IAgrE Student Awards

NOMINATION SUMMARY

Student Project Award*
Safety Award*
***please delete as appropriate:**

PROPOSER: (usually Course Director/Head of Department)

Name: Rhys James

Position: Level 3 Course Director

University/College: ColegSirGar, Gelli Aur Camps, Home Farm, Golden Grove, Camarthen SA32 8NJ

Contact details:	**Tel:01554748583**	**Email: rhys.james@colegsirgar.ac.uk**

DETAILS OF NOMINATION:

Name of Student/Group of Students: Oli Jones

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

Pencilmaren, Crugybar, Llanwrda, Carmarthenshire SA19 8UN	07534 798278	**Email: olidjones@icloud.com**

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

Period studied	**From: September 2024**	**To: July 2026**

Qualification to be gained:
180 Credit extended diploma

Project Title: Tractor mounted spec lift for moving non-running vehicles around the yard

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

Powerpoint presentation

SIGNED BY PROPOSER: DR James	**DATE SUBMITTED:** 18/09/26

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

By Oli Jones



Background

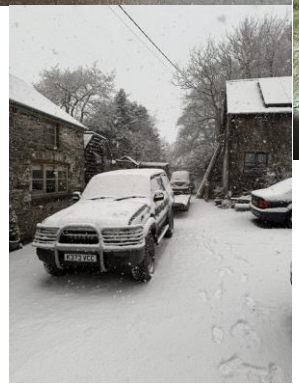












My name is Oli Jones, I am 18 years old. I live around Crugybar, near Talley. Whilst not from a farming background I have always been around and been interested in farming and particularly farm machinery, hence my decision to come to Gelli Aur. I spend the majority of my time buying, fixing and selling cars, particularly Land Rovers.

Aims

The aim of the project is to design a new concept or improve upon an existing technology with the intention of making a task either easier or safer in some way. I came up with 4 ideas, all focused around not only making life easier, but safer as well when working on or around off road vehicles.

Research

Over the past 2 years I have done a great deal of research into what I would design for my project. This has included researching online, speaking to potential customers and evaluating how my concepts might improve the working lives of those who might purchase it. In november 2025 I also attended Agritechnica in Hanover Germany where I saw a range of different machinery and spoke with a number of different manufacturers.



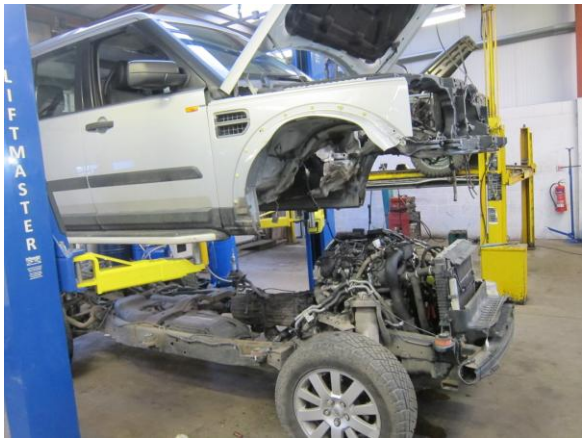


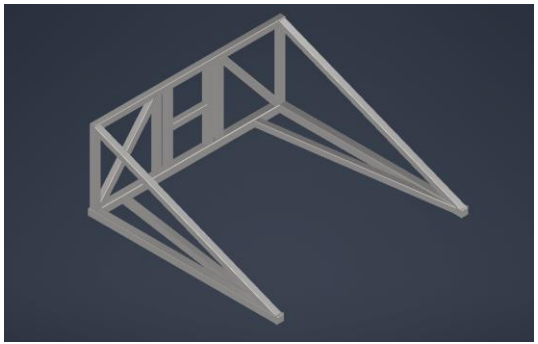
Previous concepts

I originally came up with 5 different concepts, these were all designs which would either solve an issue, streamline a process or make a task safer when working on or around vehicles. I researched all these concepts and weighed them up against one another, I also applied a scoring system which enabled me to select my chosen concept.

Concept 1 Vehicle body lifting frame

Lifting frame for vehicle bodies. A lifting frame mounted on the rear linkage of the tractor. Comprising of an A-frame onto which are mounted the brackets to attach the link arms of the tractor, from this frame there are two straight arms protruding rearward these sit either side of the vehicle. This frame has four lifting points which sit under the sills of the body, these allow you to raise the body from the chassis without damaging the body of the vehicle which often happens when you lift the body through the doors. This frame could also be used to move the body away from the chassis so that you have better access to the chassis, it could also allow you to reverse the body over a trailer and lower the body onto it in order to transport it.





