

Advancing Manufacturing Challenge Fund

AMCF: 1 April 2020 to 30 June 2023

Final Report

Project Reference:	AMCFST2-029
Project Name:	Advancing Manufacturing within the West Highlands
Lead Organisation:	UHI West Highland College
Partner Organisation(s) (if relevant):	HIE
Project Start Date:	01/06/2020
Project End Date:	30/06/2023

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Date:	31/08/2023



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Contents

Executive Summary.....	3
Project Overview.....	4
Project Results	8
Other Project Achievements.....	9
Horizontal Themes	13
Positive approaches to equal opportunities and non-discrimination	13
Equality between men and women	13
Sustainable Development	14
Project Challenges.....	15
Publicity.....	17
Project Legacy	21
Appendix A: Photos of the equipment	22
Appendix B: Minister Previews Highland Future with visit to College Manufacturing Centre	25
Appendix C: Cabinet Secretary Officially Open Innovative New Manufacturing Centre	27
Appendix D: Advancing Manufacturing Centre Welcomes Minister to Showcase Innovation.....	30
Appendix E: A Celebrating of Women in Engineering Advert.....	32
Appendix F: NMIS, Online Digital Manufacturing & Leadership CPD workshops.....	33
Appendix G: Script/Agenda for Innovation in MTB and Outdoors Industries event - DMBinS	34
Appendix H: DMBinS innovation in MTB and outdoors industries event advert	35
Appendix I: Below are the photos of the DMBinS events	36
Appendix J: Dyslexia Presentation Slides	37
Appendix K: Women in Business lunch	39
Appendix L: HeatSource and AMCF-Decarbonising Heat Supply Chain Opportunities Advert:	40
Appendix M: Transitioning to Net Zero Advert	42
Appendix N: Signage Photos.....	43
Appendix O: AMC Website.	44



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Case Study I:	0004 – West Highland Tea Company Packaging.....	45
Case Study II:	0022 – Just Add Green Ltd, vertical planter development and CAD files.....	47
Case Study III:	0021 – CFUK Concepts Mudguard Mould.....	50
Case Study IV:	0021 – CFUK Concepts – CV5-500 CNC training.....	52
Case Study V:	0021 – CFUK Concepts – A week of use of the CV5-500 with aid from the AMC contract operator.....	53
Case Study VI:	0033 – Lifelaw Patent Application	54
Case Study VII:	0035 – Phyco-f Investigation the use of 3D prints.....	57
Case Study VIII:	0044 – ScotMaz Cutting trial.....	59
Case Study IX:	0046 - HUID Ltd – Design moulds	60
Case Study X:	0052 – RRP Fencing Ltd – Created prototype of deer post to be able to trial the concept	62
Case Study XI:	0056 – Wee Wax Heart – Design moulds and create 3D prints for melts	64



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Executive Summary

The Advancing Manufacturing within the West Highlands project has provided unique hands on, practical support and inspiration to SME's in a rural area of Scotland which has benefited immensely from the funding provided.

From one of our first engagements on a project with an SME wanting to retrofit a catalytic converter to a classic Porsche 911 exhaust, it became apparent that the services provided were unique to the area. Following its design, manufacture and test, the product has been exported around the world, having surpassed emission and performance expectations. The business owner was delighted that a facility on his doorstep allowed him to compete in a global market and has now adopted the technology to increase his product range.

The examples and range of products and businesses supported demonstrates the diversity and potential of the manufacturing sector in the Highlands of Scotland. These range from improving the manufacturing techniques of the traditional skills involved in producing a pottery water jug, to providing the 5-axis milling capability to ensure the success of a Scottish business winning a contract to re-shore production of a Dyson composite component from China.

The inspiration provided to potential manufacturers has led to several new products which otherwise would never have been created. The redesign of a protein shaker, that would have been virtually impossible to manufacture economically in it's original form, resulted in a Scottish Edge Design award. The lightbulb moment and large grin when a bespoke Coffee retailer with a captive market at Glenfinnan discovered he could personalise and brand reclaimed pieces of wood to sell to tourists, epitomises the reaction of many small business and aspiring business owners who have used our services.

The difficulty in us achieving the target of the number of SME's attending events compared to some of the other AMCF and SPRITE projects in more central areas, demonstrates the difficulty of operating in such a rural area and further strengthens the case for facilities out-with the usual central locations. A real positive message is the quality of the engagements which did take place, with a third of the SME's attending being supported and undertaking projects with us.



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Project Overview

The project was to provide SME's within the West Highlands and wider Highland & Islands Enterprise area with access to advanced manufacturing technology and expertise. This was a multi-sector approach with SME's engaged in various manufacturing activities - for example Food and Drink, Construction, Aquaculture, Metals and Timber Products.

The project provided support to:

- Engage leaders and create Advancing Manufacturing Champions.
- Give access to a range of advanced manufacturing technologies in a sand pit environment with dedicated support.
- Enable small scale R&D and product development.
- Help adapt supply chains, identify opportunities, and innovate.

To begin the project, UHI - West Highland College was required to find suitable accommodation, as it was believed during the tendering stage that it would be housed in a new build STEM centre. A change in plan resulted in the project leasing alternative accommodation within Fort William and renaming it the Advancing Manufacturing Centre (AMC).



Figure 1: Picture of the AMC Building

Next, Margaret Weir was appointed as Project Manager to run the project. Margaret is an IMechE Chartered Engineer with a MEng in Product Design Engineering and with experience in several industries including Construction, Water, Oil & Gas and Batteries.

At the beginning of the procurement stage, the project contracted with Advanced Procurement for Universities and Colleges (APUC) to oversee the whole process to



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ensure the project followed protocol. Due to the value and volume of items requiring procurement, they were split up into different tenders and lots.

Tender:

- **CS-WHC-18679 - Provision of Industry 4.0 Advanced Manufacturing Learning Systems**
 - Mobile Pneumatic Training Workstations
 - Mobile Hydraulic Training Workstations
 - Workstation Simulation Software
 - Air investigation System
 - Mechatronics
 - Process Automation Training Rigg
 - Machine Maintenance
 - Renewable Energy
 - Industry 4.0 Modular Learning System
- **CS-WHC-19496 - Provision of CNC Printers & Scanners**
 - 3D Handheld Scanner
 - Laser Scanner
 - 3D Printer
 - 3D Printer
- **CS-WHC-19128 - Provision of CNC Equipment - Router, Lathes, Mills & Plasma Cutter.**
 - Lot 1 - CNC Mill
 - Lot 1 - Tabletop CNC Mill
 - Lot 1 - CNC Lathe
 - Lot 1 - Tabletop CNC Lathe
 - Lot 1 - CNC Plasma Cutter
 - Lot 1 - CNC Router
 - Lot 2 – Augmented Reality Welding System
- **CS-WHC-19576 - Provision of 5 Axis Industrial CNC Machine Centre**
 - 5 Axis Industrial CNC Machining Centre

The first round of tenders (CS-WHC-18679) was awarded to Didactic Services Ltd as the sole applicant and CS-WHC-19496 was a direct award to Abergower Ltd under the APUC Framework Reference: LAB-1009-AP. The remaining tenders yielded a poor response and prices of items were a lot higher than expected in the budget plan. More research was undertaken into the equipment to understand what SMEs required and to what standard, and as a result items had to be removed to fit the budget and provide a better service for the SMEs. A number of items were dropped as they were



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not industry standard, or there was insufficient interest from SMEs. These items included the tabletop CNC Mill, the tabletop CNC Lathe and the Augmented Reality Welding system, which allowed more money to be spent on industry standard equipment. The CS-WHC-20210 was a more informed tender, based around CS-WHC-19576 to encourage more suppliers to tender. For the rest of the equipment, it was split into 2 tenders each, with 2 lots allowing each item to be won by different suppliers in the hope more suppliers would bid.

Revised Tender:

- CS-WHC-20210 - Provision of 5 Axis Industrial CNC Machining Centre
 - Axis Industrial CNC Machining Centre
- CS-WHC-20227 - Provision of CNC Equipment Lot 1 Lathe & Lot 2 3 Axis CNC Mill
 - Lot 1 – CNC Lathe
 - Lot 2 – 3 Axis CNC Mill
- CS-WHC-20226 - Provision of CNC Equipment (Lot 1) Plasma Cutter & Lot 2 Wood Router
 - Lot 1 – CNC Plasma Cutter
 - Lot 2 – CNC Router

The CS-WHC-20210 was awarded to ScotMaz Ltd, the CS-WHC-20227 was awarded to Mills CNC Ltd, the CS-WHC-20226 lot 1 was awarded to Boxford Holdings Limited and the CS-WHC-20226 lot 2 was awarded to Emco Education Ltd.

All equipment except the lathe was installed before the first ministerial visit to officially open the AMC. Please see Appendix A:, for the photos of the equipment.

The UHI West highland College marketing team created and launched an AMC website, see Figure 2 of the screenshot of the website.



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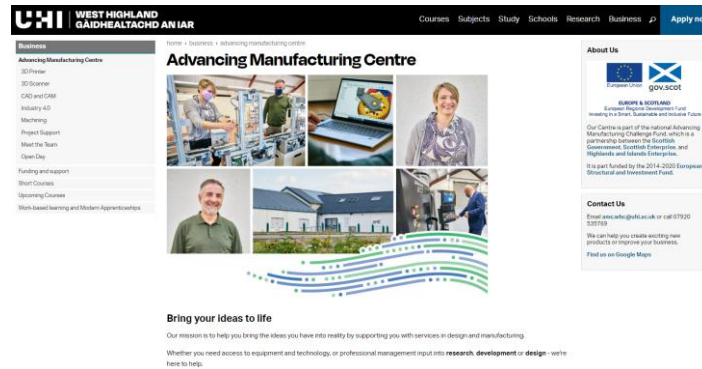


Figure 2: Website, www.whc.uhi.ac.uk/business/advancing-manufacturing/

As the project moved from set-up to being operational, our focus was the West Highlands and the general Highland region, although AMC can help anyone in Scotland or can redirect them to one of the 12 other AMCF projects. See Figure 3 for the different locations the AMC visited and/or undertook project work.

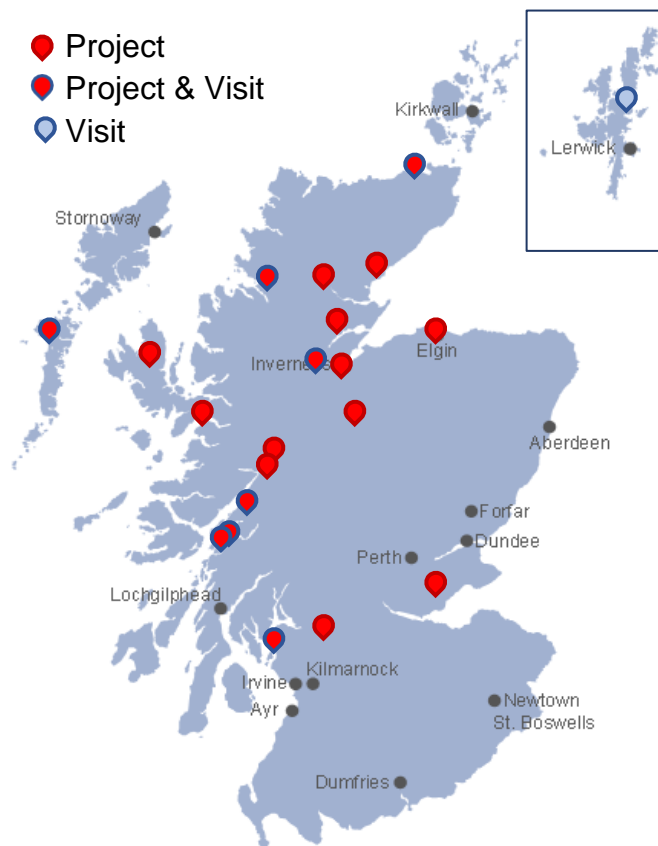


Figure 3: Locations which the AMC visit &/or did projects with.

Project Results

Outputs	Target	Actual
No. of SMEs attending events	270	91
No. of SMEs supported	40	40
No. of projects with SMEs	43	53
No. of collaborations between SMEs and Research Institutes	4	4
Value of Business Expenditure on Research and Development (BERD) (£)	£60,000	£179,674
Outcomes	Target	Actual
No. of SMEs supported to introduce new to the market products	7	14
No. of SMEs supported to introduce new to the firm products	17	21

Comments

Whilst struggling to get people to attend direct events that had been planned within the AMCF bid, through a combination of Covid and physical distances, we adapted our approach, undertaking more one-to-one meetings and tours, which ultimately filtered down to the other KPI targets being met and our ultimate goal of introducing new products being surpassed. Whilst we have had several hundreds of visitors through the doors of the centre, worked on many more projects and introduced more products to firm, the eligibility criteria for claiming has resulted in the above verified figures.

