

A photograph of a modern rail station platform. The platform is paved with grey concrete and features a prominent yellow tactile paving strip along the edge, adjacent to the tracks. The tracks are made of steel rails on wooden ties, set on a bed of gravel. In the background, there are utility poles, a station building, and a clear sky. A green banner is overlaid on the left side of the image, containing the text "Riding the Rails with FRP".

Riding the Rails with FRP



Rail platforms often act as a customer's first experience with a commuter railway, so it's important to take steps to ensure these platforms are as safe, functional, and visually appealing as possible. Rail platforms see a tremendous amount of wear and corrosion from foot traffic and environmental factors, and station managers must take proactive steps to safeguard their facilities from these risks.

Traditionally, municipalities have used concrete, wood, and steel to build rail platform decking, but all these materials degrade in response to different threats. These factors have recently caused rail platform operators to turn to fiber-reinforced polymer (FRP) composite decking material. This lightweight, durable solution resists corrosion and wear, and it holds up well against weather extremes, ice buildup, and deicing chemicals.

In this eBook, we explore a few of the most prevalent uses of FRP in rail platform design, and we provide some case studies on how our FRP products have benefited stations that regularly deal with harsh weather conditions.

Why Use FRP for Rail Platforms?

FRP provides a great alternative to steel, wood, and concrete platform decks for a number of reasons.

FRP platform panels easily incorporate non-slip overlays and warning tiles as well as curbs, railing attachments and slopes for water drainage. FRP platforms are used for exterior stations where operators have to use chemicals to melt snow and ice. With more extreme weather events and liability issues, the heavy use of chemicals has reduced the life of concrete panels to only 15 years. FRP materials resist the corrosive effects for over 75 years while maintaining the safety of both passengers and employees.



FRP's unique composition imbues it with the following traits:



Lightweight,
but structurally
robust



Design
flexibility



Ability to create
prefabricated panels
for rapid installation



Resistance to
corrosion, wear, and
weather effects

Deck Panel and Deck Design Requirements

FRP panels are built to comply with a wide range of load design requirements and other municipality code standards and specifications. FiberSPAN FRP decking, one of Composite Advantage's premier products, meets or exceeds the following typical design requirements:

- ▲ Uniform live load up to 150 pounds per square foot
- ▲ Deflection of less than $L/500$ (support span divided by 500)
- ▲ Maintenance or emergency vehicles (H-5 or H-10 vehicles up to 20,000 pounds)
- ▲ Any type structural support such as piers, piles, girders or floor beams

FiberSPAN's ability to meet these and other requirements makes it an optimal choice for rail platforms across the country. FRP's material properties along with its compliance with the above regulations enable it to have a wide range of applications, which we outline below.

Platform Panel Design Features

When applied as rail platforms, FRP panels cover the transverse width of the platform, and their length is determined by the station framing layout and construction parameters. FRP deck panels can be up to 50 feet in length to reduce the number of joints and allow for fast installation of large areas.

Panels are available in two types: slab decking and Tee stiffened panels. Decking panels are slabs that attach to support beams, and can have thicknesses that range between 3.5 and 8 inches. This dimensional flexibility allows FRP decking to meet deflection criteria based on the spacing of the support structures while also providing load weights between 6 and 10 pounds per square foot (10% the weight of concrete decking.) Tee stiffened panels are similar to precast concrete double tee panels, but at less than 20% the weight.

FiberSPAN FRP panels are built in a sandwich configuration, with numerous internal shear webs molded between top and bottom fiber polymer facesheets. This type of construction allows clients to customize panel depth and laminate/web thickness in accordance with the load requirements and support structure. FRP panels also contain closed cell foam between the facesheets. This nonstructural element provides shape during manufacturing and prevents the collection of water within the cavities. The panels meet fire-resistance requirements stipulated by NFPA 130 and ASTM E-84 Class A.

Prefabricated FRP panels integrate a wide range of features, including:

- ▲ Crown or cross-slope
- ▲ Curbs
- ▲ Drainage scuppers
- ▲ Rail post connection points
- ▲ Attachment points for equipment and signs
- ▲ Non-slip surface overlays in variety of colors
- ▲ Warning tactiles
- ▲ Rub rails



Building all these features in the delivered product greatly reduces the installation time it takes to set them up in the station, which can only be done between train schedules and system downtimes. There is much less impact on operations and passenger inconvenience caused by platform rehabilitation.

FRP Double-Tee Product Applications

FRP can be used to create tee stiffened panels, which offer identical performance as concrete double-tees but at less than 20% of the weight. FRP tee panels have been used in bridges for many years; and designers are finding this product type is a very good match for rail platforms. The Double-Tee panels span distances up to 50 feet, which significantly reduces the substructure construction next to tracks. The lightweight panels are placed quickly between train movement at the station.

