Design Ideas

"Architecture" by Barton Willmore

Maths Box

If the diameter of the cross-length is 400mm then the cross sectional area is 63,000 mm^2 using πr^2

This can be reset using hot water.

The handle will use a SMA to remember how the user grips the product.

The handle is placed at a height where most people can use it.

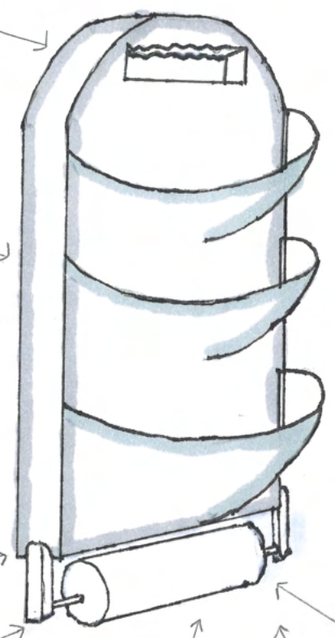
The basket slides into the main frame using a fish hook mechanism

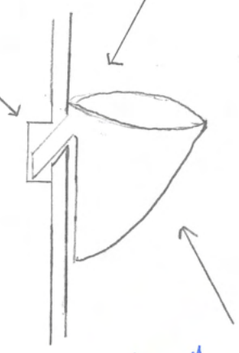
The 3 baskets can be removed and replaced very quickly using minimal effort.

Using a fabric reduces the weight of the product.

The baskets have a mild steel frame which is welded together. The rest of the basket is made from a durable fabric.

When all 3 baskets are attached 65kg of logs can be carried however the user can choose to carry less than this.





As the baskets can be removed they can be used to carry the logs or empty the logs to the desired location.

The product can be loaded flat. This could be for loading or storing away.

The fabrics will have little holes to reduces water intake if left outside

The axel will be welded to the main frame as this is a very strong joining technique.

Once again the wheels can easily be access and replaced if faulty.

Due to the wheels large size it can easily manouvre difficult terrain.

One large singular wheel allows the product to be moved easily.

As the baskets can be removed my client could only move one basket at a time which would reduce the strain on her.

Welding uses a vast amount of energy. Therefore as little time should be used for welding to reduce the impact on the environment.

As there is only a singular the product can be moved at the desired height of the user.

The frame of the product is made from Aluminum. This reduces the weight of the product

Aluminum is resistant to scratching and denting. This means the frame will last the 6 years it needs to meet the specification.

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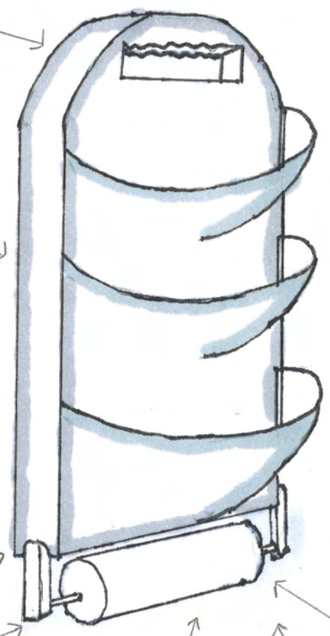

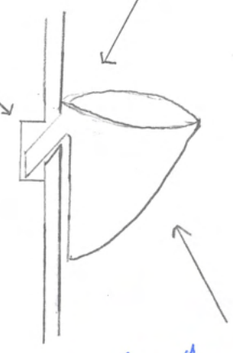

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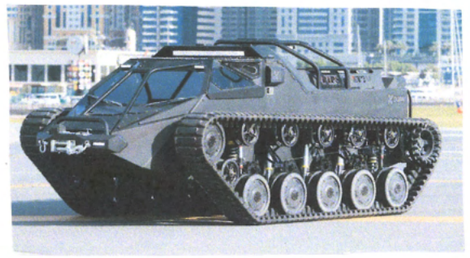


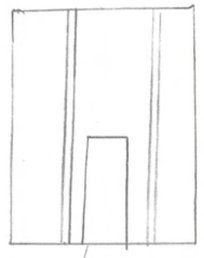
"Machinery"

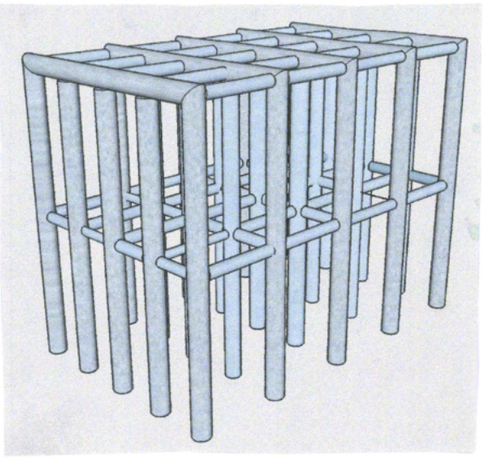
All edges will be rounded so that they meet the BSI sharpness test.

The motor will be electric and so can be plugged in to recharge

A motor will power the back set of wheels which will in turn move the treds forward.

Tubes slide over eachother



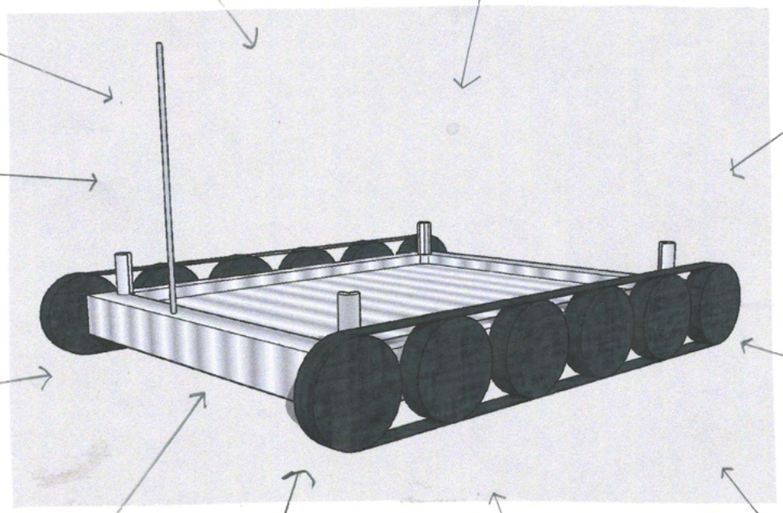


The radio wire can be removed when not in use

The controls will be forward, rotate left/right. This will make the product very easy to control

This product will be radio controlled through a remote controller

Due to the low height of the product it can easily be stored under a table or alongside a wall.



If the user wants to carry more logs without having to make an unstable height pile they can use this attachement. Once connected to the 4 points of attachement it allows a greater volume of logs to be carried whilst remaining safe and stable

65 litres Volume

The product has a very wide base so that it is safe and stable.

BSI EN 1730

Tire treds allow the vehicle to move easily over uneven terrain

I plan to use old bicycle tires as the treds. This will have less impact on the environment.

Using similar materials will make it easier to recycle at the end of the products lifespan.

The product will be made from Aluminum. This is a lightweight material, therefore my product will meet the required weight.

Aluminum is durable and will absorb dents from logs being dropped.

BSI EN 1730

The corners will be pop riveted together

Metal overlap pulled together using pop rivet gun

By using bike treds with this product it allows the treds to be easily replaced.

This leads to easier/cheaper maintance of the products which in turn leads to an extended lifespan of the product.

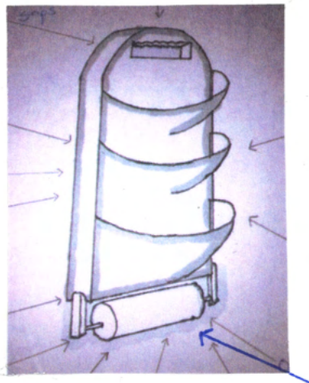
I will finish the wheels in a black primer and leave the Aluminum as it is as it is already corrosion resistant.

