



Case Study: EXTREN®

Modern Apartment Complex Stays Classy by Using FRP

Known for a dynamic downtown and close proximity to the beach, San Diego, California, has undergone a housing revitalization designed to match its hip and trendy landscape.

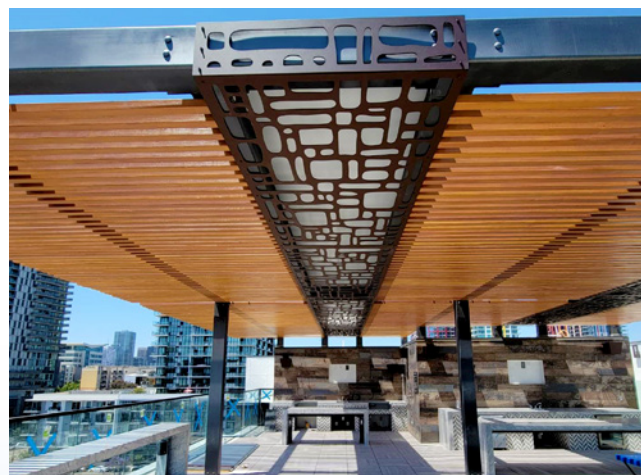
Within the downtown area, a leading developer worked to build a seven-story rental community with over 350 apartments. The LEED-certified apartment complex was designed with luxurious accommodations.

Aluminum was originally specified into the design for many of the facility's large exterior living structures due to weight and on-site fabrication limitations. However, issues concerning corrosion and intense UV exposure arose. PORTER FRP Solutions initiated the sourcing of fiberglass components as a more suitable alternative to solve the challenging environmental needs of the building's prominent outdoor structures.

On top of the building sits a 5,100 square-foot sky lounge, the premiere accoutrement of the building, outfitted with a complete spa, pool, and lounge area. The area boasts spectacular views of the bay and downtown area. Adjacent to the pool sits a pergola-style cabana constructed with EXTREN® fiberglass structural shapes and plates. To create a wooden slat resemblance, 2" x 2" tubes were painted to look like grained wood texture. EXTREN® tubes were also used for the columns and beams of the rooftop bar and kitchen. Each of the 6"x 9" tubes were coated with metallic paint to produce a custom finish.

In another rooftop canopy application, the cabana design carried over to an outdoor social area. 1/4" fiberglass plate was used to fabricate lightweight planter boxes housing living shrubs and natural foliage.

The center of the housing complex contains a courtyard area featuring a brick oven within a communal kitchen for its residents and their guests. In this instance, PORTER FRP Solutions attached the textured wood facade on FRP EXTREN® tubes to the vertical supports of the kitchen awning to create floating planter boxes.



At the conclusion of installation, building management, residents, guests, and installers were impressed with the materials, build quality, outcome, and design of all FRP structures.



STRONGWELL

Corporate Offices / Bristol

400 Commonwealth Ave.
Bristol, VA 24201 USA
(276) 645-8000

Chatfield

1610 Highway 52 South
Chatfield, MN 55923 USA
(507) 867-3479

Highlands

26770 Newbanks Road
Abingdon, VA 24210 USA

Mexico

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

www.strongwell.com

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Case Study: Custom Pultrusion

Custom Pultruded CFRP Beam Lightens Fifth Wheel Design

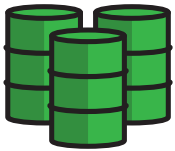
Strongwell recently pultruded a custom CFRP beam for use in the core of JOST International's fifth wheel system. The customer searched for a critical component improvement to reduce overall transportation costs while reducing its environmental footprint on shipping, installation, and road performance.

Designed for safety, the beam weighs in at under 2 lbs. and sees no loads during normal operations. The beam comes into action in the event of an overturn. In the moment that event occurs, the composite-steel hybrid wheel first combats plastic deformation through load absorption and then redirects external physical forces back into the locking mechanism.

Designers utilized composite's superior strength-to-weight ratio to remove 70 lbs. of weight over the previous steel design. Integrating carbon fiber into this part also improved the cross-section strength by 50% compared to other alternative options.

