

CANTILEVER SIDEWALKS & FRP



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Sharing the Road With FRP

Sidewalks date back to ancient Rome, where they were made from lime and volcanic rock. Since then, sidewalk technology has continued to advance. Evolving from mortar and stonework to cement and concrete, sidewalks and walkways are taking the next logical step by incorporating Fiber Reinforced Polymer (FRP).

Concrete is susceptible to the elements—especially the freezing and thawing of the ground—and tree roots can cause significant damage to a walkway. Deicing chemicals also contribute to the deterioration of pedestrian sidewalks, over time rendering them unsafe and difficult to traverse.

Despite these drawbacks, concrete sidewalks have still been the primary choice in pedestrian and bicycle infrastructure, particularly in areas where people desire distinct and complete separation from automotive traffic. According to the People for Bikes' Green Lane Project, prior to 2011, only 78 protected bike lanes existed nationwide. The most recent figures from the advocacy group show that the number has since surpassed 500.

The installation of such bike and walking lanes presents a design and engineering challenge for bridge owners, who must meet strict weight limits and space restrictions. However, as an increasing amount of people are pulling out their running shoes and hopping on bicycles, these owners are becoming more aware of the fact that vehicle drivers will need to share a greater portion of the road with pedestrians and cyclists. As their numbers continue to grow, a narrow sidewalk curb will simply no longer suffice.

So how can sidewalks be installed such that they protect cyclists and pedestrians without impeding the flow of vehicular traffic?



FRP: Separating Busy Roads From Pedestrian and Bicycle Paths

In most cases, reducing vehicle lane size to make room for pedestrians and cyclists isn't practical and is likely to be met with discontent from drivers. Fiber Reinforced Polymer (FRP) provides bridge owners and engineers with a design solution that both fulfills user needs and adheres to strict weight and space requirements.

Prefabricated FRP decking is engineered to work with any bridge application. These panels are delivered, numbered and ordered to allow for quick, easy installation on supports tied to the existing bridges. They create a comfortable, safe space for bikers and walkers to cross the bridge during leisure time or commute without decreasing the amount of road space, allowing for peace of mind even in high-traffic areas.

A safe, non-slip quartz aggregate polymer overlay on the surface ensures durability under harsh weather conditions and heavy use, making the material ideal for high-traffic areas. It is also available in a variety of colors to match or enhance the aesthetic of the location. Plus, bridge owners and engineers reap long-term savings thanks to the material's natural corrosion resistance and low maintenance requirements.

Versatile, reliable, and long-lasting, FRP completely eliminates the need for concrete in sidewalk applications.



How FRP Sidewalks Work

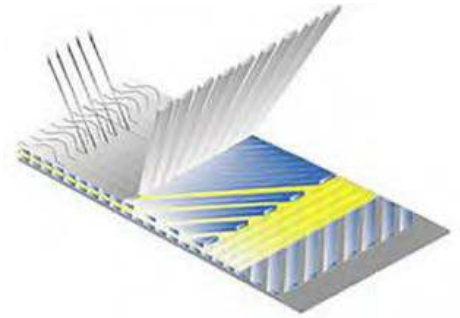
Sidewalks and pathways made from crushed stone material—such as cement and concrete—rely on pressure molding and sealing agents to create strong, durable structures. However, regardless of the quality of the design and build, they all eventually succumb to weathering and wear. By using Fiber Reinforced Polymers, bridge designers and engineers solve many of the problems inherent in crushed stone structures.

FRP composites are orthotropic—i.e., they exhibit different properties along each axis. The material's directional fibers can be oriented to serve a specific design function. This quality allows designers and engineers to adjust the material properties, such as its strength, stiffness or thermal expansion, to best fit the bridge owner's specifications. In this way, engineers design the right combinations of properties to fabricate FRP sidewalk components that are custom-tailored to the area, usage, and conditions of their destination.

Fiberglass reinforced polymer composites typically feature a sandwich-type construction: the fiberglass facesheets are integrally molded with a fiberglass reinforced core and then infused with a high-performance polymer resin. The resulting material demonstrates high strength, durability, and corrosion resistance.

