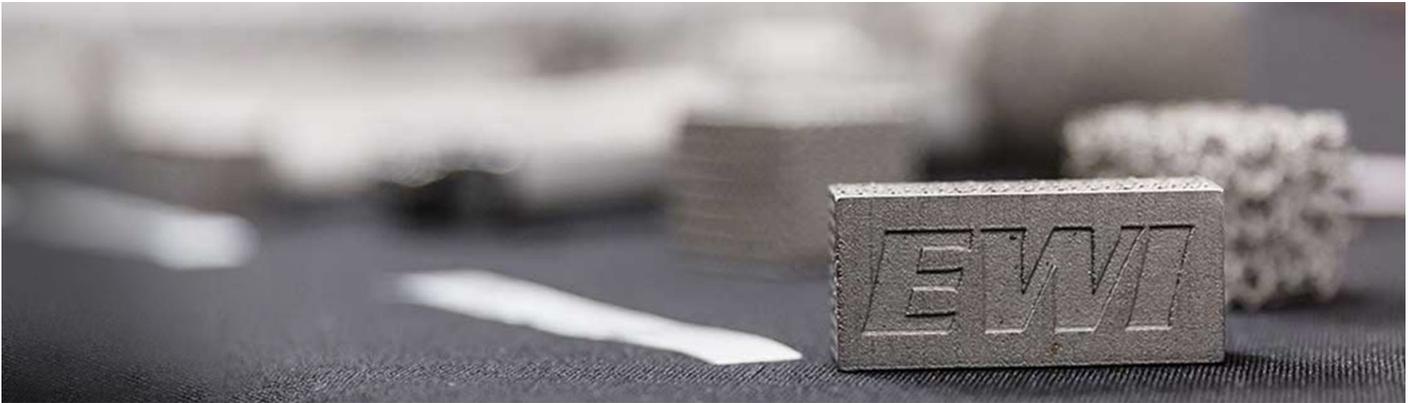


Additive Manufacturing Case Study



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Best practice AM data management at EWI

At a web seminar hosted by IEEE Globalspec, Alex Kitt, Product Manager at EWI, described the organization's use of GRANTA MI to facilitate best practices in managing and using Additive Manufacturing (AM) data.

EWI is a non-profit manufacturing R&D company committed to de-risking the adoption, development and implementation of leading-edge technologies with end-to-end technical advisory, advancement, and support services. Its history in welding and joining technologies has positioned it to be a leading innovator in AM, which can be viewed as an extreme form of materials joining: whereas a typical automobile may contain around 700 feet of weld, a 1-inch cube of additively-manufactured laser powder bed fusion (L-BPF) material contains around 5 miles of weld!

EWI supports the AM space through commercial projects, working with leading manufacturing companies to help them meet metal AM challenges, through involvement in Government R&D projects, and via its AM centers, consortia, and other collaborations. To support this work, it maintains an array of printing equipment covering laser and EB powder bed fusion, binder jetting, laser- and EB-directed energy deposition, sheet lamination, and robotic laser and arc-based AM.

The challenges faced by EWI include a number connected to the effective management and use of AM project data:

- Making best use of many sources of linked data (e.g., from powder characterization, builds, and mechanical testing)
- The need to share pedigreed data with a range of customers and partners
- The range of project/program types and goals

Given the complexity of the data involved, these are tough requirements to meet – but meeting them is essential to the efficiency of EWI's projects and to enabling EWI to collaborate with its partners. Collaboration cannot proceed unless project members can reliably share data and know that they have a complete and accurate picture of project results and analyses.

Objective

Enable AM innovation and collaboration through effective AM project data management.

Solution

Implement a materials information management system.

Benefits

- Capture data from many linked sources in AM projects
- Share and use this data effectively with internal and external project partners
- Enable insight into AM processes, based on the full pedigree of mechanical testing results.

“The pedigree of AM data is becoming more important”, explained Alex Kitt. “We needed to progress from our past state, where most of our data outputs were Excel sheets, to a mature data handling world.”

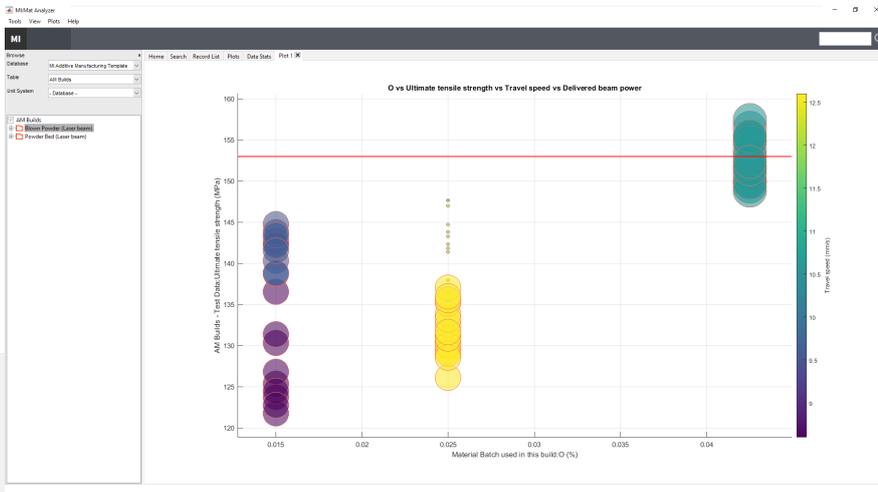
To meet these challenges, EWI has worked with ANSYS Granta since January 2019 to implement the GRANTA MI materials information management system. The project began by reviewing the Additive Manufacturing ‘Schema’ – the best practice data structures provided with the GRANTA MI databases to support data management for AM projects. The schema provided a robust starting-point for EWI in knowing which data to capture, and how.

EWI worked with the ANSYS Granta team to adapt it to its exact needs – integrating data capture from priority EWI equipment, management of powder inventory data, and making modifications for specialized workflows. By June 2019, the system was able to support powder characterization work, data capture from several AM systems (e.g., ExOne Innovent, RPM, and Arcam), and inspection systems (including Nikon CT systems, VGStudio porosity analysis, tactile profilometry, and Keyence surface roughness measurements).

This enabled deployment on its first project – an ‘America Makes’ program studying the mechanical performance debit in L-PBF processes with thin walls with narrow flow channels. The aim of the program is to understand the cost/benefit of HIP treatment and finishing. These are questions where a response has to be very data-driven and to consider the full pedigree of mechanical testing data that is the end-result of the experimental work.



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Analyzing AM data in the GRANTA MI software



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