Concept 2 Vehicle body transport trailer

My second concept was a trailer for transporting the body and chassis of vehicles. Lightweight trailer with specialist mountings for securing chassis’ and bodies of vehicles. This trailer has specialist pass through points on the bed of the trailer to allow the arms of a lift to pass through the deck of the trailer, this allows you to lower the body or chassis directly onto the trailer, this is the safest and most precise way of aligning the body on the trailer. This would allow you to move the bodies around even if they are not on their axles, it would also decrease the chances of damaging the body whilst you are moving it.



Concept 3 Lock for raised jack

My third concept is a lock which would be fitted to a jack to add additional support when raised, this would increase the levels of health and safety as it would mean that the jack would act like a stand. This would mean that for shorter tasks such as changing a tyre, you won't necessarily be using an axle stand so if the jack were to fail then the vehicle would fall, this device would negate this issue. This makes the task safer but would not be a replacement for a traditional axle stand.

Concept 4 Rotary tool storage

Concept number 4 is a portable, rotary tool and component storage solution. This is something which would be very useful to me as it would make it far easier to access your tools and parts whilst you are lying underneath a vehicle. I came up with this idea as it is a real pain when you are working under a vehicle and you have to crawl out and stand up in order to get a tool from a tool chest, it is even worse if you have to bring all the tools and parts with you and you end up lying on them and losing parts.



Concept 5 Tractor mounted spec lift

My fifth concept is a tractor mounted spec lift. I came up with this concept as I have personally struggled with moving non-running vehicles around the yard, I can see this being an issue for a huge number of people. The main issue I have experienced personally is moving vehicles around on rough terrain and or slopes, this means that vehicles cannot be safely towed using a rope as they may hit the towing vehicle and are not controllable without the help of another person. You also cannot reverse a non-running vehicle using this method. The tractor mounted spec lift will allow for a vehicle to be held securely on the rear of the tractor, it can then be moved around in a safe and controlled manner, it can also be moved in any direction and it allows for one person to safely move a vehicle without needing assistance.



Weighting

Concept	Production cost	Operator hazard reduction	Development / production time	Complexity	Quantity of usage	Average score
Lifting frame	1	5	2	2	4	2.8
Trailer	3	5	2	4	3	3.4
Jack lock	7	7	4	4	5	5.4
Rotary tool storage	5	3	6	6	7	5.4
Spec lift	4	9	6	6	8	6.6

Highest average score will become chosen concept

Chosen concept 3-point spec lift

My chosen concept is the tractor mounted spec lift. When I evaluated the viability of all my concepts, this one came out on top. This was primarily due to the hazard reduction to the operator as well as the general usability. This product will allow for vehicles to be moved around safely, securely and under complete control. Which will improve the working environment and safety for all involved as well as ensuring the safety of the vehicles being worked upon.



Issue to overcome/ Justification of the idea

The primary justification for this concept was the improved working environment and workplace health and safety which it can provide. It will allow for one person to safely move non running vehicles without placing themself, others or the vehicle at any risk of damage or injury. A big issue for lots of people such as mechanics, is that if moving a vehicle by hand or using a tow rope, the vehicle is not properly controlled. In the best case scenario there can be someone sat in the vehicle in order to attempt to keep it under control, however some of these vehicles may not have functional steering or brakes, this makes the vehicle uncontrollable. Attempting to move a vehicle in this state is extremely dangerous as it can result in people straining themselves or being crushed by uncontrolled vehicles. My product removes this danger as it allows one person to move a broken vehicle from the safety of the tractor cab.



What's on the market

When researching my 5 concepts, one of the primary factors I had to consider was whether what I was designing or something similar was already available on the market. Unfortunately, a few of my concepts were already available on the market, discounting them as they would not then meet the criteria for the project. However, despite exhaustive research, there was no sign of there ever being a tractor mounted spec lift available on the market. This was good news as it meant not only that the concept met the criteria for the project, but also that, if offered for sale, there would be no issues with infringing upon copyright or patents.

