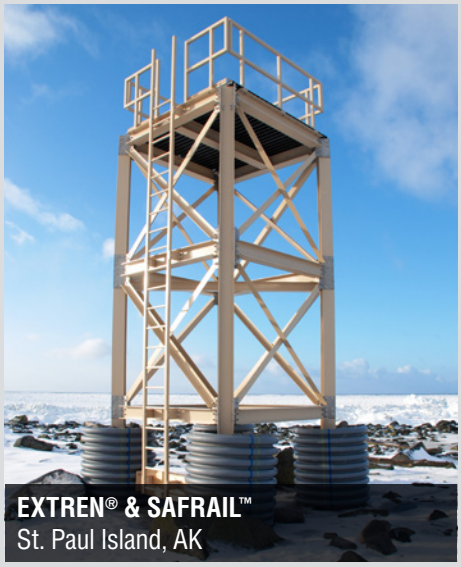

STRONGWELL®
PULTRUSION
POWER

CONTENTS

SAFRAIL™ & DURAGRID®
Nitro, WV



EXTREN® & SAFRAIL™
St. Paul Island, AK

COMPOSOLITE® Containment System
Blacksburg, VA

36" EXTREN® Double Web Beam

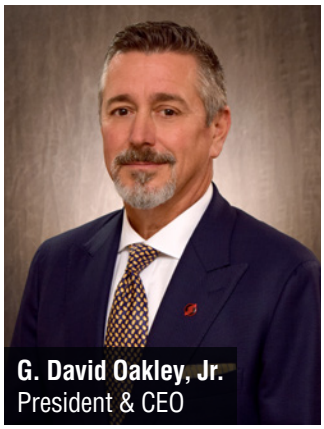
COMPANY OVERVIEW

Strongwell is the recognized leader in the manufacture of fiber reinforced polymer (FRP) composites utilizing the pultrusion process. Strongwell has pultruded FRP composite structural products since 1956 and remains active in product, process, and market development programs. All U.S. facilities are ISO 9001 Quality Certified. Strongwell's four manufacturing facilities offer more than 730,000 sq. ft. (67,819m^2) of space to house over 60 pultrusion machines, ranging from those capable of pultruding very large parts (for example, a 36" double-web beam) to those capable of pultruding up to 40 lines at a time.

Strongwell also operates an in-house 10,000 sq. ft. (929m^2) laboratory for product testing and research and development. A modern in-house machine shop allows Strongwell to build its own machinery and tooling.

Strongwell's success is a direct result of a strong team and diverse products offered in a wide variety of markets. No other pultruder offers such a broad product range. From structural shapes and building panel systems to handrail and grating to complete fabricated structures, Strongwell is the one-stop source for any structural fiberglass needs.

The privately-held company is financially strong, technically advanced, and focused on total quality. Engineers of numerous disciplines bring the latest technologies to bear on customer challenges and opportunities. Registered professional structural engineers design structures of all kinds using pultruded components.



G. David Oakley, Jr.
President & CEO

Strongwell's focus is on achieving growth and success through continuous improvement and through working hand-in-hand with business allies to displace traditional structural materials with pultruded composites.

All of this combined gives Strongwell unequaled capacity, versatility, and flexibility to meet the needs of its customers and allied partners.

OUR MISSION

To manufacture high quality pultruded fiber reinforced polymer composite parts and structures that solve problems and provide value for our customers, enable secure and desirable employment for our people, and create profits for future growth and development of our company.

OUR VISION

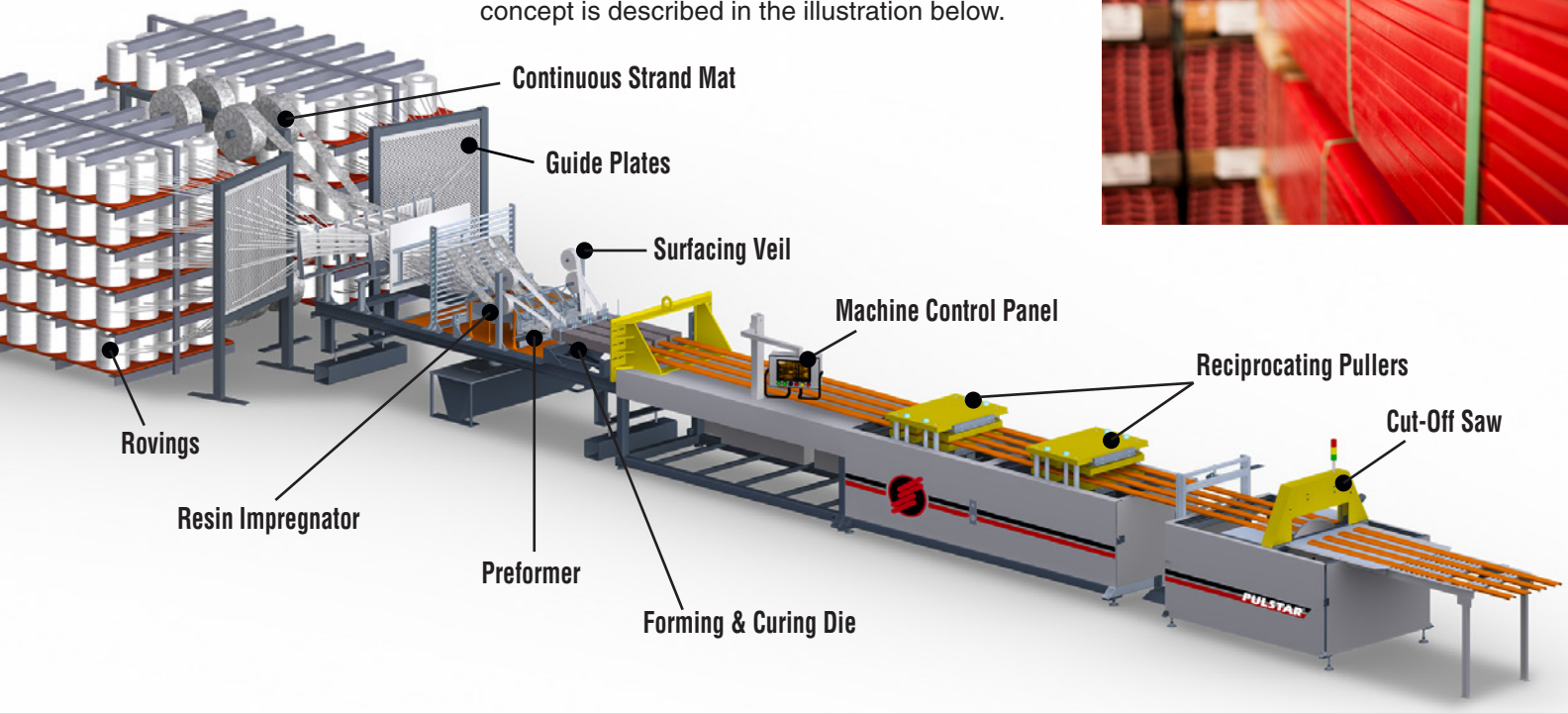
Adhering to our Guiding Principles, and in an environment of high global awareness of the benefits of fiber reinforced polymers, Strongwell is the preferred supplier, best value producer, and leading innovator of pultruded composites and structures.

