Utilizing Plastic-Based FDM Printing for Metalwork, 3D Printed to Perfection

Company
Yujia Metal Science

Industry
Household Metal furniture

Challenge
Before 3D printing, the industry's traditional methods included:

- Sourcing 3rd party companies to create various custom small batch prototypes
- Leverage of their high costs due to labour, design, and material requirements
- Long lead times due to parts being individually created

Solution
By applying 3D printing, the company was able to:

- Lower time by splitting printing time between multiple printers.
- Reduce costs by reducing required labour and utilizing a more inexpensive material.
- Eliminate outsourcing by producing in-house

Results
A reduction in overall production time by 91.67%, with 75% decrease in labour hours, creating 99.17% reduction in prototyping costs.

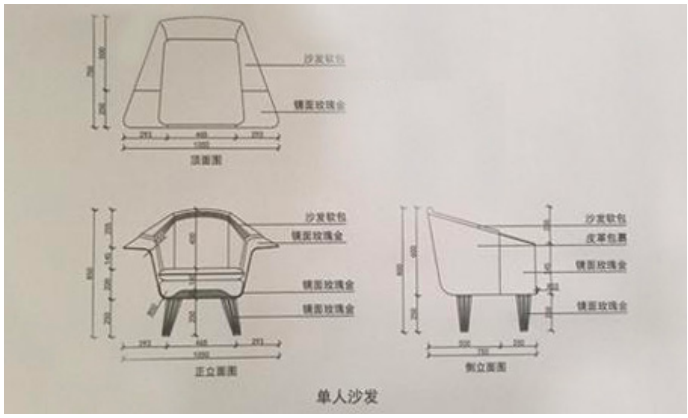
"3D printing saves labour costs and improves the efficiency. Product are more visually intuitive, it's much faster to understand issue details during production."

— Chai, Yuanhao
Owner and Designer of Yujia Metal Science

Introduction
Yujia Metal Science creates metal household furniture products including: room partitions, doors/ windows, wine cabinets, metal ornaments, furniture, custom shapes, and other personally customized pieces.

Yujia's designs have participated in a design training camp by KINETIC and home.163.com (one of the most popular furniture online websites) The winner will be displayed in Salone Internazionale del Mobile.

As boutique furniture designer and manufacturing company, Yujia serves high end niche market with individually made products. They continuously create new designs and pieces, but due to their low product volume and short product cycle they rely heavily on their extensive R&D. The Yujia team relies on 3D printing to fulfil their needs of speed to maintain their high frequency of new products.



Blueprint of the final chair design

Challenges

The logistics surrounding small batch production typically create high costs. For the Yujia Metal Science team, labour costs are typically $30 per person, per day. Over the course of 15 days, the cost for a single prototype can reach $1800, not including the significant cost of materials.

Before introducing 3D printing, the Yujia team would first acquire a wooden prototype to verify their designs. This process would be repeated multiple times before finalizing a stainless steel version.

Even with this involved process, Yujia still faces many risks when attempting to get these traditional prototypes. Many factories will not welcome this type of business due to the efforts of small production or the needs for handmade goods. The lack of production capacity orders leave Yujia and their peers in a difficult situation that can often end in rejection of their orders.

Solution

By instead utilizing Raise3D printers, Yujia has been able to produce their own prototypes and products in house. By completely handling their R&D, they eliminate their struggles and uncertainty when outsourcing with other companies.

With the large build volume and the detail printing that Raise3D's systems can offer, they can create larger and more intricate versions of their designs enhancing their ability to create. Their plastic models can visually verify their designs while also reducing the cost and time needed in their traditional design cycle.

Process

Yujia Metal Science focuses their 3D printing efforts into prototyping. For prototyping their designs, Yujia only requires the blueprints, CAD drawing, and their N2 printer. First converting their file into an STL, they will preview the print and optimize its layout and positioning to maximize the appearance of the print while minimizing the required supports.

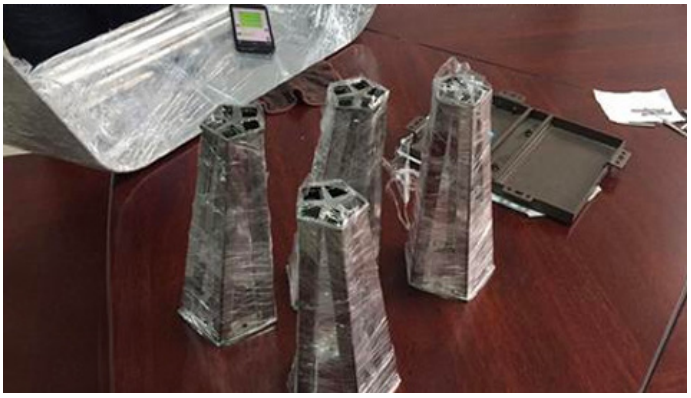
The first model is printed to verify the look of the design. By using a physical model, designers can physically interact with the model and discover any changes they'd like to make resulting in rapid adjustments and iterations.

Cost and Savings

	Traditionally	3D Printing	% Saved
Time	60 days	5 Days	91.67%
Cost	£1384.06	£11.53	98.89%

Traditional methods would take about 480 hours of labour to complete, with implementing 3D printing that has decreased by 75% to 120 hours of labour.

3D printed model of the final chair before creating them in stainless steel



1:1 Stainless Steel Prototypes Parts

Metal parts and legs to be used in final design of chair