CREATIVE COMPOSITES GROUP

FRP ACCESS STRUCTURES

E.T. Techtonics Fiberglass Bridges

LOW MAINTENANCE. LONG LASTING. LIGHTWEIGHT. EASY TO INSTALL.

Flatts Inlet, Bermuda

Introducing The Longest Single Span FRP Bridge In The World

The Challenge

In the early 1900s, cars were banned to preserve the island's peace and quiet. As an alternative, The Bermuda Railway built 33 bridges and trestles to support a 22-mile rail line. The train carried passengers and freight from 1931 to 1948 before it closed in favor of bus transportation. The abandoned railbed has since been designated a national park and is maintained by the Bermuda Parks Department. The rugged trail was divided into nine sections that were broken and in some cases difficult to access. Friends of Bermuda Railway Trail undertook the job to connect the links. The Murphy family funded the project by raising capital locally from private companies and individuals. The nonprofit found the E.T. Techtonics product through an internet search. But there was one major hurdle. Design parameters called for a clear span bridge 152 ft. long and 8 ft. wide. The maximum length for E.T. Techtonics profiles was 120 ft. long with a double truss system above and below the deck.

The Design

The Friends of Bermuda Railway considered several designs including a Leonardo da Vinci arch bridge. But E. T. Techtonics' pultruded profiles offered several advantages that tipped the group's decision. The corrosion-resistant, light weight components could be kitted and shipped economically and easily assembled near the job site. The nonprofit wanted to minimize disruption to marine life while preserving the look and feel of the historic railway. The original trestle was 40 ft. high with steep grades on either side. Piers with wooden supports were built on concrete pylons. Two groups of four pylons remained. The new FRP bridge design incorporated use of the concrete pylons as its support structure. The FRP pedestrian bridge also had the ability to blend with its surroundings and leave Bermuda's sweeping vistas unobstructed. To validate the design and reach the new length requirement, engineers had to perform a number of tests.

The Testing

Section testing on unique components and connections was conducted by the University of Miami and West Virginia University. FRP profiles were pultruded, fabricated and readied for assembly and final testing at CCG's Creative Pultrusions campus. Following structural element testing, two full-scale tests were performed to address construction restrictions and maximum load. Because the job site was in the middle of the water, top-down construction was not an option. A lift test was performed to make sure that the large crane at the Bermuda job site could effectively pick up the entire bridge span based on a pre-specified rigging and pick plan. Maximum design load was tested by uniformly placing wooden holding tanks along the bridge deck surface and filled with water to simulate the bridge filled to capacity with people. The results met design parameters for safety and performance. The bridge was then disassembled, packaged, and readied for shipment to Bermuda.

The Installation

The typical shipping container has a maximum length of 40 ft. CCG's E.T. Techtonics bridge team had to meet a size requirement of approximately 39 ft. when it kitted the light weight bridge components for overseas travel. Friends of Bermuda Railway Trail and a small crew met the container, unpacked it and re-assembled the bridge in a manner very much like that of an Erector Set. The entire 152 ft. long bridge was assembled near the project's location. Following pre-approved rigging instructions, the entire span was lifted by a crane and placed on a barge where it was ferried to the installation site. Once the barge reached the work site, it was moved into position and lifted onto the existing concrete foundation with a crane.

Progress Report

The clear span is the first of several FRP bridges that will be installed in Phase 2 of the project currently underway. For the bridge market, this structure serves as a construction milestone for FRP composite technology. For visitors and Bermudians, it will provide access and a different perspective to the scenery and the marine life that travel the inlet.

Fiberglass Access Structures - E.T. Techtonics Truss Bridges

If your access application requires a structure that is reliable, resilient, sustainable, lightweight, green, and needs very little maintenance, then an E.T. Techtonics structure is the right choice.

GREEN/SUSTAINABLE

Pultruded profiles are long-lived and exhibit a lower carbon footprint and embodied energy than steel and aluminum. The pultruded members are inert and will not leach any chemicals into the environment.

LIGHTWEIGHT

Our structures are prefabricated in lightweight component profiles for easy transfer to limited access locations. Many of our structures are transferred and installed by trail organization volunteers.

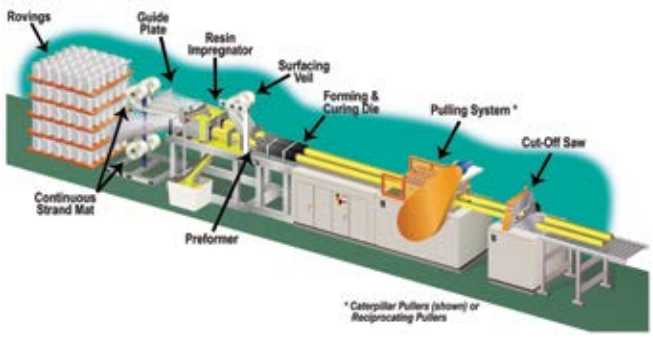
Alberta, Canada 2015

Mtn. Creek Trail Bridge, Pennsylvania

PULTRUSION PROCESS

Our access structures are made of pultruded high-strength, lightweight fiberglass reinforced polymer (FRP) structural profiles. Pultrusion is a continuous manufacturing process utilized to make composite profiles with constant cross-sections whereby fiberglass reinforcements, in the form of roving and mats, are saturated with resin and channelled into a heated die. The profile exits the die in a solid state and in the form of the desired cross-section.

