



Anchor System For Fiber Reinforced Polymer Plate

Background

Fiber reinforced material and, in particular, fiber-reinforced-polymers (FRP), have been introduced for the structural rehabilitation and retrofitting of aging infrastructure as they are stronger than steel and not susceptible to corrosion. However, FRP plate can be more difficult to anchor to the base material (the underside of a bridge for example) because of low transverse compressive strength (i.e. it's easily crushed), which can lead to breakage at or near the anchor point. Finding a suitable anchor system for FRP plates is a challenge as FRP plate is generally sensitive to lateral stress. It is, therefore, desirable to provide an improved anchoring system for fiber reinforced materials. Further, typical anchors for FRP plates tend to be very large, expensive, and difficult to manufacture.

Description of the invention

A researcher at the University of Waterloo has created a simple, reusable, compact, easy to machine, and light weight anchor system, which includes an outer casing that supports a wedge to hold the FRP plate. The anchor system is configured to anchor an FRP plate to a concrete structure. This anchor system utilizes a unique patent pending geometry which eliminates breakage and enables 100% of the tensile strength of the FRP to be used. This unique geometry allows the new anchor system to be very compact and light, especially when compared to traditional anchor systems.

Reference

8810-7430

Patent status

PCT patent
application filed
& issued US Patent 11,326,347

Stage of development

Working Prototype

Contact

Scott Inwood
Director of Commercialization
Waterloo Commercialization Office
519-888-4567, ext. 43728
sinwood@uwaterloo.ca
uwaterloo.ca/research

Advantages

This unique geometry anchor system has multiple advantages:

- Full (100%) utilization of the FRPs tensile strength;
- Large saving in FRP materials per project due to high load carrying capacity;
- No wasted material as 100% of anchor length is used (traditional systems often have 20% of unused and protruding component from the anchor system);
- Compact and lighter anchors making them easier to use and fit into tight spaces; and
- Significant cost savings which can be realized through all of these advantages.

Potential applications

This new anchoring system can be used to anchor FRPs for:

- structural rehabilitation, strengthening and retrofitting of aging infrastructure; and
- new structural design.