Final Design Brief

DESIGN & TECHNOLOGY

NON-EXAM ASSESSMENT

Northgate D&T Design and Technology

For my project I would have had to create either something for sports and leisure, something for children or something environmentally friendly. I chose leisure and will be making this product for my client to improve her everyday career life as a nail technician as she needs to be able to manually take her equipment to her own clients this can be done with my product: a mobile nail storage box. This should make it easier for her to carry things and around and store them safely and efficiently.

The design options that I looked at included producing ideas that could be to design a mobile nail technicians box, which already exist, however I will modifying mine to fit the preferences of my client as well as focusing on the storage of nail polishes.

My client is going to be my sister, India, who is a professional nail technician. She is 20 years old and works everyday for her customers. Because of her age she stereotypically prefers more modern themes (which I will incorporate into my product) the product also needs to be light in weight for her to be able to carry it around with her, it should additionally have wheels and handles to provide as an aid.

My client needs the product to asset with her job so she can move her nail products around more efficiently. The storage will provide a great place to put her nail polishes in for when she is traveling from client to client.

I plan to design, develop, manufacture and evaluate a modern hand made mobile nail polish storage box for my client to use daily career.

From my research I have discovered the product must be/work in the following way: it will be able to move across the ground with the help of wheels and an extendable handle, it evidently has to open, and therefore will have a lid of door of some sort. Additionally, on the inside, there will be shelving for the nail polishes which will help with efficiency and organising.

The product will be (estimated) 450mm x 250mm x 400mm (Height x Width x Depth)
It will be made to function as a mobile nail technicians storage box. The style of the product will be modern and sleek (to the client's preferences) It will be constructed from Hardwood (Maple), Manufactured board. I will construct my product using traditional wood joints such as lap joints, rebate joints, housing joints. The finish I will be using sandpaper (p80, p180, p240), wax it and then use vanish.

I am gong to look at the work of Phillpe Stark and use their ideas to develop my product by taking after their style, as it is sleek and modern. My Client likes the designer because of her preferences towards modernism which will reflect on my product.

