Complete 3D

CASE STUDY

SLS 3D Printing / Manufacturing Benefits to Robinson Interiors

For: Custom Boardroom Shutters

Complete 3D is proud to have assisted Robinson Interiors in making a difference to their product offering and manufacturing processes. This case study outlines how, with an open mind and the willingness to entertain alternative manufacturing methods, the client was able to find the perfect solution to their problem. Find out how this came about in the case study below:

FINDING THE RIGHT SOLUTION FOR THE OUTPUT

Initially, Robinson Interiors put in a request to Complete 3D for information on a small DLP style machine. After a visit from one of our team, we soon realised that the intention of Robinson Interiors was to produce many thousands of parts, making the small DLP style machine they were looking at unsuitable for the application.

We worked with Robinson Interiors to redesign their part to reduce material consumption and product assembly. From there we were able to reach out to our industry support group, Callaghan Innovation, to assist with the real-life production application.

This is the full report in Chris's, General Manager for Robinson Interiors, own words.

ROBINSON'S MANUFACTURING REQUIREMENTS

PRODUCT SPECS: What we wanted to manufacture

- Custom Steel and Cedar Boardroom shutters
- 3.56m tall x 0.95m wide each shutter
- 30 shutters, automated to all open and close at the same time
- Shutters had to be hinged (also custom) to allow access to clean glass behind
- Due to hinging nature, all shutters had to be able to be serviced (if ever required) from the opening side only. Shutters are hinged in pairs, so 15 LH and 15 RH doors required
- 1,719 slats/blades operating simultaneously
- Perfect horizontal alignment required over 12m length of boardroom walls
- Inbuilt allowances for temperature variations, material expansion/contraction
- Low friction material used to eliminate any requirements for additional bushes, bearings or washers
- Minimal assembly times essential due to sheer numbers of components

BENEFITS OF SLS 3D PRINTING FOR US

MORE TIME FOR GOOD DESIGN:

The reliability and speed of manufacture of the final SLS 3D printed products meant we (Robinson Interiors) could spend more time on initial design, modelling and small scale prototyping, allowing us to fully economize the individual components (there were originally 6 components required for every shutter blade/slat, with drilling and taping required which meant time-consuming assembly).

LESS COMPONENTS:

SLS 3D Printing allowed us to reduce the components for each and every shutter blade required – from 6 down to 3 – and develop the process so the assembly required only push-together connections. This reduced our original assembly time from 10 minutes per shutter blade to about *15 seconds* per shutter blade.

The lessening of the number of components required and the labour saved during the assembly process far outweighed the slightly higher costs of the SLS 3D printed components (over other forms of 3D printing) which helps make it possible for us to manufacture the parts here in NZ and offer fairly unique, fully customizable solutions and products to our customers

