

When reliability and speed of construction are concerns, ARES® Walls offer unmatched advantages.



## TENSAR® GEOGRIDS

The ARES Systems owe their strength and durability to **Uniaxial (UX) Geogrids**, Tensar Earth Technologies' patented reinforcement geogrids. Due to their stiff interlocking capabilities, these geogrids stand the test of time, performing better than other commercially available geosynthetics. For more information, visit [www.tensarcorp.com](http://www.tensarcorp.com).

## ARES Retaining Wall Systems →

DOTs, contractors and engineers have long appreciated the many advantages of panel walls. Their wide range of appearances and finishes, combined with the simplicity and speed of construction, make them attractive when compared to other types of wall systems. Unfortunately, limitations imposed by the behavior of reinforcing materials and a very narrow and expensive range of acceptable backfill properties have restricted their use until the introduction of Tensar Geogrids. By mechanically connecting Tensar Geogrids with the advantages of panels, the fully integrated ARES Retaining Wall Systems now offer a high performance, cost-effective and aesthetic solution.

### No Metal – No Corrosion

With the absence of any external metal components, stray electric current and corrosive backfill material pose no problems for the ARES systems. This makes them the

logical choice for electrified rail systems, transformer platforms and coastal applications. Furthermore, the high pH found in concrete panels has no effect on the properties of the embedded geogrid reinforcement tabs.

As testimony to the durability of the ARES Systems, one of the first Tensar-reinforced panel walls was built as a seawall on the Gaspé Peninsula in Canada. After fifteen years of North Atlantic storms and constant exposure to salt water, there are still no problems. In fact, some of the first ARES installations were instrumented and carefully observed to verify the effectiveness and long-term performance of the systems. As part of an FHWA study at the Tanque Verde project, the Tensar Geogrid behind sections of one such ARES wall was excavated to validate its durability. Thirteen years after the original installation, there was no significant loss of strength to the geogrid reinforcements.

### ARES Systems' Components

Component	Function
<b>Tensar Geogrids</b>	High-density, polyethylene (HDPE) structural geogrids internally reinforce structure and fill materials. Inert to chemical degradation, they can be used with non-select fill or even crushed concrete.
<b>Precast Panel Facing</b>	AASHTO conforming precast panels come in a variety of architectural patterns.
<b>Bodkin Connector</b>	HDPE Connector for high capacity without possibility of corrosion.
<b>Full Engineering and Construction Services</b>	Detailing, design, site assistance and drawings for each ARES project upon request.



## ARES Modular Panel System

Contractors can save time and labor costs when installing ARES modular walls, because standard ARES modular panels are larger than the majority of the systems in the market today. Panels are offered in two basic sizes: 5-ft. x 5-ft. (articulated) and 5-ft. x 9-ft. However, the form used to create the panels can be easily modified when the owner's needs dictate the use of a smaller, narrower panel.

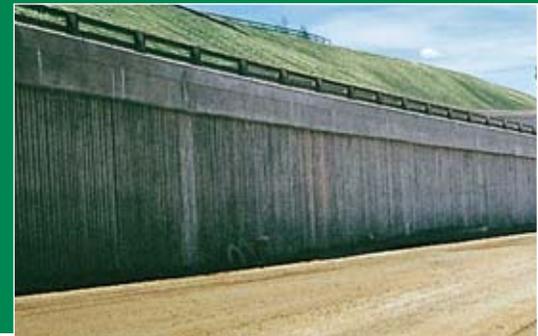
The modular panel wall system is a time-tested, proven mechanically stabilized earth (MSE) wall solution. It has been evaluated by the Highway Innovative Technology Evaluation Center (HITEC) and has been utilized on hundreds of transportation and site development projects. The ability to utilize non-metallic earth reinforcement makes the system inert to chemical and electrical corrosion. Therefore, it is especially suitable in areas where salt, chemically active

soils or stray currents are a concern. The inert properties permit the use of reinforced zone backfill such as reclaimed concrete, slag, untreated ash and other non-select fills which cannot be used with metallic reinforcement systems. The ability to use a wide range of backfills, including recycled materials, translates into greater economy.

