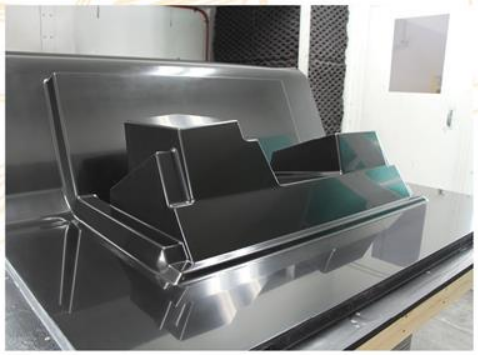
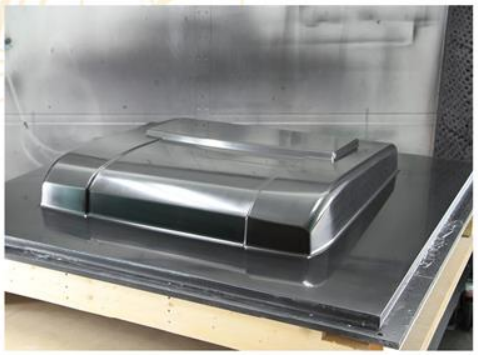
Composites Innovation Centre

Solution Providers for the Composites Industry

COMPOSITES INNOVATION CENTRE FOCUS

In partnership with industry, government and academia, the CIC develops and commercializes innovative composite technologies for aerospace, ground transportation, biomaterials and industrial applications that are more cost effective, environmentally friendly and offer enhanced performance.





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Prototyping Services

Introduction

Composites Innovation Centre

Our prototyping and process development team provides fabrication services for all composite related parts.

We specialize in custom shaping by machine or hand and can use many composite materials and processes.

We have fabricated prototypes as small as hand-held articles and as large as car hoods and vehicle-sized assemblies.

Our Services

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Plugs and Patterns

- Design for prototyping
- Material sourcing and procurement
- CAM programming and machining
- Surface shaping and finishing

Tools

- Fabrication of industry standard FRP tools for open and closed moulding
- Fabrication of direct-to-mould tooling for prototypes and one-offs
- Selection of materials for process/construction method

Prototype parts

- Material and/or product demonstrators
- Test panels to obtain material properties
- First articles/prototypes using traditional and novel fabrication methods

Manufacturing Processes

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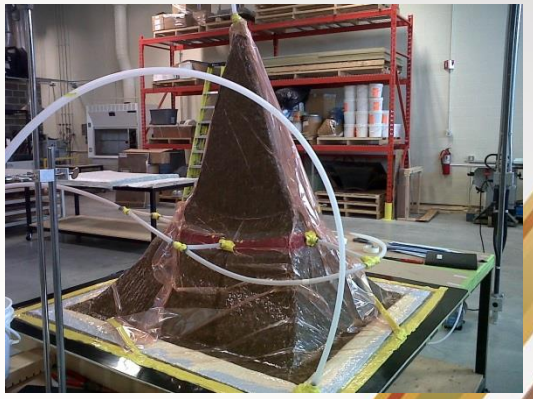
Mould and Tool Fabrication

- 5-axis machining
- 3-axis machining
- Hand forming
- Custom wood fabrication (crated structures)

Part Fabrication

- Hand layup
- Gelcoat application
- Disposable-bag resin infusion
- RTM light infusion
- Oven-cured prepreg layup
- Additive manufacturing with FDM



Materials

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Mould and Tool Fabrication

- Wood and laminate products (HDF, MDF, Melamine, Plywood)
- Tooling foam boards (Polystyrene, Polyurethane, Epoxy)
- Seamless modelling paste (Polyester)
- Machineable thermoplastics
- Printed thermoplastics (FDM ABS)

Part Fabrication

- Natural fibre mat and fabric
- Thermoset resins (Polyester, Vinylester, Vinylester blends, Epoxy, Bioresins)
- Glass fibre mat and fabric
- Carbon fibre mat and fabric
- Infusion hybrid mats
- Adhesives
- Oven-cured thermoset prepregs

Case Study: Curling Broom

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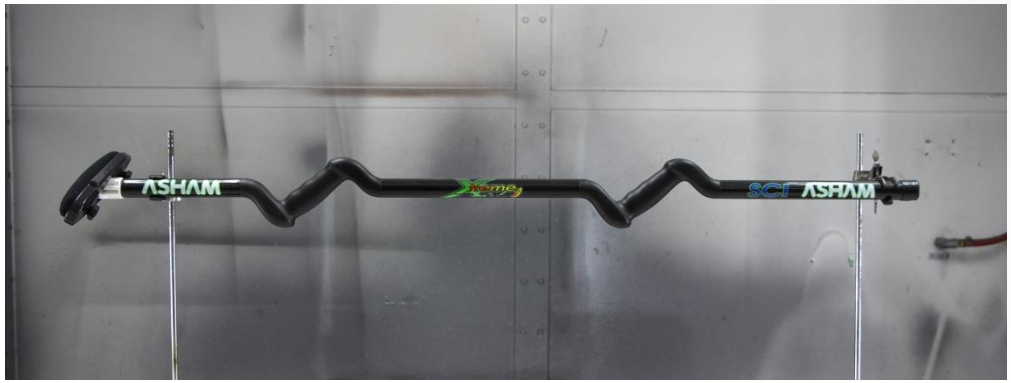
Client: Sande Curling Innovations

Project: Sande Curling Innovations (SCI) contacted the CIC to design, prototype and test a new double-handled model to replace the traditional straight curling broom.