Final Design Specification

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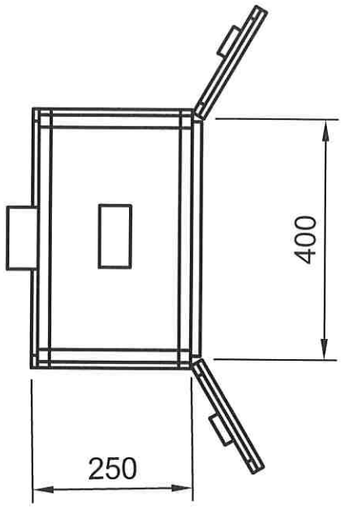
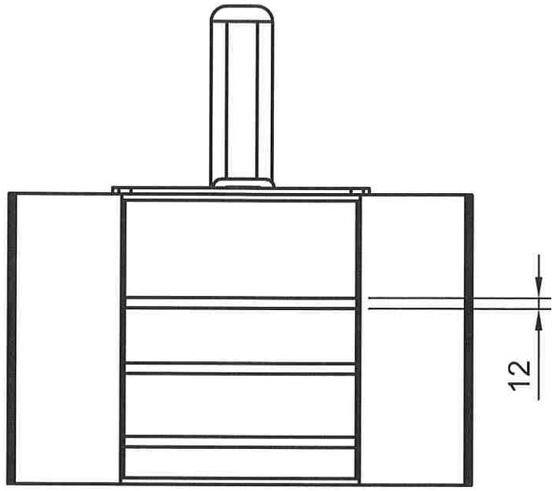
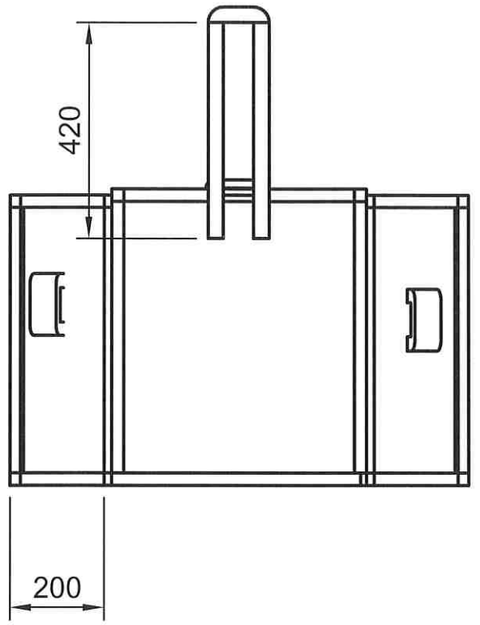
Specification Point	Explanation	Importance	How to Evaluate
Timescale	The deadline to complete my product, including my design sketchbook and formal portfolio, is Easter 2019. It will take 35 hours to complete the product and to make a prototype. I will spend as much time to design and plan ahead and therefore have a great outcome at the end of the project with hopefully even time to spare to improve upon the outcome.	High	I will plan my days ahead, write a criteria and set timeline to work towards so I can either achieve the right amount of work or get ahead of time, this will be represented in a table. I will use my time wisely and not take advantage of extra time, I will keep adding until its reached perfection.
Target Market/Client	My client is my sister, India-Rose Gravina. My target range varies in age, career choice and interests. Stereotypically, it would be used by those who are interested in makeup or those who progress to work with cosmetics (around teen years and above) My client is a perfect example of someone who would find great use in this product as she is in the makeup industry.	Medium	I have already received feedback from my client and given a client interview, which gives me more than enough information to work from. I will continue to receive feedback from my client to make sure everything is up to date and if she wants any changes, I can work back on my product to always keep to her standards.
Function	The function of my product is to be of value to my client, to help her with her job by having it carry her nail polishes in mass numbers around easily and to look aesthetically pleasing. It should be able to hold a considerable amount of nail polishes for storage and be mobile and transportable.	High	The client has told me already about her work and I have a good knowledge of what she does and what she needs the product to improve her everyday job. Again, I will keep receiving feedback from my client to make sure that the product is helping her with her job and I will test the product for manufacture.
Product Size & Weight	(Estimate Size Only) Size: 400mm x 250mm x 450mm Weight: With shelving the product will be around 6kg-8kg	High	Accuracy is key; I will keep measuring and checking the product to make sure it is to the perfect scale, if not the product could fail. The product cannot to be too heavy, as its main purpose is to be mobile and easy to carry, therefore I will make sure the product is at a minimal density (considering my client is not able to carry mass amounts of material and storage)
Durability	My client would like the product to be as durable as possible, meaning I have to design it and construct it as strong as possible. I believe the product, treated with care, will last a year +. I will design it would strong wood joints, a good adhesive and a well done finish to prevent rotting, and because the product will be moved around, I may add an aluminium trim for protection and edges.	High	Durability is extremely important; this product cannot fail and fall apart as its necessary every day and in most environments. The aluminium should add a slight strong aspect to it, however my focus will be to ensure the joints are perfect, the better the joints the more efficient the product will be. It will be tested after to ensure its durable enough.
Aesthetics	The style of my product will be evidently be modern, sleek and to my clients desire. My client has specified that she wants the product aesthetics to correspond with her existing furniture and therefore be of the same style. She likes white themes, which are stereotypically seen as modern, and she has mentioned previously that she would like an aluminium trim to conclude the look (and durability) of the product. This description matches one of my clients favourite existing products (the mobile makeup box as my first existing products)	Medium	I have a close relationship with my client therefore I am familiar with her likes and dislikes and what her style is, however I still made a client interview to ensure that everything was to her taste. I will receive feedback on my drawings from her so she can make any changes if she wants, and I will keep referring back o previous comments about the aesthetics.
