FORD MOTOR COMPANY

Opportunities for Additive Manufacturing in Tooling and Production

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Ford Motor Company, with $156 billion in annual revenue, is the second largest automaker in the US and an Additive Manufacturing (AM) leader in the automotive industry. To explore the applications of AM, Ford has created the Additive Manufacturing team to promote AM as a manufacturing tool within the company. The Tauber team has partnered with the Additive Manufacturing team to assess AM for use in tooling and production.

While AM usage in rapid prototyping contexts is developed and mature, AM adoption in tooling and production contexts is still under development. With new advances in AM technology, however, AM is now starting to be considered as a viable option for larger-scale manufacturing environments. The Tauber team conducted a tool redesign and created a comprehensive cost model to identify the potential of AM in tooling and production applications, respectively.

In tooling, Ford can immediately avoid $2.25 million in assembly line extension and shutdown costs through the implementation of an innovative tool redesign powered by AM. The team demonstrated proof-of-concept on the existing generation of tooling by performing finite element analysis and printing a full-scale model of the resulting tool to test fit compatibility. The learnings and experience from this project will be expanded to similar design for AM (DFAM) applications with the potential to save an additional $18.5 million in the next five years.

To assess the feasibility of AM in production, a decision matrix was created by incorporating current printing limitations, geometric considerations, and printing quantities. Results showed that AM can currently be considered for select parts with quantities of up to 50,000 units/year with higher economic efficiency than traditional manufacturing processes. In the future, analysis on how improvements in AM printing speed and resolution will boost AM applications in production concluded that quantities of 100,000 units/year will be attainable within five years.