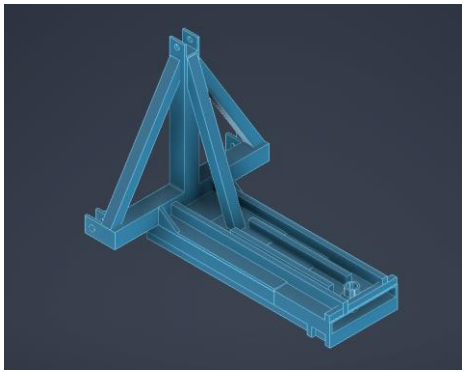
Target market

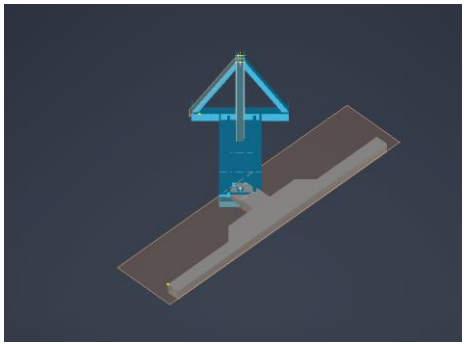
Having spent time researching potential customers for this product, including speaking with a number of them personally, I have established that there are several different types of people who will be interested in this product. One such customer base is mechanics. Mechanics often have to deal with non running vehicles, they often move them about manually using a combination of towing them using another vehicle and pushing them by hand. This is not the safest way of dealing with a vehicle as it means heavy manual work which could result in injury, it also involves people working around unsecured vehicles. Another potential market is farmers in need of a solution for recovering broken vehicles, this product could be uprated and designed to handle recovery of a broken tractor. This would not only require the arm being made heavier, but also a pair of wheel dollies to keep the tractors wheels off the ground, this is to prevent damage to the tractor’s drivetrain.



Different designs

My final product has been through several stages of development, there have been several different designs which have been attempted. This included fitting it with not only a 3 point linkage headstock, but also the ability to be mounted on pallet forks. I also investigated having hydraulic rams to alter the angle of the spec lift. Both of these designs had their merits but, ultimately, both of these would have drastically increased the weight and also given considerable issues with clearance to get the head of the spec lift under lower vehicles.





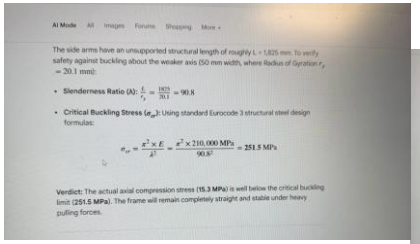
Chosen design

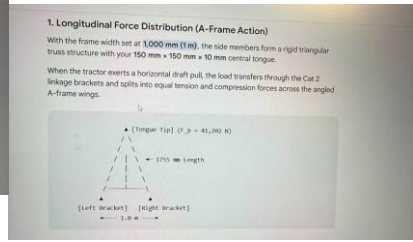
The chosen design uses a solidly mounted headstock, this adds rigidity to the design and lessens the number of potential weak points, it also reduces the overall weight of the design. With this design, I made the decision to utilise the top link on the tractor to angle the spec lift, this reduces overall weight and cost significantly. By choosing not to use rams, I can build it with a much smaller and less complex frame which places less weight on the tractor, I also don't have to use rams and pipes which considerably reduces cost.

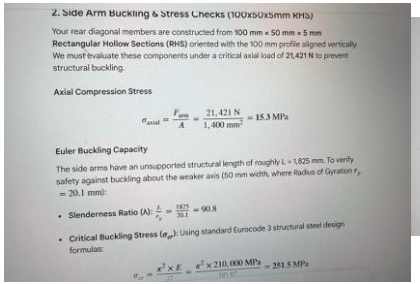


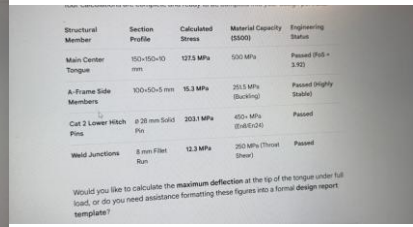
Calculations

Before I built the product, I used CAD as well as other online resources to help me figure out the loads, stresses and tolerances to ensure that my project would be strong enough to do what it has been designed to do. I used the inbuilt CAD stress testing program which shows me how the design will react with forces acting upon it, this allowed me to build it confident that it was built to the correct specification.



