



General Motors

Use Case – Sheet Metal Hemming Tool

Customer Profile

General Motors (GM) is a world leader in the development of transportation innovations that include electric cars and self-driving vehicle technology. Headquartered in Detroit, Michigan, GM serves six continents with 164,000 employees.

Challenge

The rear wheelhouse hemming tool used on the production Chevrolet Equinox is a large device used to join the inner and outer sheet metal fender panels. The tool is traditionally machined from aluminum and requires significant manufacturing lead time (>10 weeks), which doesn't afford any schedule flexibility in a preproduction environment. If tool changes are needed, significant delays could result. The tool is also heavy, requiring lift assistance to position it on the car. This opens the potential for damaging the sheet metal from hard contact with the tool because of its momentum when moving it into place.

Solution

As an alternative, GM opted to 3D print the tool with an F900™ printer using FDM® ASA thermoplastic material rather than machine it from an aluminum billet. 3D printing offers lighter materials, a much shorter lead time and faster iteration capability when tool design changes are needed.

Impact

The 3D printed hemming tool performed successfully and was produced in three weeks in contrast to the 10-13 week timeframe needed for an aluminum tool, a lead time savings of over 70%. In addition, weight was reduced from 75 pounds for the metal tool to 33 pounds, negating the need for lift assistance and significantly improving ergonomics of the assembly operation. Total cost was reduced 74%.



The wheel arch hemmer tool (ivory) made from ASA thermoplastic.

Weight
Reduction



56%

Lead Time
Savings



70-77%

Lower
Cost



74%