



IAgrE Student Awards

NOMINATION SUMMARY



IAgrE CNH Industrial Award* / Student Project Award* Safety Award*

*please delete as appropriate:

PROPOSER: (usually Course Director/Head of Department)

Name: [Rhys James](#)

Position: Lecturer

University/College: Coleg Sirgar

Gelli Aur Camps,
Home Farm
Golden Grove
Camarthen
SA32 8NJ

Contact details:

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Email: rhys.james@colegsirgar.ac.uk

DETAILS OF NOMINATION:

Name of Student/Group of Students: Owain Jones

Personal contact details (i.e not college) to enable us to contact the student(s) once their course has ended:

Home Tel: 01267 241239

Mob: 07464106668

Email: owz2007@gmail.com

Name of course studied: Level 3 City and Guilds Extended Diploma in Land based Technology

Period studied

From: September 2023

To: July 2025

Qualification to be gained:

180 Credit extended diploma

Project Title:

Magnetic crop roller

Details of material submitted with nomination: (Project/Exec Summary/videos etc)

Powerpoint presentation

SIGNED BY PROPOSER: DR James


DATE SUBMITTED:

22/10/25

If you wish to provide any additional information to support this nomination, please do so in a covering letter. When complete, return this form, together with the supporting documents, to

The Secretariat, IAgrE, The Bullock Building (Bldg 53), University Way, Cranfield, Bedford MK43 0GH
secretary@iagre.org

NB All work submitted is treated with complete Confidentiality; no part of the paper will be published by IAgrE except for the Title and Name of the winner in each category.



Land Based Technology Level 3

Year 2 Project 2024/25

Unit 333

Owain Jones



Cefndir/ Background

My name is Owain Jones, I'm 18 years old and I was raised on a mixed dairy and beef farm in Llangain, not far from Carmarthen. We milk around 200 dairy cows and 250 head of beef for finishing. We do all our work ourselves apart from pumping with umbilical kit, baling and lime spreading.





Dyheadau Gyrfa/ Future Aspirations

Rwy'n gobeithio gorffen y cwrs gyda Merit neu uwch, ac yna symud ymlaen i weitho adref ac yn y dyfodol cymrud dros fferm deuluol. Hoffwn fynd i Seland Newydd neu Australia am gyfnod i ddysgu ar systemau gwahanol o ffermio a gael cyfle i weld y gwahaniaeth mewn raddfa yn y peiriannau sy'n cael ei defnyddio.



Nod ac Amcanion/ Aim and Objectives

- The aim of the project is to design and manufacture or improve a new or existing product to benefit the agriculture industry.
- I need to think of four initial ideas then design and build the final one i choose
- The objective is to successfully design, manufacture and present my product to a distinguished panel of judges

Amlinell amser/Timeline

<u>Month</u>	<u>Process</u>
November	Research for the perfect idea
December	Design the concept of the product
January	Research the material for the product, present proposed ideas
February	Sketching/CAD
March	Fabrication
April	Testing and improving
May/ June	Final presentation



Ymchwil/ Research



I carried out the research on my ideas on many different platforms and sources,

- I made research searching for similar products with magazines and books such as farmers weekly and farmers guardian and Profi magazine.
- I also visited many agricultural and machinery shows like the Royal Welsh Show, Winter Fair and LAMMA 25.
- I also spoke to other farmers and contractors on the concepts/ideas and had considerations of improvements for my designs.



Concept

My fourth and final concept is a magnetic crop roller on the 3 point linkage that could pick up any tines, broken parts or small pieces of fencing wire that have been pulled into the field over the year. This would decrease down time finding the metal in the crop when the metal detector goes off and reduces the foreign objects if followed by a baler or forage wagon. The magnet would be easily cleanable.



Sgorio Dylunio/ Design Scoring

Magnetic crop roller/press

Functionality and performance	
Ease of use	8
Effectiveness	8
Reliability	8
Efficiency	9
Safety	9
Total	8.4

Trailing shoe section control


Functionality and performance	
Ease of use	6
Effectiveness	6
Reliability	7
Efficiency	7
Safety	9
Total	7

Retractable fertiliser bag knife

Functionality and performance	
Ease of use	8
Effectiveness	8
Reliability	7
Efficiency	9
Safety	9
Total	8.2

Automatic feed bin control

Functionality and performance	
Ease of use	8
Effectiveness	7
Reliability	7
Efficiency	7
Safety	8
Total	7.4