Ergonomics	This product will be evidently used on a daily bases, as this product fits into the everyday life of a full time nail technician worker. My client will use this product every day, as it is necessary for her work to go to client's house and take her supplies with her in a mobile storage device.	Medium	The client will test the product at the end of the project to review and give feedback about how it has improved her work environment.
Materials	Materials vary from the actual box to the added designs and features, The wood I need to use must fall under my client's needs, I concluded that the best hardwood that is the lightest in colour and affordable is maple wood. When I have finished I will use an aluminium trim (this may change over time depending on how I deign the shelves/storage).	High	The materials will be to the clients taste (specified in the written feedback in my sketchbook and in the client interview) everything is to her given style and preferable colour choices. I will consult with the client regularly.
Safety Requirements	Safety requirements will include rounding off edges to reduce the possibility of accidently cutting yourself, I will sand it down with p80, p120 and p360 and wet and dry paper to reduce splinters and then I will provide handles for easy lifting so that the possibility of dropping the product is reduced. There will be no sharp edges and will conclude as a stable product	High	Testing out the product at the end with determine its sustainability and how safe it is, if it goes though the required 7 consecutive days without falling apart or harming anything it has reached the standard my client wants
Cost	Manufacturing this product will probably cost around 25 pounds, which includes buying the supplies and producing the product. Then selling it onto my client it will be 50-60 pounds to gain a good profit.	Medium	I will minimise the cost of manufacturing as much as I can, to receive the best profit.
Environmental Issues	The box will be made out of maple, which is a familiar hardwood, which is very durable and is a good material to use for my product. Hardwoods are good for the environment because products that are manufactured out of hard wood are usually more durable and lasts for a considerable amount of time compared to light woods, the off cuts are more sustainable, they are denser and therefore they will not break as easy and need to be replaced by more wood.	High	To achieve a durable product that does not need to be replaced as often, and therefore use up more natural materials and it will be designed to be recycled, I will manufacture the product the best I can, from having the best joints to sealing it to perfection.
Manufacture & Quantity	To make this product, I will replicate constructing a normal opening/closing box then add the additional features. I will construct the box using lap joints then seal is together with PVA. When dry I will make the shelving and test out an example nail polish to see if it works. Then I will apply the wheels and an existing extendable handle by screwing them into the storage box, finally testing the product out by moving it around an area. In the final hours, if the product is constructed at a satisfying standard, I will sand it down with P80, P120 and P360 with a final finish of wet and dry paper. To seal this off, to add a nice finish and to stop rotting, I will wax the all the maple wood on the finished storage box.	High	My plan will be set out days in advance and I will make maybe include a computer based model to scale to help with achieving perfect measurements (Fusion 3D) I will measure it carefully to ensure the quality of the product.
Packaging	The product can be made to be just a box with the handle un attached or unextend, I will use bubble wrap to minimise damage and maybe even include bubble wrap inside to make it even safer. Then finally packaged in a cardboard box	Low	The packaging would be low cost and needs to ensure the product does not break.
Testing	To finally test the product and evaluate it, I will give it to the client to use for 7 consecutive days and then get feedback from the client about; the pros, what I could have done to improve it and a conclusion.	Medium	My client will write out a feedback sheet that will include details of what has happened during the 7 consecutive days whilst handling the product.