Maths Box

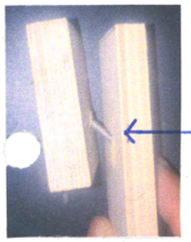
Distance between wheels = $6 \times \frac{C}{\pi}$

C = 500mm

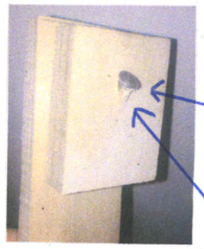
Distance = 955mm



Further modelling and explanation of design ideas 1 and 2



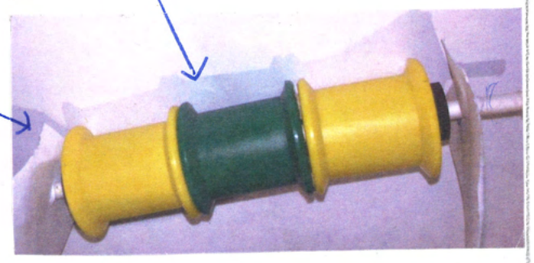
Steel bar is used as the 'fish hook' to hold the basket in place. Steel is used as it is very hard and so won't deform easily.



The bar will pass through the back of the basket to provide extra strength.

The beam will pass through at a low angle, this will result in more contact time and therefore greater strength.

I found using 3 rollers gave improved maneuverability.



This nut ensures the axel remains attached.

This part on either side will be welded to the main frame.

Drilled using the pillar drill

The screw thread would be made using Tap + Die.

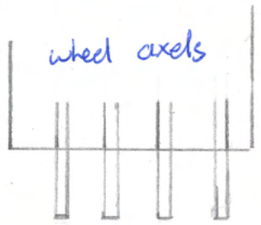
The main axel is made from Brass as it has a low friction coefficient.

Little gaps results in improved maneuverability

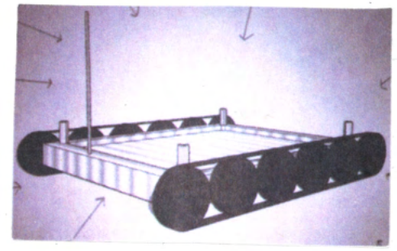
The inside is coated with Brass to reduce friction and corrosion

The nut holds the 3 rollers together

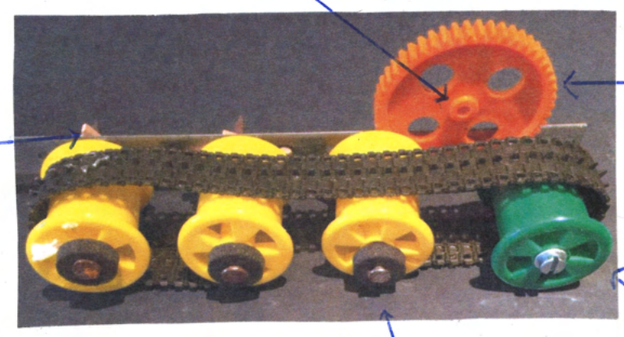
A washer distributes the pressure of the nut evenly over the surface.



The wheels will all need an axel that goes into the main body of the product.



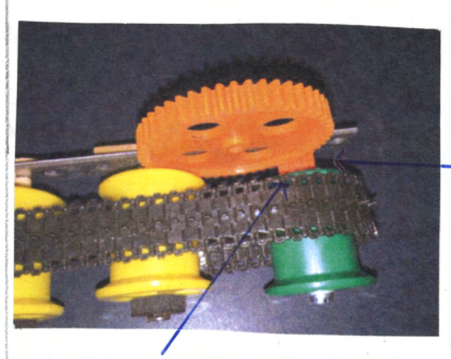
The motor would rotate the large gear which would rotate the smaller gear which would in turn rotate the rear wheel.



A smaller gear could be used to reduce size but this would reduce the RPM.

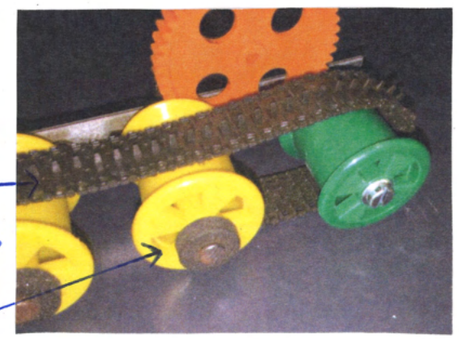
A nut either side will hold the wheel in place.

One wheel must be accessible so that it can be removed when a new track needs to be added



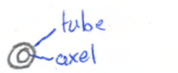
A second gear is needed so that the main gear doesn't hit the floor

A smaller gear allows the RPM to increase without using a more powerful motor.



The wheels will have to be the same size as the tracks to avoid the wheels scrapping the floor.

Washers are needed to reduce the pressure on the nut.



The axel has a smaller diameter to allow the wheels to bend/change height when going over obsticals

Design Idea's 3

Post modernism architecture

Made from mild steel which is durable and long lasting.

very strong joining method → more durable product

extended lifespan

The product is low maintainence which extends its lifespan

Welded frame ← Arc welding provides a very strong join

The finish will be paint as this is a cheap but effective way to protect the metal and reduce corrosion.

Rounded edges for safety (BS EN ISO 9000)

lots of room to hold required 65litres

Jigs can be used to recreate the curved metal

platforms provide multiple areas to hold logs

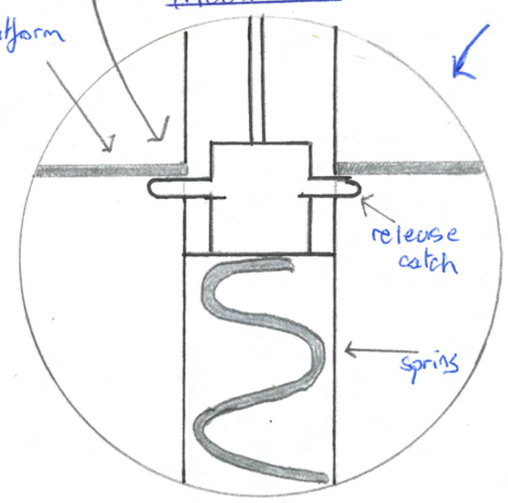
The button is placed below the platform to stop the platform interfering with the mechanisms

Potential for attachement that lifts the logs individually onto the platforms.

platforms made from steel to reduce scratching/denting

little material used which is better for the environment as less material needs to be extracted.

Mechanism



Spring force = $k\Delta L$

Platforms can move vertically to adjust for size of logs

Maths Box

$c = \sqrt{b^2 + a^2}$

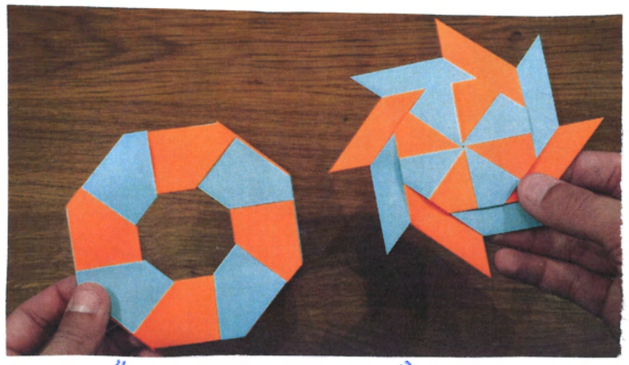
Metal pattern gives added grip for logs

as a result the total weight is reduced.

large wheels allow the product to move on uneven terrain

wide base leads to a more stable product (BS EN 1730)

Design Ideas

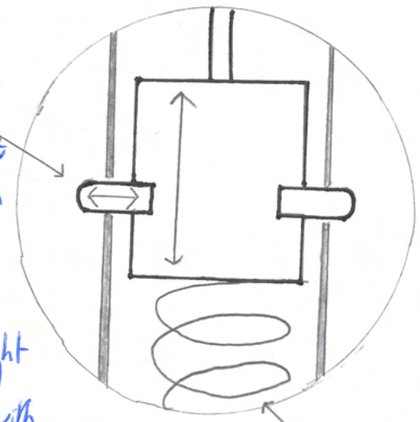


"2 in 1 design" from Origami

All edges and corners will be rounded off to meet the BSI Sharpness test

The mechanism will be in a cover to improve safety

Pins move in to allow height change, when released they pop into chosen height.