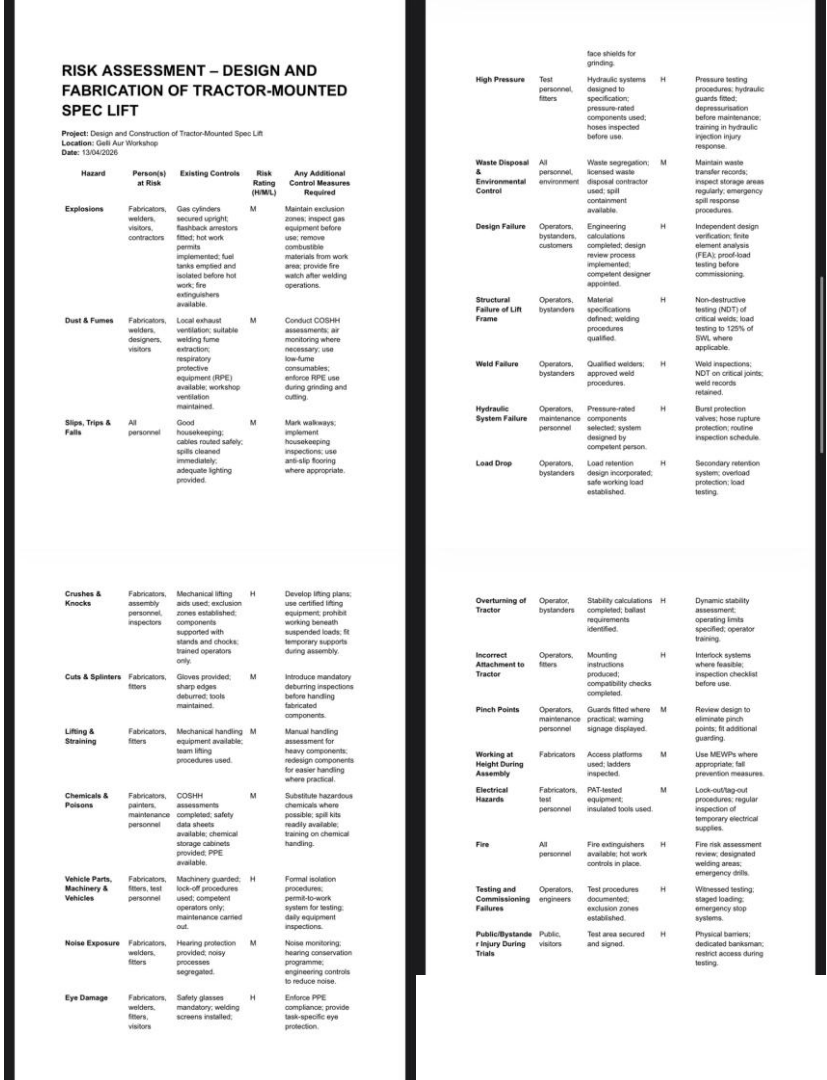






Risk assessment

Before beginning to build the product, I filled out a comprehensive risk assessment.



RISK ASSESSMENT – DESIGN AND FABRICATION OF TRACTOR-MOUNTED SPEC LIFT

Project: Design and Construction of Tractor-Mounted Spec Lift
Location: Gelli Aur Workshop
Date: 13/04/2026