When constructing FRP sidewalks, decking can be attached directly to floor beams, stringers, or piers. Railing components then securely fasten to the decking to create a cohesive unit. In addition to these installation options, FRP allows for greater design flexibility by offering:

- Availability in various sizes and shapes
- Functional features, such as crowns, cross-slopes, railing attachments points, drainage scuppers with gratings, curbs, and expansion joints
- A range of color options for functional and aesthetic purposes (for example, browns and greens blend structures with a backdrop of foliage and natural landscapes, while brighter colors make the structure stand out)



Sidewalk Case Studies

Although a relatively recent sidewalk technology innovation, FRP has already been used in a number of sidewalk and walkway repair and replacement operations, including:

1. Tower Bridge in Sacramento, CA.

Although Tower Bridge was originally designed to carry cars and trains, today it caters to four lanes of automobile traffic and a couple of sidewalks of bicycle and pedestrian traffic. In 2008, during a repair and restoration operation, FRP cantilever sidewalks were added to increase the width of the existing sidewalks without overloading the lift bridge's weight capacity.



2. Water Street Bridge in Albany, NY.

Compromised by deterioration due to ice and salt, the Water Street pedestrian walkway was closed down in early 2017. The city reclaimed the existing walkway by installing prefabricated FRP. The material's durability and strength ensure that the walkway will continue to serve its purpose for years to come.



3. Wilson Burt Bridge in Niagara County, NY.

Built in 1959, this 442-foot long structure bears motorized vehicles and foot traffic over Eighteen Mile Creek. To make the bridge more accessible to walkers and bike riders, engineers replaced the narrow concrete walkway with lightweight FRP. This switch allowed designers to increase the shared use pathway without overloading the bridge's weight limits.



4. State Route 410 Bridge in Bonney Lake, WA.

During bridge reconstruction, managers decided to add a wider sidewalk to the structure. By using the more lightweight FRP composite material, the city of Bonney Lake was able to revamp the 106 x 6-foot pathway to provide a safer experience for pedestrians.



5. San Lorenzo Riverwalk in Santa Cruz, CA.

This walkway connects the Santa Cruz boardwalk with the nearby amusement park. The original bridge consisted of a deteriorating wooden sidewalk attached to an active railroad bridge. After rebuilding the structure with FRP decking, pedestrians and cyclists are able to enjoy wider sidewalks while safely avoiding travel on the railroad tracks.



6. Speers Road Bridge in Oakville, Ontario

When the bridge was widened with separated bike lanes, an FRP cantilever sidewalk was an important inclusion. The sidewalk minimized weight by using an all-FRP structure: pultruded elements for channel floor beams, longitudinal decking planks, and an FRP picket railing on the outboard edge of the sidewalk.



Why FRP Works for Sidewalks

FRP provides bridge designers and engineers with several benefits, including:

High strength-to-weight ratio

The high-strength, fiber-reinforced polymer deck construction allows engineers to cantilever, or suspend, pedestrian walkways alongside vehicle bridges with minimal increase in weight. Additionally, FRP decking has a dead load of only 4–9 psf, which is 80–90% lighter than reinforced concrete panels.



Ease of installation

As these sidewalk components are prefabricated, construction is quicker, installation costs less, and high-quality results are guaranteed. FRP composites also offer greater design flexibility as they are available in a variety of sizes and colors with options for additional features.



Durability

FRP is resistant to chemical and water corrosion—which means that structures will last nearly 100 years, reducing the need for costly, time-consuming, and highly inconvenient rebuilds.



Increased live load capacity

As FRP composites allow for a lighter dead load (i.e., the weight of the structure), bridges made from FRP composite have a greater live load capacity (i.e., the weight of the people and vehicles that move across the bridge). With an increased capacity for live loads, bridges can support wider sidewalks that leave more room for both walkers and cyclists. It also means that the bridge can accommodate larger crowds during high-traffic periods and special events.



Creative Composites Group: Your Partner for FRP Sidewalks

Every infrastructure project is unique, and proper material selection is crucial for ensuring the quality, longevity, and safety of the build. To learn more about the benefits and uses of FRP or if you think that it could be a good fit for your next project, **[contact the team at Creative Composites Group today](#)** to discuss your options with an expert.

We're happy to answer any questions you may have and can guide you through each step of the process to ensure you receive a sidewalk solution that works for your unique application requirements.



Choose Creative Composites Group for Comprehensive Project Support

Your Single Source for Innovative Pedestrian Bridge 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 a leader in technical innovation that is backed by the industry's most comprehensive FRP manufacturing group for infrastructure.

As Creative Composites Group, we can help you engineer and manufacture pedestrian infrastructure projects to meet the needs of future generations.

We offer comprehensive engineering, design and consultation for shoreline and asset protection. Our manufacturing capabilities include the broadest range of engineered FRP solutions to build your ideal projects. 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 Cantilever Sidewalk & FRP Provider

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

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

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