Progressive Surface Installs Shot Peening System at Purdue University

STUDENTS AND RESEARCH TEAMS will be using a cutting-edge shot peening system this fall in Purdue's Manufacturing and Materials Research Laboratories (MMRL). The shot peening system was built and installed by Progressive Surface. "We provided this machine as a cost share with Purdue because we believe in the mission of the Center for Surface Engineering and Enhancement (CSEE) and want to be a part of improving the understanding and implementation of peening across all industries," said Jim Whalen, President of Progressive Surface.

Progressive Surface is a global leader in the design and manufacture of automated machinery and closed-loop process controls for shot peening, abrasive grit blasting, thermal spray coating, and ultra-high pressure waterjet stripping applications in the aerospace, energy, medical, military, and general manufacturing industries. The company is in Grand Rapids, Michigan, USA.

The shot peening system is designed to shot peen parts up to Ø30" x 30" tall and weighing up to 300 pounds. The system's features include:

- Heavy duty 1/2" thick plate construction
- Work door for access to the machine
- Viewing window on front and side of machine
- Ease of programming for a wide variety of components using the FANUC R-30IB controller and teach pendant
- Flexible work envelope from the FANUC LR-10iA robot (22 lb payload capacity)
- .6-60 rpm indexing spindle
- Integrated four (4) filter cartridge dust collector
- Closed-loop air pressure control
- Two (2) MagnaValve media flow controllers: 3-30 lb/min and 1-10 lb/min flow ranges
- 3/8" blast nozzle
- Quick-change Sweco vibratory separator
- Media sample port for capturing in-process media
- Stairs and platform for Sweco access
- Allen-Bradley Panelview operator interface with data logging
- Allen-Bradley CompactLogix PLC
- FANUC R-30IB controller

"The machine specifications were based on our industrial experience as well as our understanding of the projects conducted at CSEE," said Mr. Whalen. "It meets the most stringent requirements of the aerospace industry." The Progressive Surface team provided training in the operation, maintenance, and programming to the CSEE and MMRL staff.

Compact Layout, Robot Flexibility and HMI with data collection make this a perfect system for MMRL activities

Langdon Feltner, a Graduate Research Assistant with the School of Materials Engineering at Purdue University, is one of the people that will be working with the Progressive Surface machine. He is a researcher with expertise at the confluence of solid mechanics and stochastic processes, and he is devoted primarily to the modeling and experimental validation of shot-peening induced residual stress fields.

Regarding the installation of the shot peening machine at Purdue, Mr. Feltner said, "I believe that the Progressive Surface unit can simultaneously support cutting-edge research while also enriching hands-on teaching experiences for both undergraduate and graduate students. Professor Mike Sealy, Associate Professor of Mechanical Engineering at Purdue University, teaches a course on additive manufacturing

that takes an in-depth look at the application of peening as a treatment for additively manufactured components. Additionally, the School of Materials Engineering's industry-sponsored senior capstone projects allow small groups of students to gain first-hand experience operating the machine. Overall, this partnership between Progressive Surface and Purdue University represents a unique commitment to providing formal education in shot peening and supporting MMRL's mission to advance American manufacturing."

Two 600 series MagnaValves control media to two nozzles

Purdue's Manufacturing and Materials Research Laboratories (MMRL)

MMRL is a 30,000 square feet facility with the latest in manufacturing machinery and processes. In collaboration with industry and government partners, the Purdue teaching and research faculty is sharing advancements in shot peening, laser machining, particle coating, roll-to-roll printing, additive manufacturing, and more.

Along with Purdue's new eXcellence in Manufacturing and Operations (XMO) initiative—an initiative to build a national coalition of academia, government, and industry partners—MMRL and XMO focus on manufacturing research and experimentation to create a renaissance in U.S. manufacturing that will ensure jobs and national security.