Additional advantages of FRP double-tee panels include:

- ▲ FRP Double-Tee panels can span piers up to 50 feet apart
- ▲ Weight between 15 and 22 pounds per square foot (compared with concrete double-tees, which weigh as much as 120–130 psf)
- ▲ Deck and tee stiffeners molded as a single piece
- ▲ Stiffeners can transition to slab depth at piers
- ▲ Panels have two or three tees depending on platform elevation
- ▲ Simple stainless steel clip connection at piers.



Case Studies

FiberSPAN-R FRP decking and FRP double-tee panels have been successfully installed at a wide range of rail platforms across America. The following case studies demonstrate FRP's potential to revolutionize all kinds of rail platforms.

Chicago METRA System (New Lenox, IL)

Due to its location next to a wetlands area, the New Lenox, IL, METRA station required a lighter and more durable system for its rail platform than what was previously in place.



The Chicago METRA System outlined the following specifications for this project:

- ▲ 125-psf live load with L/500 deflection
- ▲ 2,500-lb. concentrated-load steel beam superstructure
- ▲ 6-feet beam spacing
- ▲ Mechanical fasteners for deck-to-beam attachment
- ▲ Epoxy aggregate non-slip overlay
- ▲ Integrated guardrail attachment to backside of the platform
- ▲ Crown-molded panel with 1% slope
- ▲ Yellow warning tile strips
- ▲ Internal steel plate for rail attachment

The FRP decking that we installed met the necessary weight requirements without incurring maintenance since we completed the project in 2009.

West Natick Rail Platform (Natick, MA)

The constant buildups of snow and deicing chemicals present at the West Natick, MA, rail platform caused wood and concrete deck surfaces to deteriorate rapidly during the winter, which incurred frequent maintenance costs and eventually required the platform to be closed. The Massachusetts Bay Transport Authority (MBTA) sought to overcome this issue by replacing the platform with lightweight, corrosion-resistant FiberSPAN-RTM in November, 2017.

The MBTA outlined the following specifications for this project:

- ▲ 100-psf live load
- ▲ Concrete pier superstructure up to 25 feet spacing
- ▲ Stainless steel angled deck connection
- ▲ Quartz aggregate panel non-slip overlay
- ▲ Guardrail attachments
- ▲ Yellow warning tile strips
- ▲ Retractable edges for passage of freight trains
- ▲ Double-tee panels



FiberSPAN-R installation replaced existing materials, meeting the specifications and feature requirements outlined by the MBTA. The result is a rail platform deck that performs much better under the harsh environmental and chemical conditions found in the northeast US.

FiberSPAN-R and Composite Advantage

FiberSPAN-R FRP composite panels by Composite Advantage provide the necessary structural support, corrosion resistance, and maintenance reduction sought by rail transportation systems across the country. The advantages of installing FiberSPAN include:

- ▲ Resistance to wear caused by heavy foot traffic
- ▲ Durability under harsh weather conditions
- ▲ Resistance to breakdown caused by de-icing chemicals
- ▲ Lightweight construction with full structural integrity
- ▲ Flexibility to meet design and load requirements
- ▲ Quick, low-cost installation of prefabricated panels
- ▲ Ability to integrate features into prefabricated FRP products (drainage scuppers, guardrail attachments, non-slip surface, curbs, etc.)
- ▲ Extremely low maintenance requirements over long periods of time



These features and benefits allow FRP to provide a viable alternative to traditional rail platform decking. FRP panels are easy to install, and station retrofits using these materials often cause minimal inconvenience to commuters. FiberSPAN-RTM panels are available either in deck slabs or as double-tee panels.

Overhaul Your Rail Platforms with Composite Advantage

Composite Advantage provides top-of-the-line FRP installation services for commuter rail operators across the country. Our FRP systems have enhanced the safety and reduced maintenance costs for countless rail platforms, and we're excited to see where our next project will take us.

Contact us to learn how our engineers at Composite Advantage can provide the right, long-term solution for your rail platform challenges.

When it comes to reputation, we believe a track record for innovation, solving problems, good service, and a commitment to do what we say speaks volumes.

As a leading supplier of FRP products for bridges, waterfront infrastructure and rail platforms – based on award-winning technology and innovative designs – we understand that high performance, lower cost alternatives are our customers' first priority. Contact us for the DESIGN and MANUFACTURING of FRP fender systems for high strength and high energy absorption. Our large diameter pipe piles are the critical component that reduces pile count and installation costs.

Find out more about our [Technology](#), our [Team](#), and our [History](#).

Composite Advantage is part of the Creative Composites Group within Hill and Smith Holdings PLC. Together, CCG provides a wide range of infrastructure products including:

- Fender Protection Systems
- Sheet Piles
- Ship Berthing Equipment
- Vehicle Bridge Decks
- Pedestrian Bridges and Decks
- Rail Platforms
- Utility Products
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