Imprinted Glass Fiber Reinforced Polymer (FRP) Vascular Network for Self-Healing Composites

OTT ID #1670

APPLICATIONS

Wind Turbines Blades, Airplanes, Hydro Turbine Rotors, Automobiles, Alternative Energy Sources, FRP composite materials, Self-healing FRP composites, Polymer Vascular networks, etc.

TARGET PROBLEMS

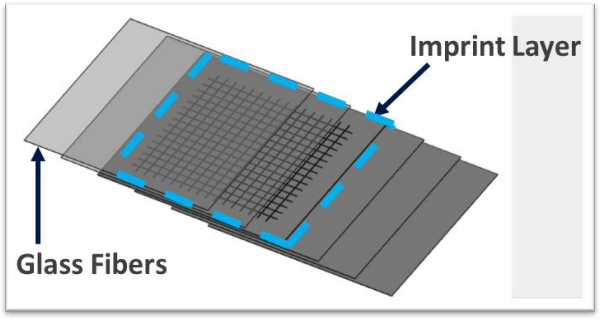
- Increase in sustainable energy needs
- Mechanical and structural failure due to uncontrolled environmental conditions or impact loading e.g.: cracks in wind turbines due to high wind speed
- Increase in manufacturing costs

KEY BENEFITS

- **AUTONOMOUS HEALING -** Self-healing provides a foolproof safety measure against catastrophic failure by healing the damages autonomously
- **COST EFFECTIVE** – The containers are made from the same resin as the rest of the FRP and require less amount of catalyst, reducing the overall cost without sacrificing the strength
- **EASY TO INSTALL AND MORE CONFIGURABLE** – Entire composite network prepared relies on 3D printed technology, making it easy to install and infinitely more configurable for multifunctional composites
- **CONTINUOUS OPERATION** – Autonomous healing upon crack formation enables continuous operation without service interruptions

TECHNOLOGY

Inventors at the University of Wisconsin - Milwaukee have developed a method that involves 3D printing to create a single self-healing layer fiber-reinforced plastic (FRP) sample with an imprinted network known as “imprint layer” as shown in the picture.



The imprinted layer is filled and sealed with a healing agent and embedded into a multilayer sample, replacing a layer of fiberglass. The healing agent reservoirs are interconnected, allowing greater access to the healing agent throughout the sample. This arrangement dramatically reduces the amount of catalyst required, and the container is made from the same resin as the rest of the FRP, reducing the total cost without sacrificing the strength. The entire network created relies on 3D printed technology making it easy to install and infinitely more configurable for multifunctional composites and assemblies for various applications such as wind turbine blades, airplanes, hydro turbine rotors, automobiles, etc.

INTELLECTUAL PROPERTY

Provisional Patent Application (PPA) filed Nov. 26th, 2019

This technology is part of an active and ongoing research program and is seeking partners for manufacturing and scale-up. It is available for licensing under either exclusive or non-exclusive terms.

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