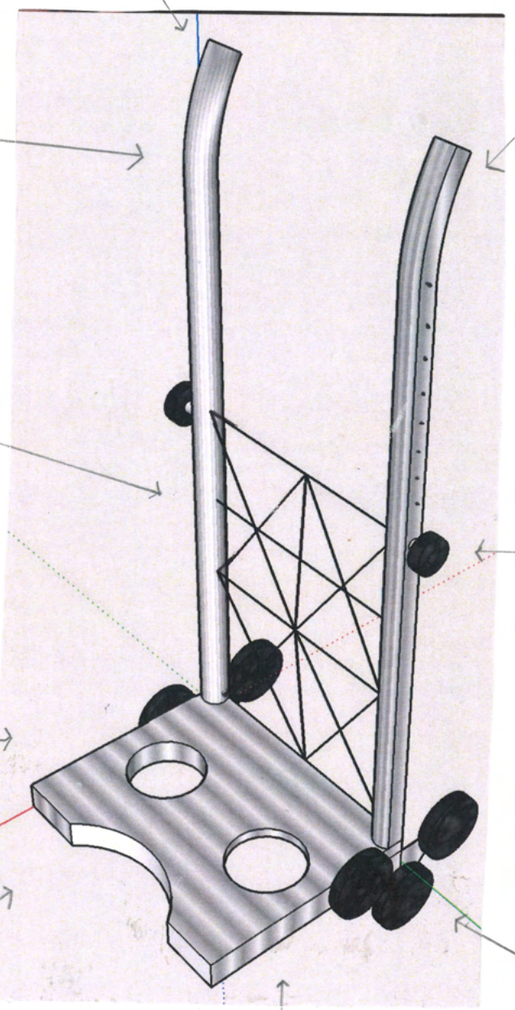


The handle bars height can be adjusted to support users with different heights

Spring holds the weight of the inner tubing without restricting manoeuvering.

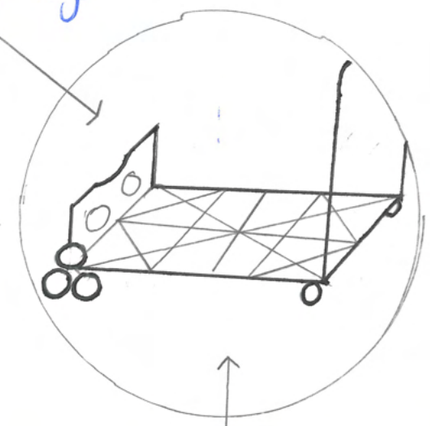
This will create better accuracy and greater speed which will reduce unit cost.

Jigs will be used to recreate identical curves



The wire mesh stops the logs from falling of the trolley as well as it reduces the total weight of the product.

This mode also reduces the needed strength to move the logs



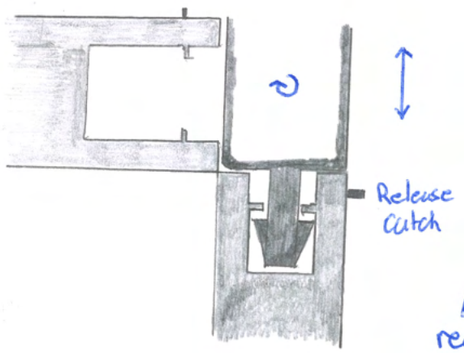
The product has a second mode which allows a more stable way to carry more logs

When the product is in this format it allows 65% of logs to be carried

The metals will then be coveed in paint to reduce corrosion.

The metals will mainly be welded together. This will create strong joints.

Transform Mechanism



The product will be mainly made from Stainless steel and Aluminum

Aluminum can be recycled, it has less impact on the environment this way

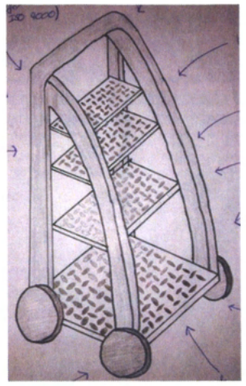
The base of the trolley is made from steel which is very strong and damage resistant to the logs.

As this makes the base heavy two holes have been cut away to reduce weight

Tri-wheels allow the trolley to manoeuvre easily across hard terrain as well as steps/inclines.

Less material is therefor used which reduces the cost of the product.

3



Further Modelling and explanation of design ideas 3 and 4

The back wheels use the same setup.

Steel axel, steel is very hard/durable and so won't wear away over time.

Main base

The "U" is made from brass. Brass has a low friction coefficient and so it won't wear away over time.

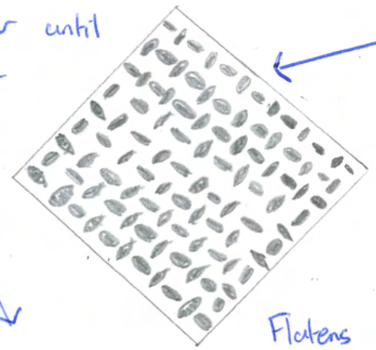
Under the main base.

Screwed in on both sides to hold in place

"U" frame holds the axel in place.

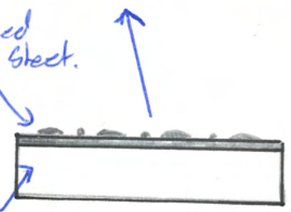
This is done using a Pop riveting plyers.

Pliers squeeze together until either stem snaps or the head breaks off.



Pre-formed sheet, this will be joined onto a metal base using pop riveting.

Pre-formed sheet.



main base

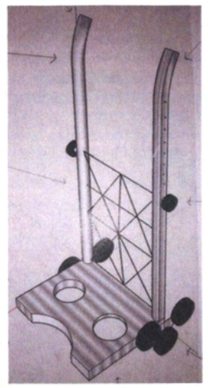
Pop Riveting

Flattens out to hold one end together

Stem snaps off once pieces are firmly together.

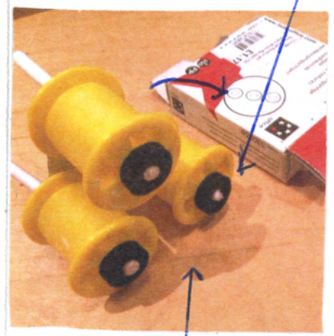
Bulge holds the sheets together.

This model is intended to show how the tri-wheel functions as well as to show how it attaches to my design.

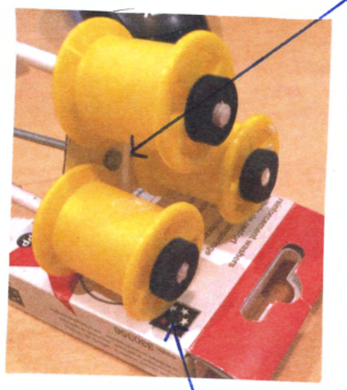


4

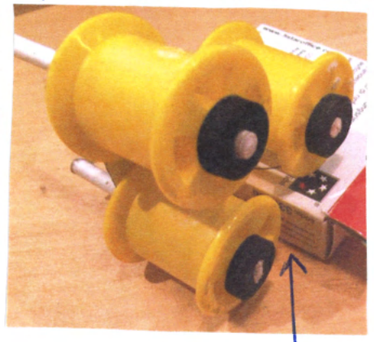
① The front wheel hits the raised surface such as a curb.



A central axis is where the triangle wheel frame is joined.



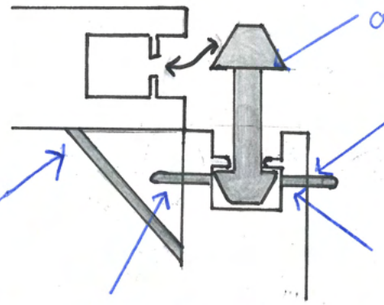
② The top wheel flips onto the raised surface such as a curb.



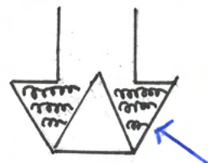
③ The back wheel hits the raised surface.

④ The back wheel moves onto the raised surface.

Support beam supports the mechanism and stops it snapping off.



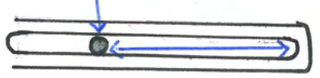
These 2 catches will need a hole to be drilled beforehand, this will be done using the pillar drill.



The catches then releases the edges so that the main frame can be changed into its 2nd form.

Springs allow the edges to fold in but then return to the orginal position

Beam slides up and down when changing modes.



Springs made from titanium to make sure they last the lifespan of the product.