We are exceptionally pleased with the outcomes of the project, having brought 14 new products to the market and 21 new products to the firm. Whilst the economic impact of these new products is not yet known, the inspiration, confidence and appetite for further development and manufacture has certainly increased. The creative juices have been nurtured with most of the businesses requesting more support to increase their range of products.



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This gives us confidence as we move into the legacy stage of the project that we will be able to sustain interest in our services and support. The extent to which we will be able to do this will depend on any future funding, or financing within the current AMCF guidelines.

Along with the intended impact of the project, some of the indirect benefits have been the raising of the UHI - West Highland profile within the business and engineering community, critical production support to large national and international businesses enabling continuity of production, along with increased awareness of STEM, advanced manufacturing and Industry 4.0 to school pupils.

The AMCF support through our project has made a significant impact to the Scottish economy. It has allowed small businesses the opportunity to develop, innovate and produce new products that would otherwise have eluded them. It has allowed other businesses to compete in the global market by allowing access to equipment they could not afford or risk to purchase without prototyping in our facility. The best example being CFUK Concepts having the ability to bid for work that will see production of carbon fibre tubes for Dyson, re-shored from China to their facility in Ardgay on the Dornoch Firth along with proof manufacturing components for seats on Airbus aircraft.

Other Project Achievements

The AMC had 3 ministerial visits - please see the details below with links to appendices about each visit:

- 28th of October 2021 – Visit by Jamie Hepburn MSP, Minister for Further and Higher Education to West Highland College UHI. Please see details in Appendix B: *Minister Previews Highland Future with visit to College Manufacturing Centre.*
- 15 November 2021 – Official Opening of AMC at West Highland College UHI by Kate Forbes MSP/Cabinet Secretary for Finance. Please see details in Appendix C: *Cabinet Secretary Officially Open Innovative New Manufacturing Centre.*
- 18th February 2022 - Visit by Ivan Mckee MSP, Minister for Business, Trade, Tourism and Enterprise to its new Advancing Manufacturing Centre. This was part of his visit to Lochaber businesses. Please see Appendix D:

The AMC arranged events at centres, around Scotland and onsite visits:

- The AMC ran a webinar on “How the AMC can help your business?” with the Lochaber Chamber of Commerce and tickets were available on Eventbrite.

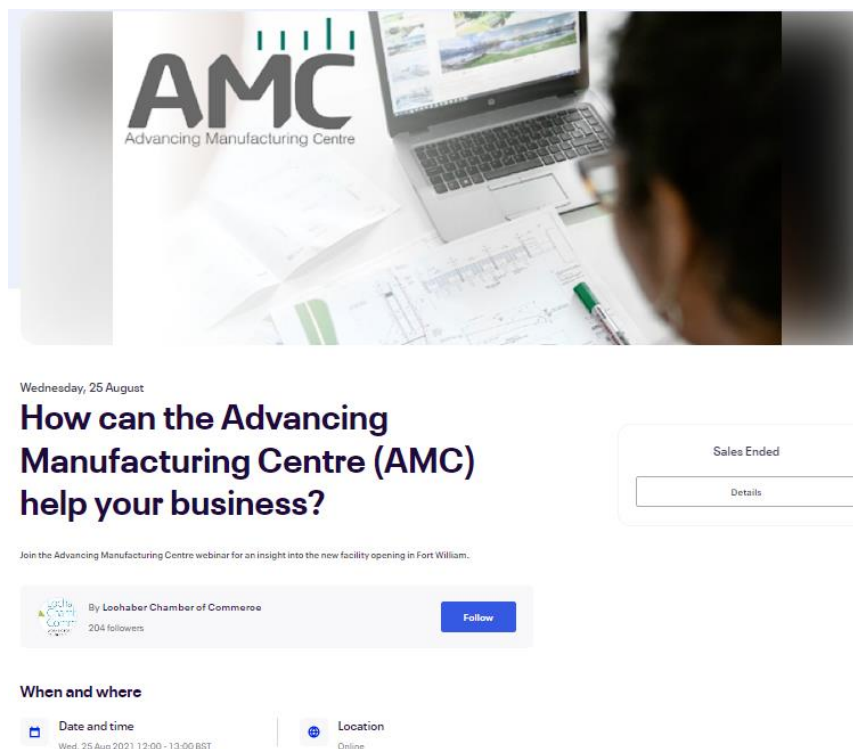


Figure 4: How the AMC can help your business booking page

- The week the centre was opened by Kate Forbes MSP, AMC held a public opening on 19th of November 2021, as part of the Idea's Week programme run by Lochaber Chamber of Commerce, with 4 tours at 11:00am, 12:00pm, 1:00pm and 2:00pm. During the event we had a total of 55 people attending.
- Through regular meetings with the Cluster builder, CEED, the AMC mentioned its desire to arrange an event about Women in engineering and include some of the other AMCF projects. CEED arranged “A *Celebrating of Women in Engineering*” event, at Forth Valley College on 23rd of June 2022 with 3 speakers, Dr Carol Marsh, Caroline Brown from Lanarkshire Smart Hub and Margaret Weir, Project Manager at AMC. Margaret's presentation covered her route into Engineering and what influenced her, including the belief that Dyslexia aided her choice of career. See Appendix E: **Error! Reference source not found.** A Celebrating of Women in Engineering Advert.

- Through meeting with HIE, the AMC part funders, it was agreed to do tours of locations from Shetland and Oban to deliver the presentation “How the AMC can help your business?”.
 - AMC presented at HIE, European Marine Science Park, Malin House, Oban on 16th June 2022 at 2pm. The companies attended were Seagrass Marine, Patogen, Oceanium, Xanthella, SAMA Enterprise, Tritonia and Crubag.
 - AMC travelled to Shetland on 17th August 2022 to present at HIE, Solarhus, North Ness Business Park at 2pm. The companies that attended were L&M Engineering, Shetland Composites, AquaShip and Flugga Boats Before visiting the HIE office, we visited various SMEs. 9:00am visited at Malakoff, 10:15am visited at Ocean Kinetics, 11:30 am visited at LEF.
- Through the work AMC undertook with Denchi and introducing them to the Lanarkshire smart Hub for the Cobot trial, an event was arranged at the North Highland College to demonstrate how the Lanarkshire smart Hub and AMC could work with businesses. [Collaborative Robots Demonstration UHI North Highland Tickets, Multiple Dates | Eventbrite](#)
- The AMC hosted NMIS, Online Digital Manufacturing & Leadership CPD, at Fort William over two workshops, *Becoming Operationally Excellent* and *Introduction to Lean Manufacturing & Continuous Improvement*. Both workshops were on the 15th of March 2023:
 - *Becoming Operationally Excellent* was at 9:15am to 12:30pm
 - *Introduction to Lean Manufacturing & Continuous Improvement* was at 1:15pm to 4:30pm
 - See Appendix F:1)a)i)(1)(a)(i)Case Study I:Appendix F:NMIS, Online Digital Manufacturing & Leadership CPD workshops.
- [DMBinS](#) asked the AMC to host and lead an innovation event at the centre. The AMC created the script/Agenda, please see Appendix G:, for the event, which was led by Margaret Weir, AMC project manager, along with Ruari Watt, Highland Development Co-ordinator, DMBins, and Arthur Bossi, Consultant for the Mountain Bike Centre of Scotland, Edinburgh Napier University. Please see the advert in Appendix H: and photos of the event in Appendix I:.
- The AMC’s Project Manager, Margaret Weir, visited Braehead primary school, to talk about Dyslexia, how it affects her and her family, how she still achieved education and work, and the strength dyslexia has given her. See the Appendix J: for the presentation slides.



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The Lochaber Chamber of Commerce and Royal Bank of Scotland was hosting a “Women in Business Lunch” and asked Margaret Weir, AMC Project Manager, to present alongside Anja Baak from Great Glen Charcuterie Ltd. See Appendix K: for the Lochaber Chamber of Commerce LinkedIn post about the event.

Please see below the list of Case studies and within them are testimonials from the SMEs:Signage Photos.



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Figure 34: Signage at the Entrance.



Figure 35: Building Sign.



Figure 36: Sign in the lobby.



Figure 37: Plaque.



Figure 38: Entrance sign to the Rapid Prototyping Area.



Figure 39: Entrance sign to the CNC Workshop.



Figure 40: Sign in the Industry 4.0 Workshop.



Figure 41: AMC Banner.

Appendix A: [AMC Website.](#)



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Advancing Manufacturing Centre

About Us

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Our Centre is part of the national Advancing Manufacturing Challenge Fund, which is a partnership between the Scottish Government, Scottish Enterprise, and Highlands and Islands Enterprise.

It is part funded by the 2014-2020 European Structural and Investment Fund.

Contact Us

Email amc.whc@uhi.ac.uk or call 07920 535769

We can help you create exciting new products or improve your business.

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Bring your ideas to life

Our mission is to help you bring the ideas you have into reality by supporting you with services in design and manufacturing.

Whether you need access to equipment and technology, or professional management input into **research**, **development** or **design** - we're here to help.

All of our services are offered at **zero cost** to small and medium businesses by **our experienced team**.

Leave your **contact details** if you'd like to arrange a consultation or visit

Download our **Advancing Manufacturing Centre (AMC)** flyer for more details.



3D Scanner	CAD and CAM	3D Printer
Machining	Industry 4.0	Project Support

Business - Advancing Manufacturing Centre (uhi.ac.uk)



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- 0004 – West Highland Tea Company Packaging
- 0022 – Just Add Green Ltd, vertical planter development and CAD files.
- 0021 – CFUK Concepts Mudguard Mould.0021 – CFUK Concepts Mudguard Mould.
- 0021 – CFUK Concepts – CV5-500 CNC training.
- Case Study V:0021 – CFUK Concepts – A week of use of the CV5-500 with aid from the AMC contract operator.

- 0033 – Lifelaw Patent Application
- 0035 – Phyco-f Investigation the use of 3D prints
- 0044 – ScotMaz Cutting trial.
- 0046 - HUID Ltd – Design moulds
- 0052 – RRP Fencing Ltd – Created prototype of deer post to be able to trial the concept.
- 0056 – Wee Wax Heart –

The AMC got involved with the “digital on a shoestring” project from IfM, University of Cambridge. Scottish Enterprise was supporting the pilot in Scotland and were invited into the training session on how to deliver the project sessions. The AMC also attended the initial meeting and was invited to learn how to run the “digital on a shoestring” workshops. The AMC went to the first pilot at Orthogonal Engineering to observe and assist if required. Please see the [Scotland’s regional scoping pilot completes – Digital Manufacturing on a Shoestring \(digitalshoestring.net\)](#) website of the details of the projects and the case studies. Scottish Enterprise required another company for the 2nd pilot and contacted AMC for suggestions of appropriate SME. The AMC contacted one of its SME’s, the Denchi Group and explained what the Digital Shoestring covered and how it could help their business. It was organised for the AMC, SE and IFM to visit Denchi Group to run a workshop. The workshop was delivered by the AMC and Scottish Enterprise, with IfM observing the first day and the 2nd day was the implementation of the job tracking product. Please see the [Shoestring | Job tracking to improve production visibility - YouTube](#)

The AMC secured a NMIS student placement and placed them with one of the local SME’s, Lochaber Stainless, to gain experience of a working environment and to aid Lochaber Stainless by documenting their processes for ISO9001 accredited. This proved to be a great success, with the student gaining valuable hands-on practical experience that he will take with him into his final Masters year at Strathclyde University. During his placement the student utilised the scanning and digital



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technology from the AMC reverse engineer several parts that Lochaber Stainless can now offer to it's customer.

Horizontal Themes

Positive approaches to equal opportunities and non-discrimination

As previously mentioned, the AMC Project manager is dyslexic and this is something she feels strongly about championing, to ensure equal opportunities for people who are neurodiverse. The AMC has been involved in a discussion with NMIS, about setting up a neurodiverse group within the manufacturing sector.

As mentioned in the section "Other Project Achievements", AMC visited a school to give a presentation about dyslexia and how it affects their project manager. She went into detail about the positives she has found with being dyslexic. See Appendix K: for the presentation.