The new weight savings combined with JOST's stationary mounts makes this system the world's lightest fifth wheel rated for 55,000 lbs. This product was awarded the "Infinite Possibility for Market Growth" ACE Award in 2022; it challenges a fragmented sector of industry slower to adopt new technologies and materials due to logistical, environmental, and financial headwinds.

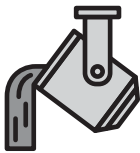
Implementing this design on the 250,000 qualified trucks estimated for 2023 production alone would result in:



2 million gal/yr
of diesel saved
(\$10 MM+ in fuel savings)



45 million lbs./yr
less CO₂
(from diesel emissions)



58.5 million lbs. less CO₂ vs. cast steel OR
490 million lbs. less CO₂ vs. aluminum
(from production)



Literature Updates:

- Design Manual Sections:
 - 6 (Imperial + Metric)
 - 12 (Imperial + Metric)
- Availability List (I+M)
- Solutions for the Coastal Market Flyer
- DURAGRATE® Brochure (I+M)
- DURADEK® vs. DURAGRATE® Comparison Flyer
- STRONGRAIL® Brochure

Visit www.strongwell.com for the latest resources.



Case Study: HS ARMOR

Ensuring SWAT's Safety

A law enforcement agency located in Northeast Tennessee recently procured a new unmarked cargo van to covertly transport its SWAT Team members into potentially volatile situations.

Prior to acquiring the new van, the team's only options were to utilize multiple un-armored SUVs or make use of a 40+ year old surplus armored bank transport truck when required to approach hostile settings. Both of those options were far from ideal.

To solve this problem, the department raised the funds to purchase a Ford Transit 350HD with plans to up-armor it and configure it to meet their needs. The 350HD's dual rear axle, 148" overall length, and significant powertrain offer capability for hauling several passengers or substantial cargo. Upon delivery, the vehicle was outfitted with an additional layer of protection. Multiple panels of Strongwell's UL 752-rated 1/2" HS Armor were fabricated, coated with an elastomeric polyurethane material, and installed along the van's interior, along with bench-style seating with built-in storage. The end result blends perfectly with the existing style of the van while offering



significant ballistic protection for the vehicle's occupants.

The department understood that adding ballistic protection and seating would lead to a potentially significant weight increase to the vehicle's factory 10,500 lbs. gross vehicle weight (GVW). However, fully outfitting the van with 1/2" HS Armor composite ballistic panels only increased the vehicle's GVW by roughly 10%. This minimal weight increase was critical, considering the van may be at times loaded with up to twenty fully outfitted SWAT Team members.

The entire department was impressed by the installation. They noted the material was easy to handle and fabricate, and the end result is perfectly suited for their end use. Additionally, they noted how maneuverable and nimble the van feels for its size and ballistic armoring. ●



Strongwell New Hires



Alexis "Lexi" Ball

Customer Relations and Pricing
Administrator - Corporate

Lexi holds an Associate of Applied Science degree in Business Management from Southwest Virginia Community College. Prior to joining Strongwell, Lexi worked in customer service and direct sales.



Melissa Owens

Quality Improvement Coordinator
- VA Operations

Melissa has several years of previous experience in the manufacturing quality field, including past roles as CRM Coordinator and Quality Technician. She is also a certified welder.



Rhonda Merchlewitz

Credit Manager / Accounts
Receivable - Chatfield

Rhonda retired from a regional bank in 2021 where she was a VP/Mortgage Loan Officer for 17 years. Rhonda had been in banking and lending for 23 years.



David Lichvar

Manufacturing Engineering Specialist
- VA Operations

David joins Strongwell with 35 years of pultrusion experience.



Jason Reike

Process Engineer - Chatfield

Jason holds a Bachelor of Science in Composite Materials Engineering from Winona State University. Most recently, Jason worked in a testing lab for an automotive parts manufacturing company.