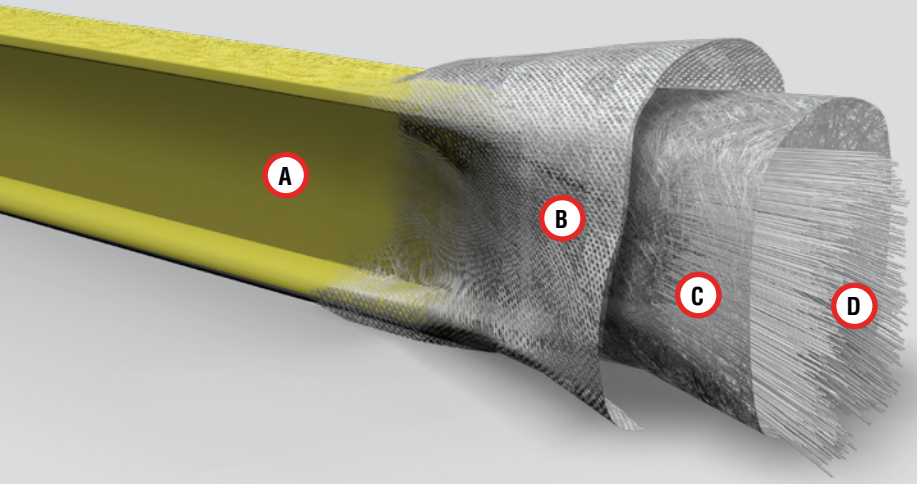
Composites Bridge | Knoxville, TN

The

PULTRUSION PROCESS

Pultrusion is a manufacturing process for producing continuous lengths of fiber reinforced polymer (FRP) structural shapes with constant cross-sections. Raw materials are a liquid **resin** mixture (containing resin, fillers, and specialized additives), continuous glass fiber filaments known as **rovings**, chopped filaments called **continuous strand mat**, and a protective fabric known as **surfacing veil**. The pultrusion process involves pulling these raw materials through a heated **forming and curing die** using a continuous **pulling system**. While pultrusion machine design varies with part geometry, the basic pultrusion process concept is described in the illustration below.





Raw Materials

The reinforcement materials are in continuous forms such as rolls of continuous strand mat and doffs of fiberglass roving. As the reinforcements are saturated with the resin mixture (“wet-out”) in the resin bath and pulled through the die, the gelation, or hardening, of the resin is initiated by the heat from the die and a rigid, cured profile is formed that corresponds to the shape of the forming and curing die.

Benefits of

PULTRUDED FIBERGLASS

Corrosion Resistance

Superior resistance to a broad range of chemicals. Unaffected by moisture or immersion in water when sealed. Will not rust like metal and will not rot like wood.

Lightweight

Pultruded fiberglass shapes generally weigh 75-80% less than similar steel shapes and 30% less than similar aluminum shapes.

Virtually Maintenance Free

Will not permanently deform under impact. Corrosion resistance eliminates need for constant painting and upkeep. Provides long-term, cost effective solutions with lower life cycle costs.

Easy Installation

Can be field fabricated using simple carpenter tools and is easily lifted into place during installation.

High Strength

Stronger than steel and aluminum, pound-for-pound, in the lengthwise direction.

Low Conductivity

Low electrical and thermal conductivity properties and high dielectric capability.

EMI & RFI Transparency

Transparent to electromagnetic and radio frequency interference. Approved via DRJ TER for RF Panel Rooftop Enclosure Systems, which is approved by Los Angeles Department of Building and Safety (LADBS), now in place of the L.A.R.R.

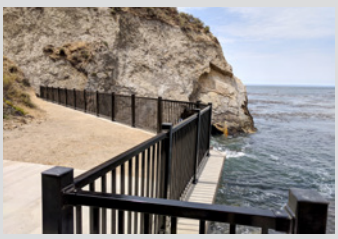
Versatility

FRP can be pultruded in a wide variety of profiles for many different markets. Multiple resin types and custom color options are available.

SELECTED MARKETS

Strongwell manufactures and fabricates problem-solving products for a wide variety of markets and specific applications. The selected markets listed below are typical of where pultrusions are being utilized.

Architectural
Building / Construction
Cellular
Coastal / Marine
Data Center
Electric Utility
Hotel / Motel
Industrial
Infrastructure
Ladder Rail
Mining
Oil & Gas
Parks & Recreation
Security / Military
Tool Handles
Transportation
Water / Wastewater
Waterparks



The POWER of

STRONGWELL'S CAPABILITIES


Bristol Location | Bristol, VA

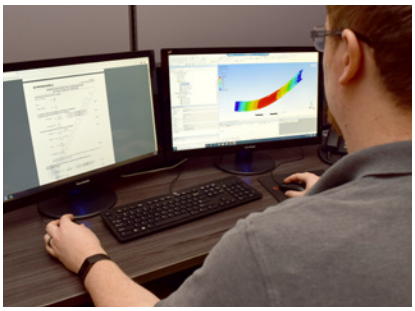

Chatfield Location | Chatfield, MN


Highlands Location | Abingdon, VA


Mexico Location | Apodaca, MX

CAPACITY

Strongwell is the world leader in pultrusion of fiber reinforced polymer structural composites. The company's four plants contain more than 60 pultrusion machines, with single machines capable of pulling small parts up to 40 lines, or large parts as wide as 5 ft. (1.5m) and as high as 3 ft. (0.9m). Strongwell has numerous multi-cavity pultrusion machines that allow for efficient multi-line production on a single machine. Multi-cavity machines allow Strongwell to increase capacity and shorten lead times for special orders.



ENGINEERING

Strongwell has virtually every engineering discipline on staff including multiple registered professional structural engineers. Finite Element Analysis capability is available in-house.

FABRICATION

Strongwell's extensive experience in fabrication procedures, joint design, and stress analysis of composite assemblies, combined with the use of Strongwell's fiber reinforced products, result in structures of superior, cost-effective design and structural integrity. Strongwell can furnish custom fabricated assemblies based upon customer drawings. Individual parts can also be fabricated to produce specialized parts for custom applications.

Strongwell's fabrication services include cutting, drilling, routing, grinding, coating, and painting. Strongwell can perform many secondary operations on pultruded parts using CNC equipment (traditional and waterjet). These operations include vertical and horizontal drilling, machining, cutting, and routing. Customers benefit from this additional service because it adds value to the part and provides a product that will precisely meet the specifications and end use.

RESEARCH & DEVELOPMENT

Strongwell's Bristol Location houses a 10,000 sq. ft. (929m^2) laboratory for ASTM structural and electrical testing and a modern in-house machine shop for design and build of advanced pultrusion machinery, tooling, and dies.

The POWER of

FABRICATED STRUCTURES

Strongwell has substantial capability to add value to pultruded parts including the fabrication and shop assembly of parts, components, sub-assemblies, and entire shop-built structures. The fabrication group is supported by a strong engineering team including registered professional structural engineers experienced in FRP design and AutoCAD detailers who translate requirements into shop drawings.

Strongwell fabricates fiberglass structures at both the Bristol and Chatfield Locations. Typical fabrications include beam, column, and plate structures, all-fiberglass buildings using foam core panels, platforms, and decking products as well as other custom fabrications involving grating and handrail. Find easy-to-complete fabrication worksheets on Strongwell's website to receive a quote for your upcoming fabricated project!

Mountaintop Park Super Structure | Stone Mountain, GA

RF Transparent Rooftop Structure | Orlando, FL

STRUCTURAL SOLUTIONS FROM CONCEPT TO COMPLETION!

Platforms and Walkways, Raised Floor Systems, Loading Platforms, Ladder and Cage Systems, All-fiberglass Buildings, Structures and Enclosures, Water/Wastewater Products, Architectural Applications, Pollution Control Products, Equipment/Facilities, Structures, Roofs, Covers, and more.

The POWER of

EXTREN®

Structural Shapes and Plate

EXTREN® is Strongwell's proprietary line of structural shapes. EXTREN® is produced in more than 100 standard shapes and all shapes have a surface veil to protect against glass fibers penetrating the resin surface in service and to increase corrosion and UV resistance.

Today, EXTREN® is increasingly replacing steel, aluminum, and wood in a wide variety of structural applications.

Why? Because EXTREN® is a problem solving material.

EXCLUSIVELY MADE IN THE USA

EXTREN® is:

- Corrosion Resistant
- Low in Thermal and Electrical Conductivity
- Nonmagnetic - Electromagnetic Transparency
- Lightweight - Weighs 75-80% less than Steel
- High Strength
- Dimensionally Stable
- Low Maintenance

Unlike steel, which will rust when exposed to weathering and chemicals, EXTREN® fiberglass structural shapes are highly corrosion resistant.