ARES modular panel walls also offer designers a choice of textures, patterns and shapes to fit the architectural, structural and budgetary needs of any retaining wall project. The panels are cast with polymer tabs on the back side of each panel and then connected to the reinforcing geogrid. The 100% polymer connection assures full load transfer to the geogrid reinforcement with no loss in strength for the project's life.



ARES Full-Height Panel Walls can be constructed over 30 ft. vertically with a single panel.



## ARES Full-Height Panel Wall System →

### Full-Height Panels Made Possible

The use of full-height panels wasn't practical in the past because steel soil reinforcement was the only option generally considered in such applications. Problems can arise because horizontal joints in the facing of full-height panel walls are absent. With no horizontal joints, there is a possibility for differential movement between the facing and the backfill as the fill material consolidates. When using steel soil reinforcement, this relatively small movement is enough to cause significant bending moments in the connection of wall systems. Such overstresses are difficult to predict with any degree of accuracy and can lead to failure of the connection. As a result, full-height panels are inappropriate in many instances when steel soil reinforcement is considered.

In contrast, the unique, flexible connection of the Tensar Geogrid to the full-height panel will not develop bending moments. Consequently, full-height panel construction has only become practical with the introduction of the ARES Full-Height Panel Wall System.

### Fewer Panels – Less to Go Wrong

The ARES Full-Height Panel System can mitigate one of the biggest challenges in wall construction – alignment. ARES Full-Height Panel Walls can be constructed over 30-ft. vertically with a single panel, which effectively eliminates panel-to-panel articulation and the headaches associated with “out-of-tolerance” specifications. The panel goes up as one continuous vertical face with no horizontal joints to align. Simply put, fewer pieces in the system mean fewer potential problems on the site.

Full-Height Panels are also easier to cast than segmental panels. They speed up construction and reduce costs because the casting job is simple enough to be done on-site.

### Full-Height Panels Speed Construction

The primary advantage of the ARES Full-Height Panel Wall System is its speed of construction. Imagine the efficiency with a 9-ft. x 30-ft. panel, 270 sq. ft. is being placed with each lifting operation. Based on actual project experience,





contractors have achieved sustained panel placement rates of up to 800 sq. ft. of wall per hour (site preparation and component staging are the keys to achieving these rates of construction). With good planning and proper coordination, one panel can be set every 12 to 18 minutes with an average of 32 panels in a two-hour shift.

The installation process is just four steps:

- Once the subgrade is prepared, cast leveling pad in place
- Place bracing anchors – typically temporary traffic barrier or large concrete cubes
- Set and brace the panels
- Place geogrid and backfill

Contractors especially appreciate the impact that this fast and easy installation process has on overhead rates and rental charges associated with lifting equipment.

Installation is further simplified because backfilling does not need to occur as soon as the panels are placed. This allows the general or earthwork contractor to coordinate wall building with other related earthwork activities. In this way, fill placement can be integrated with the overall grading plan.

### **A Variety of Attractive Facing Alternatives**

Full-Height Panels are the facing of choice when you want to avoid the “jigsaw puzzle” look that is so prevalent along highways today. The uniform face of the ARES Full-Height Panel Wall System permits the use of a wide range of architectural finishes, such as Ashlar stone, fractured fin and many others. Etching, applied color and finish coats can also enhance appearance. The result is a variety of facing options to achieve any desired effect. And, with an ARES Full-Height Panel, the architectural characteristics are not ruined by the distraction of hundreds of horizontal joints and geometric shapes associated with typical MSE panel walls.



Discover a more affordable strategy for building retaining walls in settlement prone areas.



## ARES Two-Stage Construction Permanent Wall System

Building a retaining structure in a settlement prone area is a big challenge. Traditional approaches like pile-supported cast-in-place structures, temporary surcharging, or supercompacting foundations are time-consuming and expensive. In most settlement situations, the ARES Two-Stage Construction Permanent Wall System provides engineers and architects with a faster, more affordable strategy when site conditions pose settlement problems. The system consists of a MSE structure with a stage-one-flexible facing and a stage-two-permanent concrete facing.

