Mercury Marine

Use Case – Custom Decal Application Fixture

Customer Profile

For over 80 years, Mercury Marine has been a leading producer of consumer and commercial marine propulsion systems. As an innovator, Mercury Marine pushes the boundaries of manufacturing, from developing its own corrosion-resistant aluminum alloy to employing state-of-the-art processes such as additive manufacturing.

Challenge

Custom-made "hats" – fixtures used to apply decals to engine cowls – typically take six months and $1250 to produce. In addition to the cost and long lead time, they present several additional challenges:

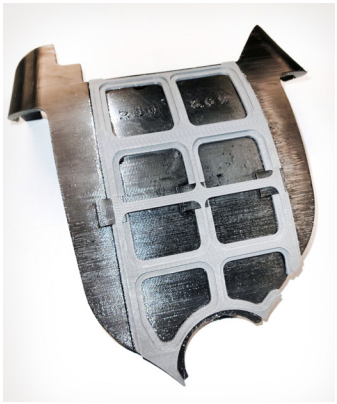
- Large hats are cumbersome and usually damaged in the production environment, requiring the manufacture of a replacement each year
- Matching the engine cowl's curvature is difficult using conventional construction methods
- Fixtures need provision for a softer, non-marring surface to avoid scratching the painted cowl

Solution

To solve these challenges, Mercury Marine designers 3D printed the latest hat fixture using an F370®CR composite printer. The F370CR prints with high-strength carbon-fiber composite thermoplastics and other materials such as FDM® TPU-92A, a flexible thermoplastic polyurethane. The new fixture employed an outer framework made with FDM® Nylon-CF10 carbon fiber material, providing sufficient rigidity. The frame supported an inner liner printed separately with TPU-92A to provide a non-marring surface against the painted cowl. Combining the two materials resulted in an effective decal template that can withstand daily use on the factory floor.

Impact

The 3D printed fixture was designed and produced in one week compared to six months for a conventionally made tool. The total cost was $400 vs. $1250 for the previous version. The stronger tool means less breakage and fewer replacements, and its light weight makes it easier for operators to use. In addition, the versatility of the F370CR to use multiple thermoplastics with easy material changes provides time and resource-saving manufacturing capabilities.



3D printed emblem locating fixture with carbon fiber frame (gray) and TPU backing.

Fixture shown in place on the engine cowl.

Time Savings

96%

1 week vs. 6 mos.

Cost Reduction

68%

$400 vs. $1250

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