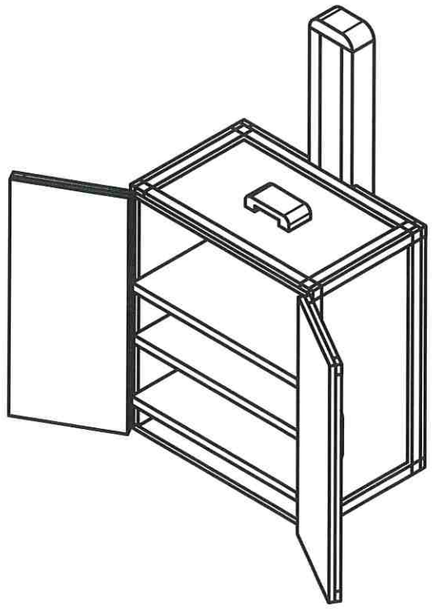






Materials

12mm Beech Wood
4mm Ply Wood
0.8mm aluminium trim (angle)

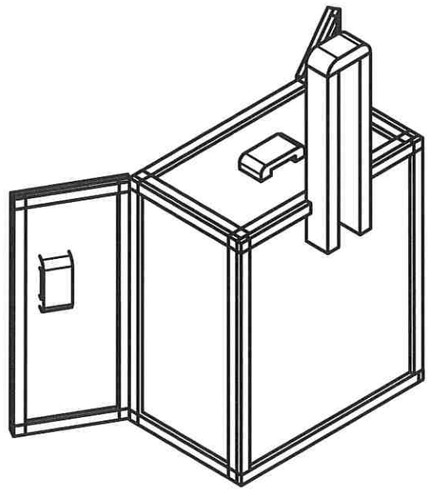


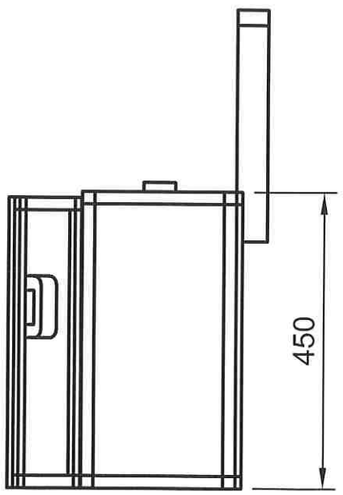
Machine Tools

T5 Router (12mm router bit)
Drill (various sized drill bits)
Piller Drill (various sized drill bits)
Circular Saw

Hand Tools

Tenon Saw
Hax Saw
Mallet
Bevel Edged Chisel





Dept.	Technical reference	Created by	Approved by
		Florence Gravina 04/03/2019	
		Document type	Document status
		Title: box	DWG No.
			Rev. / Date of issue / Sheet: 1/1

Computer Aided Design Materials Render

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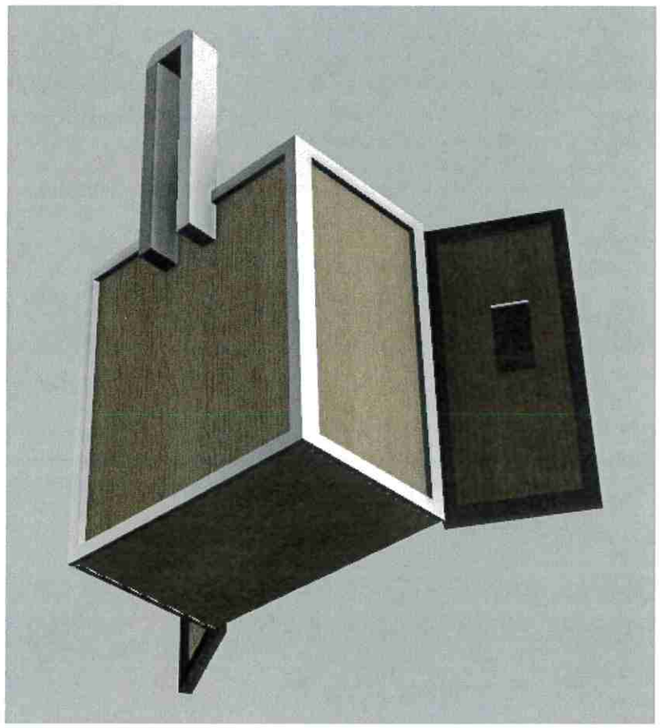