Equality between men and women

As mentioned in the section "Other Project Achievements", the AMC was involved in "A Celebrating of women in engineering" event with CEED and Business lunch with the Lochaber of Chamber Commerce. See the Appendix F: and Appendix L:

Having Margaret as our Project Manager and Product Design Engineer has delivered great benefits on the equality front. Occasionally Margaret was faced with the traditional stereotypical reaction of engineers/business owners that she was "too young" and "what could a woman show me". Within a very short period of time Margaret had them convinced that she was highly capable and could provide a great benefit to their business, completely transforming their perception of young females in engineering. Students on campus along with all our visitors have witnessed the professionalism, innovative talents and wisdom that Margaret has brought to the project, demonstrating the equality that we would like to see across the manufacturing sector. In addition, several of the projects undertaken with businesses and new product innovation, have been led by women.

Several of the AMC projects were run by sole women teams, please below case studies:

- HUID Ltd is run by Renuka Ramanujam, 0046 - HUID Ltd – Design moulds



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- RRP Fencing Ltd is run by Mhairi Goodwyn, 0052 – RRP Fencing Ltd – Created prototype of deer post to be able to trial the concept
- Wee Wax Heart is run by Jenna Maclean – Created a selection of designs and 3d printed to allow trials of creating Silicon molds 0056 – Wee Wax Heart –

Sustainable Development

The AMC did promote a number of hosted sustainable events, but they didn't get enough people able to attend, so unfortunately they did not run. Please see the advert of the events Appendix M:HeatSource and AMCF-Decarbonising Heat Supply Chain Opportunities Advert: and Appendix N:Transitioning to Net Zero Advert.

A number of AMC projects had sustainability as its main focus.

- CFUK Concept investigated if it was feasible to create tube moulds for Dyson using the CV5-500 to onshoring manufacturing from China. See Case Study V:
- HUID Ltd is creating a sustainable material for food tray packages. Please see Case Study IX:
- RRP Fencing Ltd is designing deer fencing post system that are made from recycled materials and will be reusable. Please see Case Study X:
- Just Add Green Ltd is designing vertical planters made from recycled material that attaches to railings. These planters will transform railings by creating a green screen. Please see Case Study II:



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Project Challenges

When the College was awarded the project, the STEM Centre premises which were to house the equipment hadn't been built. The Lochaber area suffered from a lack of suitable properties to fit all the equipment and their requirements. The college secured a lease on what was the Underwater Centre, which fortuitously is located very close to the UHI West Highland College building. The college had to incur the lease costs and the building required a lot of renovation to get it ready for the project.

In hindsight, the bid budget was underestimated for both staffing and equipment. Staffing numbers for the centre were slightly less than required, and wages were relatively below the market rates. Due to location, it was more challenging to source the correct staff. The Project manager recruited couldn't relocate from Aberdeen due to a lack of housing in the Lochaber area, which has for some time been recognised as a challenge. With regards the technician position, it required a lot of technical expertise and the ability to use all the equipment which aren't common to the area. The staff member appointed had a background in CAM, with some experience in using CNC machines. Unfortunately, the staff member left the project early, which due to the lack of people with suitable skills, led to the AMC contracting with CADCAL who provided CV5-500 CNC training for one week a month. This was not covered by the funding but did increase the AMC project output considerably.

Due to the rural area that the AMC aimed to help, it was more of a challenge to reach out to people, with some people being unable to travel to Fort William. As a result, AMC found it difficult to get footfall through the door, or to get SMEs to attend events. AMC sent out a questionnaire to local SMEs to gauge which workshops they would attend and what their preference was for timing during the year. There were good responses, and two workshops were arranged around the results. From the responders, only one attended the workshops and the majority of attendees came from the central belt.

Through working with small businesses, it became apparent that they are very busy and don't have time to implement the changes, which they would like. With our attempts to convert electricians to the use of greener technology through our solar, wind power and EV charging points, many of the businesses are already busy and did not see the need to change. Also due to the cost of technology and lack of knowledge,



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a lot of the small businesses can't offset the benefits against the cost. This is the reason the AMC got involved with "Digital on a shoestring".

As expected, Covid affected all areas of the project:

- Sourcing equipment became more difficult, costs increased, and lead-time was longer.
- Having to move events to online.
- Working out how to engage with SMEs without in-person meetings.
- Creating policies and procedures on how to re-introduce in-person events and in-person meetings.



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Publicity

The AMC had limited access to the UHI West Highland College Marketing team, so they used alternative ways to reach out to SMEs:

- The Business Development Manager set up one-to-one team meetings with SMEs to talk through how the AMC could help their business.
- The AMC worked closely with the Lochaber Chamber of Commerce who helped organise and promote the events and the AMC activities in their newsletter.
- AMC also used CEED, the cluster builder, to create the promotional material and organise events.
 - Appendix F: A Celebrating of Women in Engineering Advert.
 - Appendix M: HeatSource and AMCF-Decarbonising Heat Supply Chain Opportunities Advert:
 - Appendix N: Transitioning to Net Zero Advert
- AMC was featured in BBC Alba [Our Advancing Manufacturing Centre featured on BBC Alba's An Là programme. - YouTube](#)

The AMC had a webpage as part of the UHI West Highland College site, see Appendix P: AMC Website.

The building where the AMC is housed has numerous signs with the ERDF logo, which can be seen Appendix B: Photos of the equipment and Appendix O: Signage Photos.

Financial Expenditure

Eligible Costs

COST TYPE	ELIGIBLE COSTS APPROVED (£)	ACTUAL COSTS (£) CLAIMED (up to and including the final claim ¹ submitted to SE)	DIFFERENCE (£)
Total Direct staff costs + 15% flat rate	£233,649.30	£233,649.30	£0
Procurement of Services Costs			
Procurement of Equipment Costs	£1,144,894.40	£1,144,894.40	£0
TOTAL COSTS	£1,378,543.70	£1,378,543.70	£0

Grant Funding

COST TYPE	ELIGIBLE COSTS APPROVED (£)	GRANT TOWARDS ELIGIBLE COSTS APPROVED (£) (70%)	ACTUAL COSTS CLAIMED (£) (up to and including the final claim ¹ submitted to SE)	ACTUAL GRANT CLAIMED (£) (up to and including the final claim submitted to SE) (70%)
Total Direct Staff Costs + 15% flat rate	£233,649.30	£163,554.51	£233,649.30	£163,554.51

¹ Final claim to be verified by Scottish Enterprise (SE)



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Procurement of Services Costs				
Procurement of Equipment Costs	£1,144,894.40	£801,426.08	£1,144,894.40	£801,426.08
TOTAL	£1,378,543.70	£964,980.59	£1,378,543.70	£964,980.59

Comments

(If applicable, provide reasons for difference between eligible costs and actual costs claimed)



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Ineligible Costs (if relevant, to demonstrate full project costs)

COST DESCRIPTION (insert more rows if required)	ACTUAL COSTS (£)
Building Lease & Survey costs	162,530.73
Consumables	65,923.75
Professional Fees	9,399.00
Marketing	1,191.61
Building adjustments	65,461.74
Travel and subsistence	6,991.50
Finance & Procurement time	5,000.00
Project Director time	32,500.00
TOTAL COSTS (£)	£348,998.33

Comments

A range of costs were incurred during the project, which were not eligible for grant funding but were essential for the successful operation of the project. These costs were incurred by UHI West Highland College, as it's contribution to the project.



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Project Legacy

The UHI West Highland College merged with UHI Outer Hebrides and the UHI North Highland on 1st August 2023 to form UHI North, West and Hebrides, providing us with a fantastic opportunity to widen the impact of the legacy of the project. To this end, we plan to move some of the more portable equipment to some of the other locations to increase footfall and to gain new SMEs access. Future plans include developing advanced manufacturing courses and PLC programming courses using the legacy equipment once the restrictions of the AMCF contract are lifted. These will be offered through college curriculum to students and commercially to businesses looking to upskill their current workforce. The AMC is currently investigating funding options for resources and consumables, to allow the service to continue growing and developing.

The AMC's part-funder HIE is looking to fund more equipment for the centre:

- Resin 3D printer.
- Cobot Arm that can work with the CNC equipment and the industry 4.0.
- ROV equipment.

As part of UHI - NWH College there is a plan to develop ROV training and to run it beside the AMC, increasing the offerings into STEM within the area.

Appendix B: Photos of the equipment



Figure 5: 5-Axis Mill - Mazak CV5-500



Figure 6: 3-Axis Mill - Doosan DEM 4000 with Fanuc OiMF control



Figure 7: Lathe - Doosan Lynx 2100LMB with Fanuc OiTF Plus control



Figure 8: Plasma Cutter - Boxford A1HSPi – 80 Amp



Figure 9: Router - Isel EuroMod MP65



Figure 10: FESTO Mechatronics 1 x Robot



Figure 11: FESTO Mobile Hydraulic Workstations



Figure 12: FESTO Wind Trainer



Figure 13: FESTO Double Sided Mobile Pneumatic Workstation



Figure 14: FESTO Electric Vehicle Trainer



Figure 15: FESTO Solar Trainer



Figure 16: FESTO 8 Station Industry 4.0 Modular Learning System + AGV



Figure 17: FESTO Machine Maintenance, Mechanics
- L1, L2, L3



Figure 18: FESTO Double Sided Mobile Pneumatic Workstation



Figure 19: FESTO Mechatronics 2 x DSL202



Figure 20: FESTO Robotino



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Figure FESTO Compressors, DunAir 6-25, 18-40

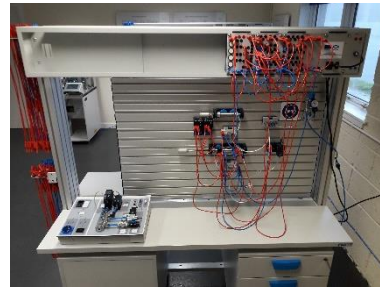


Figure 21: FESTO Double Sided Mobile Pneumatic Workstation

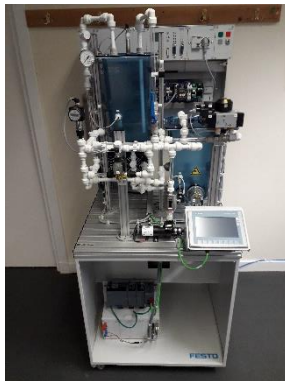


Figure 22: FESTO Process Automation (Proportional, Integral, and Derivative (PID) Training Rig)



Figure 23: Craftbot IDEX Flow XL



Figure 24: Craftbot IDEX Flow



Figure 25: Leica RTC 360 Professional Laser Scanner

Appendix C: Minister Previews Highland Future with visit to College Manufacturing Centre



Figure 26: AMC Visit (L to R) Derek Lewis Jamie Hepburn MSP David Campbell and Lydia Rohmer Jamie Hepburn, Minister for Higher and Further Education, Youth Employment and Training, visited West Highland College UHI's new manufacturing centre on the 28th of October 2021. Mr Hepburn was a special preview guest at the Advancing Manufacturing Centre (AMC) which officially opened its doors the month after.

The Minister, who was visiting the college for the first time in his new role, was shown a range of innovative technology - including the Mazak CV5-500, the first Mazak model of its kind available in Scotland - before meeting construction students and joined an online college school link class to speak with pupils studying Business.

Mr Hepburn was welcomed by Lydia Rohmer, Principal and Chief Executive, Derek Lewis, Chair of the Board of Management and David Campbell, Project Director for STEM.

Lydia Rohmer, Principal and Chief Executive of West Highland College UHI, said:

"As COP26 begins, we welcome the opportunity to show the Minister our vision for a future which will create a step change in access to green, digital and health skills for our young people and help strengthen our rural, coastal and island communities in the West Highlands.

There are currently no specialist education and training facilities for STEM or specialist clinical health or related disciplines and life sciences in the West Highlands, and young people and businesses are forced to leave our communities to get access to skills and training in these areas.



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With strong support from our strategic partners, including the University of the Highlands and Islands, Highlands and Islands Enterprise, NHS Highland, Highland Council and the Scottish Funding Council as well as our business community, we're forging ahead with our plans for our STEM Centre to provide much-needed local skills and opportunities as part of our commitment to create an empowered and sustainable future economy for the rural Highland and Island communities and businesses we serve."

David Campbell, Project Director for STEM at West Highland College UHI, said:

"This Government recognises that STEM is vital to the future of the Highlands as part of its goal to create a more educated, inclusive and innovative Scotland. With AMC and the planned STEM centre which will also incorporate digital and health, we will have everything in place to deliver excellent localised learning, providing employers access to the workforce they need. Our plan will attract new investment and talent and allow everyone the chance to develop rewarding careers without the need to leave homes and families."

Appendix D: Cabinet Secretary Officially Open Innovative New Manufacturing Centre



Figure 27: Cabinet Secretary Kate Forbes officially opens the AMC with (L to R) Lydia Rohmer Derek Lewis and David Campbell

Business and community leaders gathered for the official opening of West Highland College UHI's new manufacturing technology centre on 15th of November 2021 which was expected to transform access to expert technical support and specialist equipment currently available to businesses in Highlands.