Hazard	Person(s) at Risk	Existing Controls	Risk Rating (H/M/L)	Any Additional Control Measures Required
Explosions	Fabricators, welders, visitors, contractors	Gas cylinders secured upright; flashback arrestors fitted; hot work permits implemented; fuel tanks emptied and isolated before hot work; fire extinguishers available.	M	Maintain exclusion zones; inspect gas equipment before use; remove combustible materials from work area; provide fire watch after welding operations.
Dust & Fumes	Fabricators, welders, designers, visitors	Local exhaust ventilation; suitable welding fume extraction; respiratory protective equipment (RPE) available; workshop ventilation maintained.	M	Conduct COSHH assessments; air monitoring where necessary; use low-fume consumables; enforce RPE use during grinding and cutting.
Slips, Trips & Falls	All personnel	Good housekeeping; cables routed safely; spills cleaned immediately; adequate lighting provided.	M	Mark walkways; implement housekeeping inspections; use anti-slip flooring where appropriate.
Crushes & Knocks	Fabricators, assembly personnel, inspectors	Mechanical lifting aids used; exclusion zones established; components supported with stands and chocks; trained operators only.	H	Develop lifting plans; use certified lifting equipment; prohibit working beneath suspended loads; fit temporary supports during assembly.
Cuts & Splinters	Fabricators, fitters	Gloves provided; sharp edges deburred; tools maintained.	M	Introduce mandatory deburring inspections before handling fabricated components.
Lifting & Straining	Fabricators, fitters	Mechanical handling equipment available; team lifting procedures used.	M	Manual handling assessment for heavy components; redesign components for easier handling where practical.
Chemicals & Poisons	Fabricators, painters, maintenance personnel	COSHH assessments completed; safety data sheets available; chemical storage cabinets provided; PPE available.	M	Substitute hazardous chemicals where possible; spill kits readily available; training on chemical handling.
Vehicle Parts, Machinery & Vehicles	Fabricators, fitters, test personnel	Machinery guarded; lock-off procedures used; competent operators only; maintenance carried out.	H	Formal isolation procedures; permit-to-work system for testing; daily equipment inspections.
Noise Exposure	Fabricators, welders, fitters	Hearing protection provided; noisy processes segregated.	M	Noise monitoring; hearing conservation programme; engineering controls to reduce noise.
Eye Damage	Fabricators, welders, fitters, visitors	Safety glasses mandatory; welding screens installed; face shields for grinding.	H	Enforce PPE compliance; provide task-specific eye protection.
High Pressure	Test personnel, fitters	Hydraulic systems designed to specification; pressure-rated components used; hoses inspected before use.	H	Pressure testing procedures; hydraulic guards fitted; depressurisation before maintenance; training in hydraulic injection injury response.
Waste Disposal & Environmental Control	All personnel, environment	Waste segregation; licensed waste disposal contractor used; spill containment available.	M	Maintain waste transfer records; inspect storage areas regularly; emergency spill response procedures.
Design Failure	Operators, bystanders, customers	Engineering calculations completed; design review process implemented; competent designer appointed.	H	Independent design verification; finite element analysis (FEA); proof-load testing before commissioning.
Structural Failure of Lift Frame	Operators, bystanders	Material specifications defined; welding procedures qualified.	H	Non-destructive testing (NDT) of critical welds; load testing to 125% of SWL where applicable.
Weld Failure	Operators, bystanders	Qualified welders; approved weld procedures.	H	Weld inspections; NDT on critical joints; weld records retained.
Hydraulic System Failure	Operators, maintenance personnel	Pressure-rated components selected; system designed by competent person.	H	Burst protection valves; hose rupture protection; routine inspection schedule.
Load Drop	Operators, bystanders	Load retention design incorporated; safe working load established.	H	Secondary retention system; overload protection; load testing.
Overturning of Tractor	Operator, bystanders	Stability calculations completed; ballast requirements identified.	H	Dynamic stability assessment; operating limits specified; operator training.
Incorrect Attachment to Tractor	Operators, fitters	Mounting instructions produced; compatibility checks completed.	H	Interlock systems where feasible; inspection checklist before use.
Pinch Points	Operators, maintenance personnel	Guards fitted where practical; warning signage displayed.	M	Review design to eliminate pinch points; fit additional guarding.
Working at Height During Assembly	Fabricators	Access platforms used; ladders inspected.	M	Use MEWPs where appropriate; fall prevention measures.
Electrical Hazards	Fabricators, test personnel	PAT-tested equipment; insulated tools used.	M	Lock-out/tag-out procedures; regular inspection of temporary electrical supplies.
Fire	All personnel	Fire extinguishers available; hot work controls in place.	H	Fire risk assessment review; designated welding areas; emergency drills.
Testing and Commissioning Failures	Operators, engineers	Test procedures documented; exclusion zones established.	H	Witnessed testing; staged loading; emergency stop systems.
Public/Bystander Injury During Trials	Public, visitors	Test area secured and signed.	H	Physical barriers; dedicated banksman; restrict access during testing.

Timeline

Month	Week 1	Week 2	Week 3	Week 4
October	Research Online	Research Online	Research Online	Research Online
November	Initial ideas presentation	Agritechnica / market research	Research Online	CAD designing
December	CAD designing	CAD designing		
January		CAD designing	CAD designing	Research
February	Research	Research	CAD designing	
March	Research	Research	CAD designing	Making material list
April			Acquiring materials	Beginning physical design
May	Finalising	Preparing for	Beginning build	

Methodology

The methodology behind this product is to make the job of moving broken vehicles easier, safer and less strenuous. It also makes the act of moving vehicles possible with only one person as opposed to requiring 2 or more. It drastically reduces the likelihood of injury as it means that the person moving the vehicle can be a safe distance away from the vehicle itself.

