3-30-2022

Rapid On Site Repair of Wind Turbines by Cold Spray

Behrad Koohbor
Rowan University, koohbor@rowan.edu

Francis M. Haas
Rowan University, haas@rowan.edu

Joseph F. Stanzione III
Rowan University, stanzione@rowan.edu

Virtual Faculty Research Day 2022

Rapid On-Site Repair of Wind Turbines by Cold Spray

Behrad Koohbor, Francis Haas, Joseph Stanzione

Henry M. Rowan College of Engineering

Advanced Materials and Manufacturing Institute (AMMI)

Sponsors

Ørsted

Rowan University
HENRY M. ROWAN
COLLEGE OF ENGINEERING

Virtual Faculty Research Day 2022

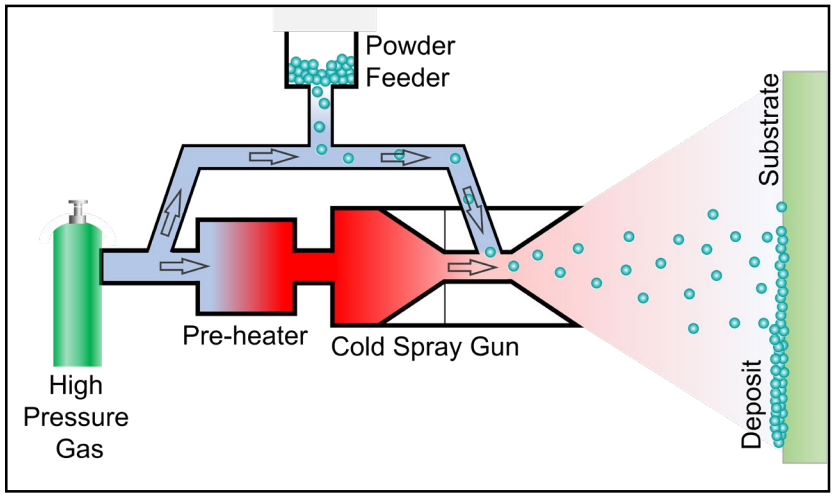
Motivation and Objectives

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

Images from: http://www.aweo.o

Conventional repair protocols

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



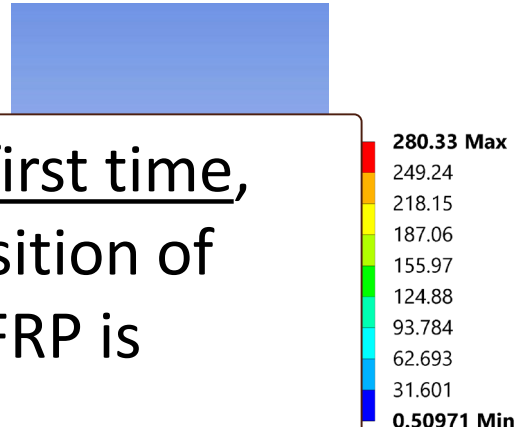
- ❑ Explore the nature of multiphysics phenomena occurred at polymer/composite interface during cold spray,
- ❑ Establish correlations between the modeling data and practical cold spray process variables

Virtual Faculty Research Day 2022

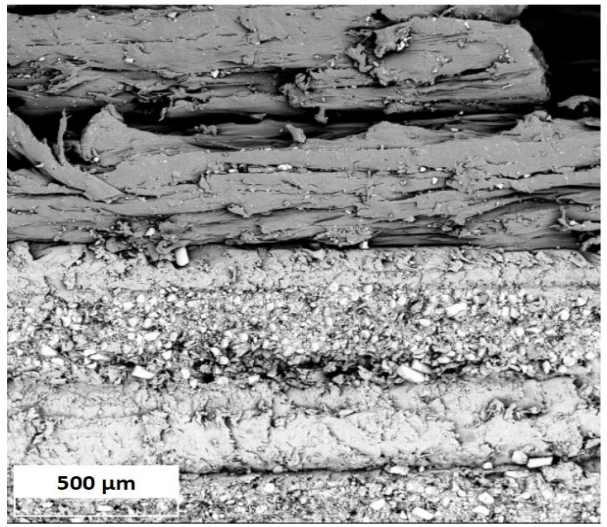
Research Methodology and Results

Microstructural Analyses

Multiscale Modeling



Successful Cold Spray Deposition on GFRP Composites



- 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.

Acknowledgement

Ørsted

Rowan University
HENRY M. ROWAN
COLLEGE OF ENGINEERING