Waterpark Structure | Westlake, OH

Pedestrian Bridge | Blowing Rock, NC

Data Center Cable Bus Support Structure
Santa Clara, CA

The POWER of

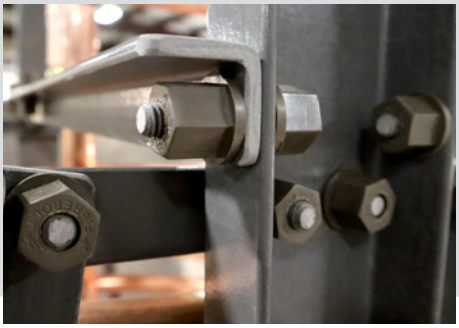
FIBREBOLT®

EXCLUSIVELY MADE IN THE USA

Fiberglass Studs and Nuts

FIBREBOLT® consists of a pultruded stud with threads cut in a glass mat reinforced outer layer (the center of the stud is unidirectionally reinforced for high strength) and a molded nut.

FIBREBOLT® does not possess the thread shear strength of steel, but has sufficient strength to be a viable alternative in structures where fastener corrosion is a concern or where metal fasteners are not permitted (antennae housings, computer equipment testing structures, etc.).



HVAC Ductwork Support Rods & Nuts
Michigan Indoor Waterpark

Passive RF Component Frames & Supports
Bonaire, Dutch Caribbean

The POWER of

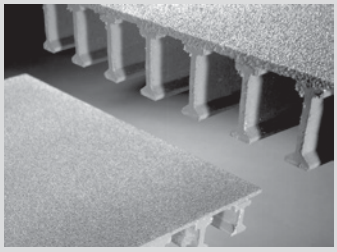
SAFPLATE®

EXCLUSIVELY MADE IN THE USA

Fiberglass Gritted Plate

SAFPLATE® fiberglass gritted plate is a tough, corrosion resistant floor plate. SAFPLATE®'s unique combination of pultruded fiberglass plate and an anti-skid grit surface creates textured, solid sheet flooring that is ideal for both wet and dry environments. Used in a variety of applications such as trench covers to contain vapors and fumes or pedestrian bridge walkways for sure footing, SAFPLATE® provides a long-lasting maintenance-free alternative to steel plate for severe, corrosive environments.

SAFPLATE® is available as solid plate or bonded to DURADEK® or DURAGRID® grating. SAFPLATE® can also be customized to meet the requirements of a variety of applications.



Train Station Platforms | Manchester, England

The POWER of

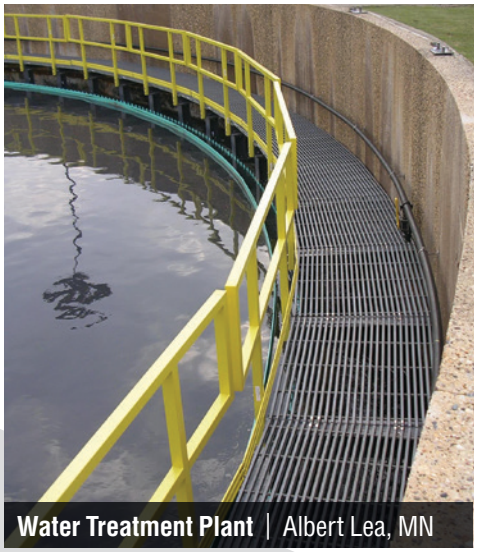
DURADEK®

EXCLUSIVELY MADE IN THE USA

Standard Pultruded Grating

DURADEK® is Strongwell's standard pultruded grating. DURADEK® is available with individual bearing bars in either 1" (25.4mm) or 1-1/2" (38.1mm) "I" shapes or a 2" (50.8mm) "T" shape. The grating design implements a 3-piece cross-rod system and Strongwell's proprietary bonding method ties the bearing bars together to provide superior stability on the grating panel. DURADEK® is a flame retardant product utilizing a polyester or vinyl ester resin. The bearing bars use both longitudinal (glass roving) and multidirectional (glass mat) reinforcements as well as a synthetic surfacing veil to provide unequaled corrosion resistance.

Pier Walkways | Dinner Key Marina, FL



Water Treatment Plant | Albert Lea, MN

The POWER of

DURAGRID®

EXCLUSIVELY MADE IN THE USA

Custom Pultruded Grating

DURAGRID® custom grid and grating systems are designed to accommodate specific applications that cannot effectively be met by DURADEK®. DURAGRID® offers the customer options such as selection of bar spacing (which creates varying open space in the grating or grid), bar shape, cross-rod placement, custom fabrication, custom resin, or color.

Electric Vehicle Test Track Trench Covers | Logan, UT

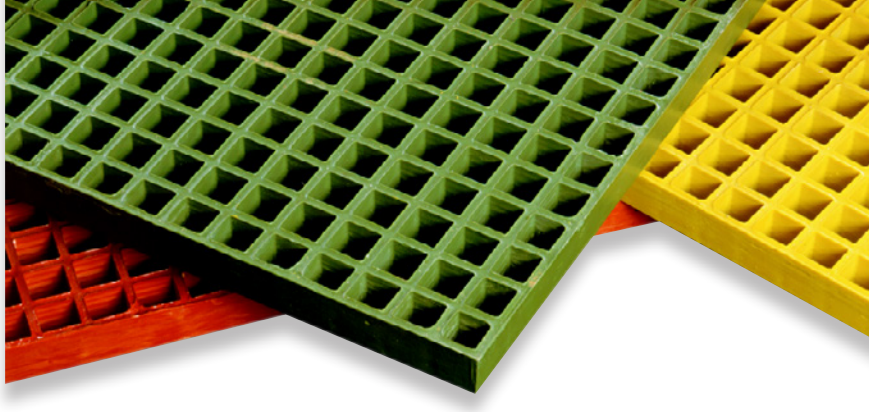
HD Grating

Fire-Integrity Phenolic Grating

R-Bar Grating

BUREAU VERITAS · ABS · Lloyd's Register · DNV·GL

YMCA Canopy Screening | Norfolk, VA



The POWER of

DURAGRATE®

EXCLUSIVELY MADE IN THE USA

Molded Fiberglass Grating

DURAGRATE® molded fiberglass grating is a premium-quality mesh grating panel made exclusively in the U.S.A. While molded grating is a chemical resistant flooring choice for many industrial applications, DURAGRATE® offers performance and quality superior to imported suppliers. DURAGRATE® panels are molded in one piece and feature a concave non-slip walking surface. The panels allow for efficient on-site cutting to minimize grating waste. Load bearing bars in both directions allow for use without continuous side support. DURAGRATE® molded fiberglass grating weighs significantly less than metal gratings while a high resin content provides excellent corrosion resistance which requires very little maintenance. A high glass content offers greater stiffness and strength resulting in a higher safety factor.

Copper Extraction Facility Platform | Mexico

DURAGRATE® Stair Treads

Stair Tread Covers | Baltimore, MD

The POWER of

DURATREAD™

EXCLUSIVELY MADE IN THE USA

Molded Fiberglass Stair Tread Covers

DURATREAD™ molded fiberglass stair tread covers provide an easy, cost-effective way to increase the safety of stairways. The covers are intended for installation over concrete, metal, or wood steps. Fiberglass stair treads may also be covered with DURATREAD™.

DURATREAD™ stair tread covers are ideal for use in any area where frequent use or exposure to slippery environments increases the risk of accidents. The ADA-compliant covers feature a durable gritted surface and a highly visible nosing to ensure years of safe, maintenance-free service. DURATREAD™ covers can be customized with various colors and stenciled safety messages.

