TPI Composites Participates in Cure Optimization for Wind Blade Fabrication with University of Texas at Dallas

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SCOTTSDALE, Ariz., Aug. 14, 2024 (GLOBE NEWSWIRE) -- Today TPI Composites, Inc., (TPI) (Nasdaq: TPIC) announced its participation with the University of Texas at Dallas to apply physics-informed machine learning (ML) algorithms to simulate and optimize the composite curing process through multi-zone temperature control. This will solve a current technological gap by developing a smart “digital twin” that optimizes the curing process in blade manufacturing. Funded by the Office of Energy Efficiency & Renewable Energy, this project will accelerate the transition of research on ML-based modeling tools in academia to real industrial applications.

The digital twin will take inputs like spatial and temporal characteristics of the process and material properties of the composite components to guide the manufacturing process by providing the optimal spatiotemporal temperature profiles needed for the achieving the design target mechanical properties. Real-time data from sensors are collected as the blade manufacturing process advances. Thermal loads in multiple heating zones are then adjusted based off optimal cure trajectory identified by the surrogate digital twin in the background.

Dr. Shaghayegh Rezazadeh, TPI Lead Engineer, said “the application of statistical physics-informed AI models bridges the gap between deterministic Multiphysics simulations and kinetics of cure as happening on the shopfloor. This process leverages different heating zones integrated in TPI molds to achieve the desired mechanical properties while optimizing the cure cycle time to ensure consistent quality and enhanced productivity for the blades manufactured by TPI. The data collection from sensors enables reinforced learning and model refinement to improve the accuracy of the models and adaptation to environmental conditions and variabilities in labor-intensive manufacturing processes.”

Dr. Dong Qian, the principal investigator on the project, commented, “We are very excited to have this opportunity to work with TPI on the project. Our collaborative research will lay an important foundation for smart composite manufacturing and provide a significant competitive advantage for industries adopting these technologies, in terms of both cost savings and performance improvement.”

About TPI Composites, Inc.

TPI Composites, Inc. is a global company focused on innovative and sustainable solutions to decarbonize and electrify the world. TPI delivers high-quality, cost-effective composite solutions through long-term relationships with leading OEMs in the wind market. TPI is headquartered in Scottsdale, Arizona and operates factories in the U.S., Mexico, Türkiye and India. TPI operates additional engineering development centers in Denmark and Germany and global service training centers in the U.S. and Spain.

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