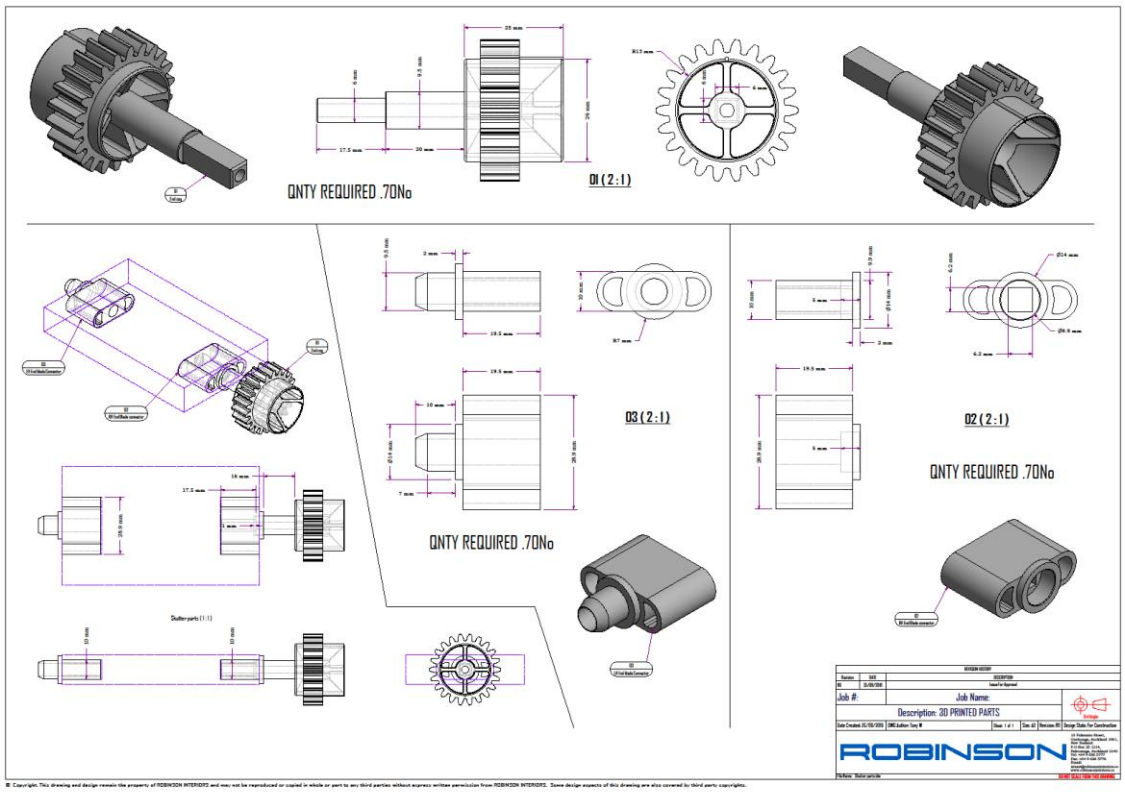


Image above: Note the bearing surfaces, thrust washer faces etc all incorporated into individual component design. Zero requirement for mechanical fastening of components delivering rapid assembly times. Also, simple to incorporate timing marks to ensure every single blade is in perfect alignment during assembly

STRONGER PARTS:

The SLS printing from Nylon gave us the strength we needed for this application and allowed us to use smaller components, whereas with other forms of 3D printing and the materials available, strengths would have been marginal and would have meant we needed to have larger parts to compensate for the lower strength from the lesser materials which meant a larger end product, more printing time, more material consumed during manufacture etc

NO DELAYS:

We had no additional costs and time delays waiting for the manufacture of tooling etc (For example, if we decided to use injection molding processes)

HIGHER CUSTOMER SATISFACTION:

No upfront costs or requirements for tooling which enables our design(s) to stay fluid and fully customizable so we can alter our designs to deliver our customers exactly what they want every time – not try to make their desires fit in with what our old school tooling, process' and components 'might' have been able to provide to them…

PERFECT PARTS:

We had a 100% success rate – every single item of the 5,321 components we had printed were usable – ZERO REJECT RATE!

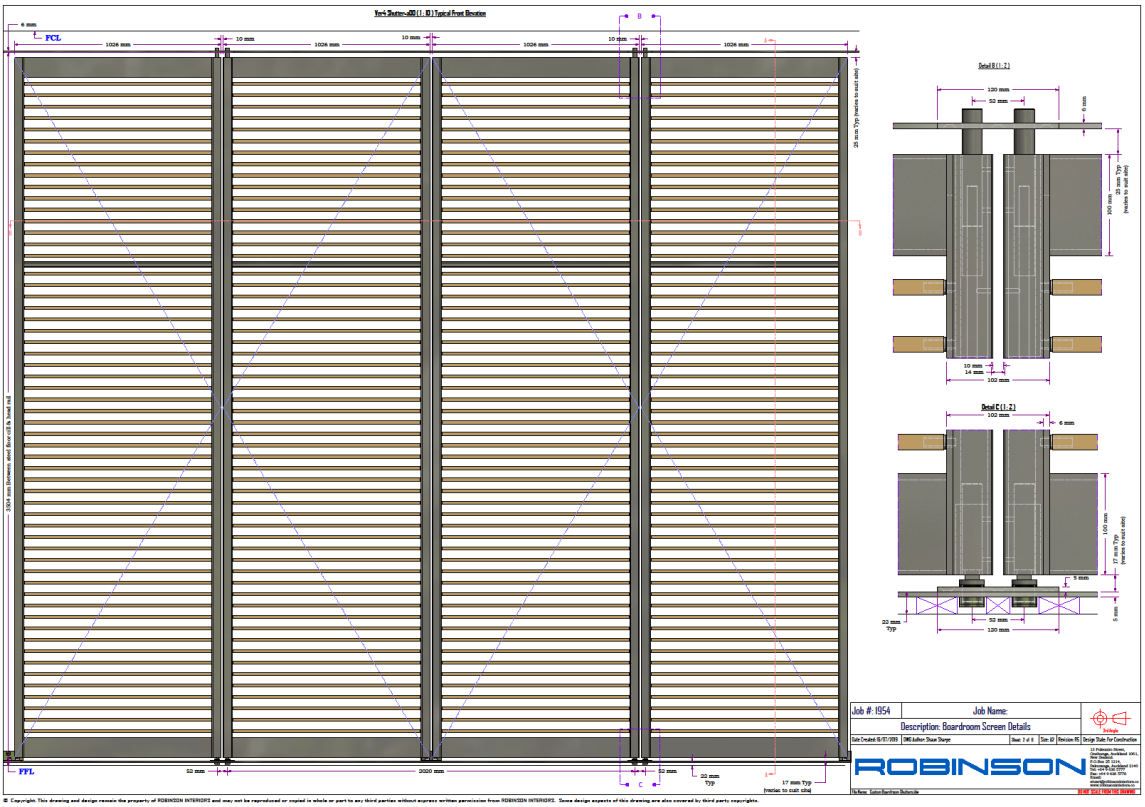
MORE OPTIONS:

