



FRP FOR INFRASTRUCTURE:

Products, Applications and Benefits



CREATIVE
COMPOSITES
GROUP



Infrastructure projects traditionally have three default material choices: reinforced concrete, steel and wood. It's essential to select materials that can achieve safety and performance objectives while also creating an architecturally beautiful and long-lasting addition to the infrastructure system. Traditional materials for infrastructure lack many of the engineered properties of Fiber Reinforced Polymer (FRP) including corrosion, UV, harsh weather, fire and pest resistance.

Conventional materials quickly fall into disrepair, even when used correctly—ultimately impacting the financial resources of municipal, industrial and/or commercial stakeholders. This sort of unpredictability often means that engineers may need to intercede years before the initial plan predicted.

FRP composites are superior to traditional materials and have a long track-record of service. This product is superior to traditional building materials in many ways, such as:



Long-Lasting
Durability



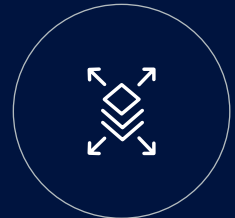
Corrosion
Resistance
to Water and
Chemicals



Lower Lifetime
Cost



Ease and
Speed of
Installation



Design
Flexibility



Five Key Benefits of FRP for Infrastructure:

Transitioning to a new material technology appears challenging, but FRP provides multiple benefits that competing materials lack. These advantages quickly outweigh the logistical challenges of the change. Some of these benefits include:

1. Production and Installation Time

Manufacturing production time is a significant factor in project planning and organizing milestone deadlines. If materials can be produced faster, that leads to shorter project schedules and gives engineering teams more time to complete the advanced stages of the project. Prefabricated structures are manufactured in parallel to initial onsite construction tasks. FRP can be produced in fifteen fewer days than precast concrete, and it may be installed at the work site in an average of five fewer days. That's a return on investment by shortening the project timeline by twenty days.

Another key benefit of faster construction time is reduced labor costs on the worksite. For example, rather than performing highway-based installations solely during busy weekdays, reduced installation times allow crews to install FRP components on the weekends when traffic is lighter. This is a safety benefit for work crews and a convenience benefit for end users.



2. Weight

Lightweight FRP composites lower transportation expenses. When possible, lighter construction materials are nearly always preferred over heavier materials. They are easy to work with—especially for large infrastructure projects such as overpasses and bridges. They are safer for workers to be around and require less and lower cost equipment for both installation and removal projects.

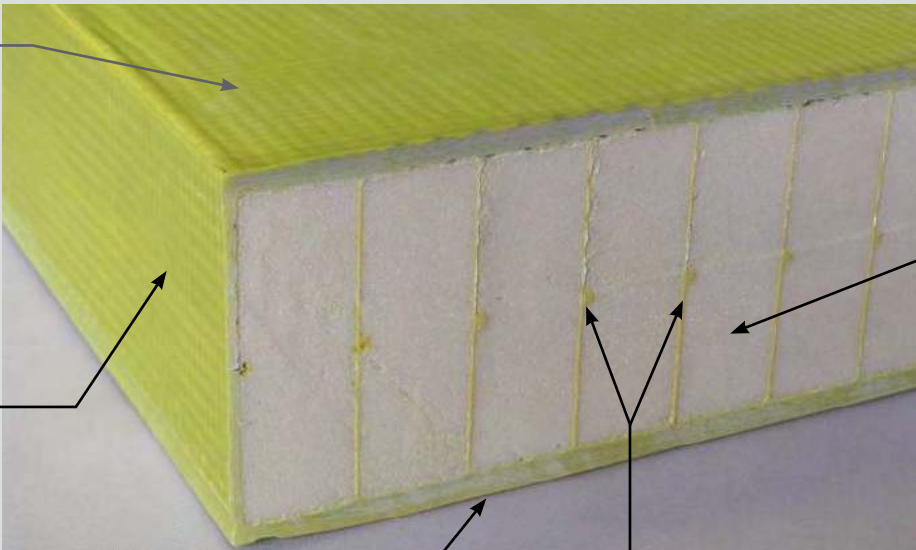
Engineered composites, like FRP, are more than eight times lighter than precast concrete. Precast concrete panels weigh slightly more than 40,000 pounds, while a corresponding FRP panel is only 5,000 pounds. A smaller team of construction workers can easily install the FRP panel without undue effort.

Lighter materials aren't just beneficial during the construction stage. Bridges and other infrastructure projects have to consider the weight of the construction material when predicting the project's life span and future maintenance needs. Since FRP is just a fraction of the weight of traditional materials, the finished structure will face less wear and tear over time in relation to its weight.