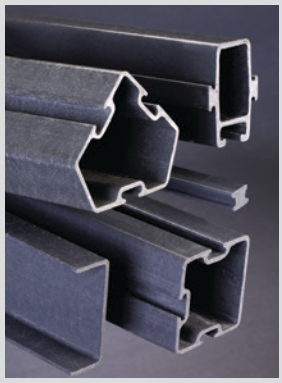
The POWER of

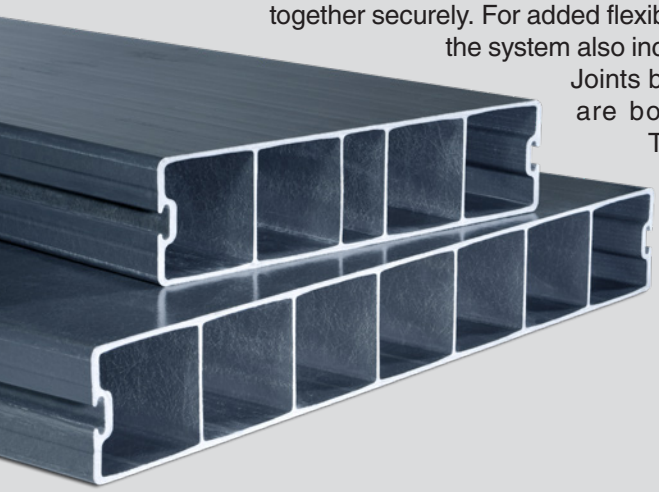
COMPOSOLITE®

EXCLUSIVELY MADE IN THE USA

Fiberglass Building Panel System

COMPOSOLITE® is a patented advanced composite building panel system suitable for major load bearing structural applications. The system combines manufacturing simplicity with an almost unlimited number of configurations. The modular construction system consists of a small number of interlocking components. The main building panels are 3.15" (80mm) thick and either 23.68" or 13.70" (601.5mm or 348.0mm) wide and feature a cellular construction. Three-way and 45° connectors allow the system components to turn corners and facilitate the joining of walls or sides. Toggles lock panels and connectors together securely. For added flexibility, the system also includes a hanger and an end cap. Joints between panels and connectors are bonded during final assembly. This uniquely designed system of interlocking components makes it possible to design fiberglass structures for a broad range of construction applications with an almost unlimited number of configurations.





Cooling Tower | Benson, MO

WWTP Baffle Panels | Greeneville, TN

Secondary Containment | Baldwin Substation, IL

The POWER of

COMPOSOLITE® HD

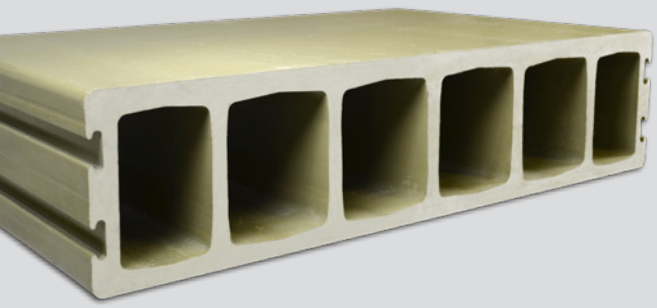
EXCLUSIVELY MADE IN THE USA

Heavy Duty Building Panel System

COMPOSOLITE® HD is a heavy duty advanced composite building panel system suitable for major load bearing structural applications. The modular construction system consists of a small number of interlocking fiber reinforced polymer (FRP) structural components produced by the pultrusion process. The main panel is 4-1/2" thick x 19-5/8" wide (115mm x 498.5mm) nominal size and features a cellular construction.

Like standard COMPOSOLITE® panels, COMPOSOLITE® HD features interlocking components which make it possible to design fiberglass structures at significantly lower costs for a broad range of construction applications.

COMPOSOLITE® HD structures can be designed in “kit form” and shipped flat to the job site.



Bascule Bridge | Bridgetown, Barbados

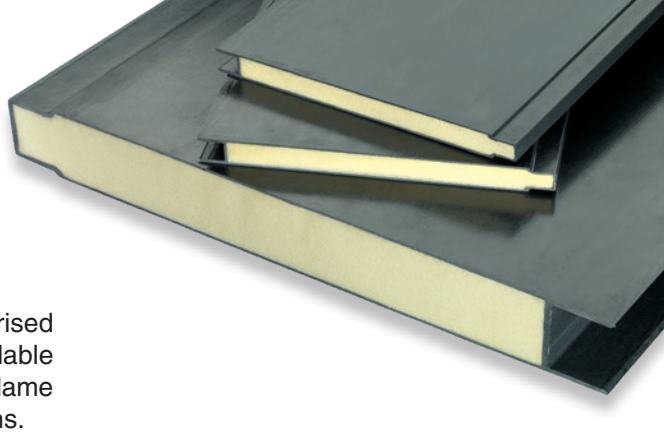
Fabrication of Above Bridge
Bridge deck is constructed of both COMPOSOLITE® and COMPOSOLITE® HD

The POWER of

DURASHIELD®

EXCLUSIVELY MADE IN THE USA

Fiberglass Foam Core Building Panels



DURASHIELD® is a tongue-and-groove fiberglass pultruded panel comprised of a pultruded skin over a foam core. The pultruded fiberglass skin is available in either a premium polyester or vinyl ester resin. Both resin systems are flame retardant (UL 94 V-0). Vinyl ester is utilized in more corrosive applications.

A synthetic surfacing veil is incorporated into the skin to improve weathering, corrosion resistance, and protection against degradation from ultraviolet rays. Resistance to weathering can be further enhanced by the application of a polyurethane paint. The core material is rigid closed-cell urethane foam. The foam core provides an insulation “R” factor of 5 for the 1" (25.4mm) panel and 17 for the 3" (76.2mm) panel.

Energy Company’s Emissions Monitoring Shelters | New Albany, IN

Fiberglass Shelter | Alaskan North Slope

Removable Roof Structure | Joliet, IL

The POWER of

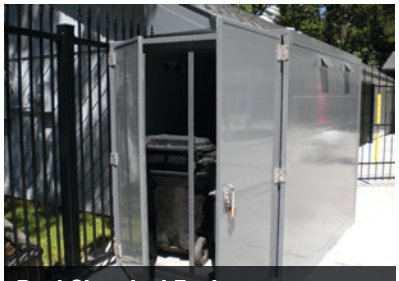
DURASHIELD HC®

EXCLUSIVELY MADE IN THE USA

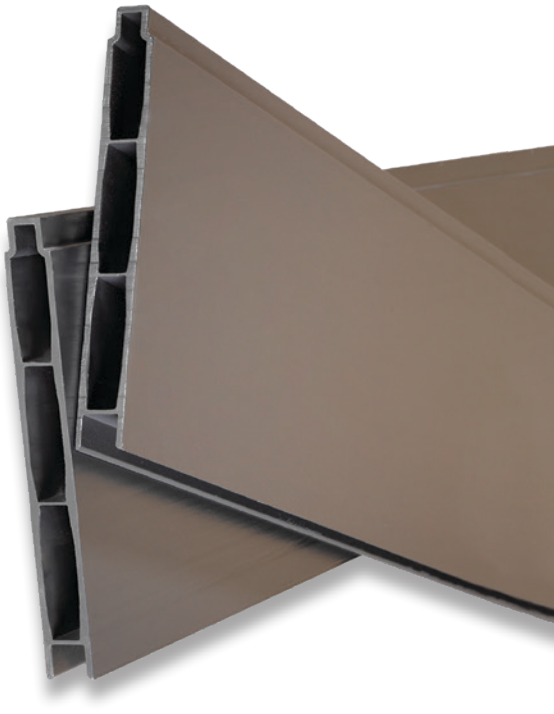
Fiberglass Hollow Core Building Panels

DURASHIELD HC® is a cost-effective alternative to DURASHIELD® because the building panel has a hollow-core. The panel is a sensible choice for any type of roofing, flooring, enclosures, or screening that does not require insulation. It is a custom designed tongue-and-groove building panel for quick assembly and easy installation in various applications.

The pultruded panel’s unique hollow core and intermediate ribs provide extra stiffness for uses such as decking, cladding, or tank covers. The panels can be bonded together with standard adhesives and attached to structural shapes with bolts or screw fasteners. These standard polyester panels will not rot, rust, or mildew, which makes them ideal for high moisture environments including saltwater.