Kate Forbes, at the time Cabinet Secretary for Finance and the Economy and MSP for Skye, Lochaber and Badenoch, formally opened the college's new Advancing Manufacturing Centre (AMC) in Fort William by 'pressing the button' on state-of-the-art digital manufacturing machinery and unveiling a plaque.

The Centre opened its doors at the launch of Lochaber Ideas Week, an annual celebration of community, business and innovation held by the Lochaber Chamber of Commerce.

Kate Forbes, former Cabinet Secretary for Finance and the Economy, said:

"The Scottish Government fully appreciates the vital role of manufacturing in the Scottish economy and in building a green and sustainable economy following the pandemic. Our integrated manufacturing programme – Making Scotland's future – will help secure a sustainable future for the sector."

"I am delighted to officially open one of the 12 Advancing Manufacturing Challenge Fund projects. Combined with our £75 million investment in the National Manufacturing Institute Scotland, they demonstrate the extent of our commitment to



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one of Scotland's most productive sectors. That commitment extends to every part of Scotland. I encourage manufacturers – locally and further afield - to take advantage of the support on offer and see how it can help grow your business.”

David Campbell, Project Director for STEM, said:

“We are very grateful to Kate Forbes for opening the Centre, which brings a much-needed resource to the region in support of local businesses. The Advancing Manufacturing in the West Highlands project supports SMEs to innovate and grow their businesses by adopting new technologies and improving processes.

The Centre allows us to enhance the opportunities of our region, its economy, its people and its communities in a changing world. Now the doors have been officially opened, we would like to extend an open invitation to businesses to engage with our team. Whether you are a business struggling to meet demand or are looking for an innovative incubation space to work on the art of the possible, we are here to help with no cost to your business.”

Lydia Rohmer, Principal and Chief Executive, said:

“As an anchor institution, West Highland College UHI is working with partners in the University of the Highlands and Islands, Scottish Enterprise and Highlands and Islands Enterprise to bring together industry, academia and the public sector to help transform manufacturing in our region.

Our new Advancing Manufacturing Centre will help small and medium sized businesses develop their manufacturing capabilities with free access to future-facing specialist technologies and expertise.

Emerging from the Covid-19 pandemic, manufacturing has a vital role to play for our local and national economy, not least in supporting key equipment needs for the health and social care sectors, as well as providing the future technology solutions to support the global race to net-zero.

The opening of this new centre is a step-change in the college's offer to support local businesses and communities, and this will make a vital contribution to transform skills, productivity and innovation in our region. It enables us to bring national and international expertise and specialisms in manufacturing to our rural businesses otherwise not available to them locally.



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AMC's official opening by Kate Forbes MSP, Cabinet Secretary for Finance and the Economy, is a significant milestone in working with our strategic partners to realise our plans for a major Centre for Science, Technology, Health and Engineering in Fort William. This will ensure equity of opportunity and access to world-class industry led facilities, skills and knowledge transfer for young people, businesses and the communities of the West Highlands as part of the post-Covid recovery."

Alastair Nicholson, HIE area manager for Lochaber, Skye and Wester Ross, said:
"Manufacturing is very important to our region's economy and will be crucial as we continue to navigate our way forward from the impacts of the pandemic. As well as being a key component of the Fort William 2040 Masterplan, this centre will be an excellent resource for SMEs in all sectors across the Highlands and Islands, giving businesses the opportunity to learn more about how technology and digital manufacturing can help them be more productive and achieve net zero ambitions. It's great to see the centre formally opened and we look forward to working with everyone in the project to make sure these benefits are fully realised."

Derek Shaw, Commercial Director at Scottish Enterprise, said:
"Helping manufacturers face new challenges and get back on track is our priority. A collaborative approach is vital to kick start our sustainable economic recovery, and it's great to see this in action through the new AMC in Fort William, making it easier than ever for businesses in the region to take advantage of the latest digital manufacturing technology and practices.

With the 12 Advancing Manufacturing Challenge Fund projects, and the National Manufacturing Institute Scotland as a national centre of excellence, there is fantastic support for SMEs the length and breadth of Scotland to embrace innovation to sharpen their competitiveness."

Appendix E: Advancing Manufacturing Centre Welcomes Minister to Showcase Innovation



Figure 28: AMC visit Aidan Purcell, David Campbell and Ivan McKee

West Highland College UHI was delighted to welcome Ivan McKee MSP, at the time minister for Business, Trade, Tourism and Enterprise to its new Advancing Manufacturing Centre on 18th of February 2023 as part of his visit to Lochaber businesses.

Mr McKee, who was in Fort William to learn about the business community's post-covid recovery plans, was shown specialist machinery at the AMC which provides small to medium businesses with free access to equipment and software such as 3D printing, scanning and CNC machining.

More than 70 businesses have engaged with the team at AMC since the centre officially opened in November. Experienced engineers and technicians have provided help with research, training and machining to provide business solutions, inspire entrepreneurs, and bring ideas to life thanks to a successful funding bid.

The range of businesses the college engages with in the region is vast and this is evident in the diverse breadth of sectors who have been supported by the team. From candle makers to exhaust manufacturers, the centre's list of projects to date includes work with seaweed farmers, bike suppliers, vertical planter producers, engineering firms, potters and gin makers.

David Campbell Project Director for STEM at West Highland College UHI, welcomed the opportunity to discuss innovation with Mr McKee, who is himself a graduate in Manufacturing Sciences and Engineering.



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Mr Campbell said:

“The Advancing Manufacturing in the West Highlands project allows us to provide practical support to manufacturing businesses. It was rewarding to not only show the Minister our fantastic facility but to introduce him to business owners who are directly benefiting from step changes in their productivity and innovation through our services.

“The AMC forms part of the college’s support for local businesses and communities, making a vital contribution by bringing national and international expertise and specialisms in manufacturing to rural businesses that would previously have not been accessible locally.”

Mr McKee said:

“The Scottish Government is supporting communities and businesses in Fort William and the wider Lochaber area as we rebuild a sustainable and prosperous economy following the pandemic.

“I was pleased to visit West Highland College in Fort William today to see how funding from the Scottish Government’s Advancing Manufacturing Challenge Fund is supporting this £1.6 million project at the College. This is helping transform production capabilities and create highly skilled jobs at smaller companies across Scotland.”

After touring the centre, Mr McKee visited Highland Cinema and met with Lochaber Chamber of Commerce members and community representatives.

Mark Gibbings, Commercial Manager at Lochaber Chamber of Commerce, commented:

“Lochaber is a thriving hub for business and tourism, hosting and speaking with Mr McKee provided businesses to hold productive conversations and the day was a great opportunity for us all to further put the West Highlands on the map”.



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Appendix F: A Celebrating of Women in Engineering Advert.

21/08/2023, 16:09

220623 A Celebration of Women in Engineering | Ceed

Ceed - where 'know how' meets 'can do'

Login



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220623 A Celebration of Women in Engineering

Registration is closed for this event

On International Women in Engineering Day, we'll be celebrating women in engineering and industry.

June 23rd, 2022 9:30 AM through 1:00 PM

Forth Valley College
Grangemouth Road
Falkirk, FK2 9AD

Email: j.findlay@ceed-scotland.com Email: d.macgregor@ceed-scotland.com



Celebrating Women in Engineering

To mark International Women in Engineering Day on 23rd June, we have teamed up with a number of partners to celebrate women in engineering and industry. We'll recognise where we are now, the journey female engineers have followed to get here, and what more needs to be done to encourage more women into engineering roles into the future.

You'll hear from the following speakers, followed by a guided tour of Forth Valley engineering facilities on campus:



Dr Carol Marsh



Margaret Weir



Caroline Brown

- Dr Carol Marsh, OBE Chair of the Institute of Engineering and Technology (IET) Council
- Margaret Weir, Project Lead, Advancing Manufacturing Centre in the West Highlands
- Caroline Brown, Project Lead, Smart Hub Lanarkshire
- Additional speaker to be announced

Agenda

- 9.30am - Registration
- 10.00am - Event start
- 11.30am - Guided tour
- 12.00pm - Networking lunch
- 1.00pm - Close

This event is being hosted at Forth Valley College (Falkirk Campus). Register now to hear from our speakers and share your own experiences and journey, or of that of others that you know.

Speaker Biographies

Dr Carol Marsh has worked in the field of electronics for over 35 years, specializing in programmable logic. She is the Head of Digital Systems at Celestia-UK, a Visiting Professor at Edinburgh Napier University and a volunteer for the Institution of Engineering and Technology (IET), where she is the Chair of the Council, Chair of the Engineering Policy Group Scotland, a Fellow Advisor and a Professional Registration Advisor and Interviewer. She is also Past President of the Women's Engineering Society.

Carol graduated with an HND in Electrical and Electronic Engineering from Edinburgh Napier University in 1985 and was awarded a degree in Doctor of Engineering in System Level Integration from the Universities of Glasgow, Edinburgh, Heriot-Watt and Strathclyde in 2011.

A winner of 7 technology and diversity awards, Carol is passionate about prompting engineering and in 2020 was awarded an OBE for Diversity and Inclusion in Electronic Engineering.



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This event is part of the **Advancing Manufacturing Cluster Builder** programme which aims to have a significant impact on advancing the manufacturing capabilities of SMEs within Scotland, leading to long-term transformational change.

The Cluster Builder is managed by Ceed in partnership Scottish Enterprise, Highlands and Islands Enterprise and Scottish Government, and is part-funded by the 2014-2020 European Regional Development Fund.

<https://ceed-scotland.com/civicrm/event/info?reset=1&id=1607>

1/2








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Appendix G: NMIS, Online Digital Manufacturing & Leadership CPD workshops.

On Wed 15th March AMC hosted 2 workshop lead NMIS.

Workshop #1 - [230315 Becoming Operationally Excellent | Ceed \(\[ceed-scotland.com\]\(#\)\)](#)

Registration is closed for this event
Join the Manufacturing Skills Academy at NMIS to explore the concept of Operational Excellence and find how to apply operational excellence and related concepts that can be used to build a sustainable competitive advantage.
March 15th, 2023 9:15 AM through 12:30 PM
Advancing Manufacturing Centre
Ocean Frontier
Marine Walk
Fort William, HED PH33 6FF
United Kingdom
Mobile: 07920335769
Mobile: 07517104037
Email: marpant@nmis.ac.uk Email: dmacrepor@ceed-scotland.com



Ceed are delighted to share a learning workshop opportunity aimed at developing value adding operational excellence thinking and fundamental improvement principles. Hosted in Fort William at the **Advancing Manufacturing Centre** the workshop will take place on **Wednesday 15th March 2023 from 9.15am to 12.30pm**, and be delivered by the **University of Strathclyde** and the **Manufacturing Skills Academy from NMIS**.

The session will introduce related concepts such as the value proposition, Six Sigma and Lean Manufacturing as mechanisms to build a successful operational excellence strategy. Practical examples will be provided to help delegates gain a better understanding of what might be required to get started on the operational excellence journey.

The topics that will be covered include:

- The need for change
- Building a value proposition
- Introduction to Operational Excellence
- Six Sigma vs Lean Manufacturing
- Improving organisational performance through measurement

Interest is expected to be high so early registration is recommended







 

This event is part of the **Advancing Manufacturing Cluster Builder** programme which aims to have a significant impact on enhancing the manufacturing capabilities of SMEs within Scotland, leading to long-term transformational change.

The Cluster Builder is managed by Ceed in partnership with Scottish Enterprise, Highlands and Islands Enterprise and Scottish Government, and is part-funded by the 2014-2020 European Regional Development Fund.

Workshop #2 - [230315 Introduction to Lean Manufacturing and Continuous Improvement | Ceed \(\[ceed-scotland.com\]\(#\)\)](#)

Registration is closed for this event
Join the Manufacturing Skills Academy at NMIS to explore the concepts of Lean Manufacturing and the fundamental principles of continuous improvement
March 15th, 2023 1.15 PM through 4.30 PM
Advancing Manufacturing Centre
Ocean Frontier
Marine Walk
Fort William, HED PH33 6FF
United Kingdom
Mobile: 07920335769
Mobile: 07517104037
Email: marpant@nmis.ac.uk Email: dmacrepor@ceed-scotland.com



Ceed are delighted to share a learning workshop opportunity aimed at developing value adding operational excellence thinking and fundamental improvement principles. Hosted in Fort William at the **Advancing Manufacturing Centre** they will take place on **Wednesday 15th March 2023 from 1.15pm through to 4.30pm**, and be delivered by the **University of Strathclyde** and the **Manufacturing Skills Academy from NMIS**.