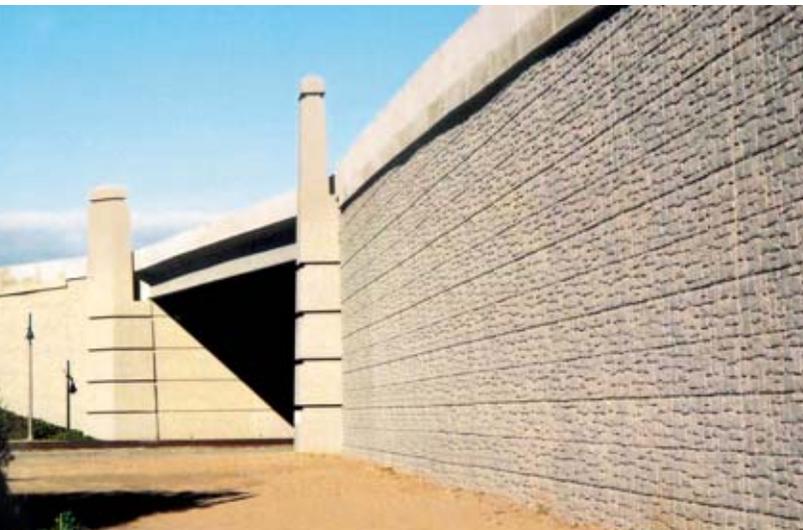
The ARES Full-Height Panel Wall System can also tolerate differential settlement of the foundation better than generally assumed. For example, on one project, an ARES Full-Height Panel Wall settled differentially 6" over a length of 36-ft. (1:72). After evaluating the wall it was determined that there was no adverse impact on the structural integrity of the system.

### Stage One: MSE Accommodates Settlement

The MSE structure is installed first. The strong, flexible components reinforce the fill within the wall and provide an initial facing that accommodates settlement during construction. Normally, the fill mass can consist of general embankment fills or on-site soils.

### Stage Two: Permanent Facing Attaches to MSE Structure

After settlement has occurred, a permanent concrete facing is attached to inserts within the MSE structure. The system offers a number of facing options, including cast-in-place concrete, ARES Full-Height Panel Walls or Mesa® Segmental Retaining Wall (SRW) units. These facing options permit you to use a wide range of architectural finishes, colors and textures.





## ARES Two-Stage Wall Advantages

- **More Affordable** – Solutions such as cast-in-place walls save up to 60% over traditional solutions.
- **More Versatile** – Allows multiple facing options and low-cost fills.
- **Easy to Install** – Installs without special equipment or skilled labor. Field adjustments are easy and accurate.
- **Proven Solution** – Uses time-tested Tensar Geogrid materials and design methodologies. Wall designs comply with AASHTO.
- **Saves Time** – The MSE retaining structure is built once with cosmetics added later.

## Proven in the Field

Conventional methods of dealing with highly compressible areas involve temporary surcharging, undercutting and replacing the existing soils, or installing piles, caissons or stone columns. Two-Stage Walls are ideally suited to a project's harsh coastal conditions. Unlike other soil reinforcement systems, proven Tensar Geogrids are the only common soil reinforcement materials that are not subject to corrosion, hydrolysis, stray current and chemical or biological degradation.

## Experience You Can Rely On

Tensar Earth Technologies is the industry leader in geosynthetic soil reinforcement. We have developed products and technologies that have been at the forefront of the geotechnical industry for the past two decades. As a result, you know you can rely on our systems and design expertise. Our products are backed by the most thorough quality assurance practices in the industry. And we provide comprehensive design and site assistance for every ARES Retaining Wall project.

Our entire international sales team is dedicated to providing you with the highest quality products, service and support. With more than 30 in-house engineers, we strive to keep our systems at the forefront of today's design technology and market trends.

For more information on the ARES Systems, please call 800-TENSAR-1, visit [www.tensarcorp.com](http://www.tensarcorp.com) or e-mail [info@tensarcorp.com](mailto:info@tensarcorp.com). We are happy to supply you with additional ARES product information, complete installation and design guidelines, system specifications, design details, conceptual designs, sealed construction drawings, preliminary cost estimates and much more.





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