This sliding folding side when in its 2nd mode

Support beam on both helps support the product

Design Ideas

An "existing solution" to moving heavy goods such as logs

Using this as inspiration

Maths Box

Length of ramp Z =

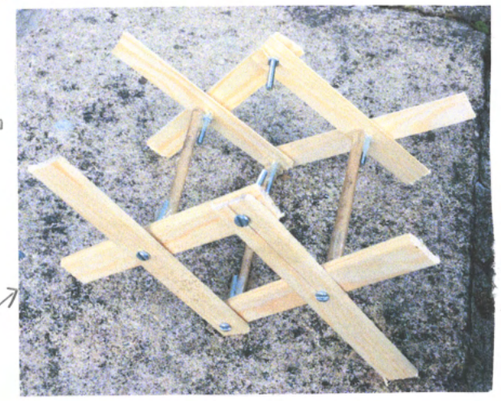
$Z = \sqrt{y^2 + x^2}$

Due to the shape the handles reduce the strain on back which will help my client and older clients.

Handle shape allows trolley to be pushed or pulled.

Reduces the load for the less abled.

As a result of the model I learnt that support beams may be needed to stop the mechanism twisting



Made from mild steel due to its tensile strength

A support beam ensures the product is stable and secure

BSI EN 1730

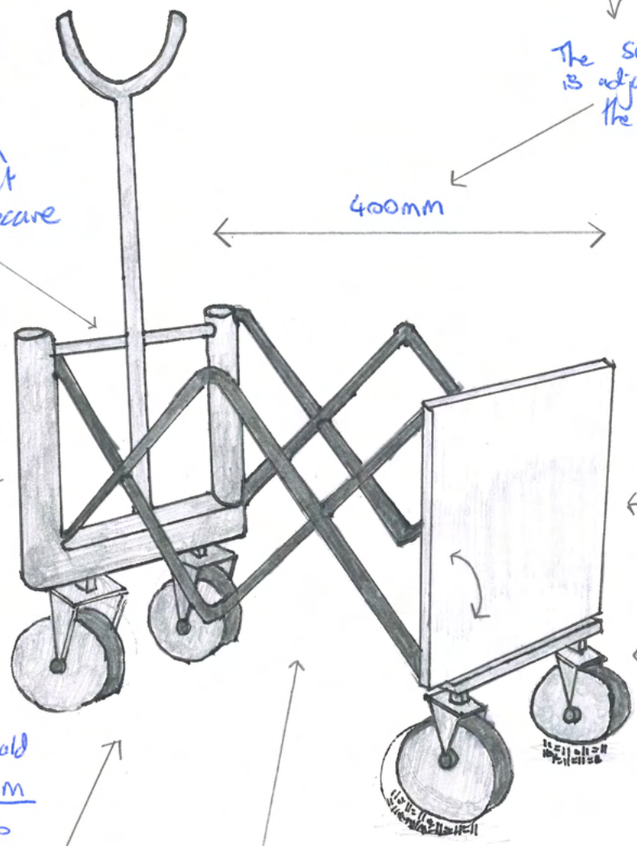
The scissor part is adjustable to fit the amount of logs needed

400mm

I also learnt the wheels must be raised in order to avoid a collision with the middle of the mechanism

I created a model of mechanism to test the strength and functionality of my design

The bends in the metal can be recreated using jigs for repeated accuracy and increased speed of production.



A bag is placed in the skeleton frame to hold the logs

The main frame would be made from Aluminium to keep the weight to a minimal.

The front section can be unclipped allowing a ramp to be created. This allows logs to be loaded just by pushing into them.

Swivel wheels allow improved manoeuvrability

Direction of logs

Direction of trolley

Wheels are held in by pins, this allows for easy replacement if a fault is discovered.

The 'scissor frame' would be made from mild steel in order maintain a strong and stable product.

The bags can easily be removed which means logs inside can be lifted and emptied easily.

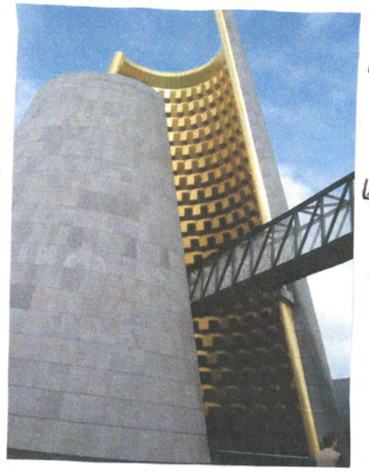
When folded away its reduced size can easily be stored in confined spaces.

Due to the skeleton frame the product is less than the required 15kg.

As a result less materials are used which results in less environmental damage

Extends the lifespan of the product beyond 6 years in check with specification.

Design Ideas



Architecture inspiration

Post-modernism

Could model handles for client to see which provide the best comfort

handles can lay flat to provide stable loading platform

metal tracks for sliding cover that holds logs in place during transport

Would either be made from

Aluminum — lightweight, Strong, Hard to construct

or

Wood — FSC, Better for environment, Strong, Durable

With this idea the logs will need to be moved to a greater height which could be a problem for my client.

Idea after modelling

Mild steel as very durable

Brazed/welded together

These handles provide a large variety of hand spacings for added comfort and ergonomics to all users.

Handles too short?

logs stored inside

mostly hollow to reduce weight

As a result of my model I learnt that the wheel axel must be placed at a specific point otherwise the axel interferes with the metal sliding cover.

By creating a model and experimenting I found it best with the cylinder lying horizontally as the logs are less likely to fall out.

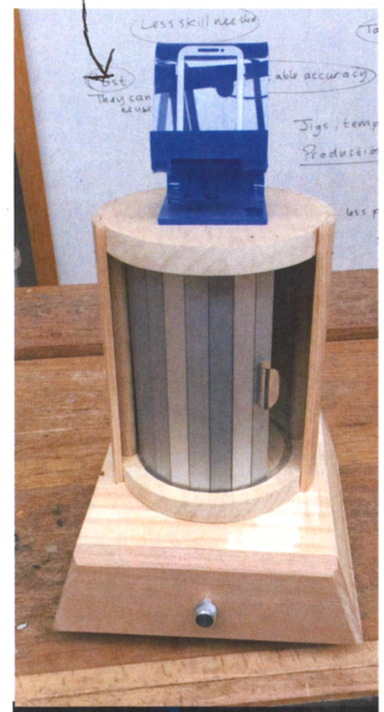
Centre of gravity at front which makes it easier to move.

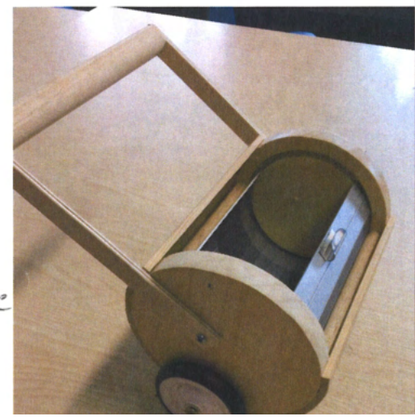
wheels need to be large to avoid runners

slide needs a way to be locked close (Magnet?)

The opening tab may need to be changed to help fit the elderly

This was about to be scrapped





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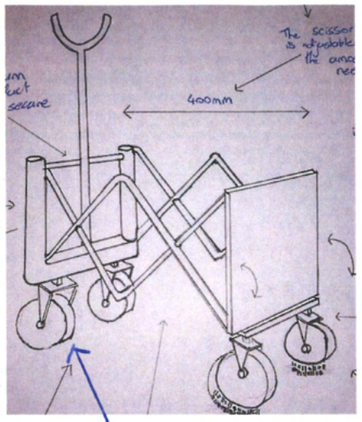
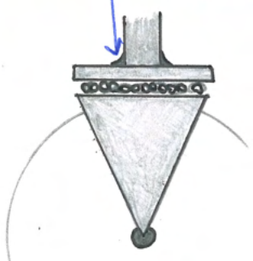


Further Modelling and explanation of design ideas 5 and 6

Lazy susan will have a plastic cover. This can easily be removed so that the mechanism can be maintained.

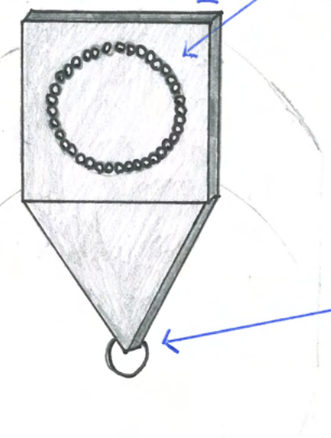
A lazy susan is screwed into the top of the wheel holders. This allows the wheels to be rotated easily

Lazy susan welded to the connecting between the wheels and main frame.



