrids to form a stiff composite material to aid load transfer
Engineering Services	Design utilizing Dimension Solution Software
Site Assistance	Reduces costs and expedites the installation process

Coastal and Waterway Systems



Triton® Systems are a family of composite marine structures used for a broad range of construction and protection applications in and around the water. Because they can provide durable, cost-effective solutions, Triton Marine Cells, Gabions and Mattresses are typically used for:

- ▶ Foundations for coastal structures and underwater utilities
- ▶ Structural fills constructed in submerged conditions
- ▶ Erosion and scour protection for stream banks and dunes, bridge foundations, walls and utilities

The Triton Systems are used together with conventional solutions to enhance overall performance. By using readily available, natural fill materials such as aggregate, rock and dredge material to create highly reliant, flexible cells, Triton Systems can be significantly less expensive than conventional solutions such as riprap. Because Tensar® Geogrids enable Triton Systems to resist all naturally occurring forms of biological, chemical and environmental degradation, they are often specified for aggressive conditions where other types of materials would deteriorate rapidly.

Triton Systems Components

Component	Function
Marine Mattress	Coastal Foundation; Riverbank and Shoreline Revetment
Filter Mattress	Bedding and Filtration; Deep Water Geotextile Installation
Gabions and Gabion Mats	Retention Structures; Channel Lining
Marine Cells	Breakwater Core; Embankment Foundation
Grid Composite	Riprap/Revetment Underlayer
Geotextile Tubes	Coastal Protection; Sediment Dewatering

Mining Systems



Tensar® Mining Systems offer a wide range of cost-saving solutions to meet the needs and objectives of mining operations. Among the proven applications are roof and rib control, long-wall shield recovery screens as well as soft bottom and haul road stabilization.

ROOF AND RIB CONTROL

Tensar Geogrid, teamed with Minex™ RockMesh, provides effective roof and rib control for soft minerals as well as the most demanding hard rock and tunneling applications. Tensar Mining Grid meshes are impervious to acidic environments and have very similar strength characteristics to steel, but at a fraction of steel's weight. These properties add up to a drastic reduction in back, hand and facial installation injuries, due to product weight and flexibility. Lightweight, easy-to-handle Tensar Mining Systems easily reduce installation and material handling time by up to 75%.

LONG-WALL SCREENING

Moves that traditionally took weeks several years ago have been reduced to days, enabling our customers to save thousands of dollars working in the most brutal of conditions. Flame-retardant Minex RockMesh maintains similar weight characteristics to Tensar Mining Grid, yet is over eight times stronger with increased flexibility.

ROAD REINFORCEMENT

Soft bottom and haul road conditions found at mining sites require effective base reinforcement. A layer of Tensar Geogrid covered with suitable aggregate distributes loads over a wide area, which significantly reduces the amount of stone required to maintain travel while increasing the bearing capacity and life of the road. Tensar's Spectra® Roadway System has been proven to provide reinforcement during underground long-wall moves with 50-ton shield/shield hauler loads to 150-ton surface applications.

Capacity Improvement Systems



ADD³

CAPACITY IMPROVEMENT SYSTEMS

ADD³ Capacity Improvement Systems are performance-based designs customized to meet owners' economic needs by reconfiguring waste containment facilities based on site specific conditions. The ADD³ Systems' integrated approach to waste containment structure construction can maximize the economy, life span and security of both municipal and industrial facilities by reducing unit airspace costs and providing a higher level of environmental security. Even within tight boundary constraints, ADD³ Systems allow efficient expansion of waste containment facilities, thereby increasing the waste flow and extending service life.

The systems can be used to:

- ▶ Construct landfills over marginal foundations
- ▶ Structurally support new landfills built on top of existing landfills
- ▶ Build safer, structurally stable, steeper slopes to reduce land requirements and increase capacity

ADD³ Systems Components

Component	Function
Tensar® Uniaxial (UX) Geogrids	High-Density Polyethylene (HDPE) structural geogrids provide primary reinforcement allowing near-vertical construction of engineered berms. Highly resistant to chemical degradation, they can be used with non-select fill or even crushed stone.
Tensar® Biaxial (BX) Geogrids	High-Density Polypropylene (HDPP) structural geogrids provide durable reinforcement to the face of engineered berms.
Tensar® TriAx® (TX) Geogrids	Support soil cover layers of sludge or ash ponds.
Facing Elements	Wire-formed baskets provide temporary facial stability during placement and compaction of fill material and simplify facing alignment.
Connection Rods	These HDPE components facilitate a positive, mechanical connection between ends of rolls of Uniaxial Geogrid reinforcement.
Struts	Support struts are secured to the wire form and help stiffen the facing element and maintain facing alignment.
Turf Reinforcement Mats (TRMs)	Biodegradable Erosion Control Blankets (ECBs) aid in vegetation establishment on the face of engineered berms.
Geotextiles	Non-woven, separation fabric provides filtration for the structural fill at the face of engineered berms. Only used in stone-faced or drainage applications.
Engineering Services	Engineering and design drawings are available for certain applications by separate contract, permit-level design drawings are prepared to assist owners with permit application, while more detailed construction-level design drawings for certain applications provided at time of construction.

