

3D printing of aftermarket car components for time and cost savings



"3D printing has allowed us to quickly make a high-quality part that can be used as a functional piece. It has also allowed us to test the waters for possible manufactured products. Due to the nature of this work, prototype iterations wouldn't be possible in the same way when working traditionally."

— Dom Tucci, Tucci's Hot Rods

3D printing enabled Tucci Hot Rods to produce customized car components that are used to modify and build custom vehicles for their clients - all to exceptionally high design standards and in much less time than was previously possible.



Company

Tucci Hot Rods

Industry

Automotive

Challenge

Create custom aftermarket car designs quickly and easily. Off-the-shelf parts rarely suit the needs of fitment and quality necessary to produce a suitable finished product.

Solution

Use 3D printing to develop functional prototypes and end-use parts and test multiple design concepts within hours at minimal cost.

Results

- The ability to create and test multiple design prototypes
- Cost-effective production of complex custom car parts
- Increased productivity and output speed

Tucci Hot Rods - Introduction

Established in 1997, Tucci Hot Rods, Marcy, New York, has been producing customized, specialty vehicles for over twenty years. By combining its strong reputation for boldness and creativity with impressive technical prowess at sheet metal and custom car part fabrication, Tucci Hot Rods has helped to grow a specialty automotive niche into a world-recognized movement.

Car modification is complex. It involves changing so many surfaces that there rarely is a ready-made, off-the-shelf component that seamlessly matches the rest of a custom design while meeting the company's high standards for fitment and quality. Creating the perfect custom part takes time and can become prohibitively expensive, especially if traditional machining and CNC milling techniques are used. These restrictions inhibit creativity and reduce the quality of the final build.

Challenge

Before 3D printing, Tucci Hot Rods would fabricate custom aluminum or plastic parts using laser cutting and CNC milling techniques, or create custom pieces by hand. Both processes are expensive and time consuming. Also, there is no way of ensuring that a newly-created piece will 100% fulfill its purpose. Iterations can involve starting the process from scratch; resulting in wasted time and money.

Solution

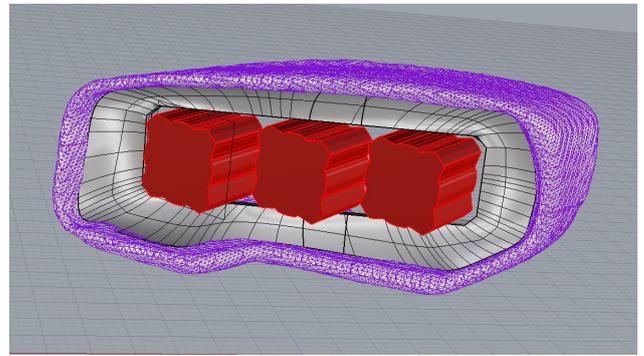
3D printing has allowed Tucci to speed up and refine the entire production process, from design and testing, through to production and post-processing. Staff moves seamlessly between design and testing; using their 3D printer to create prototype parts and then produce refined final pieces that are then sanded, painted, and installed. Later in the process, the team also uses their 3D printer to manufacture detailed painting templates, bezels, trims and painting shields, all of which help to achieve the final look of the car.

Results

With 3D printing, the Tucci team works three times more efficiently; and in their business, time is money. Tenfold savings have been made in producing test part iterations, which in turn, has encouraged greater creativity and raised production standards. Their Ultimaker has also reduced waste, decreased the costs of custom part production and opened up further expansion possibilities for the company in the area of mass-manufactured templates and products.

Costs

In the custom car business, cost depends on many factors. From designing and producing a custom piece, which may require different combinations of raw materials and time, to the labor involved in installing and finishing that part, the variables make it difficult to measure. The company estimates they save as much as \$500 per part using 3D printing methods instead of purchasing machine-made, aftermarket solutions. The estimated production costs of the hood vents for a Ford Fiesta modification project are given in the table to the right.



Designing a CAD model of custom Ford Fiesta ST headlights.



Assembling and testing customized 3D printed Ford Fiesta ST headlights.



With 3D printing, Tucci can make many more custom parts per project than is possible using traditional model making methods.

	Traditional model making	Machining	Ultimaker 3D printers
Iterations	1/part	1/part	10/part
Costs (incl. initial outlay, materials)	\$3,000/part	\$500/part	\$15-\$17/part
Delivery time	40 hrs/part	3 - 4 weeks	12-24 hrs/part
Post-processing*	5-8 hrs/part	4-7 hrs/part	6-9 hrs/part

* Post-processing (sanding, painting, finishing, rework, installation) is an important stage in the production process as the parts are used as final components in the car.