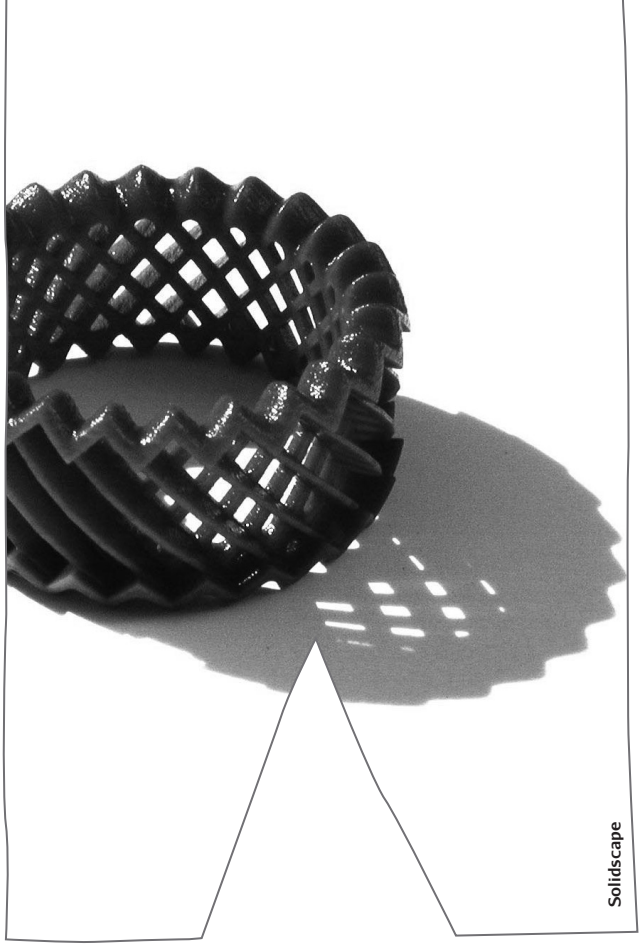

Fact Sheet 09: rapid prototyping

Introduction

The term rapid prototyping refers to the creation of a three-dimensional plastic or metal model from 3D CAD generated data. The designed object emerges as a solid, three-dimensional part without the need for tooling. The models can be used to create master patterns and even batch production.

In the jewellery industry, three-dimensional printing is the process most commonly thought of when referring to RP although there are a number of other processes that come under this umbrella term including:

* Three-dimensional printing (3DP)
* Selective laser sintering (SLS)
* Fused deposition modelling (FDM)
* Laminated object manufacturing (LOM)
* Electron beam melting (EBM)

The main advantages of rapid prototyping are widely accepted to be:

The ability to create complex geometric forms, repeatability, scalability, accuracy, speed, and of course, your master CAD model is always available for further use.

Preparing your design for rapid prototyping

As discussed in **Fact Sheet 08: CAD**, most CAD/RP bureaus now accept designs in many forms, from a pencil sketch to a fully completed 3D model. It all depends on your modelling capability and the price you want to pay. If you are sending a drawing, ensure you have included a detailed technical drawing with as many dimensions as possible.

Assuming you have a CAD model that you have created on a jewellery specific programme, ensure it is completely solid as any 'holes' in the model may interfere with its ability to be built correctly before saving it as an .stl file and emailing it to the CAD/RP bureau for assessment. Most CAD bureaus will double-check your data before proceeding with producing any prototypes and make any minor adjustments but major errors will need to come back to you to alter.

Once your file has been converted to an .stl file and sent to the machine, your model will be built up layer by layer in wax or resin to form a whole part. Waxes don't tend to last very long and are quite brittle so need to be used fairly quickly.

The part can then be used to create a master pattern by moulding or used to cast directly in to precious metal. More information about dealing with manufacturers can be found on **Fact Sheet 02: approaching a manufacturer**.

Costing and pricing

Once you have sent your .stl file over to the RP bureau, you will be given a price and a production time. Once you have confirmed this, the bureau will print the wax and send it back to you. Some bureaus offer a one-stop shop and will be able to provide you with a finished item.

Rapid prototyping FAQ

Q: Can I get multiple castings from one rapid prototype build

A: Yes a silicon mould can be taken of the rapid prototype model

Q: Can I get someone to do the file checking for me?

A: Usually the CAD/RP bureau will check your file prior to printing and make very minor repairs. Any major issues will be referred back to the customer to resolve.

"Access to CAD training is very valuable and has already helped me to win a design commission for jewellery brand."

Glossary

Additive
RP models built by building layers of material

CAD
Computer Aided Design

CNC
Computer Numerical Control

Rapid prototype
Construction of an object from CAD data into a solid object using additive technology

SLS
Selective laser sintering

STL file
Industry-standard cross-platform file format used in rapid prototyping. Most jewellery CAD packages will allow you to export in this format

Subtractive
RP models built by removal of material, e.g. CNC machining

Databases of industry specific trade services

The following websites hold information about trade services, equipment suppliers, products and educational courses:

benchpeg: www.benchpeg.com
The jewellery industry's leading creative and digital communications network

British Jewellers' Association Trade Product Search: www.bja.org.uk
A membership organisation that represents the jewellery industry

Ganoksin: www.ganoksin.com
An international online resource for the jewellery industry

The Goldsmiths' Company Technical Portal: www.thegoldsmiths.co.uk
A supplier database of trade-to-trade services and suppliers

Further reading

For an in-depth explanation of the rapid prototyping process, the following is an excellent source of information for the jewellery industry:

The current 'state of the art' and future developments for rapid prototyping

The Goldsmiths' Company Technical Bulletin, Issues 7 & 8, Publ. 2008

To view a video of the rapid prototyping process, visit **www.westonbeamor.co.uk**

Acknowledgements

CAD-MAN: technology 'one-stop shop' for small and medium-sized jewellery enterprises
www.cad-man.co.uk

CAD & Rapid Prototyping Bureau, Weston Beamor Ltd
www.westonbeamor.co.uk