Facesheet Laminate

Fiberglass Fabrics Wrap around Edges



Closed Cell Foam

Facesheet Laminate

Fiberglass Shear Webs

3. Corrosion and Service Life

One of the key advantages of FRP is its resistance to corrosion. FRP's material composition significantly reduces the need for continual maintenance and repairs. FRP is a long-lasting material featuring attributes such as:

- Weather Resistance (Wind, Fire and Ice)
- UV Resistance
- Holds up to Salt Water and Corrosive Chemicals

Not only is structural FRP designed to withstand long-term, heavy-duty usage, it's also ideal for infrastructural projects in nearly every climate. The material won't wear down or become vulnerable to damage due to wind, rain, UV exposure from the sun or snowy weather and associated chemical de-icing treatments.

FRP lasts decades longer than reinforced concrete. Concrete will start to degrade within 15–20 years of installation—potentially sooner in installations that require frequent de-icing—while FRP can last approximately 75 years. FRP's service life is much longer than wood and steel for many structural applications extending the service life project.



4. Cost-Effectiveness

FRP is built for long-term savings and profitability. Construction and infrastructure management companies that use FRP can expect these benefits:

- **Reduced Maintenance & Repair Costs.** FRP generally requires no maintenance. Even in high-traffic areas or cold climates, FRP constructions will perform with minimal need for repairs or adjustments.
- **No Material Replacement Costs.** FRP has a long life span and is resistant to corrosion and chemical damage. That means the material doesn't have to be replaced for many decades after its installation.
- **Reduced Labor Costs.** FRP requires less labor during the construction stage. The subsequent reduction in maintenance and repairs further reduces associated labor costs.
- **Lower Lifetime Cost.** Materials like reinforced concrete can begin to fail after just 15 years—or even sooner if the project didn't adequately account for all of the area's environmental conditions. Reconstructing a bridge or other project is a costly endeavor. Projects that use FRP have a longer life and much lower total cost of ownership.

While FRP has a slightly higher initial cost, its long-term savings are easily offset when divided by the additional years of service. Not only does it reduce costs over the life of the project, but it also has a better standard of performance that can enhance your company's construction and design reputation.

5. Design Flexibility

FRP is an engineered composite material that's built to meet exact specifications. Designers and owners can specify customized sizes and shapes to complete complex and unique designs that are architecturally pleasing. Since the material is so lightweight, it facilitates complex and creative applications without sacrificing integrity or load-bearing capacity. While specifying a new advanced material can be challenging, these advantages more than compensate for logistical challenges or upfront costs.



Bridges & Access Infrastructure

Bridges & Access Structures



Creative Composites Group designs and manufactures fiberglass-reinforced polymer access structures, such as bridges, boardwalks, walkways and planking. Our product line is prefabricated for quick and simple installation, and is made using corrosion-resistant materials that guarantee years of problem-free use. Our access structures are high-strength while being lightweight, featuring a higher tensile strength than structural steel while weighing 80% less.

Bridge Decking

FRP decking has become the material of choice for all types of bridges because it is versatile and long-lasting. With the design flexibility of engineered FRP composites, we can fabricate deck systems to meet any loading and geometry requirements. Maximum structural capacity is made possible with unique continuous fiber reinforcements that deliver performance metrics superior to those of other composite products, or traditional materials, on the market.

Our innovative designs take full advantage of FRP's capability to handle any load and bridge geometry requirements.

Prefabricated panels can incorporate a number of functional features including:

- Curbs
- Crowns or Cross-Slopes
- Railing Attachments
- Drainage Cuppers
- Attachments for Lights, Signs, Benches and Equipment
- Expansion Joints

