NASCAR

Use Case – Aerodynamic Strake Prototyping

Customer Profile

NASCAR (National Association for Stock Car Auto Racing) is the sanctioning body for the No. 1 form of motorsports in the United States and owner of 14 of the nation's major motorsports entertainment facilities. Founded in 1948 and based in Daytona Beach, Florida, with offices in five cities across North America, NASCAR sanctions over 1,200 races annually in 11 countries and more than 30 U.S. states. Serving the competitive racing industry, NASCAR is known for driving innovation in performance engineering, safety, and vehicle design across its premier racing series.

Challenge

To optimize aerodynamic performance, NASCAR R&D engineers sought to develop and validate a new design for engine panel strakes — components that increase a race car's front downforce. These parts required extensive design iteration and performance testing before being finalized for race use. Traditionally, these parts would be prototyped using CNC machining or early-stage metal stamping to validate designs. However, both methods are time-consuming, costly, and less agile for rapid iteration.

Solution

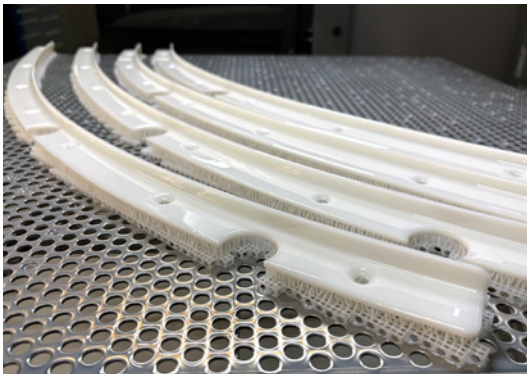
Instead of using machined or stamped metal, the NASCAR team 3D printed multiple strake designs on a Stratasys Neo®800 SLA 3D printer, which is large enough to accommodate the 30-inch strake length. Engineers used Somos® EvoLVe™ 128, a durable SLA material with a smooth surface quality necessary for optimal wind tunnel aerodynamics. 3D printing enabled the team to quickly evaluate the fit and wind tunnel behavior, and expedited multi-car on-track testing to validate performance before making production tooling. In addition, 3D printing allowed low-clearance testing (the minimum permitted gap between the test strakes and the rolling wind tunnel belt that simulates the road), which isn't possible with metal due to different clearance restrictions.

Impact

3D printing afforded NASCAR engineers multiple benefits compared to prototyping with conventionally made metal strakes:

- 50% lower cost
- One week average time reduction
- Faster concept iteration, resulting in the best design before committing to tooling
- Improved race performance from an optimized aerodynamic design

The Neo800 printer's size, accuracy, and smooth part surface finish provided a highly suitable combination, enabling the NASCAR R&D team to reduce the time from idea to successful on-track performance.



The 3D printed strakes shown in the Neo800 printer.

A strake (white) installed on the underside of the race car.

Time Savings

1 Week Avg vs. Conventional Prototyping

Cost Savings

50% vs. Metal Strakes