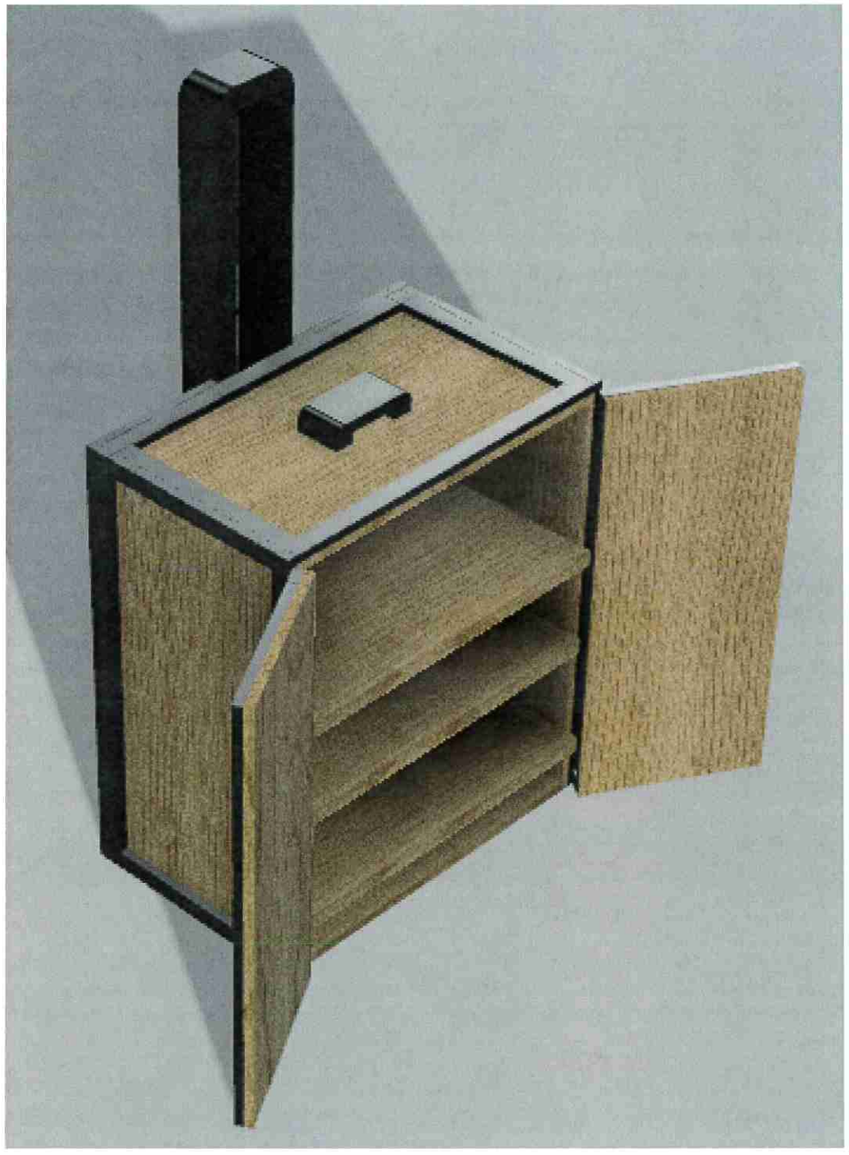

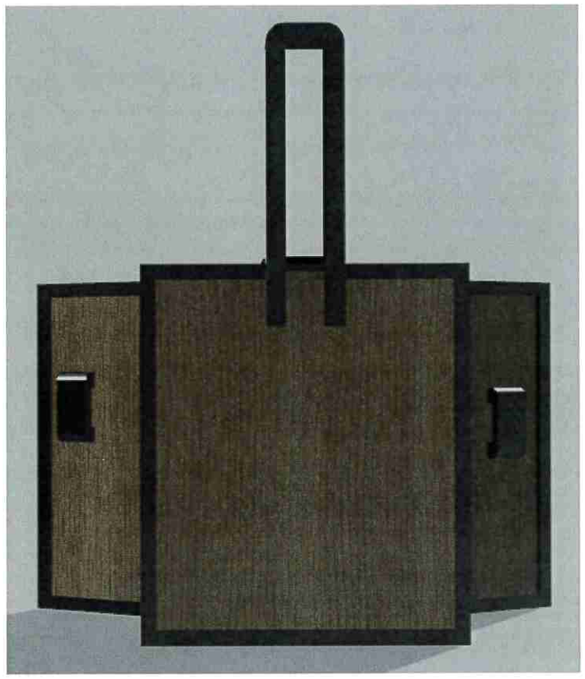

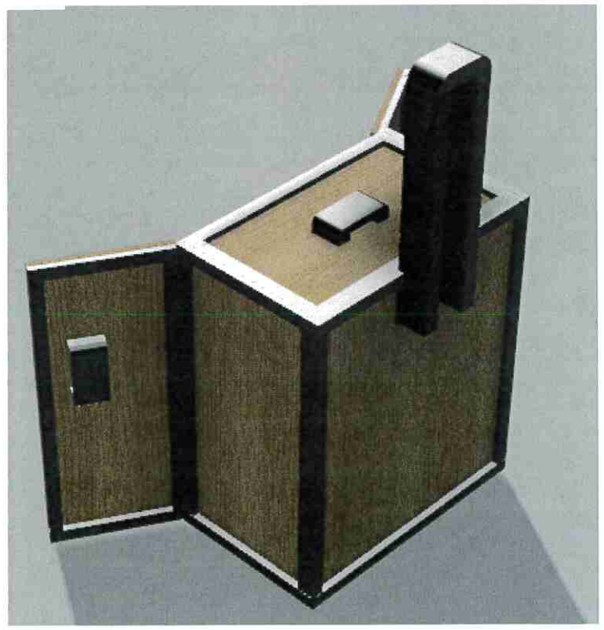

Planning the Make (page 1)

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Manufacturing Step	Materials, Tools and Equipment	Timings	Quality Control	Risk Assessment
Measure parts from cutting list Beech Sides 450x250x12 2 Off Beech Top/Base 400x250x12 2 Off Beech Shelves 400x250x12 2 Off Plywood Back 450x10x400 Off	Flat surface to work on Tape measure, steel ruler, try square, sharp pencil	20 minutes	Ensure all ends are square using a tri square Measure lengths accurately, check for knots in locations of joints, check wood for splits, twists or cupping	Hair tied back. Goggles. Take care when handling timber to avoid splinters
Mark out position of lap joints and Router Beech Sides	Flat surface to work on Tape measure, steel ruler, tri square, sharp pencil Lap joint jig, T5 Trend Router, 12mm Router bit, 2 x G-Cramps	20 minutes	Mark out joints accurately 12mm in from each end. Clamp side into jig, ensure ends are fully in the jig with no gaps. G-Cramp jig and side onto bench top. Set router depth to 4mm, set speed setting on Router to level 5.	Hair tied back. Goggles. No loose clothing. Ensure work is clamped securely. Ensure cutter is fitted securely. Consider dust extraction.
Mark out where the shelving will go and Router Beech sides	Flat surface to work on Tape measure, 4 x G-Cramps, tri square, sharp pencil, T5 Trend Router, 12mm Router bit, scarp wood	20 minutes	Mark out 4 lines to which you want the shelves to be (keeping in mind the extra space 6mm from each side of the line), then clamping the wood with scrap wood so wood does not damage, clamp a straight piece of wood for the router to follow, set speed setting on Router to level 5.	Hair tied back. Goggles. No loose clothing. Ensure work is clamped securely. Ensure cutter is fitted securely. Consider dust extraction.
Sand all pieces ready for gluing	Flat surface to work on p80, p120, p240, wet and dry paper, sanding block	20 minutes	Take a piece and sand whilst working your way up from p80 to wet and dry paper, sand until smooth	(this would be safe)
Glue sides to top/base	Flat surface to work on Tape measure, 4 x Sash-Cramps, tri square, scarp wood, PVA	20 minutes (a day to dry)	Set up the box to how you want it to be glued, make sure the measurements are correct and the sash-cramps are ready to be secured, glue an even layer of PVA onto the lap joints, secure the sash-cramps with scrap wood to keep the wood safe, measure from the opposite angles to make sure the product is square (if not, adjust sash-cramps), leave to dry	Ensure work is clamped securely. Make sure it is in a safe place and you leave the product to fully dry
Router around the edge of the glued box to fit the ply wood back	Flat surface to work on A vice, bevel edged chisel, sharp pencil, tri square, 12mm Router bit, T5 Trend Router, mallet	20 minutes	Set up the box so it is tight in a vice to ensure security, router around the edge of the box where you want the ply wold back to be in, do this twice to make sure you router it equally, use a tri square and pencil to mark where the edges will be, using a bevel edged chisel and mallet chisel the corners so that they look 90 degrees	Hair tied back. Goggles. No loose clothing. Ensure work is secure. Ensure cutter is fitted securely.
Glue the back onto the box	Flat surface to work on PVA, 2 x sash-cramps	20 minutes (a day to dry)	Test if the plywood back fits into the back of the product, put the ply wood back into the back with PVA, secure the ply wood back with sash-cramps, leave to dry	Ensure the work is clamped securely. Make sure it is in a safe place and you leave the box in a safe place. Leave the product to fully dry