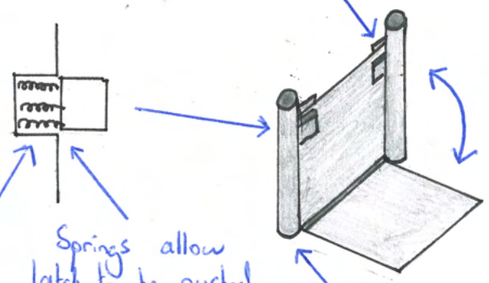
Made from steel due to its hardness

Axle passes through to the other triangle connector. Made from ~~brass~~ steel as heard wearing



Wheels would be made from recycled rubber. This way the product will have a smaller carbon footprint.

Catch either side holds the ramp in place.



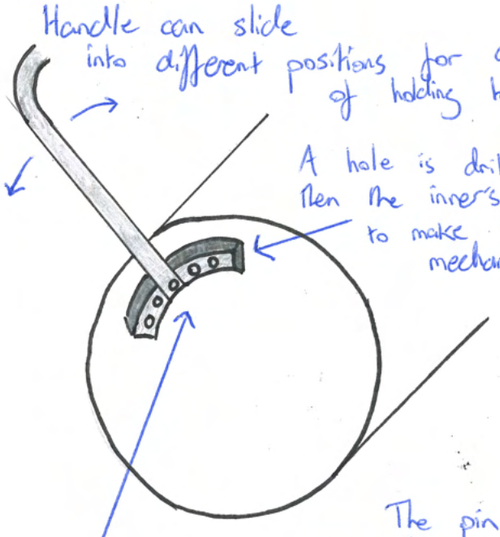
Springs allow latch to be pushed in to release/trap the ramp.

Springs made from titanium so that the products lifespan is beyond 6 years in accordance to the specification.

Steel beam used to connect both sides.

ramp

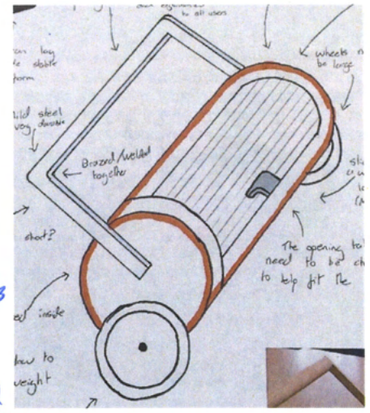
Ball bearings allow the ramp to move up and down.



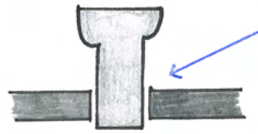
Handle can slide into different positions for a range of holding heights/angles

A hole is drilled and then the inners are removed to make room for the mechanism.

This mechanism is on both sides. The handle can only move when both pins have been removed.



Magnets make sure the pin doesn't accidently fall out.

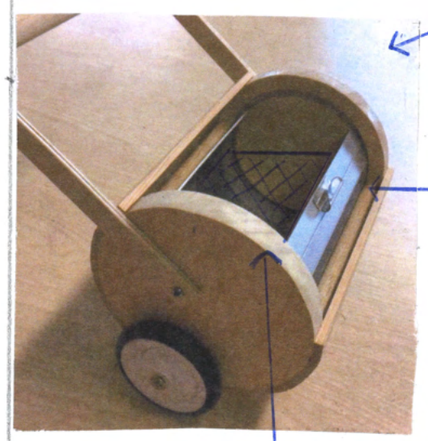


The pin can be removed which allows the handles to move.

A steel pin holds the chosen handle placement in place.

6

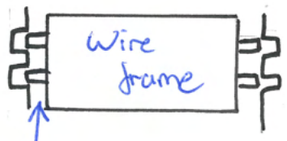
From making this model I realised that a platform will need to be introduced to avoid the legs interfering with the sliding cover.



The platform will have a wooden frame which will have a metal wiring in the middle.

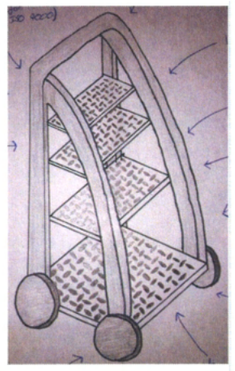
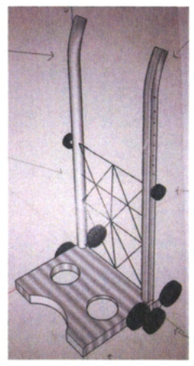
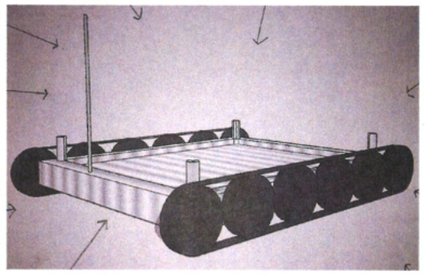
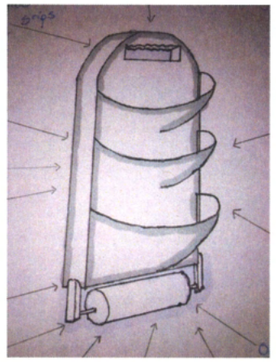
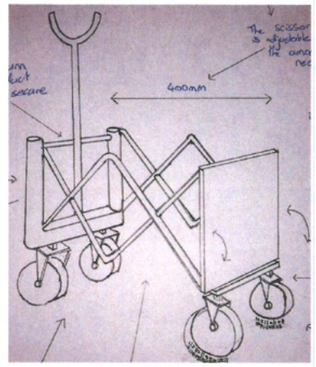
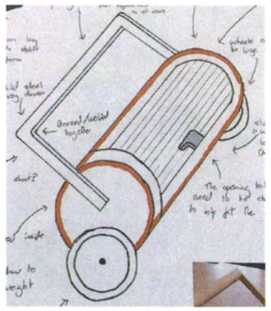
A wiring will reduce the weight of the product.

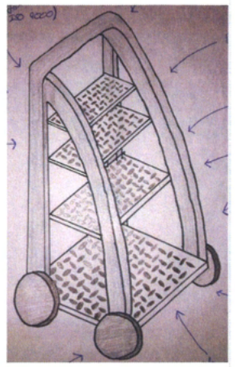
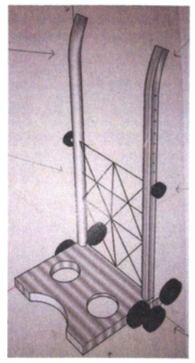
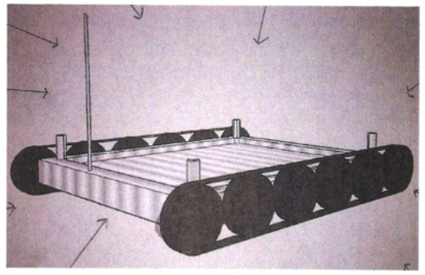
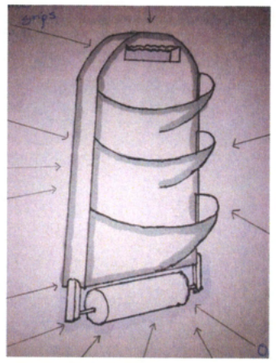
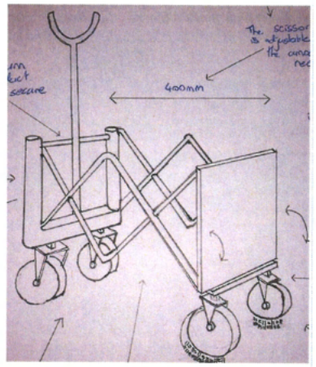
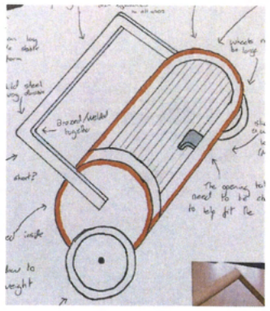
The platform will have to be connected before the outer cover is installed due to its size.