- The new design stemmed from a pressure pad sensor trial from SCI. This determined that a new technique was required for more efficient sweeping.

CIC Objectives:

- Fabricate a new double-handled broom
- Select optimal materials
- Create a CAD model using 3D scanning



Case Study: Curling Broom

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Materials used: Carbon fibre, polyurethane foam, fibreglass mat

Process:

- SCI provided us with a concept broom to visualize the desired profile
- We worked with Asham to select materials for this application
- A carbon fibre plate was sandwiched in between two pieces of polyurethane foam to provide required stiffness

Case Study: Curling Broom

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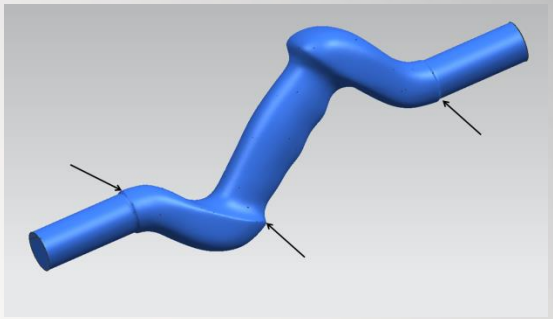
Process - continued:

- We hand formed the first prototype broom handle based on the concept broom, with added ergonomic features
- Subsequent prototypes were also hand formed based on the first part
- A CAD model was created by using 3D scanning technology on the prototype



Success: We worked with Sande Curling Innovations and Asham Curling Supplies to design, prototype, test and oversee the material selection and production of the Sande Curling Broom.

Case Study: Bio-Speaker

PRO SOUND & COMMUNICATION

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Client: Pro Sound & Communication

Project: Pro Sound & Communication contacted our team to fabricate a working prototype of a stadium speaker that contains natural fibres such as flax and hemp, with the end use in a new football stadium.

- The use of natural fibres for acoustical purposes is an innovative application, as it has potential for sound damping.
- The prototype was a product demonstrator for existing markets.

CIC Objectives:

- Create a layup schedule to meet loading and acoustic requirements
- Fabricate a direct-to-mould tool
- Fabricate the composite parts of the speaker

Case Study: Bio-Speaker

PRO SOUND & COMMUNICATION

Composites Innovation Centre

Materials used: Hemp-agave mat, fibreglass mat, polyurethane foam

Process:

- We created the CAD model for the biofibre speaker, as well as the tooling model
- A solid MDF mould was created and machined on the 5-axis mill
- Novel methods for fixturing were used to finalize the speaker mould
- Open mould layup was used for the initial plies
- Infusion of the biofibre mat was done to finish the part

Success: We fabricated a functional natural fibre speaker using novel fixturing and infusion methods, in time for a product demonstration at our facility.

Case Study: Light Housing

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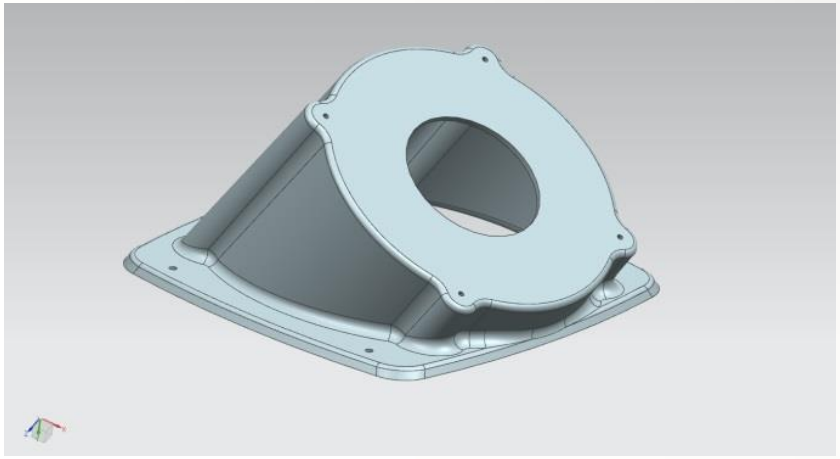
Project: The client contacted our team to fabricate a master plug for production of spare parts for a rear upper warning light housing.

- The master plugs were fabricated for a limited production run and met the clients requirements of low cost and having a quick turn around time.

CIC Objectives:

- Create a 3D CAD model from manual drawings provided by the client
- Machine a main housing and baseplate made from high density foam
- Assemble the parts using structural epoxy



Case Study: Light Housing

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Materials used: High-density polyurethane tooling foam, structural epoxy

Process:

- We created 3D CAD model using Siemens NX
- Layers of high-density polyurethane foam were bonded together to create a rough outline of the plug
- The high-density foam was machined on a 3-axis mill
- The main housing body was structurally bonded on a machined baseplate to create the final plug

Success: We manufactured a master plug for production to help the client stay on schedule with a critical timeline