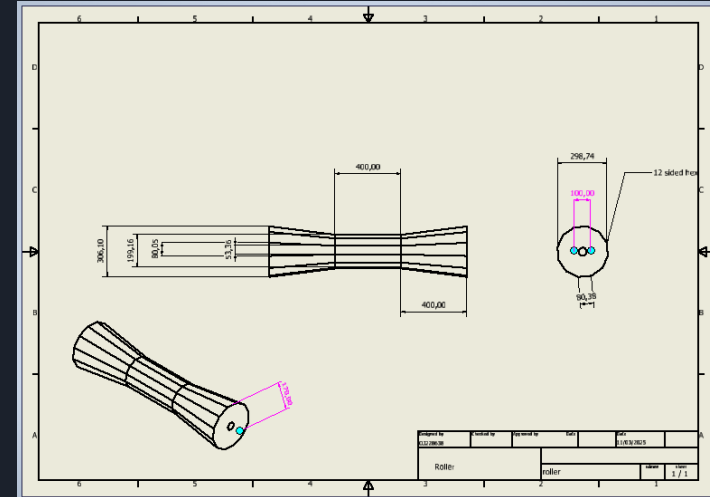
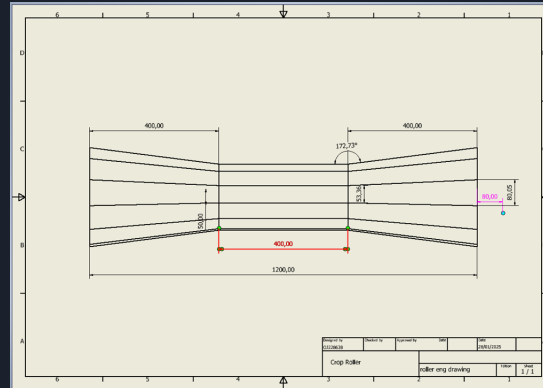
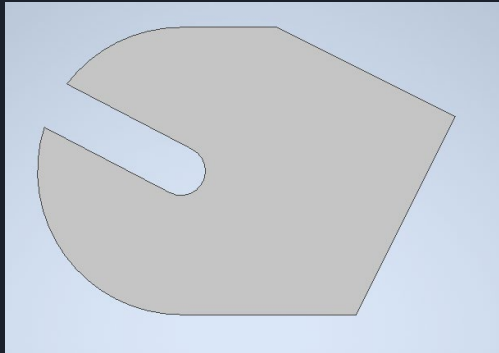
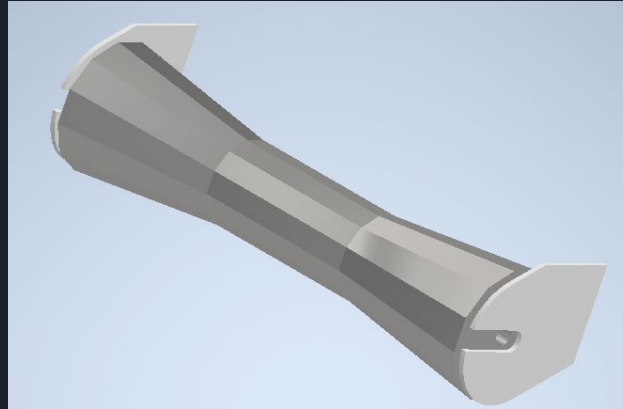
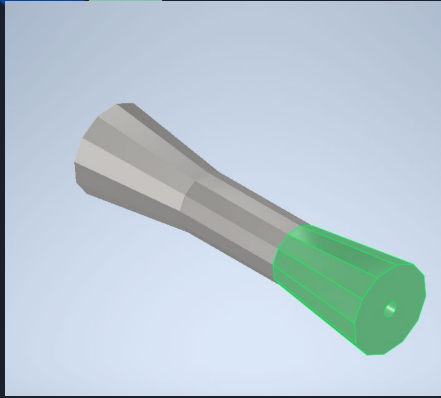
Rheswm dros ddewis y syniad / Reason for choice of project

I chose this as Carmarthenshire is predominantly a grassland area which is mostly made into silage, the silage is harvested via either Forage Harvester, baler or forage wagon. Out of these three systems only the forage harvester has a way to detect metals when entering the machine and this does not stop the object from causing damage, balers and wagons do not have any way of detecting metals.

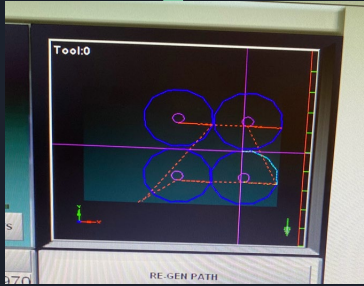
This products would reduce and prevent any metals from entering the chopping system and causing damage to the machine. It would also reduce any metals entering the feed and in the long term saving any animals from consuming the metals. To justify my idea i needed reasons to back my decisions to make sure that I was making the correct decision.

To help me decide on my final idea I design scored all of my four concepts and marked them on the Ease of use, Effectiveness, Reliability, Efficiency and Safety, then I added all the scores from each, and divided them by 5 to get the average score/total out of 10. I did this for all 4 initial ideas and it was the Magnetic crop roller that came out on top. I also had help from peer students, friends and family that thought this idea was a very innovative and would benefit a lot of different people. I also took into consideration which idea we would personally benefit the most from at home as well. With doing all these I could then justify the idea of the Magnetic Crop Roller for my project.

LLuniau CAD/ CAD Pictures



Lluniau o'r cynhyrchu





Cynnal A Chadw / Maintenance

- Rydw i wedi dylunio yr cynnyrch yma fel ei fod yn hawdd i'w chadw a rhwydd a syml i newid cydranau os oes rhaid, mae'r dyluniad wedi ei wneud er mwyn fod yn hawd i gael ei gynnal.
- I have designed this product so that it is easy to store and easy and simple to change components if necessary, the design has been made to be easy to maintain.



