NOVEL COUPLERS FOR SPLICING GFRP REINFORCING BARS

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Opportunity

Seeking a licensing and development partner to refine the design and scale the coupler toward manufacturing.

Development Stage

Validated in the lab. Prototype couplers were machined from stainless steel and tested under monotonic tension.

Intellectual Property

Utility Patent Application Filed

Publication

Coming Soon

IDF#

24-MST-037

PROBLEM STATEMENT

Fiber-reinforced polymer rebar resists corrosion and offers a high strength-to-weight ratio, so it is increasingly used in concrete structures. Yet its full potential is held back by a lack of effective ways to join the bars. The usual method is lap splicing, but FRP requires long development lengths, leading to construction challenges and rebar congestion. Mechanical couplers work well for steel, but they do not transfer to FRP. FRP is anisotropic, cannot withstand high transverse stresses, and is sensitive to stress concentration. Existing design codes cover steel splices and offer no guidance for splicing GFRP bars. There is no mechanical coupler available today for a GFRP bar.

SOLUTION

Researchers at Missouri University of Science and Technology have developed the Link-bar FRP coupler, a mechanical splice designed for GFRP reinforcing bars. The coupler uses a textured insert that interlocks with the bar's natural roughness and grooves. This creates a secure connection, improves load transfer, and strengthens the joint. The design avoids the weaknesses that make metal couplers unsuitable for FRP. Built from non-metallic materials, the coupler resists corrosion and maintains its integrity in severe marine, chemical, and industrial environments.

VALUE PROPOSITION

The Link-bar FRP coupler finally provides GFRP rebar with a reliable mechanical splice where none existed before. Its corrosion resistance eliminates the risk of rust in metal couplers and reduces long-term maintenance costs. In tensile pull-out testing per ASTM D 7205 and D 7957, spliced bars reached an average ultimate tensile strength of 8,500 lb. The result is a durable and sustainable connection suited to tough environments.