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Rapid On Site Repair of Wind Turbines by Cold Spray

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Rapid On-Site Repair of Wind Turbines by Cold Spray

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Henry M. Rowan College of Engineering

Advanced Materials and Manufacturing Institute (AMMI)

Sponsors



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Motivation and Objectives

Rain-induced leading-edge erosion (*Left*) and lightning-induced damage (*right*) on wind turbine blades

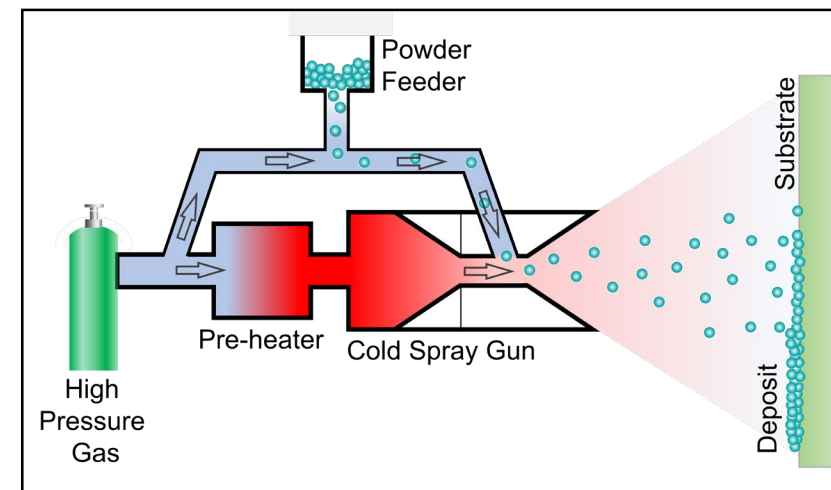


Images from: <http://www.aweo.org>

Conventional repair protocols



Images from: <https://fairwindres.com/wind-industry-maintenance/blade-repair/>



- ☐ Explore the nature of multiphysics phenomena occurred at polymer/composite interface during cold spray,
- ☐ Establish correlations between the modeling data and practical cold spray process variables

Research Methodology and Results

Microstructural Analyses



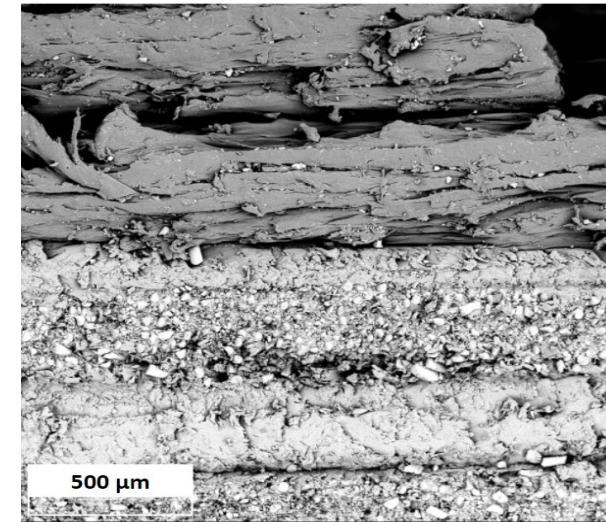
- We showed, for the first time, that cold spray deposition of thermoplastics on GFRP is possible.
- Cold spray can be a safe, fast, relatively inexpensive alternative for wind turbine blade repair.

Multiscale Modeling



280.33 Max
249.24
218.15
187.06
155.97
124.88
93.784
62.693
31.601
0.50971 Min

Successful Cold Spray Deposition on GFRP Composites



Acknowledgement



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