Methodoleg / Methodology

The first step in the process is designing the product, with this i needed to take into consideration the dimensions of the product, how i was going to get the concept to work efficiently and how i as going to assemble the parts.

- After deciding on the idea of the Magnetic Crop Roller I began doing research on the concept. For research I used books and magazines for inspiration and see if any products of the same idea has been made. I also searched in shows such as LAMMA and the royal welsh.
- I also asked other farmers and contractors for their thoughts on the design, and looked online for
- I will use CAD software to bring my ideas into a visual perspective and this will allow me to stress test the design for any weak spots so that I can strengthen them before the prototype is made.
- Next I needed to order the materials and components I would be using for the concept, I was to figure out how much or what materials I needed from the design process.
- Building the idea, after manufacturing each part of the product individually by hand I would next assemble all the components to create the one big part.
- Next I would test the prototype, this would allow me to make any changes if necessary and improve the design for the product to be perfect.
- Finally I will add the finishing touches and paint for the final product to be ready.



Syniadau tebyg ar y farchnad/similar ideas on the market

There are no identical ideas on the market but there are similar products that are used for cleaning up after festivals such as Glastonbury that cover a wide area of land. This product is a mounted plate that is attached on the front of a tractor. The magnets used on this design are fitted to a ram and can be lifted away from the bottom plate to release the items collected. The items collected can then be dropped into the trailer of the implement to collect them.



Gwellianau possib/ possible improvements

Yn y dyfodol os dewisaf i gario mlaen gyda'r syniad byddai yn bosib i mi ychwanegu electro magetau yn lle rhai arferol i wella y syniad. Gallaf hefyd addasu yr roller i brwsio efo motor hydrolig er mwyn glanhau closydd neu hewlydd yn haws.

Gallaf hefyd gosod yr roller ar gefn rake gall cael ei ddefnyddio oflaen harvester hefyd.

In the future if I choose to carry on with the idea it would be possible for me to add electromagnets instead of the usual ones to improve the idea. I can also adapt the roller to a brush with a hydraulic motor in order to clean cleaner or conditioner more easily.

I can also place the roller on the edge of a rake, it can also be used in front of a harvester.

Iechyd a Diogelwch/ Health and Safety

Hazard	Person(s) at Risk	Existing Controls	Risk Rating (see matrix)			HighMed Low
			Likelihood	Severity	Total	
Dust & Fumes	Myself and others in the workshop	wear face protection when cleaning rust from any surfaces	2	2	4	low
Slips, Trips & Falls	Myself and others in the workshop	be aware of any extension leads laying around the workshop, if not in use reel up out of the way	2	2	4	low
Crushes & Knocks	Myself and others in the workshop	make sure that disks are safely secured before working on them, held up with jack stands or wooden blocks	1	2	2	low
Cuts & Splinters	Myself and others in the workshop	clean away any sharp surfaces with a grinder and flap disk	2	2	4	low
Lifting & Straining	Myself and others in the workshop	be aware that the disks are heavy and may need more than one person to move them.	3	2	6	med
Chemicals & Poisons	Myself and others in the workshop	make sure in a well ventilated area when applying the primer and paint.	1	2	2	low
Vehicle Parts, Machinery & Vehicles	Myself and others in the workshop	stay clear if the disks need to be moved by a telehandler or other piece of machinery	1	2	2	low
Noise Exposure	Myself and others in the workshop	wear ear protection when using loud tooling and machinery for long periods of time	2	1	2	low
Eye Damage	Myself and others in the workshop	wear appropriate mask for welding PPER approved	2	2	4	low
Waste Disposal & Environmental Control	Myself and others in the workshop	dispose of any rusted metal and used welding rods in appropriate manner	2	2	4	low



Cynulleidfa Darged/Target Audience

- Wide range of target market
- Contractors that use balers and wagons to harvest silage and would like to reduce the time and cost of breakdowns
- And would like to reduce the chances of breakdowns and repair costs if tines make their way into the driveline of the forager.
- Farmers that use balers and wagons to make silage or hay and want to reduce the the illnesses that could be caused by wires digested by cows.
- In the season of 2023-24 there were 590 round balers sold and 110 big square balers sold in the UK, none of these machines would be equipped with metal detectors or magnets.

Costiau / Costings

	Quantity	Cost (£)
Steel Used	3000mm x 3000mm x 6mm sheet 1500mm x 50mm tube 2000mm x 75mm x 50mm box	£100
Magnets	5400mm x 3420mm	£3,800
Bearings	2 x 210 50mm flange bearing	£40
Paint	2 x 1ltr Tins	£40
Consumables	3 x 20mm pins, 8 x Bolts, Washers and Lock Nuts	£16.96
Labour	30hr @ 16£/hr	£480
Total		£4,476.96
Sale value		£6,750.00



Hoffwn ddiolch i'r holl ddarlythwyr sydd wedi fy helpu gyda'r project, ac wrth gwrs Julian am yr holl gymorth i adeiladu yr syniad.

Diolch am wrando

Unrhyw cwestiynau?