Pultruded profiles are used extensively for structural applications in which lightweight, high-strength, and corrosion resistance attributes are sought. Pultruded profiles have higher tensile strength than typical structural steel while weighing about 80% less.

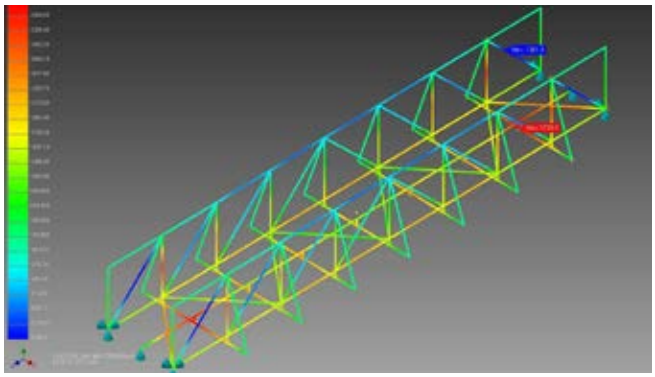


RELIABLE/RESILIENT

Our engineering and design staff can take you step-by-step through the FRP bridge design process. All finite element analysis (FEA) and CAD drawings are performed in-house. Customer service is our trademark, as we will work closely with you from start to finish to ensure the highest project quality. With our many years of experience in the design of FRP structural systems, E.T. Techtonics structures are a great choice for your FRP bridge or other access structure.

LOW MAINTENANCE

Our structures are designed to be aesthetically pleasing while blending into the surrounding environment. The standard olive green color blends well with local vegetation. The inherent properties of fiberglass profiles minimize the need for maintenance associated with corrosion and rot, typically associated with wood, steel and aluminum structures.



RISA® 3D Frame Analysis Plot

Sugarite State Park, New Mexico

Bailey's Bay Walkway Bridge, Bermuda
Total Span: 500' (8 bridges)

Limited Access Is Our Specialty No Site Is Too Remote

Our lightweight prefabricated bridges can be assembled and installed in a variety of ways depending on your site location. Bridges can be shipped to you fully assembled, partially assembled, or in component parts for remote access carry-in.

Fully Assembled Installation.

The truss bridge will be delivered to the nearest point accessible by truck. A crane or helicopter will be required to unload and place the bridge onto the prepared foundation. The lightweight attribute of the E.T. Techtonics fiberglass truss bridge allows for smaller lifting equipment to be used. The Creative Pultrusions' design team will provide the pick weight and picking points of your bridge. In most cases, decking will be shipped loose to minimize lifting weight. This installation method should be performed by professional picking and rigging crews. Depending on location, shipping cost will be higher.

Partially Assembled Installation.

Individual trusses are assembled, but all connecting crosspieces, bracing and deck are shipped loosely. This saves assembly time on site, but more helpers are needed to unload and move the fiberglass trusses. Carts can sometimes be used to roll the trusses to the job site. This method is not suitable for moving the trusses long distances or over rough terrain.

"E.T. Techtonics has been a leader in the development of environmentally friendly fiberglass bridges. In our county parks we have over 160 miles of beautiful natural surface trails open to hikers, equestrians and mountain bikers that have a large number of bridges. The design of these bridges makes them the perfect fit for remote locations. Each piece can be hand carried into the site."

— B. Turnbull
Natural Surface Trails Construction Manager

Kit Assembly All On-Site.

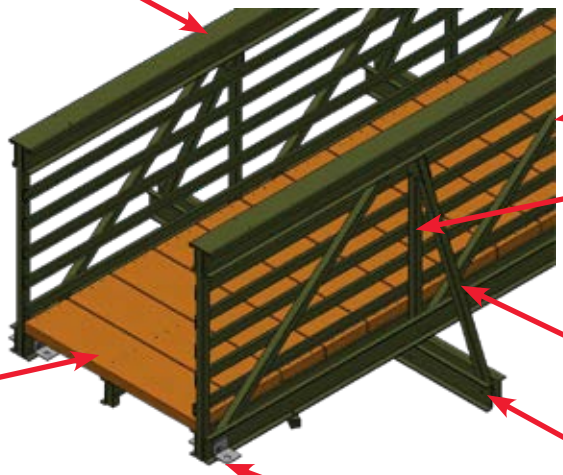
This is our most common form of shipment and installation. Fiberglass bridge components can be unloaded by as few as two workers, usually at the trail head or a nearby designated staging area. Because no equipment is required to unload, bridge arrival does not need to be coordinated with the bridge assembly. When you are ready for assembly, volunteers, park crews, or contractors typically carry the FRP bridge components to the bridge installation site. No site is too remote. We often have components carried several miles on park trails. Once everything is at the bridge site, the bridge is easily assembled using standard hand tools.