Brandon Bailey

Desktop Support Engineer - Bristol

Brandon earned his Bachelor of Science in Media and Communication from East Tennessee State University and began working in news and production before transitioning to a career in IT. After graduating with a technical diploma from Tennessee College of Applied Technology – Elizabethton, he worked as an IT Technician for a local Department of Education before joining Strongwell.



Austin Williams

Machine Design Engineer - Bristol

Austin joins Strongwell with a background in Machine Design/Mechanical Specialist at a local engineering and construction firm. He is working towards earning his Bachelor of Science degree at East Tennessee State University in Manufacturing Engineering.

Strongwell Promotions

Samuel Dutcher

Inside Sales / Fabrication Estimator - Chatfield

Scott Holmes

Manager, Engineering Services - VA Operations

Jeremy Smith

Manufacturing Manager, Bristol Operations - Bristol

Jim Hanson

Facilities, Safety, & Health Manager - Chatfield

Gilbert Valadez

Accounting Supervisor - Chatfield

Brian Godwin

Advertising & Graphic Design Manager - Corporate

Zach Mullen

Assembly Shift Coordinator - Chatfield

Kat Bicknese

Assembly Shift Lead - Chatfield

Ashley Underwood

2nd Shift Pultrusion Coordinator - Chatfield

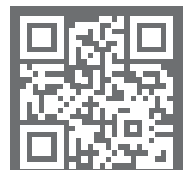
Matt Jacobson

3rd Shift Pultrusion Coordinator - Chatfield

Bryan Edgerton

Operations Manager - Chatfield

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STRONGWELL - CORPORATE OFFICES
400 COMMONWEALTH AVE.
BRISTOL, VA 24201 USA

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Ensuring SWAT's Safety



Strongwell New Hires & Promotions



Fiberglass Lands in the Top Spot

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Case Study: Custom Pultrusion

Fiberglass Lands in the Top Spot

Corrosion-related maintenance issues have plagued coastal residential developments for decades.

One of the most prevalent corrosion-related maintenance issues has been concrete spalling on the decks, stairs, and landings of existing coastal buildings, especially multi-story structures. Spalling usually occurs when the concrete's steel reinforcements and supports corrode and eventually expand. The continual internal expansion process then exerts additional stress on the concrete itself.



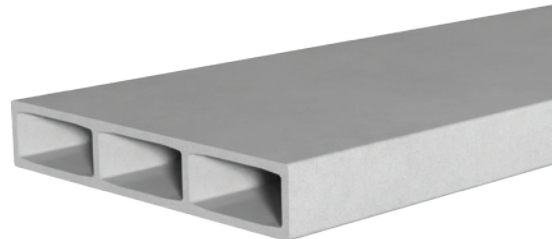
This was the case at a 41-year-old ocean front building in Indian Beach, NC. Intense rusting within its exterior stair tower resulted in prevalent concrete spalling and deterioration.

One structural and architectural fiberglass fabricator worked with Strongwell to develop a custom profile called the LAST Landing Deck Panel. The LAST Landing Deck Panel is a rigid reinforced pultruded pedestrian deck panel designed to resemble a concrete landing. Designed to compete with elevated concrete landings, the drop-in-place FRP profile measures 12" in width and significantly cuts labor and materials costs associated with the pumping, pouring, finishing, and underside painting associated with typical concrete landings. In addition to the multiple landings, the custom profile was also used for the stairs within each stair structure.

Being that the LAST Landing profile is pultruded, end users have greater flexibility in customizing the landing platform with colors and grit options.

The pultruded profile offers users a firm footing, measuring more than 30,000 psi modulus of elasticity, and makes for an economical solution for those looking to replace existing concrete mezzanines and landings.

For this project, the fabricator replaced the rusted steel frame with galvanized steel.



Using a two-man crew, each team was able to install the LAST Landing skid resistant panels into each of the 5' x 9' landing frames in under an hour. Typical concrete landings would have taken about six hours each with the same number of workers.

By going with composites, each of the multiple elevated stair structures are expected to offer at least 75 years of useful life in the coastal environment. ●