The session will introduce delegates to the concept of Lean Manufacturing and the fundamental principles of continuous improvement. This session will expand on some of the topics covered in the Operational Excellence and Continuous Improvement session. It will introduce delegates through practical activities to some of the fundamental Lean Manufacturing tools and techniques.

Topics to be covered will include:

- Continuous Improvement pillars
- Brief history of Lean Manufacturing and Lean principles
- Understanding customer value
- Understanding how the work gets done
- The importance of measurement
- Root cause analysis & graphical representations

Interest is expected to be high so registering early is recommended

This event is part of the **Advancing Manufacturing Cluster Builder** programme which aims to have a significant impact on enhancing the manufacturing capabilities of SMEs within Scotland, leading to long-term transformational change.

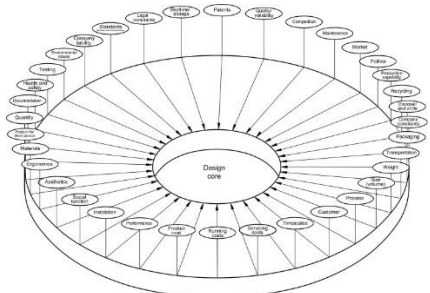
The Cluster Builder is managed by Ceed in partnership with Scottish Enterprise, Highlands and Islands Enterprise and Scottish Government, and is part-funded by the 2014-2020 European Regional Development Fund.

During the break the attendee took a tour around the AMC to see that the facility can offer. Photos of the event:



Figure 29: Photos of the events

Appendix H: Script/Agenda for Innovation in MTB and Outdoors Industries event - DMBinS

Introduction	RW	Introduce DMBinS, Author and Margaret	5 mins
Tour	MW	Show round the centre: <ul style="list-style-type: none"> • 3D Printers • Scanner • Plasma Cutter 	20 mins
Break	Everyone		5 mins
Slides	AB	Present slides in the main room	30 mins
discussion	RW	Identifying that we will be brainstorming. <ul style="list-style-type: none"> • Trail Tools • Bike Storage • Bike maintenance 	10mins
Brainstorm	MW, AB	Brainstorm: Who, what, where when and Why 	20 mins
Defines	Everyone	Talk through the brainstorm and create PDS.	10 mins
Barriers	RW	Why can't you progress this idea	If finishing here. 5mins
Break	Everyone		5 mins
Concepts	MW, AB	Rough concept generation and present.	10 mins
Barriers	RW	Why can't you progress this the idea	If finishing here. 5mins
Q&A	Everyone		

Appendix I: DMBinS innovation in MTB and outdoors industries event advert



Developing Mountain Biking in Scotland

[Our Work](#)
[Ride Guide](#)
[Campaigns](#)
[Events](#)
[Blog](#)

HOME / EVENTS

23rd March, 2023 - 6.00-8.00pm

Advanced Manufacturing Centre, Fort William

WORKSHOPS

INNOVATION IN MTB AND OUTDOORS INDUSTRIES

If you are based in the Highlands and have an interest in innovation or manufacturing in cycling or outdoor industries, this event is a great opportunity to network and learn about the professional support available.



What's the Plan?

With Fort William as the host of the 2023 Cycling World Championships downhill event we are holding an event at the [Advancing Manufacturing Centre](#), with [Mountain Bike Centre of Scotland](#). This event will include a tour of the fantastic prototyping and testing facilities, discussion on potential opportunities and information on the support for businesses and individuals with an interest in innovation and product development in the outdoor industry.

Manufacturers, designers, product developers and anyone with an interest in innovation in cycling and the outdoors are invited to participate.

For more information or to book your place, please contact DMBinS Highland Development Co-ordinator - ruari.watt@scottishcycling.org.uk / 07508040068

Appendix J: Below are the photos of the DMBinS events.



Figure 30: Ruairi Watt presenting about DMBins



Figure 31: Arthur Bossi presenting about the Mountain Bike Centre of Scotland.

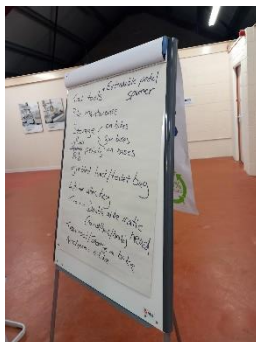


Figure 32: Identifying that we will be brainstorming



Figure 33: Attendees

Appendix K: Dyslexia Presentation Slides

What is Dyslexia

- Dyslexia is one of a family of **Specific Learning Difficulties**.
- Many people who have dyslexia have strong visual, creative and problem solving skills.
- Dyslexia is a life-long condition
- Dyslexia varies from person to person and no two people will have the same set of strengths and weaknesses.
- Dyslexic individuals often have difficulty processing and remembering information, particularly

What do I do



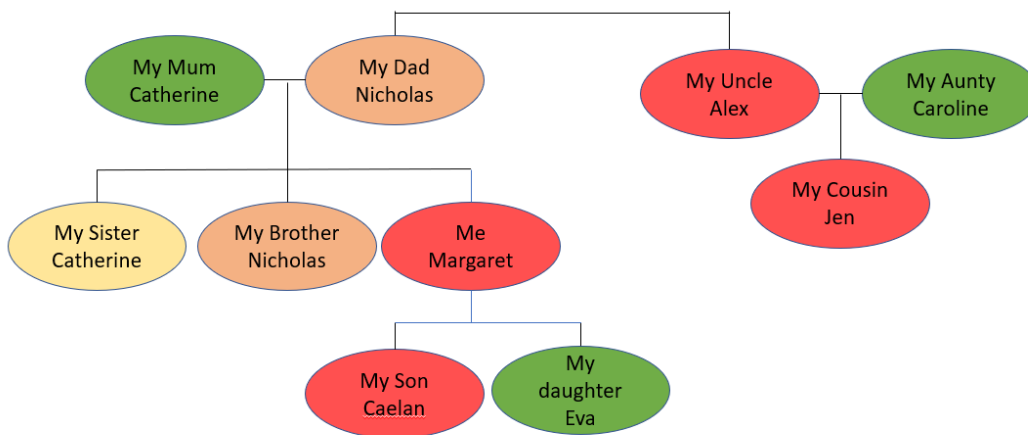
I run an Advancing Manufacturing Centre within Fort William and an Imeche Chartered Engineer who has a MEng in Product Design Engineering.

My career has crossed several industries including Construction, Water, Oil & Gas and Batteries - more recently working as Project Manager of an Oil & Gas Process team.

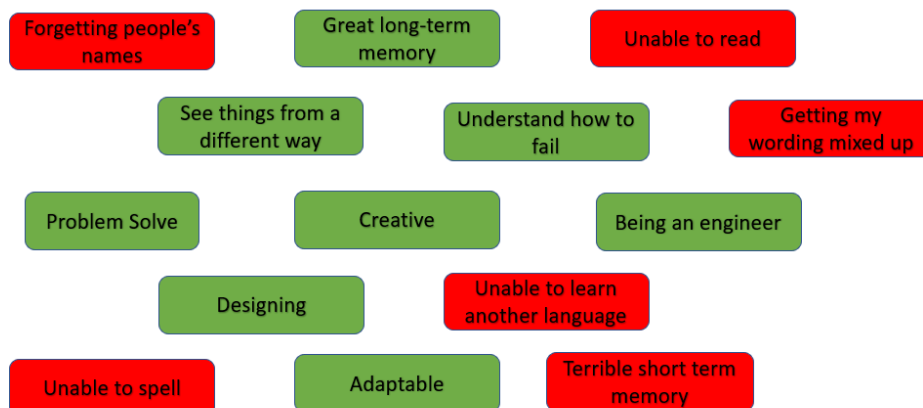
Margaret Weir

Project Manager

Dyslexia within my Family



What does my dyslexia look like



Appendix L: Women in Business lunch



Thank you to members and guest speakers for joining our Women in Business Lunch yesterday at Muthu Fort William Hotel. The lunch, setting and guests were exceptional and we're very thankful to all that made the event successful.

Photo L-R

- 👉 Màiri Macdonald | RBS
- 👉 Anja Baak | GREAT GLEN CHARCUTERIE LTD.
- 👉 Margaret Weir | Advancing Manufacturing Centre, UHI West Highland

Want to join us at our next lunch on Wednesday 6 September? We will welcome [Dr Liz Cameron CBE](#) of [Scottish Chambers of Commerce](#) and [Michelle Maddox](#) of [Cloutie Mctoot Dumplings](#)

Click the link below for more information [📄](#)

<https://lnkd.in/eqyRCPYM>





European Union



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Appendix M: HeatSource and AMCF-Decarbonising Heat Supply Chain Opportunities Advert:

HeatSource and AMCF - Decarbonising Heat Supply Chain Opportunities

27 Sep 2022
10.30 - 3PM
AMC, Fort William

[Join us](#)

Tuesday, 27 September

HeatSource and AMCF - Decarbonising Heat Supply Chain Opportunities

Cancelled

Details

HeatSource is supporting industry across all areas of the supply chain to grow their capacity and capability within this growing sector.



By Built Environment - Smarter Transformation

471 followers

Follow

Date and time



Tue, 27 Sep 2022 09:30 - 15:00 BST



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Location

 **Advancing Manufacturing Centre**
Ocean Frontier Marine Walk Fort William PH33 6FF
[Show map](#) 

Cancelled

[Details](#)

About this event

Our BE-ST Fest programme will be kicking off with HeatSource and AMCF - Decarbonising Heat Supply Chain Opportunities.

HeatSource is a new initiative delivered on behalf of Scottish Enterprise, Highlands and Islands Enterprise (HIE) and South of Scotland Enterprise (SoSE) to support the decarbonisation of Scotland's built environment.

Join us for our first in-person event delivered in Highlands and Islands in partnership with the Advanced Manufacturing Centre (AMC) - part of the AMCF programme part funded by ERDF. The event will include a tour of the facility and equipment housed at the AMC, as well as a chance to network with other businesses and hear from clients. Presentations will be delivered by National Manufacturing Institute Scotland (NMIS), HIE, Cruden and others.

Attendees will also have chance to see equipment demonstrations from the Make it Smart Hub (AMCF) including AR/VR and 3D Laser Scanning Technology.

The event will take place at the Advancing Manufacturing Centre in Fort William. Due to the nature of the rooms available and lack of one larger room to hold a typical conference style event we have taken the opportunity to come up with three 'activities' which will be run three times to allow the attendees to move around and experience each one.

Programme

Activity 1 - Conference by National Manufacturing Institute Scotland (NMIS), HIE, Cruden and others.

Activity 2 - Make it Smart Hub demonstrations

Activity 3 - AMC Tour





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Appendix N: Transitioning to Net Zero Advert



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CANCELLED - How can your business transition to Net-Zero - Fort William

With UK governmental legislation committing the UK to Net Zero by 2050, large companies are now required to report their carbon emissions. This includes the carbon emissions of their supply chain. Net Zero is not just about doing the right thing. It's about the survival of your business.



September 15th, 2022, 12:00 P.M. through 2:00 P.M.



Advancing Manufacturing Centre
Ocean Frontier
Marine Walk
Fort William, HED PH33 6FF
United Kingdom



Mobile: 07920535769
Mobile: 07517104037
Email: margaret.weir@whc.uhi.ac.uk Email: d.macgregor@ceed-scotland.com



BOOTH WELSH
Integrated Engineering Services



CANCELLED - Please re-register for another event or contact Ceed for further information

Part of Ceed's 'Transitioning to Net Zero' series in partnership with Net Zero Nation

More and more public and private sector tenders are also asking businesses to show how they're cutting emissions. This means that if you're not doing this, then you're missing out on business opportunities. Especially when Net Zero can give your business a competitive advantage by opening up new sales opportunities and attracting better talent into your business.

Join Ceed and Net Zero Nation Limited in this 2-hour session over a light lunch to find out:

- What you need to know about current government legislation and how it is already impacting your business
- The 5 M's you need to save money and gain the competitive advantage in the green economy
- Why it's important to be able to accurately measure your carbon emissions
- How you can accelerate your business' journey to prosperity now

You will also hear more about Net Zero Nation's 'Net Zero Accelerator' which helps SMEs get started on their net zero journey, as well as from Ceed Sponsoring Member, Booth Welsh, on the implementation of the Company's carbon reduction plan and how developing a planet-positive mindset across the organisation is opening up new business opportunities.

A tour of the West Highlands Advancing Manufacturing Centre (one of the 12 AMCF projects) following the presentations is available on request. Please contact [Margaret Weir](#) to confirm your attendance for the tour.

A light lunch will be provided.