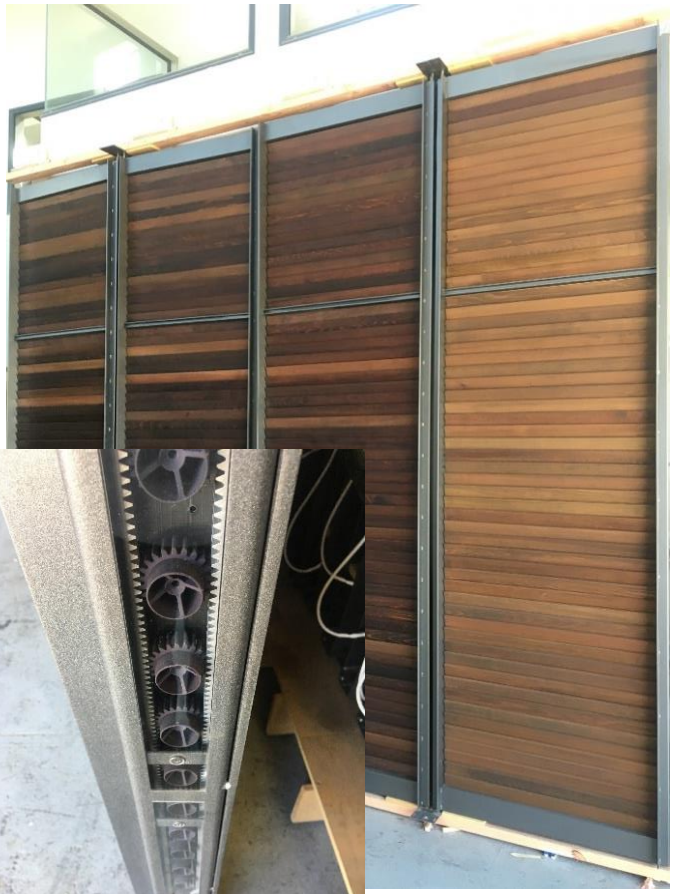
Being printed from Nylon, it provided us the flexibility to use indoors and out, allowed us to solution dye the parts to suit the colour scheme of the product we were producing. Small things but they make a big difference to our end result and future options, selling points etc.

Strength, temperature range and UV stability from the Nylon gives us the opportunity to use a vast array of shutter blades and applications to suit our customers' individual requirements

TEST RESULTS

We tested our full-sized mockup to 14,300 plus cycles (each cycle consists of an open and close operation, so each part completed in excess of 28,600 movements without failure) – the estimated equivalent of 15 years plus of normal operation





Images to Left: Test Jig Including Full Sized Mock-up door on right hand side**.** Acrylic cover plates on operational side of mockup door to enable monitoring of all components during the 28,000 (plus) movements completed during initial testing

TROUBLE SHOOTING

Very late in our assembly program, it was discovered the end fittings provided with the newly delivered drive motors were different to the one we had used during the design development stage.

SLS 3D printing allowed us to fix this with 2 hours of modelling (to model, print (resin) and test a new drive adaptor), and an email with the file for the new drive adaptor to the team at Callaghan Innovation.

Inside of 48 hours later, we were assembling the 30 motors with the new drive adaptors – problem averted, project still on schedule and very little time or cost impact! To my mind, this would not have been possible with any other form of manufacturing/CNC machining etc.

CONCLUSION

I can't say enough good things about the teams that have helped us on this journey. Jim and Alex from Complete 3D gave us the information and support to have confidence in the direction we took and introduced us to the team at Callaghan Innovation, who did a great job for us. Both teams were fantastic to deal with and excellent communicators, it seemed that every time I formed a question in my head about the manufacturing, supply, delivery, courier etc, Hamish had already emailed me with the answer!! Great stuff indeed.

We now have a unique product that we can take to market that compliments the work we are already doing with the same customer base. We can now generate more business and income from under the same roof.

Since starting this journey about 7 months ago, it has opened my eyes to the endless possibilities and applications available to us when working with this type of technology.

Chris Brown
General Manager
Robinson Interiors Limited

FIND OUT MORE

Selective Laser Sintering (SLS) technology is at the heart of a growing trend in mass custom manufacturing as well as functional prototyping. The right additive technologies, materials and finishes are transforming manufacturing.

To find out more about how SLS 3D Printing can expand and grow your business, download the informative guide here.