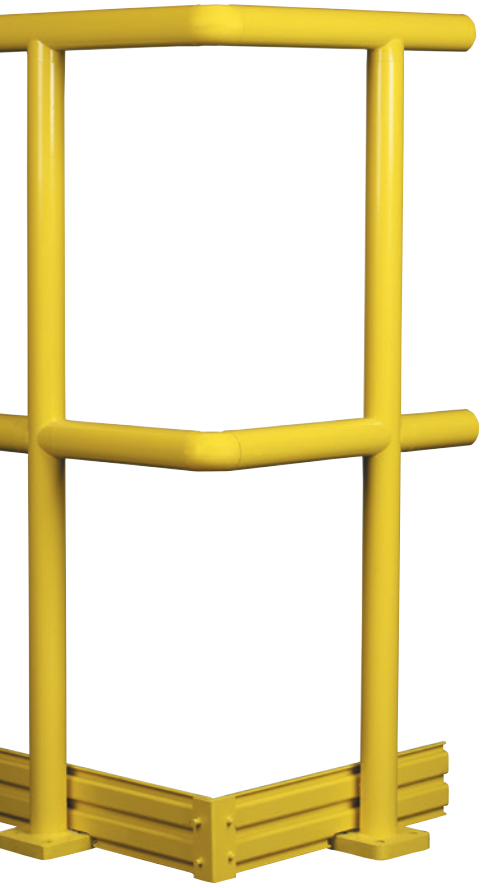
Pool Chemical Enclosure



The POWER of SAFRAIL™

EXCLUSIVELY MADE IN THE USA

Fiberglass Industrial Railing System



SAFRAIL™ fiberglass handrails are industrial/commercial railing systems for stair rails, platform/walkway handrails, and guardrails. SAFRAIL™ systems are fabricated from pultruded fiberglass components produced by Strongwell. The SAFRAIL™ system consists of internally bonded fiberglass connectors that result in no visible rivets or metal parts.

SAFRAIL™ systems are particularly well-suited to corrosive environments like those found in industrial, chemical, and wastewater treatment plants, as well as commercial structures with urban and salt air corrosion.

SAFRAIL™ systems are the result of decades of experience in the manufacture, design, and fabrication of fiberglass handrail systems. The system is available with square, round, and channel top handrail and meets OSHA strength requirements with a 2:1 factor of safety.

Power Facility Handrail | San Diego, CA

Selenium Reduction Plant | New Haven, WV

Access Platforms | Conroe, TX

The POWER of SAFRAIL™

EXCLUSIVELY MADE IN THE USA

Fiberglass Ladder & Cage System

SAFRAIL™ fiberglass ladders and ladder cages mounted on the sides of tanks and buildings are a common sight in a wide range of industries. Fiberglass ladder and ladder cage systems have been in use since the 1950s in chemical plants and other corrosive environments. Even in complete immersion applications, fiberglass has outlasted coated aluminum and steel and required little or no maintenance.

SAFRAIL™ ladders and ladder cage systems are produced using a premium grade polyester resin system with flame retardant and ultraviolet (UV) inhibitor additives. A vinyl ester resin system is available upon request for additional corrosion resistance. Standard side rails and cages are pigmented OSHA safety yellow. The rungs are a pultruded fiberglass polyester tube with a fluted, non-skid surface.

Platform Ladder | Syracuse, NY

The POWER of

STRONGRAIL®

EXCLUSIVELY MADE IN THE USA

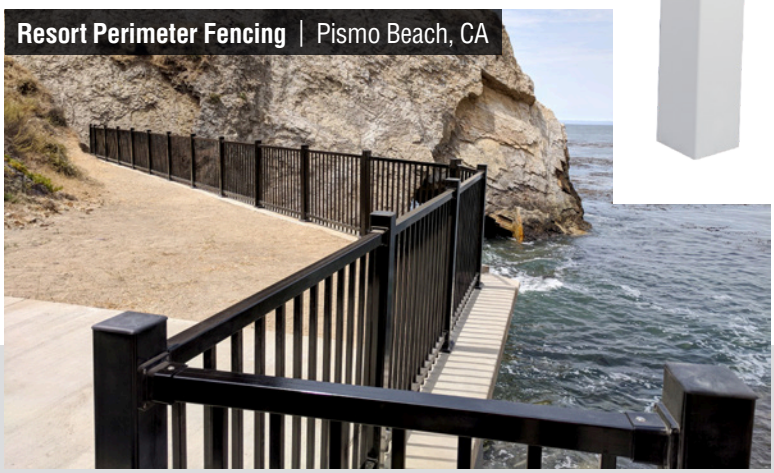
Fiberglass Architectural Railing & Fencing Systems

STRONGRAIL® architectural railing and fencing systems are a strong, attractive and safe solution to your structural needs. The standard systems are fabricated from pultruded fiberglass components produced by Strongwell and molded thermoplastic connectors.

The railing systems are particularly well-suited to corrosive environments like those found in commercial structures with urban and salt air corrosion. Systems can be made to meet ADA requirements, adding safety and beauty to your property.

In addition to STRONGRAIL®, Strongwell can produce custom fiberglass railing to meet specific customer requirements.

Parking Garage Handrail | Galveston, TX



Resort Perimeter Fencing | Pismo Beach, CA

Caltrain Station Fencing | San Mateo County, CA

Hurricane Resistant Home Handrails | Topsail Island, NC

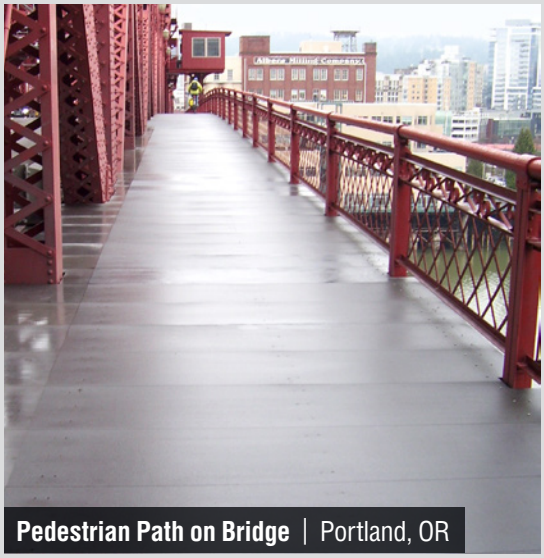
The POWER of

SAFPLANK®

EXCLUSIVELY MADE IN THE USA

Fiberglass Interlocking Decking System

SAFPLANK® is a system of 12" (304.8mm) and 24" (609.6mm) wide fiberglass panels that interlock to form a continuous solid surface. This product is intended to replace wood, aluminum, or steel planks in environments where corrosion or rotting creates costly maintenance problems or unsafe conditions. SAFPLANK® provides safe walkways in electrical applications because of its low conductivity and non-sparking features.