WHERE TO START?

Let us know your FRP bridge needs, including span width and length, and we will help you create a long-lasting solution. CCG engineers are equipped to help you design to International Building Code (IBC) and the American Association of State Highway and Transportation Officials (ASHTO) specifications. The structural design of our fiberglass bridges is performed in house by one of our Licensed Professional Engineers and done in accordance with recognized engineering practices and principles. We design for uniform live loads, snow loads, vehicle loads, wind loads, and seismic loads.

Our team is here to go over any questions you might have about FRP bridges and to assist you with your build.

Fiberglass Bridge Design



TYPICAL DIMENSIONS

Span Length: 5' to 100'
Span Width: 2' to 14'

TYPICAL DESIGN LOADS - PEDESTRIAN, EQUESTRIAN, LIGHT VEHICLE

60 to 100 psf uniform live load or 10,000 lb. vehicle

STANDARD BRIDGE FEATURES

Fiberglass Trusses: One or two diagonals (spans over 20' may be spliced for shipment and/or logistics to remote access locations)
Hardware: A307 or A325 galvanized steel bolts, anchor clips (typically 304 grade stainless steel)
Color: Creative Pultrusions, Inc. Series 1500 Olive Green
Deck: Pedestrian/equestrian/vehicle - 3" x 12" pressure-treated wood (No. 2 Southern Yellow Pine)
Rails: ADA-compliant safety rails.
Height: 42" truss pedestrian and bicycle; 54" truss equestrian
Shipping: Typically shipped unassembled by common carrier
Installation: Complete assembly instructions provided, including a video

ACCESSORIES

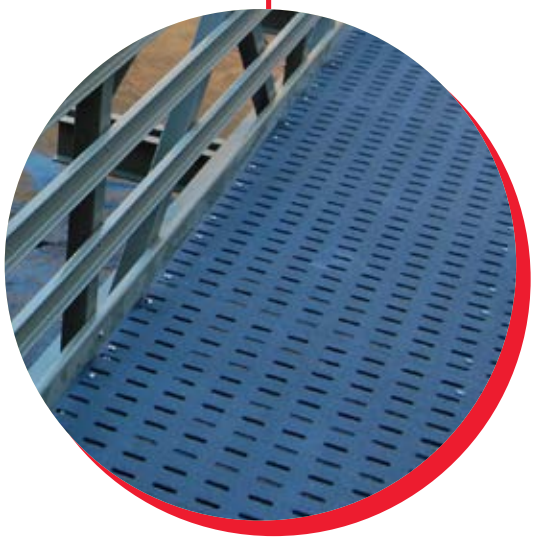
Handrails: Round fiberglass rails with aluminum standoffs

OPTIONAL FEATURES

Hardware: 316 stainless steel hardware for harsh environments (recommended for coastal applications)

Color: Custom colors available (additional costs apply)

Deck: Fiberglass Reinforced Polymer



Optional FRP Decking (with or without slots)

Optional Brown Color -
RAL 8014 - Sepia Brown/Forest Service Brown

Sloped End: Truss sloped at each end and capped full length (ideal for ATV and equestrian traffic)

Optional Sloped End

Shipping: Fully assembled, partially assembled, or in component parts

Component Parts (most common)

Fully Assembled

Safe Routes to School Bridge Project
Narragansett, Rhode Island

Partner With Creative Composites Group

Your Single Source for Innovative Engineered Solutions Using Fiber Reinforced Polymer Composites

Advance your products and projects beyond the limitations of traditional concrete, steel, and wood by leveraging the combined strength of Creative Composites Group.

We are the driving force of technical innovation that has created the industry's most advanced engineered FRP. Our team of industry leaders includes:

- Creative Pultrusions
- Composite Advantage
- E.T. Techtonics
- Kenway Composites
- Tower Tech

As Creative Composites Group, we can help you to create products and structures of any size or shape — for projects of any ambition or vision.

History of E.T. Techtonics

E.T. Techtonics, Inc., was at the forefront in the research, design, and construction of fiber-reinforced polymer (FRP) bridges and building systems since its beginning in 1987. Originally located in Philadelphia, PA, the company is recognized as an international leader in the design of FRP bridges and boardwalks. To date, over 1,000 pedestrian bridges and walkway systems have been engineered and installed using the E.T. Techtonics, Inc. fiberglass bridge systems.

In early 2016, E.T. Techtonics, Inc., was acquired by their long-time manufacturing partner Creative Pultrusions, Inc. (CPI). Today, E.T. Techtonics exists as a CCG product line that is fully owned and operated by CPI. The E.T. Techtonics access system's sales, engineering, and design group reside at the corporate headquarters of CCG in Alum Bank, PA.

Have a project that you think engineered FRP is right for? Call us. We'd be thrilled to discuss it with you.

Contact Our Access Structures Specialists

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