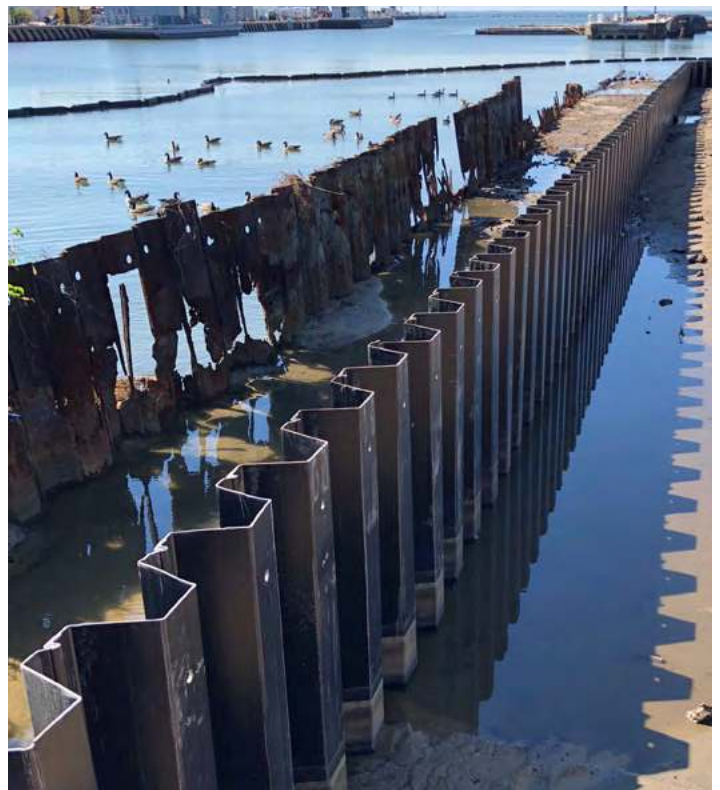


Waterfront Infrastructure

Until now, wood, concrete and steel have been the “go-to” choices for waterfront infrastructure projects; however, the challenges associated with maintaining these materials are considerable. Saltwater, chemicals, UV radiation and changing weather conditions promote rot, rust and spalling for legacy materials. Wood, concrete and steel are also prone to impact damage from vessels. FRP composites are being adopted in large scale to replace these legacy materials for structures like:

- Pipe Piles
- Sheet Piles
- Fender Systems
- Camels
- Dolphins
- Ship Separators
- Guide Walls
- Docks & Marinas

With decades of industry experience in the design and manufacture of innovative FRP waterfront applications, the Creative Composites Group can work with you to develop a custom solution, or we can tailor the product to your requirements.



Utilities Infrastructure

Utilities

We specialize in innovative FRP infrastructure for utilities, including fire-resistant utility poles. Our core products include utility poles, light poles and crossarms. Compared to those made from traditional materials (e.g., wood, steel, concrete), they offer better resiliency, dielectric strength and low maintenance which provide enhanced grid reliability.



Mass Transit & Rail Infrastructure

Rail Infrastructure

Structural FRP is becoming the material of choice for rail systems because of its lightweight, prefabricated structures, fast installation, corrosion resistance, safety features, low maintenance, architectural beauty and long life. Applications for FRP include platform structures, stairs, trackside equipment, trackside access and overhead pedestrian walkways.



Standard Structural Products

Engineered FRP shapes and profiles are used to create cost-effective, high-performance structures. We provide an extensive menu of pultruded fiberglass structural shapes and FRP pultruded profiles designed to replace wood, steel and aluminum. You can incorporate these "building blocks" into your system, or the CCG team can design, build and deliver the structure to the work site ready for installation.



Industrial Tanks & Processing Equipment

Corrosion is a serious challenge for industries that use water and chemicals. Harsh and acidic environments wreak havoc on traditional materials like metal which can endanger a structure's stability. FRP has the durability and abrasion resistance to outperform conventional materials under these conditions. FRP is a higher strength material when compared to most metals. Choosing FRP over traditional materials means eliminating costly downtime and repairs.

FRP is often used for piping, tanks, scrubbers, custom equipment and many other vessels that require resistance to corrosion. Our FRP products can be found in facilities ranging from wastewater treatment and pulp and paper mills to chemical processing and power plants. To get the longest life possible from your tanks and pipes, preventive maintenance is crucial. Our field service expertise allows us to provide equipment repairs to existing structures and extend their service-life.



OEM & Custom Products

At CCG, we use advanced manufacturing techniques and technologies to produce custom components or OEM products and systems. We can create any critical molded or pultruded part for your system or custom designed product. Our engineering and manufacturing teams can help you develop appropriate solutions for both on-off and long-term projects.



Advanced FRP for Infrastructure from Creative Composites Group



FRP Building Materials from Creative Composites Group

Simply put, FRP is a superior alternative to traditional construction materials for infrastructure projects. The material is lightweight, easy to install and lasts decades longer than traditional building materials. **Contact us today** to learn more about the versatile applications for our FRP products or **request a quote** for your next construction project.

Choose Creative Composites Group for Infrastructure Knowledge and Expertise

Your Single Source for Engineered Infrastructure Projects 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 (CCG). We are a leader in technical innovation that is backed by the industry's most comprehensive FRP manufacturing group for infrastructure.

As CCG, we can help you engineer and manufacture infrastructure projects to meet the needs of future generations.

We offer comprehensive engineering, design and consultation for large infrastructure projects. Our manufacturing capabilities include the broadest range of engineered FRP solutions to enhance infrastructure. That's possible only with our proven engineering processes, end-to-end collaboration, service and support resources. Since FRP composites last longer than conventional materials, they often have a lower lifetime cost when you consider longer service life and low to no maintenance costs.

Discover Your Custom Engineered FRP Infrastructure Provider for Utility, Waterfront, Rail and Bridges

Creative Composites Group is committed to becoming a trusted business partner who is keenly interested in your project's success. CCG works alongside your team, from owners to design engineers and contractors, to help you develop customized FRP installations that meet the most demanding structural requirements and environmental conditions.

Contact us for your next engineered FRP infrastructure project. We'd be thrilled to discuss it with you.

CreativeCompositesGroup.com

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