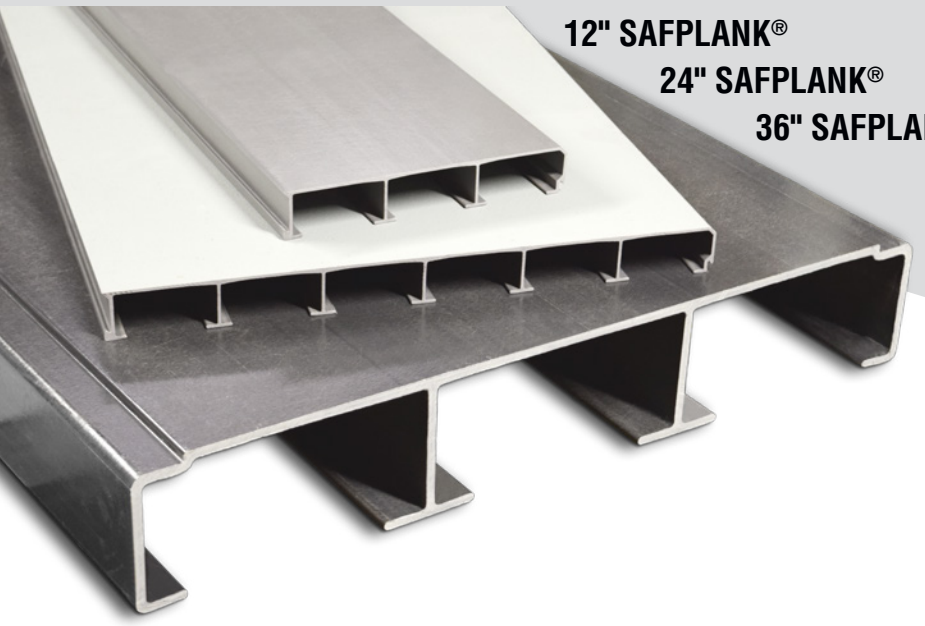


Pedestrian Path on Bridge | Portland, OR

Floating Dock Walkway | Lake Martin, AL

Stay-In-Place Concrete Forms | Black River Falls, WI

Drainage Channel Covers | Hong Kong, China



12" SAFPLANK®
24" SAFPLANK®
36" SAFPLANK HD®

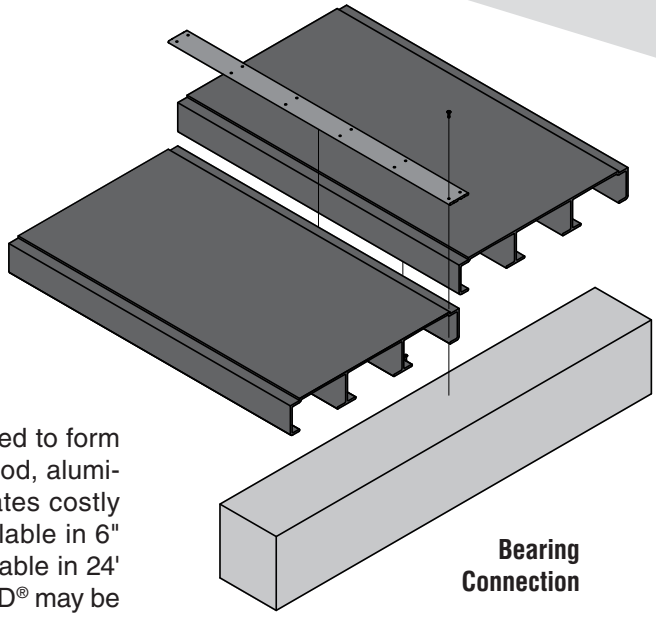
The POWER of

SAFPLANK HD®

EXCLUSIVELY MADE IN THE USA

Heavy Duty Fiberglass Decking System

SAFPLANK HD® is a high strength system of fiberglass planks designed to form a continuous solid surface. SAFPLANK HD® is intended to replace wood, aluminum, or steel planks in environments where corrosion or rotting creates costly maintenance problems or unsafe conditions. SAFPLANK HD® is available in 6" (152.4mm) deep panels in 36" (914.4mm) width. Stock panels are available in 24' (7.32m) lengths. Other lengths are available upon request. SAFPLANK HD® may be ordered with a grit surface or with a smooth surface for non-pedestrian applications.



Bearing Connection

The POWER of

SAFDECK®

EXCLUSIVELY MADE IN THE USA

Fiberglass Overlapping Decking System

SAFDECK® is a system of 24" (609.6mm) wide fiberglass panels that overlap to form a continuous solid surface. SAFDECK® is intended to replace wood, aluminum, or steel decking in environments where corrosion or rotting creates costly maintenance problems or unsafe conditions.

Cooling Tower Fandeck

The POWER of

STRONGDEK™

EXCLUSIVELY MADE IN THE USA

Ultra High Performance Structural Composite Decking System

STRONGDEK™ is a patented ultra high performance structural composite decking system that offers unmatched strength and long-term durability in an aesthetically pleasing and easy-to-install package with virtually no maintenance required. STRONGDEK™ is composed of a structurally strong FRP plank with a snap-on top cap, which offers the aesthetic beauty, non-slip surface, and UV resistance. The decking will not rot, rust, or mildew, which make them ideal for high-moisture environments, including saltwater. Each “board” measures 5.5" wide x 0.94" thick, the same nominal dimensions as traditional 5/4 wood decking and standard composite decking, while being both lighter and stiffer.

Perdido Beach Resort Decking | Orange Beach, AL

The POWER of

UTILICOVER®

EXCLUSIVELY MADE IN THE USA

Fiberglass Utility Trench Covers

UTILICOVER® fiberglass trench covers are the logical alternative to concrete trench covers for substations. The strong, durable, and lightweight fiberglass cover system installs easily and can be quickly removed for trench access by one person with far less risk of back or other injuries.

UTILICOVER® panels are designed to be individually adjustable to accommodate inconsistencies in trench width. Despite the larger spans shown, the typical trench span is 24" (609.6mm). At that span with a 500 lb. (226.80 kg) point load at mid-panel, deflection is approximately 1/8" (3.18mm).

Traditional Concrete

Utility Trench Covers
American Electric Power

The POWER of

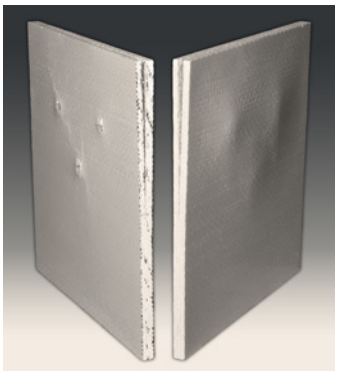
HS ARMOR & HS STORM

EXCLUSIVELY MADE IN THE USA

Fiberglass Ballistic and Storm Panels

ARMOR

Strongwell's HS fiberglass armor panels are designed for ballistics resistance. The panels are assembled using specially constructed glass reinforcements in a proprietary resin matrix. The panel components are then cured in a controlled cycle.



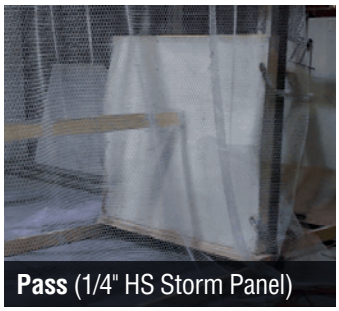
When struck by a bullet or other projectile, HS Armor panels delaminate in a way that absorbs the energy and stops the projectile. Thousands of these panels have been purchased by the U.S. military to help protect soldiers. The panels have been independently tested to meet or exceed UL 752 and several other domestic and international ballistics specifications and protocols.

HS Armor under Drywall | Tennessee School Entry

STORM

Strongwell's fiberglass HS Storm Panels are designed for high impact performance. The panels are made with a proprietary resin mix and fiberglass fabric consisting of woven rovings to create panels that absorb large amounts of impact energy. Independent testing at Texas Tech University's Wind Science and Engineering Research Center has verified HS Storm Panels meet the criteria of FEMA 320 and are suitable for above ground shelter sheathing.

Fail (5 sheets 3/4" plywood)



Pass (1/4" HS Storm Panel)

To meet FEMA 320 standards, a panel must withstand a 15 lb. 2x4 timber missile propelled at 100 mph. This relates to a missile propelled horizontally by a 250 mph ground speed tornado. Strongwell's 1/4" thick HS Storm Panel meets the FEMA 320 criteria whereas 5 layered sheets of 3/4" thick plywood failed.