Cut a beech strip and create halving joints to make two door frames	Flat surface to work on Sharp pencil, ruler, tri square, vice, tenon saw, 30x20x450 Beech (x4) 30x20x200 (x4)	40 minutes	Mark out where the halving joints will go on all pieces, put the wood against the marked joints to check it will fit, put the wood in a vice and cut the marked joints with a tenon saw for a straight edge	Hair tied back. Goggles. Ensure work is clamped securely when cutting. Watch to not cut yourself
Glue the frames to create two separate equal frames	Flat surface to work on PVA, 2 x Belt Clamp, 8 x G-cramps, tape measure, scrap wood	20 minutes (a day to drying)	Place the wooden frames in the way you want them to be glued, prepare your cramps, apply a fair layer of glue on one full frame on the joints. use the belt clamp to keep the frame square, add G-cramps to each corner with scrap pieces of wood to ensure the wood will not damage itself, use tape measure to ensure the frame is square (repeat steps with the other frame)	Ensure work is clamped securely. Ensure it is kept safe. Leave to fully dry
Router both frames for preparation of applying a plywood back	Flat surface to work on A vice, bevel edged chisel, sharp pencil, tri square, 12mm Router bit, T5 Trend Router, mallet	20 minutes	Place one frame in the vice and router around the edge, mark out where the corners need to be perfected, take a chisel and mallet and create 90 degree corners for the plywood back (repeat this with other frame)	Hair tied back. Goggles. No loose clothing. Ensure work is clamped securely. Ensure cutter is fitted securely.
Glue plywood onto the door frames to create the doors	Flat surface to work on 8 x G-cramps, PVA , scrap wood	10 minutes (a day drying time)	Take a frames and check that the plywood backs fit into the back on the frames, proceed to putting an even layer of glue around the frame, add 4 G-cramps to the corners with scrap wood in between (to ensure wood does not damage) (repeat with the other door frames) Remove excess glue	Ensure work is clamped securely. Ensure it is kept safe. Leave to fully dry
Prepare shelves	Flat surface to work on p80, p120, p240, wet and dry paper, vanish, brush, 2 x pin rack (or more if there is no room)	40 minutes (a day drying time)	Take one of the shelves and see if it fits in one of the routered sides, sand the shelf working up from a p80 to wet and dry paper, when smooth put the shelf on a pin rack and apply a layer of vanish with a brush (avoid leaving patches unvarnished), leave shelves to dry (repeat with all shelves)	Avoid getting vanish on clothing and in eyes/mouth
Glue shelves within box	Flat surface to work on PVA, 2 x sash-cramps	10 minutes (a day drying time)	Take the shelves and put them in the corresponding routered gaps within the sides of the box to see if they fit, apply glue to the gaps (avoid applying glue anywhere else, if you do use a chisel to scrape it off), put the shelves in so they are secure and level with each other, apply sash-cramps to the front to make the gluing process for effective	Ensure work is clamped securely. Ensure it is kept safe. Leave to fully dry
Add finish to the box and doors	Flat surface to work on Vanish, cloth, wax, brush, wet and dry paper, 2 x pin back	Vanishing: 10 minutes (a day drying time) Then 30 minutes	Vanish the box and doors with a brush, leave to balance and dry on a pin racks, use wet and dry paper to sand the entire box and both doors, when smooth apply wax with a cloth creating an even layer of wax all over the products, leave the wax to settle (after the wax is dry you can apply more layers if you wish)	Avoid getting vanish on clothing and in eyes/mouth

