



PROOF OF CONCEPT CASE STUDY

Maxion's Use of Additive Manufacturing Screening Software Enabled 3D Printing Technical Feasibility Proof and Future Cost Savings Potential

CASTOR software informs manufacturers when to use 3D printing instead of traditional manufacturing.

lochpe-Maxion, a global leader in the production of automotive wheels and a leading producer of automotive structural components in the Americas, and CASTOR, an Israeli-based 3D printing tech startup, recently completed a Proof of Concept (PoC) program that evaluated the benefits of using CASTOR's additive screening software in the Company's industrial 3D printing program.

THE CHALLENGE

As a traditional steel and aluminum automotive components manufacturer, Maxion's business relies heavily on the use of tooling and molds. The machine-, material- and labor-related costs associated with prototyping, tooling, mold design, and setup, etc., typically require high volume production quantities in order to produce a return on investment.

Maxion was an early pioneer of additive manufacturing, initially using 3D printing for product concepts and spare machine parts. As 3D technologies advanced, so has the Company's interest. A major hurdle to broader adoption is knowing when to apply the alternative manufacturing process. With numerous 3D printing opportunities in its pipeline, Maxion needed a proven and quick analytical method to evaluate them for their merits in terms of applicability in the company's demanding industrial working conditions.

Turning to Maxion Advanced Technologies (MAT), the Company's global innovation hub in Berlin with the challenge, the MAT team began the scouting process and eight months later, completed the PoC with CASTOR.

About CASTOR

CASTOR is an automated 3D printing software enabling manufacturers to utilize the benefits of industrial 3D printing. The software analyzes thousands of parts at once and provides deep technical analysis for a full component design while identifying cost reduction opportunities and suggesting geometry changes to the part's design. It estimates the cost and lead-time for each part and connects the manufacturer to a service bureau that can print and supply the part according to requirements.

“Discovering the most promising components for additive manufacturing is resource intensive,” said Dr. Saul Reichman, head of Maxion Advanced Technologies, and Global Director, Innovation & Corporate Venturing, Maxion Wheels. “Analyzing the numerous assemblies, tools, fixtures and jigs used in our manufacturing processes – globally – is a ‘needle in a haystack’ challenge. We identified CASTOR as the right partner to support us on this journey.”

THE PROCESS

Maxion's operational leaders and CASTOR's experts in 3D metal printing came together for a workshop to set the scope of the PoC. The software analysis focused on tooling components, testing adapters, spare parts and complex products. In total 25 parts were analyzed.

The proprietary software conducted a technical and economic analysis of each CAD file resulting in a report determining the part's 3D printability with an estimation of the cost and lead-time for 3D production, and a break-even point calculation versus traditional manufacturing.

Three parts for 3D printing were chosen and based on CASTOR's material analysis recommendation and assurance that the part's strength and durability would not be compromised during its lifecycle, Maraging steel was selected.

CASTOR's software addresses this challenge directly, as explained by Omer Blaier, CEO, "The CASTOR Enterprise software contains intelligence that we derived from analyzing more than 30,000 parts. Thirty percent of those provide cost, lead-time, consolidation or weight reduction opportunities with significant benefits for manufacturers. We automated the part screening process, so this potential does not remain unrealized."

Maxion and CASTOR Proof of Concept Overview Process



COLLABORATION AND AGILITY ARE KEY TO INNOVATION SUCCESS

A key highlight of the PoC partnership was the mutual commitment to move fast. Maxion and CASTOR worked closely together to ensure traction and produce results quickly.

"This project is an example of how fast Maxion can test new ideas and innovate when working with the right partners. In only eight months, we engaged CASTOR with both Maxion Structural Components and Maxion Wheels, shortlisted potential opportunities, selected the most suitable ones, conducted the analysis, and secured a third party printer in Brazil. Our fast pace is more proof of the innovation culture embedded within Maxion and its employees," said Reichman.

Additionally, the following 3D metal printing key learnings were noted:

- Metal 3D printing technologies have developed to the point where they can be a serious manufacturing process alternative within Maxion's demanding working conditions.

- Tooling components found to be the best candidate by Maxion for metal 3D printing technologies. For a certain tooling application investigated, metal 3D printing can provide equivalent mechanical performances than traditional CNC machining, achieving the same values of cycle time performance.
- Metal 3D printing generates different metal microstructures than traditional CNC machining. These microstructures require adaptation of post-processing techniques and are more suitable for certain applications on the shop floor than others. In addition, the mechanical properties/tolerances associated with this method are worth further investigation to achieve the full potential

The PoC proved that metal 3D printing can offer better mechanical performance compared with traditional CNC machining. This successful collaboration offers the potential for a long-term partnership between the two companies for additional explorations into the benefits of additive manufacturing.

To learn more about Maxion and CASTOR's proof of concept, please contact:
murilo.strongoli@maxionwheels.com



LIM's disc production line

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