The POWER of

STRONGIRT®

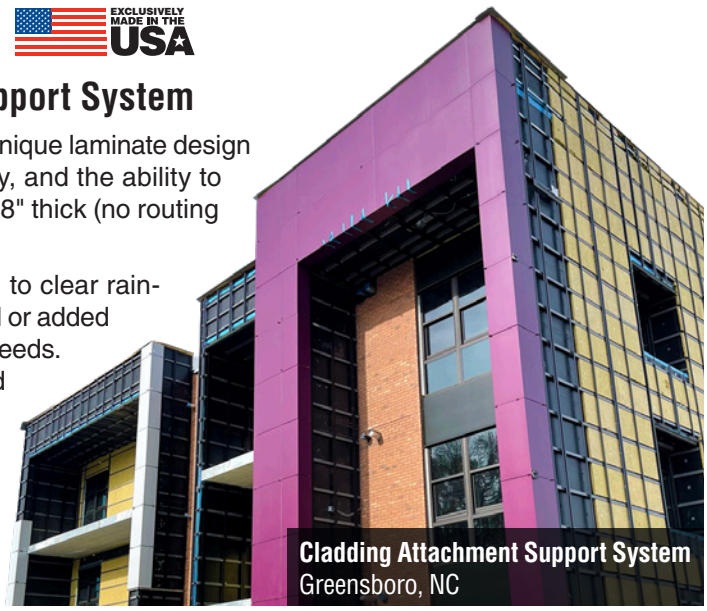
EXCLUSIVELY MADE IN THE USA

Continuous Insulation Cladding Attachment Support System

STRONGIRT® uses a custom fire-retardant resin system and unique laminate design to offer superior pull out strength, excellent thermal efficiency, and the ability to work with any non-proprietary insulation ranging from 1-1/2" - 8" thick (no routing or fabricating of rigid insulation is required).

The geometry of STRONGIRT® offers self-draining to clear rainwater, and weep holes can be pre-fabricated or added in the field for additional drainage needs.

The product has been engineered for strength and stiffness to support cladding, insulation, and wind loads, while offering a simple, durable, cost-effective solution for installers.



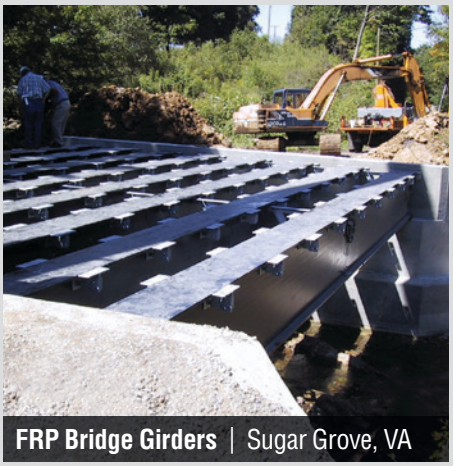
Cladding Attachment Support System
Greensboro, NC

The POWER of

EXTREN DWB®

EXCLUSIVELY MADE IN THE USA

Double Web Beam Bridge Girders



FRP Bridge Girders | Sugar Grove, VA

EXTREN DWB® 36" x 18" (914mm x 457mm) double web beams are designed for use in vehicular bridges. These uniquely designed FRP structural shapes incorporate traditional fiberglass rovings, continuous strand mat, stitched fabrics, and carbon fiber tows. The carbon fiber tows are located in the top and bottom flanges for increased stiffness. The stitched fabrics are located in the webs and internal stiffeners for improved torsional resistance and shear. EXTREN DWB® has a modulus of elasticity of 6.0 x 10^6 psi (41.3 x 10^3 N/mm^2), which is 2.3x higher than traditional FRP structural shapes. The double web shape provides excellent stability with torsional rotation less than half of one percent in three point laboratory loading.

The POWER of

PULSTAR®

EXCLUSIVELY MADE IN THE USA

Pultrusion Machinery, Equipment, and Services

PULSTAR® pultrusion machines, equipment, and tooling are manufactured by Strongwell, the world's largest pultrusion company. PULSTAR® machines are manufactured to the same high standard that Strongwell has used in its daily operations since 1956. All PULSTAR® machines are built from the ground-up on site at Strongwell's Bristol, Virginia, facility. PULSTAR® tooling and equipment have been developed from years of experience in producing high quality parts day-after-day, year-after-year.

PULSTAR® machinery incorporates the latest technology, with the ability to focus on the end user's needs. With over 200 PULSTAR® pultrusion machines sold into 25 countries, PULSTAR® is recognized worldwide for its high quality, versatility, and user-friendly operation. Strongwell understands that an untimely breakdown will completely halt production, causing the loss of valuable time and raw materials.

Engineers experienced in pultrusion build productivity into PULSTAR® pultrusion systems at every step in the process.

Attention to operating detail distinguishes PULSTAR® systems from ordinary pultrusion machines. Each component is engineered for simple operation, while providing the flexibility to adjust to the special requirements of individual profiles.

Strongwell can offer complete turnkey pultrusion systems or individual components of the pultrusion package. In addition to the PULSTAR® pultrusion machines, an entire array of support equipment, services, and programs are available.

The POWER of

CUSTOM & OEM PULTRUSIONS

A custom pultrusion is a pultruded product customized in shape, resin matrix, reinforcements, and composite design.

A custom pultruded part manufactured by Strongwell can be an excellent solution to a wide range of problems in applications where standard materials or other fiberglass shapes do not meet the needs of the customer. A custom pultrusion should be considered when a unique shape is needed and/or when the properties of other materials are not suitable for the application. Strongwell works with customers to develop custom pultrusions designed specifically for an application, resulting in better performance, increased reliability, and lower life cycle costs associated with the custom pultrusion. Parts consolidation and the competitive advantage that a proprietary design can bring are also attractive reasons to consider a custom pultrusion.

With more than 60 pultrusion machines running up to 40 lines per machine, Strongwell has the unmatched production capacity to manufacture custom pultruded parts. Combined with the broadest range of pultrusion design and engineering expertise, Strongwell offers more custom capabilities than anyone in the industry.

Flood Wall | Sacramento, CA

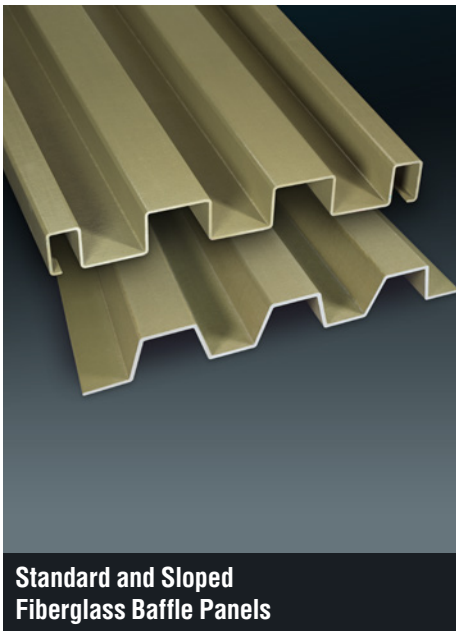
Fiberglass Sheet Pilings

Bridge Deck Form | Greene County, MO

GRIDFORM™ Stay-In-Place FRP Bridge Deck System

Bridge Strengthening
Meramec River, MO

SAFSTRIP® & SAFSTRIP® Carbon Fiber Reinforced Strengthening Strips

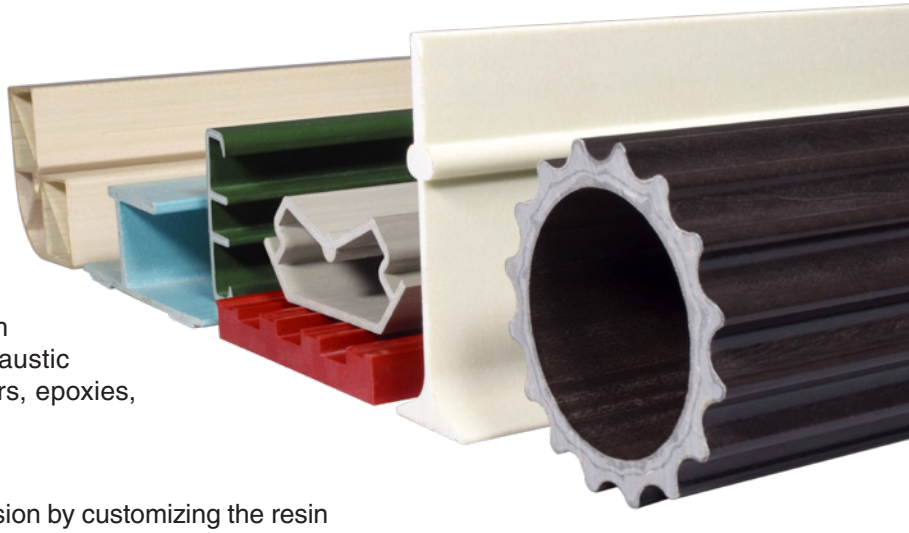


Standard and Sloped Fiberglass Baffle Panels

Fiberglass Tool Handles

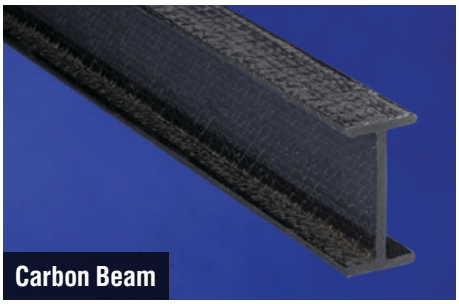
Fiberglass Ladder Rail

SHAPES
Virtually any shape with a constant cross-section can be pultruded. This allows for the integration of various parts.