Net Zero Nation is a purpose-led company limited by guarantee, not share capital. It's mission is to "mass mobilise SMEs on their journey to Net Zero" by offering SMEs carbon accounting, SECR reporting and independent carbon auditing, helping SMEs become more competitive, compliant and climate positive.

[Can't make this date?](#)

Ceed and Net Zero Nation are planning to run similar events over the next two-months - in Aberdeen, Glasgow, Edinburgh and Dundee. [Get in touch to pre-register](#) for events in these areas.



This event is part of the **Advancing Manufacturing Cluster Builder** programme which aims to have a significant impact on advancing the manufacturing capabilities of SMEs within Scotland, leading to long-term transformational change.

The Cluster Builder is managed by Ceed in partnership Scottish Enterprise, Highlands and Islands Enterprise and Scottish Government, and is part-funded by the 2014-2020 European Regional Development Fund.



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Appendix O: Signage Photos.



Figure 34: Signage at the Entrance.



Figure 35: Building Sign.



Figure 36: Sign in the lobby.



Figure 37: Plaque.



Figure 38: Entrance sign to the Rapid Prototyping Area.



Figure 39: Entrance sign to the CNC Workshop.



Figure 40: Sign in the Industry 4.0 Workshop.



Figure 41: AMC Banner.



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Appendix P: AMC Website.

Bring your ideas to life

Our mission is to help you bring the ideas you have into reality by supporting you with services in design and manufacturing.

Whether you need access to equipment and technology, or professional management input into **research, development** or **design** - we're here to help.

All of our services are offered at **zero cost** to small and medium businesses by **our experienced team**.

Leave your **contact details** if you'd like to arrange a consultation or visit

Download our **Advancing Manufacturing Centre (AMC)** flyer for more details.



3D Scanner	CAD and CAM	3D Printer
Machining	Industry 4.0	Project Support

[Business - Advancing Manufacturing Centre \(uhi.ac.uk\)](https://uhi.ac.uk)

Case Study I: 0004 – West Highland Tea Company Packaging

- SME Details
- Name: West Highland Tea Company
- Address: West Highland Tea Company, Tigh Solais, Mallaig Vaig, Mallaig, PH41 4QN
- Company Registration Number: N/A
- SME Challenge

West Highland Tea Company wanted a more cost affect package labelling solution. Their current packages have labels which takes time to print, to place on the packaging correctly and has issues with the labels peeling. They wanted the AMC to source screen print equipment for them to create their own screen print design packages for their 5 favours and their 2 sizes of product. Their original packaging:



Figure 42: Original packaging

- Support provided by the Project.

The AMC believed the screen print design packaging for be more costly and time consuming than the current solution. First thing the AMC did was to create a Product Design Specification (PDS) for the packages. Then research was gathered on what equipment and consumables was required to create the screen-print packaging. From the research the AMC created a “Packaging Options Matrix” which allowed West Highland Tea Company to filter the different equipment and consumables to provide the overall cost. The AMC also sent out PDS to custom packaging manufacturers.

From the manufacturers responses and quotes a “Custom Packaging Options Matrix” was created which allowed West Highland Tea Company to compared the two options.

- Results/Outputs
- Created PDS for the project.
 - 0004-DE-SPC-001 - West Highland Tea Company Labelling PDS
- Connected the custom packaging suppliers.
- Connected the screen-printing suppliers.
- Created matrix of the information gathered:
 - 0004-MD-MTX-001 - Packaging options Matrix
 - 0004-MD-MTX-002 - Custom Packaging options Matrix

The West Highland Tea Company choose to go with the custom packaging:



Figure 43: New packaging

- SME feedback/testimonial (*if available/received*)

The help I received from Margaret and her team was invaluable to me and my business. With her help through thorough research and guidance I was able to make the best decision to bring my tea bag packaging to a more professional level. I went for custom printed boxes in the end to account for the time it would save me as I currently do all aspects of the business myself. Investing in this packaging has cut my preparation time for these products.



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Case Study II: 0022 – Just Add Green Ltd, vertical planter development and CAD files.

- SME Details
- Name: Just Add Green Ltd
- Address: 1 Great George Street, Glasgow, G12 8PD
- Company Registration Number: SC478604

- SME Challenge

Gavin Ross is the owner of Just Add Green Ltd who are attempting to launch a new product. They have several prototypes out in location around the UK. The issue is that they don't have a digital copy or drawing of the product and their current manufacturer is no longer useable source.

- Support provided by the Project:

Just Add Green Ltd came to the AMC to see what help they could receive. After the initial meeting it was decided what was needed was to create CAD models and drawings to allow new manufacturers to be sourced.

The models and drawings were created as per the prototype provided. These files were sent to Just Add Green Ltd and their new manufacturer. It was requested to produce a dxf drawing to allow the manufacturer to use as their cutting path. Once the first planter of the current design was created, it was too big to fit on one sheet of Stokbord, which meant the cost of manufacturing was too high. Just Add Green Ltd had requested that the AMC modified their current design to fit within 2.5 x 1.3m sheet of Stokbord. AMC reduce the overall size but making sure the folds still work in the same way.

- Results/Outputs

The AMC reverse engineered the prototype and then develop the design to be cost effective to manufacture. The output were CAD Models, Technical drawings and dxf files. See figures below of the outputs:

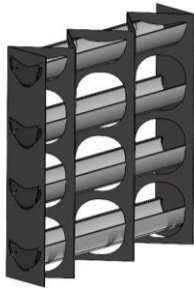


Figure 44: CAD Assembly - 0022-DE-CAD-007 – Planter

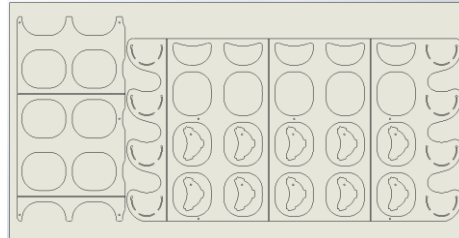


Figure 45: DXF drawing.

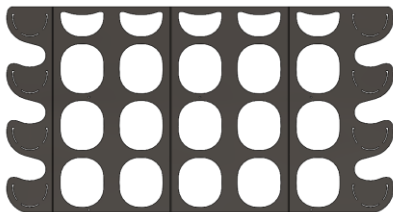


Figure 46: CAD Part - 0022-DE-CAD-005 - PLANTER STAND

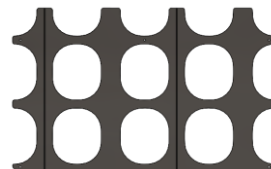


Figure 47: CAD Part - 0022-DE-CAD-008 - SMALL PLANTER STAND

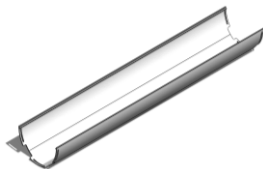


Figure 48: CAD Part - 0022-DE-CAD-002 - planter gutter



Figure 49: CAD Part - 0022-DE-CAD-004 - Planter Ends

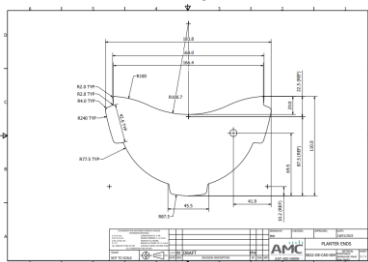


Figure 50: Drawing - 0022-DE-CAD-004 - Planter Ends

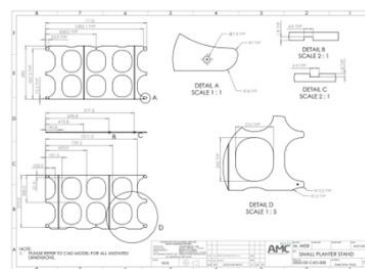


Figure 51: Drawing - 0022-DE-CAD-008 - SMALL PLANTER STAND

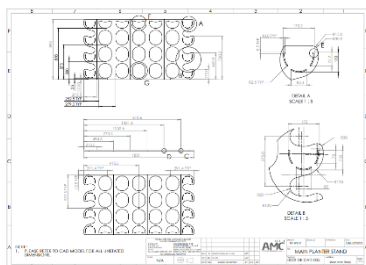


Figure 52: Drawing - 0022-DE-CAD-005 - PLANTER STAND pg1

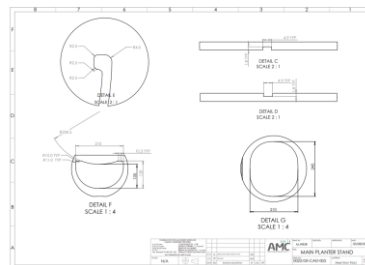


Figure 53: Drawing - 0022-DE-CAD-005 - PLANTER STAND pg2



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- SME feedback/testimonial

The AMC has allowed me to make pre-launch amendments to my product and advised on design and engineering processes. As discussed with Margaret, the AMC provides an invaluable service for business start-ups, getting ideas off the kitchen table and out to the market

Case Study III: 0021 – CFUK Concepts Mudguard Mould.

- SME Details
- Name: CFUK Concepts Ltd
- Address: Woodside Yard, Ardgay, Sutherland, IV24 3DH
- Company Registration Number: SC496696

- SME Challenge

Converting a CAD skin into a CAD model to create a mudguard.

- Support provided by the Project:

CFUK Concept Ltd manufactures carbon fiber products. They received CAD skin and needed to convert into a solid CAD model:



Figure 54: Mudguard CAD Skin

- Results/Outputs

The AMC converted the CAD Skin into a solid CAD 3-part mould model. Output Mudguard export-Mould.STEP and Mudguard export-Mould.SLDPRT

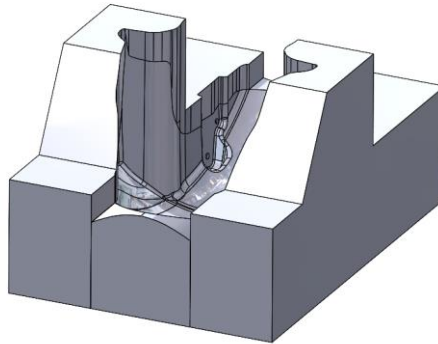


Figure 55: CAD model of the 3-part mould

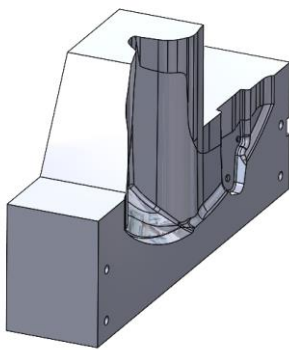


Figure 56: CAD model of the 3-part mould side

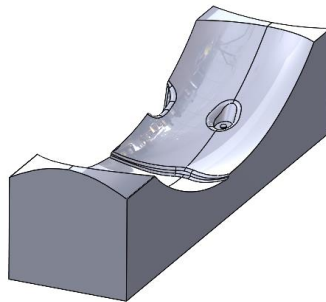


Figure 57: CAD model of the 3-part mould middle

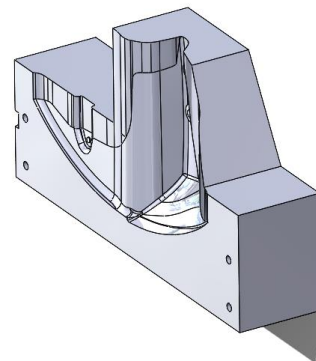


Figure 58: CAD model of the 3-part mould side

- SME feedback/testimonial

CFUK Concepts needed to produce an Aluminium mould of a Yamaha mudguard to produce in composite. Margaret was super helpful by offering her CAD skills. The quality of the file was perfect, and the assistance offered by AMC was first class.



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Case Study IV: 0021 – CFUK Concepts – CV5-500 CNC training.

- SME Details
- Name: CFUK Concepts Ltd
- Address: Woodside Yard, Ardgay, Sutherland, IV24 3DH
- Company Registration Number: SC496696

- SME Challenge

CFUK Concepts Ltd required training on the CV5-500 our 5-axis machine to allow them to access it to create moulds for mudguard and other projects.

- Support provided by the Project:

The AMC provided a 3 days training with a ScotMaz instructor. The training covered Mazatrol software.

- Results/Outputs

The training meant that CFUK Concepts Ltd was able to come down to the AMC and use the CV5-500 with only little supervision. The training also aids CFUK Concepts Ltd with their own mazak machine as it also uses mazatrol.

- SME feedback/testimonial

CNC machining is becoming a large part of our business. Although we have inhouse CNC machines, we do not have 5-axis capabilities. Having the opportunity to learn 5axis (and specifically the Mazak control at AMC), we can now look at markets and industries that were not possible previously.