Planning the Make (page 2)

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Manufacturing Step	Materials, Tools and Equipment	Timings	Quality Control	Risk Assessment
Drilling hinges onto box to attach doors	Flat surface to work on Drill, 24 x screws (number 4 wood screw), screw driver, masking tape, 4 x hinges, 2.5mm drill bit, sharp pencil, ruler, centre punch	30 minutes	Put doors in the way you wish them to be (making sure they are level with the sides of the box), apply masking tape to ensure the doors don't move during the drilling process, using a ruler and pencil mark where the best place to have the hinges are, take a centre punch and mark where each whole on the hinges are on the wood, use masking tape to measure on the drill piece where it can go furthest through the wood, drill through the marked areas, screw in the screws into the hinges and both products to attack them together, test the opening of the doors	Hair tied back. Goggles. No loose clothing. Ensure drill bit is fitted securely and centrally
Attack wheels to the bottom of the product	Flat surface to work on 4 x wheels, drill, 16 x screws (number 4 wood screw), screw driver, 2.5mm drill bit, sharp pencil, ruler, centre punch, masking tape	20 minutes	Put box upside down, mark out where the wheels are desired to be, use a centre punch to mark the holes that attach to the box on the wheels, use masking tape to mark how far the drill bit can go into the wood, drill through he marked areas, use a screw driver to screw the wheels onto the product, test the product by moving it on the floor	Hair tied back. Goggles. No loose clothing. Ensure drill bit is fitted securely and centrally
Put Handles on the front and top of the box	Flat surface to work on 3 x handles, drill, 6 x machine bolts (4mm in diameter), screw driver, 4mm drill bit, sharp pencil, ruler, centre punch, masking tape	40 minutes	Mark where you want the handles to be, use a centre punch to direct the drill into the wood, use masking tape to mark how far the drill can go into the wood, drill into the centre punched areas, screw the handles onto the box, test the handles (if the bolts are too big cut them down with a hack saw in a metal vice)	Hair tied back. Goggles. No loose clothing. Ensure drill bit is fitted securely
Bending steel tube	Flat surface to work on Pipe bender, 15mm steel tube	5 minutes	Using a pipe bender bend the steel tube so the two ends are near parallel to each other (this will resemble a handle)	Hair tied back. Watch yourself
Cutting the handle so the ends are of an equal length	Flat surface to work on Metal vice, pen, try square, hack saw, file	10 minutes	Secure handle in a vice, mark a line across both ends so they are equal lengths, cut evenly with a hack saw, file both ends down	Hair tied back. Wait until metal has cooled after cutting before removing from vice. Watch hands
Prepare beech block for back handle	Flat surface to work on Circular saw, sharp pencil, ruler, centre punch, pillar drill, vanish, p80, p120, p240, 16mm drill bit, brush	30 minutes	Take a piece of beech (40 x 35 x 40) and square it with a circular saw to get straight edges, measure where the metal will slot into the wood bearing in mind the metal might go at an angle, clamp the work onto the larger pillar drill at the angle you wish and drill into the wood as far as it seems ideal, check if the metal fits comfortably in the stand, prepare block with sanding (p80-p240) and vanish with a brush	Hair tied back. Goggles. No loose clothing. Ensure drill bit is fitted securely. Avoid contact with eyes or mouth when using vanish
Spray paint handle	Flat surface to work on Aerosol silver spray paint, paper, an outdoor space	20 minutes (10 minutes drying time each side)	Prepare a space outside and choose where to spray your metal handle, cover any bits of wall with paper that you wish not to accidently spray, shake the spray for 3 minutes+, spray one side on the handle ensuring you don't spray too much or run marks will appear (if this does happen sand the run marks with wet and dry paper and use some spray), leave to dry, repeat on the other side	Hair tied back. Goggles. Avoid staining clothing or other areas. Use in outside space or a well ventilated one
Gluing handle into beech stand	Flat surface to work on Epoxy resign, vice, scrap wood, smaller piece of long wood (pen like shape)	10 minutes (and a day drying time)	Put wood in a vice, start mixing the glue together on a scrap piece of wood with another scrap piece, put the glue into the holes of the wood, put the handle into the holes making sure the glue does not seep out, if glue seeps out use a chisel to scrap it off, leave the handle to dry (if there is any dry glue out of the sides, use wet and dry paper to sand it off)	Hair tied back. Avoid glue having contact with eyes and mouth and clothing
Attach back handle onto the box	Flat surface to work on 2 screws (number 4 wood screws), screw driver, drill, 2.5 mm drill bit, ruler , sharp pencil, tri square, masking tape, centre punch	20 minutes	Mark out where you want the screws to go in the box and the handle so that the holes will line up for screwing, using masking tape mark out how far the drill can go into the wood, centre punch where the drill will go into, drill into both the holes, screw from the inside of the box to the handle until secure	Hair tied back. Goggles. No loose clothing. Ensure drill bit is fitted securely
Cut trim for the box	Flat surface to work on Permanent pen, tri square, aluminium trim, metal vice, hack saw, tissue	30 minutes	Align the aluminium with the edges of the box, with a pen mark how long you need to cut the trim, put the trim into the vice with tissue surrounding it to protect it from the small teeth of the vice, using a hack saw cut the trim in the marked line	Hair tied back. Goggles. Make sure work is secured when cutting
Glue the trim onto the box	Flat surface to work on Epoxy resign, scarp wood, smaller scarp wood (pencil shape), masking tape, p120	30 minutes (a day of drying time)	Sand the edges of the to where you want to apply a trim, sand down the insides of the trim, mix the glue onto a scrap piece and apply the mixture to the trim with another piece of scrap wood, apply the trim to the edge and secure with masking tape, leave to dry	Hair tied back. Avoid glue having contact with eyes and mouth and clothing
Wax and finish the product	Flat surface to work on Wax, cloth	30 minutes (a day of drying time)	Wax the entire product and make any adjustments for the conclusion of the product	(Ensure your own safety depending on what you do)

Photo Diary

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Mark out lap joints and dividers and then cutting with wood router - Tape measure, steel ruler, tri square, sharp pencil
Lap joint jig, T5 Trend Router, 12mm Router bit, 4 x G-Cramps, scrap wood

Sand pieces and glue to form box shape - p80, p120, p240, wet and dry paper, sanding block, tape measure, 4 x Sash-Cramps, tri square, scarp wood, PVA


Router both frames and perfect corners and apply plywood back - A vice, bevel edged chisel, sharp pencil, tri square, 12mm Router bit, T5 Trend Router, mallet, 8 x G-cramps, PVA , scrap wood


Router around the edge of the glued box and perfect corners to fit the ply wood back - A vice, bevel edged chisel, sharp pencil, tri square, 12mm Router bit, T5 Trend Router, mallet

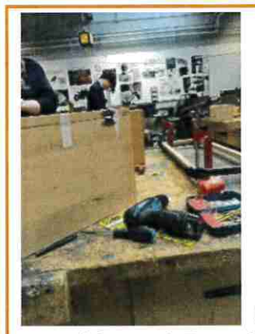
Glue plywood back onto box - PVA, 2 x Sash Cramps

Cut a beech strip and create halving joints to make two door frames – Sharp pencil, ruler, tri square, vice, tenon saw, 30x20x450 Beech (x4) 30x20x200 (x4)