APPENDIX

Representative List of Clients

Tensar clients include the federal government, many state governments and some of the largest corporations and contractors in the United States. Tensar has worked for some of the most respected names in the construction industry, as well as a variety of firms and municipalities.

A representative list of clients for whom Tensar has provided systems and/or services is provided below. The clients are grouped into the categories of commercial and industrial clients, residential clients, state governments, Canadian ministries of transport, county administrations, federal government, municipal or county governments and professional services organizations.

COMMERCIAL & INDUSTRIAL

Alcoa
American Electric Power
American Freightways
ARCO Chemical Co.
ARMCO Steel
Bethlehem Steel
Boise Cascade
Brinker International
Browning-Ferris Industries
Burlington Northern Rail
Chambers Development Col., Inc.
Champion
Chemical Waste Management, Inc.
Chrysler Corporation
CONSOL Inc. (former Consolidation Coal Cyprus Amaz)
Dow Chemical Co.
Exxon
Flying J Inc.
Ford Motor Credit
Grand Casinos, Inc.
Hechinger's
The Home Depot
Honeywell (former Allied Signal, Inc.)
International Paper
Kerr-McGee Corporation
Kiewit Corporation
Kimberly-Clark
Kmart
Kroger
Lowe's
Marriott
Marshalls

Maxus Energy Corporation
McDonald's
Mead Paper
Mercedes-Benz
New York State Electric & Gas Corp.
Owens Corning
Packaging Corporation of America
Peabody Energy (former Peabody Coal)
PepsiCo, Inc.
Port of Los Angeles
Costco Wholesale Corporation (former Price Costco)
Port of Corpus Christi
Procter & Gamble
PSE&G
Reynolds Metal Company
Rohm and Haas
Rollins Environmental Services, Inc.
Shell Oil Company
Showcase Cinemas
Simon Property Group, Inc. (former Melvin Simon Corporation)
Target Corporation
Toys "R" Us
Wal-Mart Stores, Inc.
Wegmans
Wendy's

RESIDENTIAL

Centex Homes
Gables Residential (former Gable Residential Trust)

Jefferson Properties, Inc.
Post Properties
Shapell Industries, Inc. (former Shapell Homes)
Trammell Crow Residential

ALL 50 STATE DEPARTMENT OF TRANSPORTATION (DOTS)

CANADIAN MINISTRY OF TRANSPORT

British Columbia
New Brunswick
Nova Scotia
Ontario
Yukon
Northwest Territories

COUNTY ADMINISTRATIONS

Anne Arundel County, Maryland
Broward County, Florida
Dade County, Florida
Delaware County, New York
Delaware County, Pennsylvania
Los Angeles County, California
Montgomery County, Maryland
Nassau County, Florida
Orange County, New York
Richmond County, Georgia

FEDERAL GOVERNMENT

Bureau of Land Management

Federal Energy Regulatory Commission
Federal Highway Administration
Federal Aviation Administration
U.S. Navy
U.S. Air Force
U.S. Army Corps of Engineers
U.S. Department of Defense
U.S. Department of Transportation
U.S. Environmental Protection Agency
U.S. Forest Service
U.S. National Park Service

MUNICIPAL OR COUNTY GOVERNMENTS

Brookhaven, New York
City of Huntersville, Alabama
City of Las Vegas, Nevada
City of Philadelphia, Pennsylvania
City of Waterloo, Iowa
City of Wichita, Kansas
Clark County, Nevada
Huntington, New York
Islip, New York

PROFESSIONAL SERVICES ORGANIZATIONS

Agra Environmental Inc. (former Agra Forth and Environmental)
BARR Engineering Co.
Bechtel Group, Inc.

Black and Veatch, LLP.
Brown & Root
Camp Dresser & McKee, Inc.
CH2M Hill, Inc.
CTE Engineers
Dames and Moore Group
ENGEO, Inc.
ECS Ltd. (former Engineering Consulting Services, Ltd.)
GeoSyntec
Golder Associates
Haley and Aldrich
Harding Lawson Associates
HDR, Inc.
HNTB Companies
HWS Consulting Group, Inc.
ICA Fluor Daniel (former Fluor Daniel)
Kirkham Michael Consulting Engineers
Kleinfelder, Inc.
LAW Companies Group, Inc. (former Law Engineering)
McBride-Ratcliff & Associates, Inc.
MWH Global, Inc. (former Harza)
The Shaw Group



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