Case Study V: 0021 – CFUK Concepts – A week of use of the CV5-500 with aid from the AMC contract operator.

- SME Details
- Name: CFUK Concepts Ltd
- Address: Woodside Yard, Ardgay, Sutherland, IV24 3DH
- Company Registration Number: SC496696

- SME Challenge

CFUK Concepts Ltd required use of the CV5-500 our 5-axis machine to allow them to create moulds. CFUK Ltd customer is currently going to China for manufacturing and CFUK Ltd is attempting to re-shore the manufacturing back to the UK.

- Support provided by the Project:

CFUK Ltd access the AMC for 5 days with the support from contract operator.

- Results/Outputs

CFUK Ltd were able to produce the moulds and demonstrate they were able to create the tubes.



Figure 59: CFUK Ltd using the CV5-500

- SME feedback/testimonial

Very useful week for CFUK Concepts. We came down to produce further batches of production tools. Without AMC, the help from Mazak and the CV5-500, our moulds would not be as good as they are.

Case Study VI: 0033 – Lifelaw Patent Application

- SME Details
- Name: Madison McLeod and Co Ltd
- Address: Benview, Brora, KW9 6QN
- Company Registration Number: SC165697

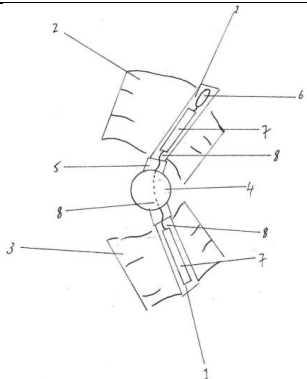
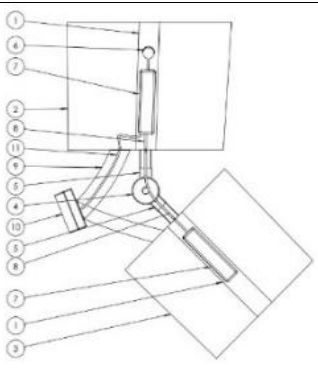
- SME Challenge

Alan is working on developing a knee brace for the golf industry targeting golfers with knee injuries that prohibits them from golfing. Alan had been submitting his patent application but was having an issue with his hand drawn figures of the product.

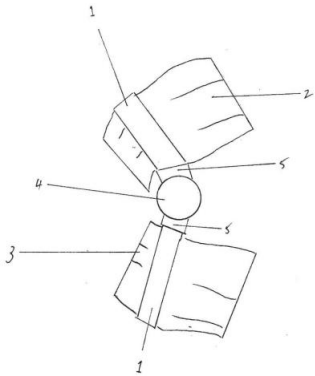
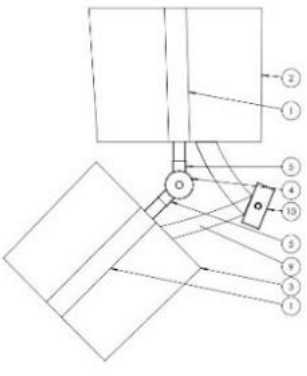
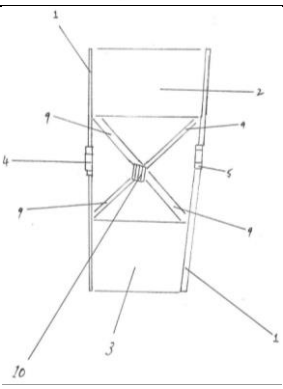
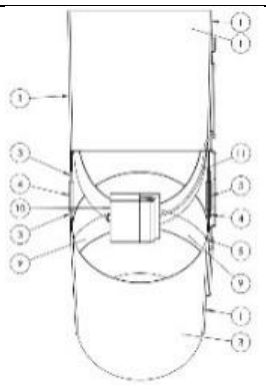
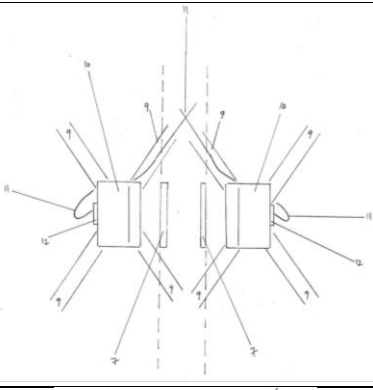
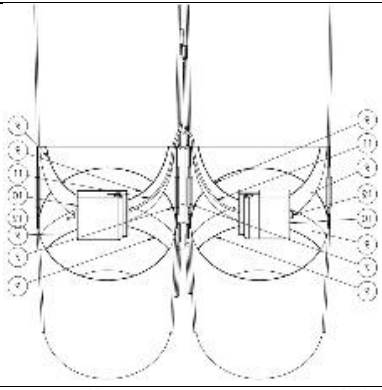
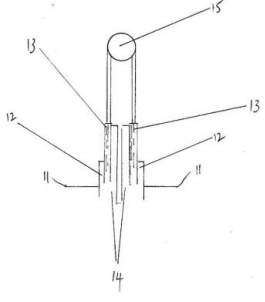
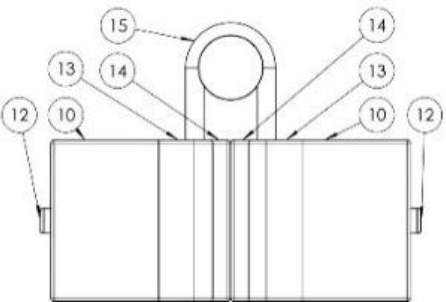
- Support provided by the Project:

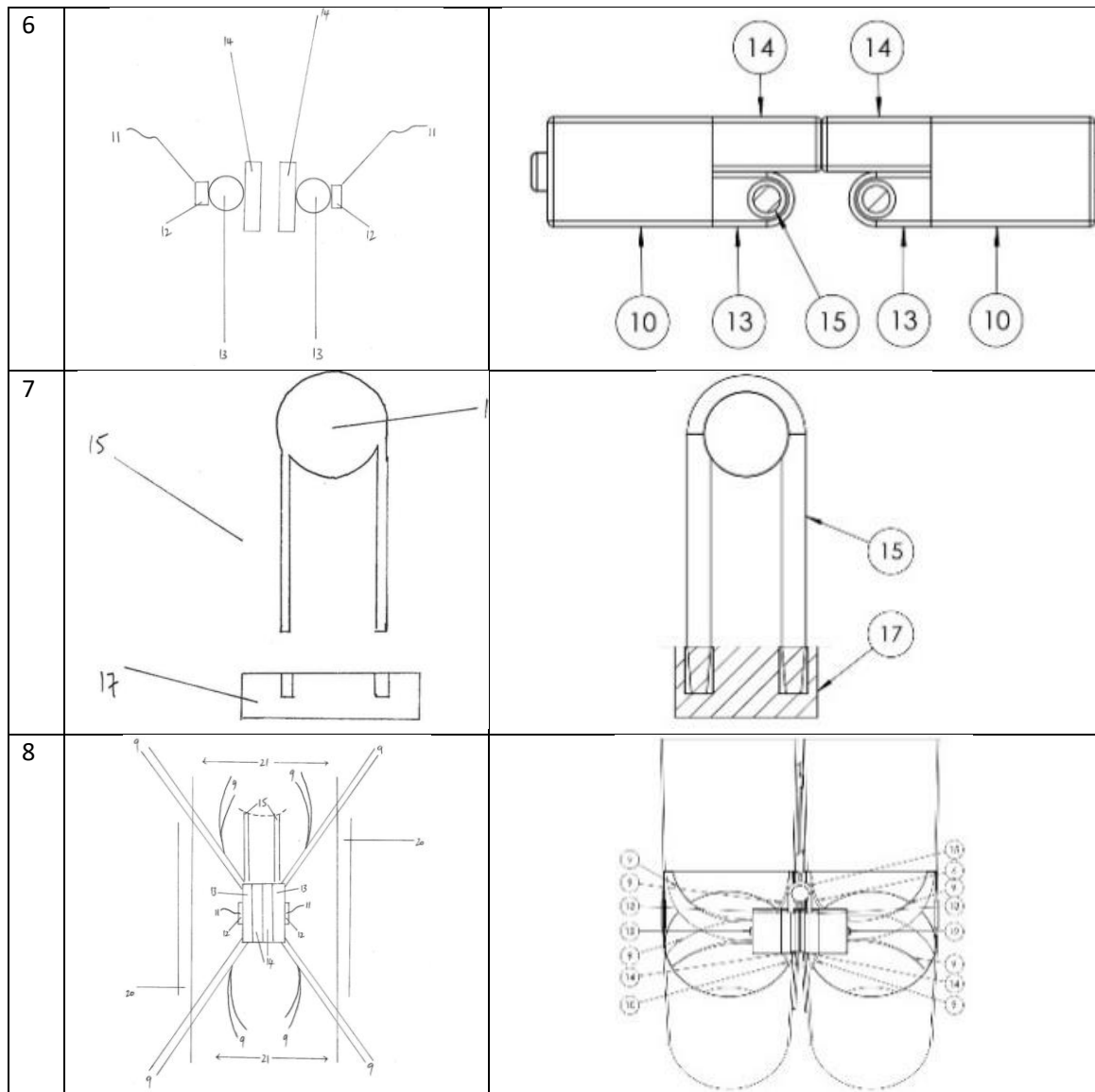
A meeting was arranged on 20/06/2022 at 10:00-11:00 between Alan, NMIS, UHI Centre for Health Science & UHI Business, Hospitality and Rural Studies. This was to discuss what Alan's next steps would be. From the meeting, there was several points came up. The first thing that was identified by the AMC were the images for the patent application, the current ones weren't clear, and the AMC proposed to use CAD to create clear images. See table below:

- Results/Outputs

Fig	Original Images	CAD Images
1		

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2		
3		
4		
5		



- SME feedback/testimonial

Margaret Weir has been a key professional colleague supporting me in my vision to manufacture knee devices in the Highlands. Her wise and discrete counsel as well as her inspiring encouragement to press ahead despite obstacles are only matched by her technical drawings. Thank you.

AMC in West Highland is a crucial asset in this region. If I succeed in manufacturing my devices in the Highlands, then it will be in part to AMC's willingness to invest intellectual capital into my project.

Case Study VII: 0035 – Phyco-f Investigation the use of 3D prints

- SME Details
- Name: Phyco-f
- Address: Malin House, European Marine Science Park, Dunstaffnage, Oban, PA37 1SZ
- Company Registration Number: SC650703

- SME Challenge

Phyco-f wanted to investigate the use of 3D prints for parts which were machined previously.

- Support provided by the Project.

The AMC previously did a CAD workshop with Phyco-f, where we recreated parts that they had no CAD for, and they previously had them machined. Phyco-f wanted to see if these machined parts could be 3D printed from the CAD models.

- Results/Outputs

The CAD model 0036-DE-CAD-045 – Bottom Flange and 0036-DE-CAD-046 – Middle Flange were converted into stl files and imported into craftbot to create the 3D print files.

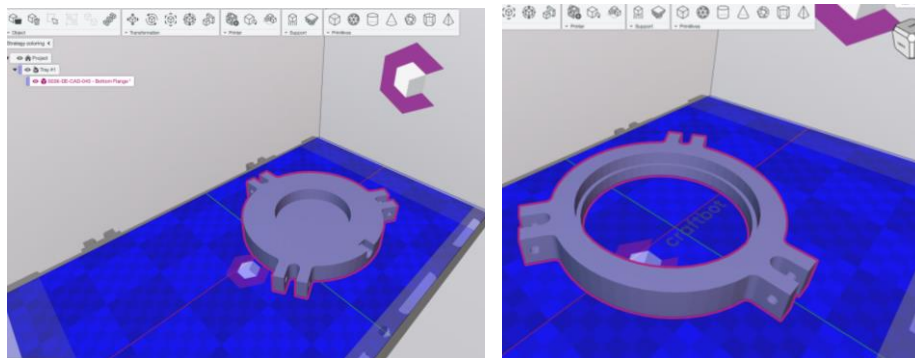


Figure 60: 0036-DE-CAD-045 and 0036-DE-CAD-046 within Craftbot software

1 off 0036-DE-CAD-045 – Bottom Flange and 2 off 0036-DE-CAD-046 – Middle Flange were 3D printed:



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Figure 61: 3D prints

- SME feedback/testimonial

Really useful to be able to produce these 3D prints so quickly.



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Case Study VIII: 0044 – ScotMaz Cutting trial.