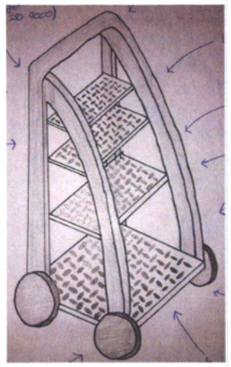
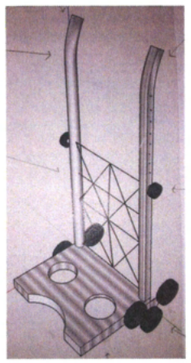
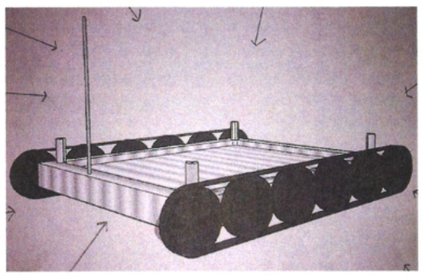
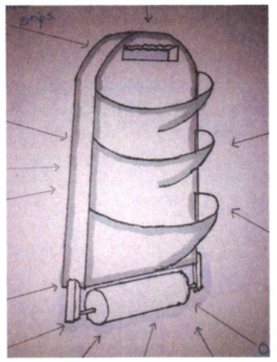
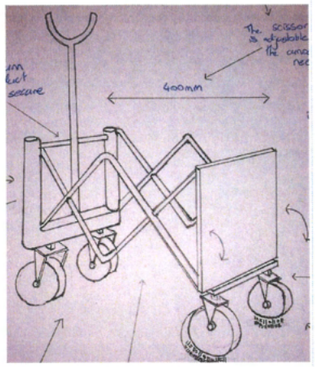
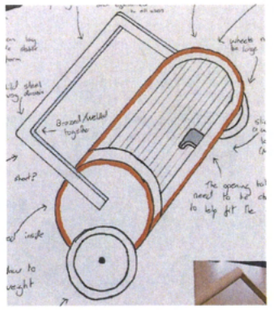


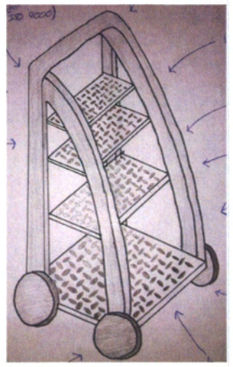
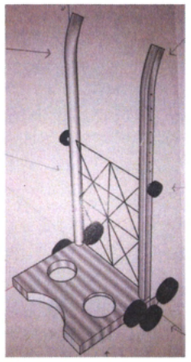
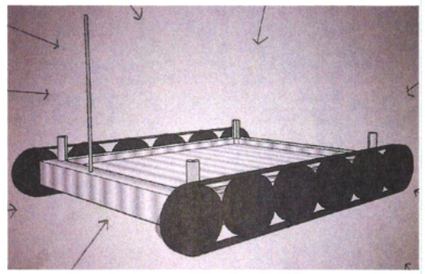
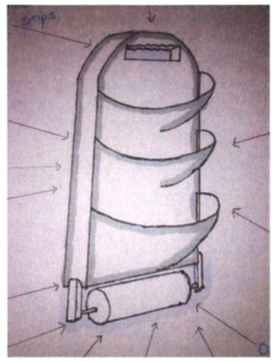
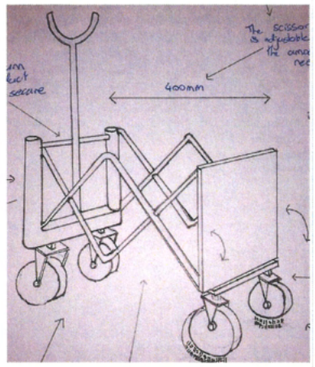
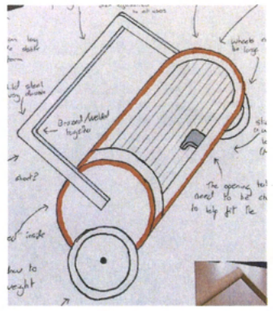
Dowell connecting rods are installed to provide added strength to the joining area.

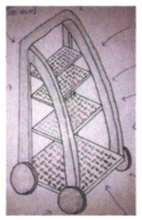
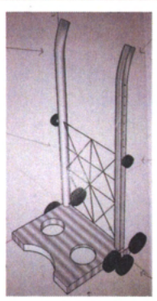
Evaluation of Design Ideas

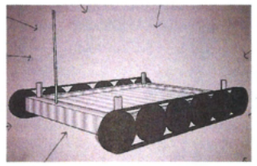
Key aspects of my specification						
Function	The product would carry around the required 65L as well as with the four wheels the product is very stable. Furthermore, not only is the product adjustable it is also very strong and so it will be able to support the 50kg. I also believe that the mechanisms are fairly simple and so wont buckle under pressure. The only area I think my product falls down is with loading/un-loading as I think this could be problematic for someone who is less abled.	This product meets the required 65L of logs needing to be carried however this is only in one of its modes. In addition to this I think unloading/loading logs could be difficult for an elderly person. Among these negatives there are still many positives about this design. Due to its wide base, it is not only stable but it is able to hold the 50kg weight not to mention withstand the 500 Newton's of force. As the product has "step wheels" it makes obstacles easier to manoeuvre which makes moving the logs easier. Finally, this product has lots of adjustability to fit different users which is required from the specification.	In terms of function this idea is excellent. It has a wide base which makes it stable as well as it allows it to carry the 65L of logs. This wide base also spreads out the weight over more area which allows for the 50kg weight of logs. Although the design has no complicated mechanisms it does have a motor, due to this whether the motor can support 500N stress is unknown. Albeit there is no clear method of unloading the logs the log carrying frame could second for carrying the logs from the main body. Whether this would be to heavy I would have to test more. This log frame also means the adjustability quota is met.	Whether this design carries 65L it is hard to tell. Whether the basket volume needs to be increased we can decide later. In terms of loading/unloading the basket method makes this very easy to do. The problem with this idea is that it is unstable, this will put extra strain on the user. Furthermore, this design has no adjustability, only parts that can be removed individually. Finally, whether the rolling wheel at the bottom can support the 500N force will need to be tested further.	Although this is one of my more complex design I still think it functions as it should. With a fully stretched basket it will meet the 65L volume requirement. Alongside this the product has 4 base point which will result in it passing BSI EN 1730. With some form of adjustability, the only specification points that might not be met are the 50kg weight and the 500N stress. Further testing will be needed to deduce the strength of the scissor frame. Before these tests I will assume they meet the specification. Furthermore, the basket for the logs can be removed which allows for easy loading/unloading.	In terms of function I think this idea works as intended. The hollow frame allows 65L of logs to be carried as well as the wide base means stability is good when moving. However, when loading the logs, a sort of stabilizer will have to be added. I think this product will be able to handle the 50kg weight as well as I am sure the cover will not falter under 500N. However, although this product has an adjustable cover it doesn't have an easy method to unload and load the logs. This must be reconsidered if the product is going to pass this specification section.
Form	Even though my product is simple I think I can say that it easily fits in most environments. It also clearly doesn't offend any cultures which is good. The design is modern which is what my client wants. Even though my design isn't "ugly" I would say its aesthetics are not outstanding.	I regard this idea as aesthetically appealing due to its sleek design. Not only is it modern looking it also fits in many environments without offending genders/cultures. Moreover, the product is designed with ergonomic consideration. The handles can be adjusted to fit all heights. I think the only way to improve the form of this product would be to engrave some sort of pattern into the product.	I think many people will find this design not only quite cool but also aesthetically pleasing. Its symmetrical sleek design is very appealing. Ergonomics are not considered partially with this design as the user has no interaction physically with the product most of the time. This design also does not offend cultures as it has no obvious patterns/symbols. This modern design will fit in many environments as the product has a low profile. Due to this, this idea easily meets the specification.	Although this product has no fantastic aesthetics it isn't exactly ugly either. The design is unlike others however I still believe it is modern looking without offending any cultures. Not only this but I think the product would fit into any environment placed in. Ergonomics have been considered, the handle is not only made to fit a hand but is also placed at an average height for the comfort of the user when manoeuvring- the product.	Not only does the "U" handle provide and comfortable handle at the right height it also ensures the product can only be pushed. Due to this back strain will be reduced. Furthermore, this minimalistic design ensures it fits into most environments. Not only this but it is also a neutral design and so hopefully should offend nobody. I also believe this sort of design has never been created with logs and so it is "modern".	I think this design, with the right materials, could be very aesthetically pleasing. With an ergonomic handle which is large so that different grips can be adopted I think this design is very modern looking. Not only this but I think everyone can say this design is not offending in any way as well as I think it will easily fit into any environment. I think in conclusion to this I can say the form of this product is excellent.
Quality Control	Due to the design being rather simple it requires no complex parts/components. Due to this the accuracy at which parts are made can be easily monitored. With the use of jigs this accuracy will improve even more.	I think due to complexity of this design quality control management would be difficult. The accuracy of small parts and mechanisms would have to most likely more accurate than ±5mm for the product to function. This is more accurate than my specification required. As a result, the product would have to be thoroughly checked before being placed on the market which would cost both time and money.	Much similar to my last design the complexity of some parts such as the motor will make quality control management very difficult. The motor would have very small parts most likely so a ±5mm tolerance might not be enough. Due to this each product will have to be thoroughly checked before being put onto the market.	This idea uses simple mechanisms and therefore I think the ±5mm accuracy will be suitable for checking the product over including the mechanisms. Checking the product over will be simple as there are no hidden parts that could be faulty.	The complexity of this idea means a ±5mm tolerance for accuracy is not enough. This will have to be greatly increased to ensure the product does not falter. In terms of checks made before the product is placed on the market these will have to be incredibly thorough otherwise a faulty mechanism or wheel could become a danger to the user's safety.	I think a ±5mm tolerance for accuracy should fit perfectly for this design. Its mechanisms are relatively simple and therefore I think they will be easy to maintain and produce easily. Due to this I believe checks completed before the product is placed on the market will be sufficient.

