

Challenge Accepted.



AVIENT™

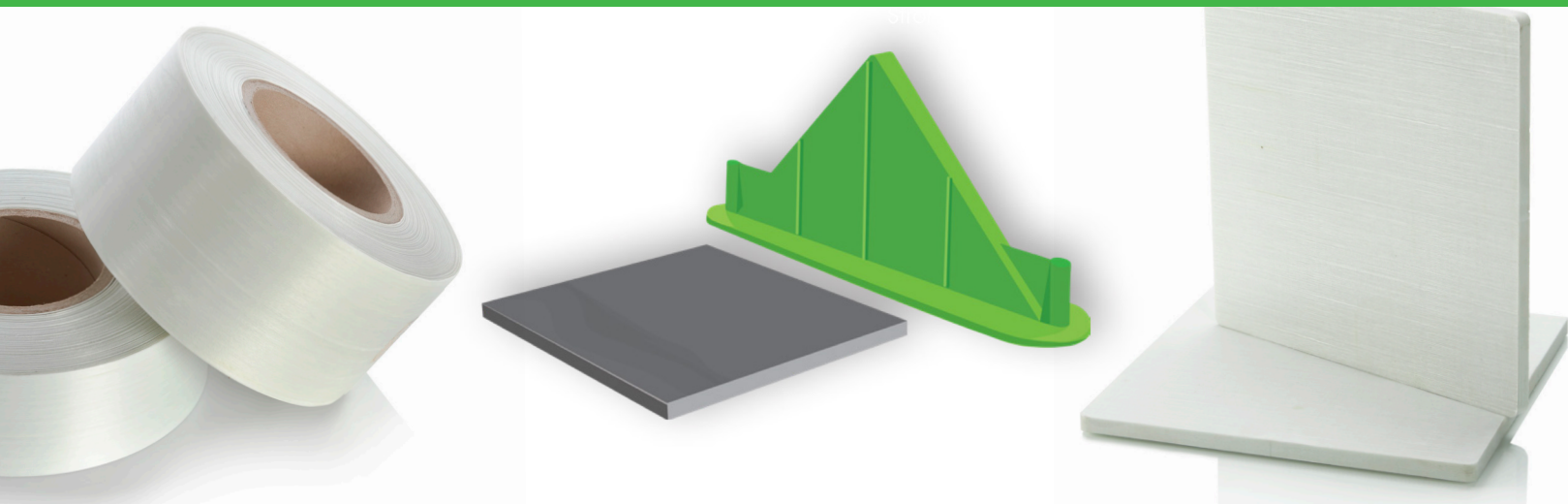


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JOIN FORCES TO TRANSFORM THE FUTURE OF CONCRETE INFRASTRUCTURE



» **CASE STUDY:** POLYSTRAND™ CONTINUOUS FIBER REINFORCED COMPOSITES



THERMOPLASTIC COMPOSITE COMPONENTS FOR NEXT-GEN CONSTRUCTION

THE CHALLENGE

Structural engineers in the concrete construction sector are increasingly facing the challenge of finding higher-performing, longer-lasting, and more sustainable building materials. Flatwork and slab-on-ground reinforcement options have traditionally been limited to steel dowel plates as the go-to solution because of their strength and availability. However, metal components can come with some significant drawbacks: they're stiff—which can lead to concrete joint damage over time—and they are prone to corrosion. Alternatively, thermoset composites provide a much lighter-weight option, but are more brittle and can fail under shear stress.

The opportunity is clear: to reimagine materials for reinforcement and to offer an innovative, cost-effective dowel plate that can provide long-lasting performance. Enter ReForm Composites Engineering. Originating from the University of Maine's Advanced Structures and Composites Center (ASCC), ReForm has evolved into a transformative collaboration in innovation. Founded in 2024, the Maine-based organization understands the need for high-performance reinforcement in critical concrete infrastructure. By using continuous fiber-reinforced thermoplastic (CFRTP) composites, ReForm is redefining the industry with innovative solutions.

THE SOLUTION

ReForm Composites Engineering manufactures PolyDowel™ flat plate dowels using their patented Continuous Forming Machine (CFM), which integrates thermoplastic pultrusion and in-line thermoforming of Avient's thermoplastic fiberglass reinforced laminates at a commercial scale.

Custom-formulated for the PolyDowel application, Avient's Polystrand™ laminates are constructed from layers of unidirectional tape that are composed of thermoplastic resin reinforced with fiberglass. Avient's advanced slitting capabilities enable the laminates to be cut at 4.5 inches wide, perfectly suited for a seamless production process in the CFM while minimizing scrap. Using Polystrand thermoplastic laminates results in a lightweight, non-brittle, corrosion-resistant alternative to traditional dowel materials.

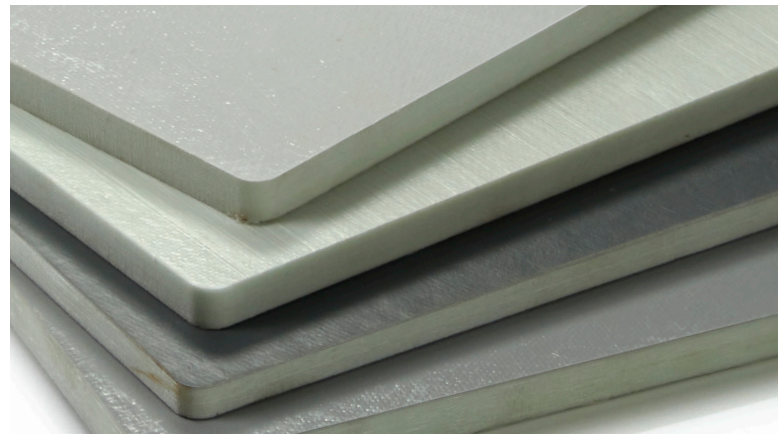
THE IMPACT

The combination of thermoplastic resin and fiberglass reinforcement produces a dowel plate that is 80% lighter than steel, reducing transportation emissions and installer fatigue. The non-corrosive and durable nature of Avient's material in PolyDowel flat plate dowels extends the service life of concrete slabs, significantly reducing the need for repairs and replacements. This not only saves costs but also minimizes environmental impact. The exemplary joint performance, which is 50% greater than steel, can effectively transfer loads without causing stress or cracking in the surrounding concrete.

"Our collaboration with Avient has brought innovation to the forefront of concrete reinforcement," said Cody Sheltra, Chief Executive Officer of ReForm Composites Engineering, LLC. "With our transformative manufacturing process and Avient's material design expertise, we were able to produce a cost-effective solution that increases the longevity of concrete."

The first demonstrator installation of PolyDowel flat plate dowels was completed in early 2025 in a high-traffic entertainment infrastructure project, validating field performance. PolyDowel dowels have also been installed in Port St. Lucie, Fla., at the Mattamy Homes Heart of Tradition plaza, home to the iconic Heart in the Park, the world's tallest heart sculpture.

Through a collaboration between ReForm and Adena Corporation, this technology is now being scaled for broader adoption, bringing high-performance composites to the construction sector at a practical price point.



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