- SME Details
- Name: ScotMaz Machine Tools Ltd
- Address: 7 Glentye Road, Broadleys Business Park, Stirling, FK7 7LH
- Company Registration Number: SC081932

- SME Challenge

ScotMaz Machine Tools provide Sales, Service and Parts for Mazak machines in Scotland. AMC took delivery of the first CV-500 in Scotland which was purchased from ScotMaz. Hydrasun subsequently purchased a CV-500 and requested a cutting trial to be done in advance of the installation at Hydrasun to see how it will machine their parts. ScotMaz requested use of the CV-500 and to host them at the AMC.

- Support provided by the Project:

ScotMaz came to the AMC from 25/10/22 to 27/10/22. The ScotMaz machinist worked through the samples provided by Hydrasun for the first 2 days on the CV-500 and then Hydrasun was hosted at the AMC as ScotMaz demonstrated how the Hydrasun parts will be machined on the CV-500. The CV-500 at the AMC is a new machine to ScotMaz, hence new to firm products.

- Results/Outputs

ScotMaz had a successful cutting trial with Hydrasun.

- SME feedback/testimonial

The AMC has been a fantastic facility for showcasing the CV5-500 and the cutting trials went very well with Hydrasun, cementing their confidence in the machine's capabilities. Margaret has been great help on each site visit, very approachable with a great working relationship with suppliers/ customers.

Case Study IX: 0046 - HUID Ltd – Design moulds

- SME Details
- Name: HUID Ltd
- Address: Flat 1, Ardblair, Albert Lane, Oban, PA34 5JD
- Company Registration Number: SC712545

- SME Challenge

Huid Ltd is developing a sustainable material for food tray packaging and required moulds to be experimenting with her curing of the material.

- Support provided by the Project:

AMC design 2 moulds, one 3D Printed mould and one Aluminium mould. The Aluminium mould will allow to do trials with temperature to see how it effect the curing time.

- Results/Outputs

They are struggling to get a consisted curing and require some mould design in CAD.

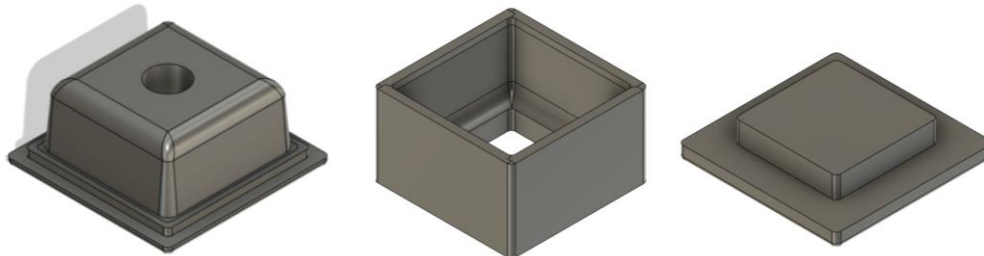


Figure 62: 3D printer 3-part mould

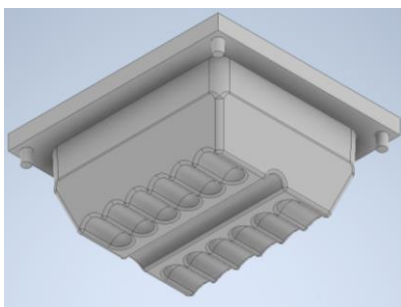


Figure 63: Aluminium Moulds - 0046-DE-CAD-005 -
120X100X50 TRAY LID

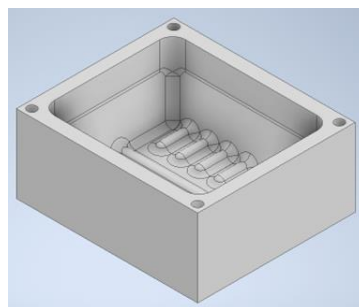


Figure 64: Aluminium Moulds - 0046-DE-CAD-004 -
120X100X50 TRAY BASE



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As you see from the above pictures' designs were created and the CAD model made. Huid Ltd visit the AMC to take apart in the AMC tour event on the 1/03/2023 and to meet the AMC team. During this visit they were able to meet another company CFUK Concept Ltd and were able to do knowledge exchanges about different moulding process.

- SME feedback/testimonial

AMC were able to consult on our 3D molding issues and give us a tour of their facility to better understand the proposed processes. They were also able to put us in touch with another company who was able to give us better insight into scaled processes, and experimental ideas that could work for 3D molding with our material. Lastly, they were able to recommend another facility to carry out further works.

.

Case Study X: 0052 – RRP Fencing Ltd – Created prototype of deer post to be able to trial the concept

- SME Details
- Name: RRP Fencing Ltd
- Address: 98 Woodlands Road, Charing Cross, Glasgow, G3 6HB
- Company Registration Number: SC756135

- SME Challenge

RRP Fencing Ltd had seen an issue with the current solution of deer fencing not being sustainable and wanted to create a sustainable deer fencing solution. To do this they need to produce prototypes for trial.

- Support provided by the Project:

RRP Fencing Ltd came into the AMC on 27/02/2023, with material and to discuss their concept. Due to our machines, we can produce a rudimentary prototype of the fence post to allow RRP to trial their ideas and see how it would work. This would not be the way to create a production product.

to create the prototype we had to use the CAD provided as a reference and recreate the designs in a scaled version. We created two fence posts of 80mm diameter with 3 pairs slots and a cone nose. With our CNC mill we had to open the slots up to 5mm.

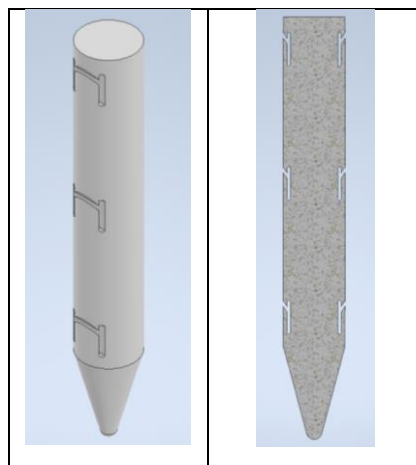


Figure 65: CAD work

- Results/Outputs

The AMC technician worked out how to machine it on our DEM 4000 and was able to produce prototype that would be able to demonstrate the concept to allow RRP to more their product forward.



Figure 66: Photos of the Prototype.

- SME feedback/testimonial
Excellent, thank you.

Case Study XI: 0056 – Wee Wax Heart – Design moulds and create 3D prints for melts

- SME Details
- Name: Wee Wax Heart
- Address: 19 Kennedy Road, Fort William, PH33 6HQ.
- Company Registration Number: SN/A

• SME Challenge

Wee Wax Heart wanted moulds to include the company's logo and Vikings themes. AMC looked at how we can use 3D printers to produce a masters to create silicone moulds from.

- Support provided by the Project:

The AMC created some designs on CAD:

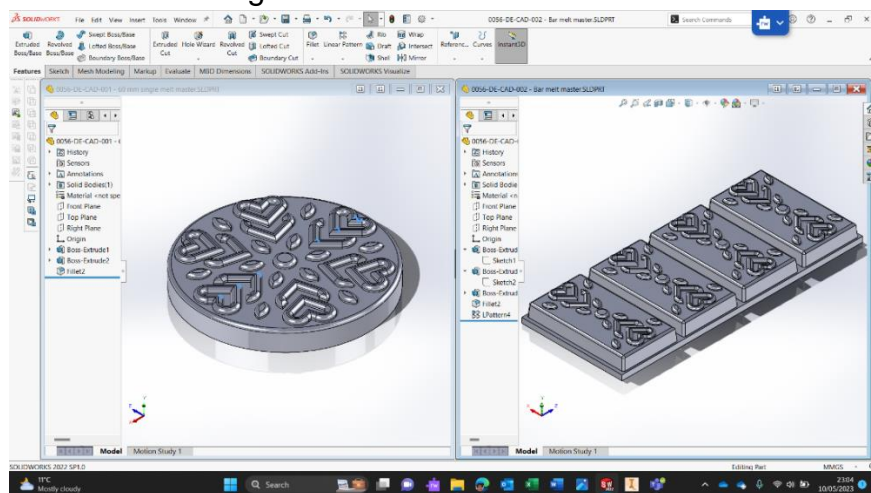


Figure 67: CAD models of designs

Once the design were approved to was putting through 3D the printer software:

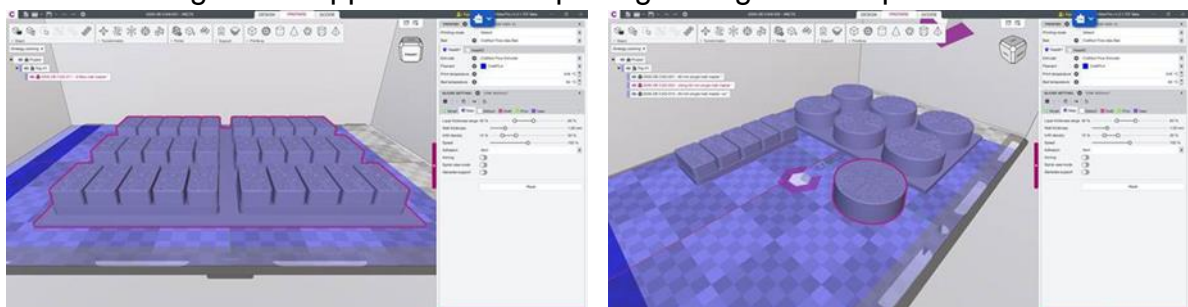


Figure 68: The craftbot software

The master molds were produced in the 3D printers:

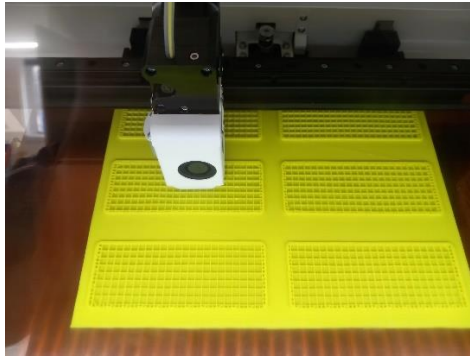


Figure 69: Master mould being 3D printed.

- Results/Outputs

A selection of designs were printed to allow trials of creating Silicon moulds.

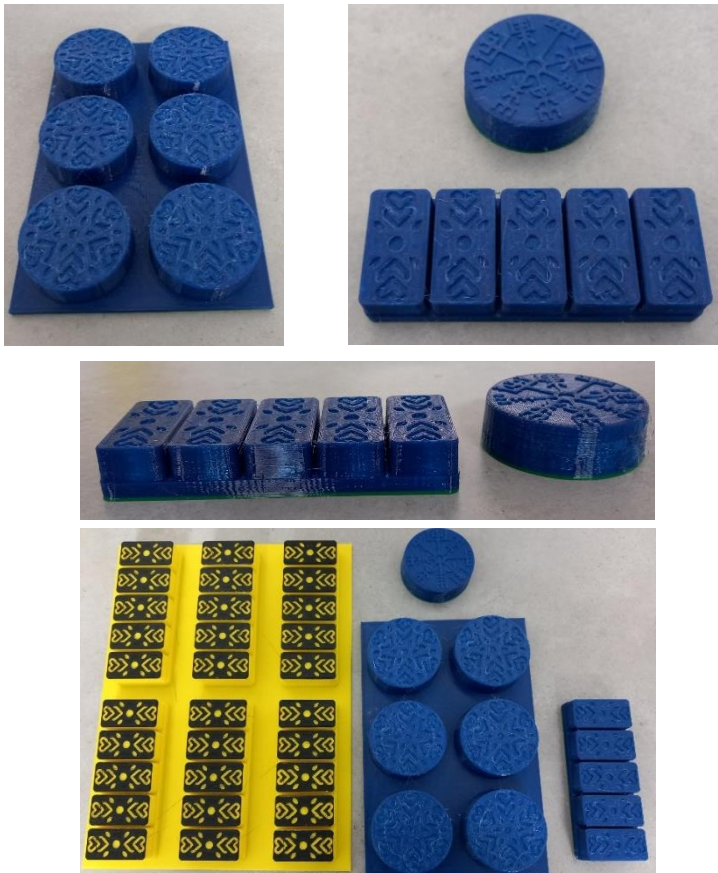


Figure 70: Photos of the masters produced.



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- SME feedback/testimonial

Great communication and fabulous designs! Loved what was created from ideas that we discussed in the initial chat stages. So impressive to see what was created. Cannot wait to get started with them! This is a great service and wish I came along sooner!

I will be looking into using the designs and moulds created to make my own moulds out of silicone as the wax will need to be in something that is playable, washable and reusable. The great thing about this is that I can create multiple moulds with the same design provided. At the beginning it could be quite expensive to create the amount of moulds that I need and there may be some mistakes at first, but overall I think I should be able to create something that is re-usable and can be kept for a long time.