Key aspects of my specification						
Dimensions	In terms of dimension requirements this design is excellent. It easily fits inside the required size of the product. Not only this but the product has no jetting out edges and it easily meets the adjustability requirement. Finally, the handles have a diameter greater than 75mm.	The dimensions of the product are in line with the dimensions required in the specification. Depending on handle extension the dimensions can exceed these values. The product as jetting out parts but none are more than the 150mm limit mentioned in the specification. As well as this the product has the 400mm adjustability required by the specification. Lastly, the handles which can be moved have a diameter larger than 75mm and so they will be easy to hold.	This design easily fits in the dimensions required from the specification. Although this design has 4 jetting out edges, they are not over the 150mm limit. Even though there is no immediately obvious adjustability when the idea uses the log frame there is over a 400mm difference in the height achieved. As a result, I think the specification point is met. Whether the 75mm diameter handle requirement is met depends on how the idea is controlled. Further designing and development is required before evaluating this point.	The dimensions of this product easily fit in the required quota. However, in terms of jetting out edges this is not so clear. Whether the baskets count as jetting out edges will be up to the decision of the client. Furthermore, whether the fact the baskets can be removed counts as adjustability will be up to the client to decide also. Finally, the cut-out handles result in the diameter being well over 75mm which means it meets the quota from the specification.	Whether the product fits inside the required dimensions is hard to tell. However, this design is definitely on the larger side. Moreover, the product does have a jetting out edge, the handle. These may have to be redesigned if this idea is developed further. However, some positives of the idea are that it has handles with a 75mm diameter as well as it has exactly 400mm adjustability which is required from the client's specification.	Although this product is quite wide I still think it will fit inside the required dimensions. On top of this the product has no jetting out edges of more than 150mm, as long as you exclude the handle. In terms of the 400mm adjustment this is a bit of a grey area for this design. The cover is adjustable and it is over 400mm so whether this is what the client wants I will have to discuss further. Lastly, the handles have a diameter that is greater than 75mm and so all specification points are met.
Safety	My product has rounded edges so it will easily pass the BSI sharpness test. As well as this due to the frame structure of my product it shouldn't weigh more than 15kg. However, due to the mechanisms being on the outside covering them up for safety reasons would be hard without removing access to the mechanism itself.	This product is full of many complex parts, due to this I would imagine some mechanisms would have sharp edges so it is possible it would fail the BSI sharpness test. However, I believe the mass would be no more than the 15kg maximum stated by the specification. Finally, finger traps would need a special cover to reduce injuries otherwise they could become a safety problem.	The design has no sharp edges so I believe it would pass the BSI sharpness test with ease. Alongside with this I think due to the whole frame of the main body the product would weigh no more than 15kg, depending on the weight of the motor this value could change though. Finally, in regard to finger traps I think this product would fail. Although there is no obvious danger if a person was to place a hand into the track area they could trap a finer or at the least injure themselves.	My product will have sharp edges however these edges, on the back of the baskets, will be covered unless the baskets are being moved. To fix this some sought of finger trap cover would have to be designed in the development of my idea. In hindsight though I believe that this product will weight no more than 15kg. If it was more than this a featherweight material could be used for the baskets.	Due to the mechanisms, this product uses it would be a hazard for young people. The scissor part could trap finger/hands if not carefully watched. However, with rounded edges this could reduce the chance of injures. Moreover, with the main body of the design being a scissor frame the weight of the product would unlikely be over the 15kg limit.	In terms of safety I think this product has no issues. The cover on top has to be physically closed by a person which will reduce injuries. The main sliding part of the product is hidden at either end of the product and so can't be reached accidently. The product has a wide base which will spread out the weight allowing it to support the 15kg. Finally, the product uses rounded edges in all possible areas and so it should pass the BSI sharpness test.
Materials	Due to the product being made from mainly metals such as mild steel it will pass BS EN 1730 as mild steel is both hard and durable. The product is finished in a paint which will not only make it waterproof but will also reduce corrosion, due to this it meets the requirements from the specification.	The materials used in this product vary from part to part. However, the metals used are all hard wearing which means the product meets BS EN 1730. The materials used are also low maintenance but only after a finish has been applied. In terms of the sustainability of materials used, Aluminium can be recycled widely which is the main metal used in my product.	The product is made from Aluminium which is not only easy to recycle but it is also a low maintenance material that will require little upkeep. Aluminium is hard as well as waterproof/corrosion resistant meaning it will meet the BSI EN 1730 requirement. The other main material is rubber which poses many similar materials to Aluminium. Although it is less hard wearing however it can be replaced easily and at a low cost.	The product uses 3 main materials. Aluminium, mild steel and a fabric. Whilst Aluminium and mild steel meet all the specification requirements I am less sure about the fabric. Many fabrics are semi-waterproof, this means that they absorb most of the water. This would not be good for the product as the water would add to it weight. The fabric chosen must be thoroughly tested before becoming part of the product.	This product is made using only metal. These metals being Aluminium and mild steel. Both these metals will pass the BSI EN 1730 hardness checks. Not only are these materials long last but they are also waterproof and corrosion resistant when the right protective finish is applied. This in turn leads to a low maintenance product. As a result, it passes the material specification part.	I decided that this product would use either Oak or Aluminium. Both materials are hard wearing and durable and so should meet BSI EN 1730. If wood is used a waterproof varnish will be needed however Aluminium is waterproof/corrosion resistant. Both these materials are long lasting as well as low maintenance so whichever material is used it still meets the material specification.