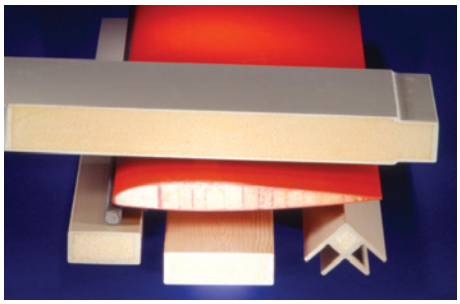


RESINS
Standard resins can be modified or special resins can be used to optimize the performance of the pultrusion in challenging environments, such as those found in high temperature or extremely caustic areas. Typical resins include polyesters, vinyl esters, epoxies, phenolics, and blends.

COMPOSITE DESIGN
A standard shape can be made into a custom pultrusion by customizing the resin or reinforcement to achieve a particular customer need.


Carbon Beam

REINFORCEMENTS
The type, form, placement, and quantity of reinforcements can be customized to maximize economy, develop oriented strength, and create or enhance other physical characteristics of a pultruded part. Typical reinforcements used include glass or carbon fibers in multi-filament strands, mat (long fibers held together with a resinous binder), or stitched fabrics.



CORE MATERIALS
Strongwell has extensive experience in pultruding over various core materials including foam, balsa, polyethylene, and aluminum. In other applications, foam can be added after the part is pultruded.

SURFACE VEIL PRINTING
By pre-printing graphics or text on the surfacing veil, Strongwell can easily customize a pultruded part for market identification or specific product needs.


Fiberglass Radomes


Custom Stair Treads


Custom Utility Tower

The POWER of

GOING GREEN

As a responsible corporate citizen, Strongwell continually seeks to improve its manufacturing practices to further protect the environment, while providing essential, environmentally friendly products to our customers. All Strongwell locations employ Environmental Management Systems, providing audited verification of our dedication to continually improving the environmental impact of FRP composite production. In addition, Strongwell continues to fund third-party, peer-reviewed Life Cycle Analysis (LCA) studies, which invariably demonstrate the inherent environmental advantage of FRP composites compared to other materials such as aluminum and steel.

DID YOU KNOW?

The manufacture of Strongwell's pultruded FRP products…

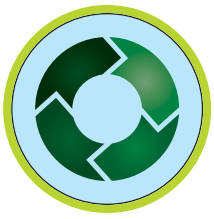
- **Produces fewer air and water emissions**
- **Consumes less energy**
- **Emits less greenhouse gas**

Therefore, FRP composites provide a reduced environmental impact and a lower carbon footprint.

FRP Composites…

- **Are highly resistant to rot and corrosion**
- **Have a longer and more economical service life**
- **Rarely require energy-intensive maintenance and replacement**

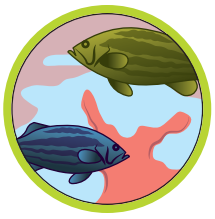
These inherent advantages lead to superior overall sustainability for our FRP products. Visit Strongwell's website to see:



Life Cycle Assessment (LCA)

LCA Methods for Design and Manufacturing of Sustainable Composites

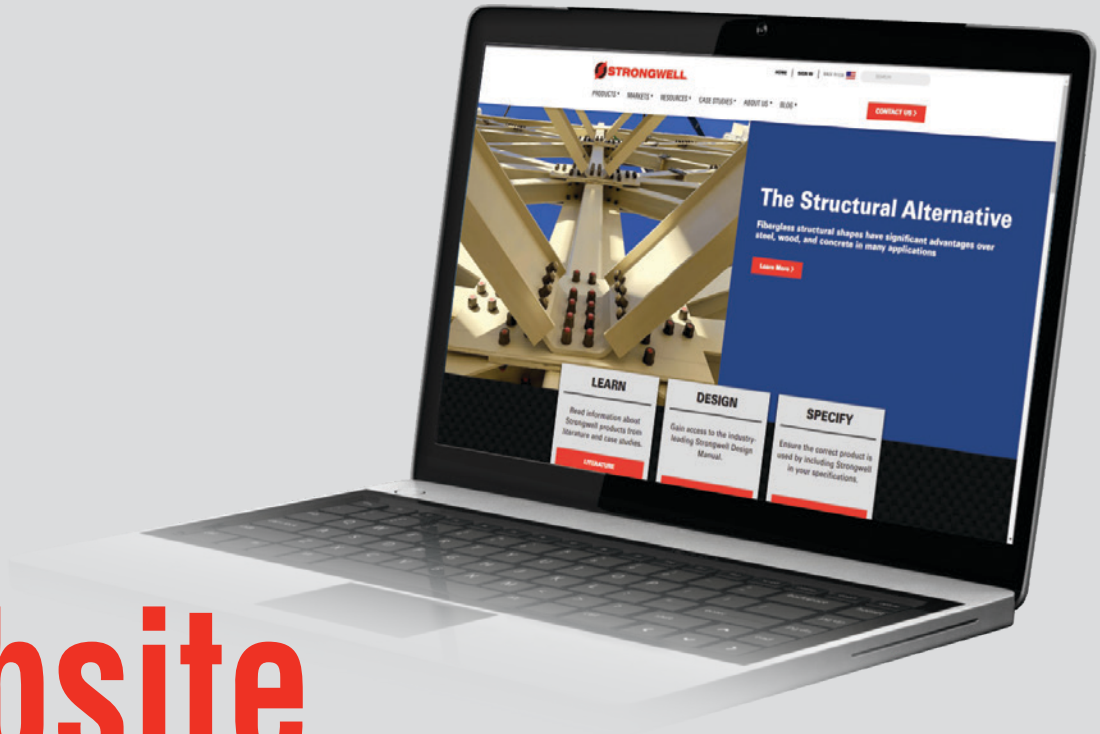
Manufacturing Impact Reduction Initiatives



LCA Comparison of Two Aquarium Tank Systems

Environmental Considerations to Structural Materials Selection for a Bridge

www.strongwell.com/green

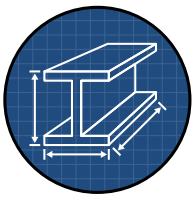


Website and Online Tools

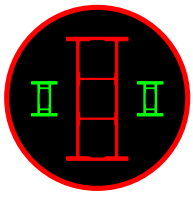
www.strongwell.com

You'll Find:

Product Literature



Strongwell's Design Manual



CAD Blocks

Product SDS

Strongwell Specifications

Fabrication Worksheets

A wealth of information is at your fingertips when you visit www.strongwell.com! The site gives you around-the-clock access to all of the above as well as load tables, research initiatives, videos, news, awards, and certifications. The site is continuously updated to provide you with the most current product information.

www.strongwell.com

CHATFIELD LOCATION

1610 Highway 52 South
Chatfield, MN 55923-9799 USA

CORPORATE OFFICES & BRISTOL LOCATION

400 Commonwealth Ave.
Bristol, VA 24201 USA
Phone: +1 276.645.8000

HIGHLANDS LOCATION

26770 Newbanks Road
Abingdon, VA 24210 USA

MEXICO LOCATION

Avenida La Silla Apodaca #110
Fracc Parque Industrial La Silla Apodaca
Apodaca, NL 66648 MX

PRODUCTS MADE IN THE USA

STRONGWELL®

ST0225