Fabrication and Manufacturing

Started by buying a Spec Lift arm off a 12t recovery lorry and removing any excess fittings.

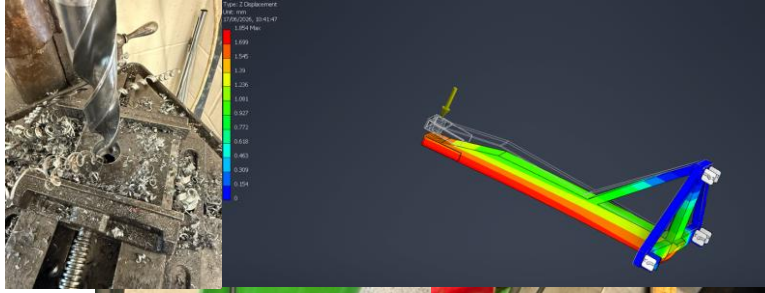
Fabricated the A-frame using 4 lengths of box and using 10mm plate to create the links

Used CAD to decide where to mount headstock

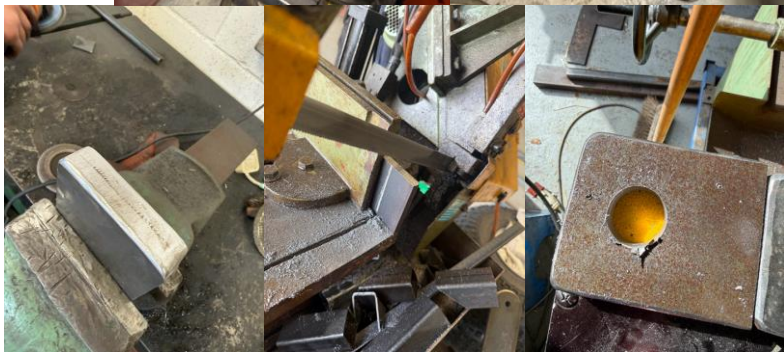
Cut slot in arm to mount A-frame into

Welded A-frame into the slot and reinforced using 12mm plate

Welded diagonal brace from the top of the A-frame to the arm to provide rigidity.







Testing

Having built the product, I tested it by attaching it to the back of a tractor and using it to lift and move a vehicle. I picked up the front end of the vehicle and used the tractor to move it around the yard. I also dropped it onto the floor and adjusted the top link, I then reattached the top link and tested the angle. Ideally the tractor would be fitted with a hydraulic top link in order to be able to adjust the angle easily from within the cab.



Costs

Spec lift arm - £325

Steel £45

Paint £50

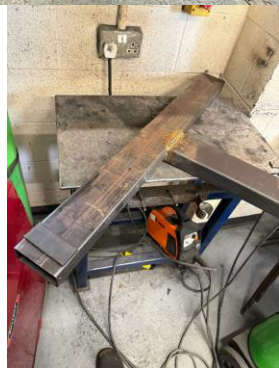
Labour 15 hours at £20 per hour

Consumables £35

Total cost £755











Possible improvements

Possible improvements include uprating the design using a heavier duty arm to be mounted on a larger tractor. The purpose of this would be for the product to be used for recovering larger equipment such as broken tractors. This product would be accompanied by a set of dollies in order to lift the remaining wheels off the ground and prevent drivetrain damage.



Skills learnt

Over the course completing this project, I have done research, both in person and online. I have also used CAD to design my product and carry out most of the calculations. Finally I have used a great many different tools when actually building the product, from measuring to cutting to welding I have developed a much greater understanding of how to go about producing something like this.





Testimonial

The issue which this product is designed to resolve is the lack of safe ways of moving broken vehicles in any environment. Many people, such as mechanics, are forced to move vehicles around by hand, in sometimes dangerous conditions. This is not only strenuous work, but also very dangerous. My product allows a single individual to safely move a broken vehicle in a controlled manner without ever placing themselves in harm’s way.

Vote of thanks

I would like to say a huge thank you to all the college lecturers

Rhys James

Geraint Evans

Jordan Hill

Colin Jones

With a special thanks to Julian Summerfield, without whom this project would not have happened!

I would also like to thank all the judges and everyone here today for listening.

Questions

Any questions would be much appreciated, many thanks