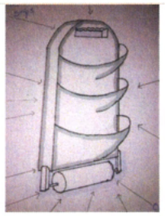
Key aspects of my specification						
Ages	The product is simple to use as it has no very complicated mechanisms. Due to this I think my product fits the required age of the specification which is 18-99. Furthermore, due to the simplicity of the product it has no small parts that a child can play with hence meeting the specification.	The product is fairly complex but any adult should be able to understand how the product and mechanisms works. However, someone who struggles with lifting/moving may struggle to use some of the mechanisms. Without some sort of aid the product may not appeal as much to people who struggle more in life.	My design is easily suitable for ages 18-99. With the use of remote control, it removes any strain that could be on the body. If the controller was design simply and in mind of the elderly than this would be the perfect product for all ages and abilities.	Any abled 18 to 99 year old would have no problem understanding and using this product. However, a less able-bodied person may struggle to support the product when it is fully loaded which could be up to 50kg. For my design to pass this part of the specification I think a second wheel/stabilizer would be needed to make the product more stable.	The product is developed has been developed with all ages and abilities in mind. Four wheels means no weight is carried. The handle reduces the strain on the users back as well as the logs can be unloaded from the product which means older ages shouldn't struggle with using this product.	Although this product is very easy to understand I still think some work is needed if the product is going to applicable to people who struggle lifting objects. Due to the product only having two wheels this means the user has to apply a force to keep the product from falling over. Due to this I think older aged people will struggle, because of this I think the product doesn't quite meet the age specification.
Cost	I think that my product could be made for less than £100. I believe this for many reasons. The product uses little materials due to its skeleton frame. As well as this it uses similar materials which in turn reduces the cost.	The complexity of this product could hazard a problem regarding the cost of the product. Depending on how much certain parts/mechanisms cost the product might fit inside the price range asked by the client.	Although the main frame of the product would be fairly cheap to create as well as using recycled tires to reduce the cost I believe that the cost of the motor would be the main contributor to the cost. The cost at which the motor could be made/bought would be the key difference between meeting the cost requirement or not.	The relative simplicity of this product would result in a reasonable price I believe. The product uses sheets of metal which will be shaped during manufacture. This results in a lower cost product. My design also removes metal rather than adding more on which means cut-offs can be used for mechanism such as the handles on the basket or a part of the mechanism attached to the main wheel.	Due to the minimal material used in this idea I think this would reduce the price. Although the mechanism is complex it would only use nuts and bolts to be created which could be done cheaply. As a result of this I couldn't see a situation where this product cost more than £100.	Due to the relatively simple design of the product complex materials/parts will not be needed. Due to this I believe this product can easily be made for less than £100. As a result, my product passes this part of the specification.
Scale of Production	Jigs can be used in manufacturing this product. The curves are exactly the same so a bending jig could be used to shape the metal when it has been heated. Jigs could also be used to recreated the metal imprint of the metal plates. Due to the fact multiple jigs can be used I think this product would be suited batch production which is required by the specification.	Although this product is complex many features can be repeatable made using jigs. The base plated would use a jig as well as the main beams could also use a bending jig. This would increase speed of production which means batch production would be suited to this idea. Furthermore the "pin holes" could be recreated exactly using a drilling jig. Due to this I believe it easily meets the requirements of my specification.	Due to the simplicity of the main parts of the design cutting jigs could be used repeatable to manufacture the main body. Using recycled tracks also means new ones don't have to be manufactured. Bending jigs could also be used to create the bends in the long frame. Due to the repeatable reason jigs can be used I think this product would be well suited to batch production. In a factory, I believe a robot could assemble this product which would reduce the employment cost.	Depending on the materials used for the basket the curve on the basket could be shaped using a bending jig. The main frame could be cut using a cutting jig, this would create exact copies of the slants on either side of the frame. As a result of heavy jig usage, I think the product would be perfect for batch production.	The complexity of this design will make many parts difficult to make and assemble. This will take time and slow down production. Whilst some parts can be recreated using jigs others will require humans to make and assemble parts. Due to this batch production will be hard to implement. Meticulous planning will be the only way an effective batch production system is implicated.	Jigs can be used for the bends in the handle but apart from this there is little use for jigs. However, because the product uses little complex parts, I think this product can easily be assembled using batch production. Many parts can quickly be assembled together without the use of heavy machinery etc which means batch production would be ideal.

Key aspects of my specification						
						
Sustainability	I think the sustainability of this product is very mixed. It uses similar materials which makes it easier to recycle at the end of the products life. As well as this the product is finished in paint which is one of the eco-friendlier finishes more this sort of product. As well as this mild steel which my product uses is a long	In terms of sustainability I think product has room for improvement. My idea uses 3 different metals which will make it harder to recycle at the end of its lifespan. My product will also use lots of machinery during the manufacture process which uses lots of energy. The product will be finished mainly in paint which is better for the environment than most finishes. I think to improve the products sustainability recycled materials should be used.	The sustainability of this idea is excellent. Not only does it only use one metal, which makes it easier to recycle. The metal used is aluminium which is widely recycled. It also uses recycled tires as tracks reducing impacts on the environment. Moreover, aluminium is self-finishing so no finish is required reducing the impact on the environment. The only place this design falters could be with the log frame. The log frame will need lots of welding to be created. However, this could be substituted for nuts and bolts to reduce energy usage.	The fact that this product only uses one metal will make it easier to recycle at the end of the products life. There is little to none high energy processes which will mean the product will have a smaller carbon footprint. I also believe that the material used for the basket could use recycled metals/elastomers. Finally, the only sort of finishes used would be a sort of water based sealant for the fabric, it would only be used in small amounts and so should have no impact on the environment.	Although both metals used have very long lifespans the fact there are two metals makes recycling harder at the end of the products life. The product is likely to be finished in some sort of paint, hopefully this will reduce the products effect on the environment. Whilst unused material will likely be wasted it can be said that hopefully the product will be bolted together. This will make disassembly easier when recycling as well as using bolts it's a low energy joining method which will reduce the products carbon footprint.	Not only are the materials for this design chosen recyclable but they are also long lasting which will reduce their harm on environment. I have also used only water based varnishes for this product which are less damaging on the environment. Not only this but many parts are bolted/glued together which are low energy methods of joining materials together. Finally, the use of similar materials throughout this design will make the product easier to recycle at the end of the products life.

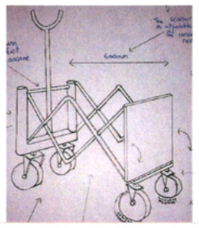
Design Idea	Clients comments regarding my initial design ideas
	"I really like the idea of the moving platform, hopefully it will be easy to understand how to change the height of the platforms. Not only this but I think the little bumps will provide extra grip for the logs so that they don't fall off whilst I push the trolley up my concrete ramp. Although there is a wide handle I was hoping for something a little more comfortable, maybe a rubber handle or something similar to that? As well as this I know there are four wheels, which will help stability but I am unsure how easy it will be to turn the trolley round without having to lift the product itself. My final comment is that I am really happy with the size of the product. The height at which everything is placed looks suitable for me. Overall, I think with a few adjustments this product could improve."
	"Although this design is very complex I really like the products main features. The fact the product has a second way to carry logs makes me happy. As I'm told the second mode can carry more logs without me (the user) having more strain on their body which impresses me. As well as this form of adjustability I think the idea of the handles acting like crutches is great. This means I can set the handle height to anything I like and then when my husband uses it he can change the height to suit him. However, there are two things about this idea that concern me. The first is safety, with all these mechanisms how will you make them safe to operate? My other problem is with the product sustainability. Using many different materials as well as welding will increase the products lasting damage on the environment. Could you think about redesign so that bits fix together instead of welding?"



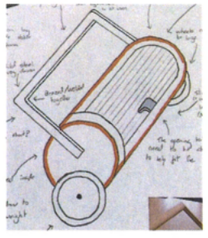
"I think this idea is quite bizarre but I think it might have potential. The idea of me not even having to push the product does sound very good but whether I'll be able to remote control I am unsure. The designer promised me the controller is extremely simple but I know people my age struggle with technology and so I think I would need to see how the product works before buying. In terms of recharging the motor I am also dubious as to how easy this will be. Another issue would be the wheels. I would like to see some sort of wheel guards to protect not only the user but also the wheels from dirt/gravel next to my logs. Everything else about this idea is great and I think this design has great potential."



"Although I think this design may place strain on my back I still think that this can be fixed resulting in a great idea. The method that this idea uses to move around is very inventive. I think it also a functional idea and with its wide base it will be easy to manoeuvre around my house. I also like how the logs can be loaded and unloaded using the basket method. On top of this the fact I can choose to carry only one basket is a great idea as it will make it easier to carry logs. The only issue I can with is stability. I think a second wheel of some sort would be needed to ensure that the transporting is easy and less strenuous. In general, I think this is an idea that could be good but needs little tweaks for improvement."



"I think this is possible my favourite idea. The four wheels not only make the product very stable but the fact they can swivel allows me to easily manoeuvre the product. I also like the idea of the ramp that folds down meaning that I can ramp the logs into the basket without having to pick them up. I also like the handles design as it promotes the use of using two hands and I am also told that the design reduces stress on the back which is good for someone of our age. Furthermore, the fact that the design can fold up when not in use appeals to me as it can easily be stored in my house. The fact the basket can also be removed when unloading/loading is also very good. In general, I am very pleased with this design."



"Although this product is a little simplistic, I think it is original as well as it has potential. The way the logs are carried is quite clever and I like that aspect of the design. Furthermore, I like the idea of a large handle allowing different grips to be used. However, I think unloading the logs could be a challenge for someone of my ages. As well as this, wouldn't dirt or mud get stuck in the mechanism if it was on the inside next to the logs? I think some sort of protective cover would be needed to stop the dirt jamming the pull over cover. Overall, I think it's a clever design but it does need some fine tweaking to improve its function."