Glue frames together - PVA, 2 x Belt Clamp, 8 x G-cramps, tape measure, scrap wood


Prepare shelves and Glue shelves within box - p80, p120, p240, wet and dry paper, vanish, brush, 2 x pin rack (or more if there is no room), PVA, 2 x sash-cramps

Add finish to the box and doors - Vanish, cloth, wax, brush, wet and dry paper, 2 x pin back

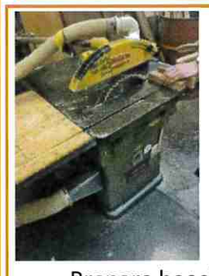


Drilling hinges onto box to attach box - Drill, 24 x screws (number 4 wood screw), screw driver, masking tape, 4 x hinges, 2.5mm drill bit, sharp pencil, ruler, centre punch



Put Handles and catch on the front and the box - 3 x handles, drill, 6 x machine bolts (4mm in diameter), screw driver, 4mm drill bit, sharp pencil, ruler, centre punch, masking tape (hack saw and metal vice for cutting down bolts)


Cutting the handle so the ends are of an equal length - Metal vice, pen, try square, hack saw, file




Prepare beech block for back handle - Circular saw, sharp pencil, ruler, centre punch, pillar drill, vanish, p80, p120, p240, 16mm drill bit, brush

Attack wheels to the bottom of the product - 4 x wheels, drill, 16 x screws (number 4 wood screw), screw driver, 2.5mm drill bit, sharp pencil, ruler, centre punch, masking tape

Bending steel tube - Pipe bender, 15mm steel tube

Cut the trim for the box – Permanent pen, tri square, aluminium trim, metal vice, hack saw, tissue

Spray paint handle – Aerosol silver spray paint, paper, an outdoor space

Gluing handle into beech stand - Epoxy resign, vice, scrap wood, smaller piece of long wood (pen like shape)

Attach back handle onto the box - 2 screws (number 4 wood screws), screw driver, drill, 2.5 mm drill bit, ruler , sharp pencil, tri square, masking tape, centre punch

Glue the trim onto the box - Epoxy resign, scarp wood, smaller scarp wood (pencil shape), masking tape, p120

Final Product

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Evaluation

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Client Feedback

"The product is a good height and is to a convenient length" – My client is around the same height as me and has similar measurements making the product easy to create, considering we are both of an average height, this product may be convenient for most people and is conventional for most heights

"It is of an obvious modern style" – I have gone by the modern theme on all aspects of making this product, from the screws and handles to the final choices in what wood to use due to tone and durability

"It should be able to store my nail equipment safely" – I have created 4 shelves to withstand the weight of the equipment that will be stored within the product as well as be stored safely so the equipment wont fall or move about, this has been done with a catch on the door to provide some strength to the doors and keep them shut, additionally one door the doors has a door trim meaning that only one door can be opened to let the other open as well

"The box needs to be durable, sustainable and withstand weather" – To keep this quality throughout the manufacturing process, I did everything to the best I could, meaning I tried to avoid as many mistakes as possible as well as being sensible with materials and the gluing process. I made sure to use durable materials and do the whole manufacturing process to the highest standards I could

Evaluating Final Brief

"I chose leisure and will be making this product for my client to improve her everyday career life as a nail technician" – This product is complete and now is able to be used, it is only specialized for my client and her needs and should be successful in providing my client with storage and an effective way or carrying around her equipment, as it is designed to do exactly this

"She stereotypically prefers more modern themes (which I will incorporate into my product)" – Through out designing and manufacturing this product I have always kept the theme of 'modern' in mind. This includes in the materials I have used, only using light toned woods and sliver colored metals such as aluminum, and also keeping the shape aesthetics to a modern theme. Looking and researching on other artists who follow the same modern theme helped in finalizing my product

"The product also needs to be light in weight for her to be able to carry it around with her, it should additionally have wheels and handles provided as an aide" – My product is light weight due to choosing lighter materials and not using too much hard wood to create the box as it is dense and heavy, over using hard wood such as beech can make the product durable however extremely heavy, to successfully create my product I needed a fair ratio of both so not only could my client easily transport the storage device however also have a durable and strong product. Due to the hardwood and its weight, I needed wheels that could withstand that weight as well as the additional weight of equipment that needs to be stored. So, I have purchased wheels that not only fit in with the aesthetics but also can hold up to 70kg, which is more than enough for this product to function successfully

"From my research I have discovered the product must be/work in the following way: it will be able to move across the ground with the help of wheels and an extendable handle, it evidently has to open, and therefore will have a lid of door of some sort. Additionally, on the inside, there will be shelving for the nail polishes which will help with efficiency and organizing" – I have met every single one of these targets for the way my product can function, I have tried to meet these at the most sufficient and easy way possible. The storage unit is able to glide across the floor in any direction and can also stand on two wheels and be dragged effortlessly with the help of the back handle, the storage box has two modern doors and a catch to secure them from rattling and allowing equipment to fall out, and the shelving inside provides enough storage for my clients equipment with its 4 durable beech wood shelves

"The product will be (estimated) 450mm x 250mm x 400mm (Height x Width x Depth)" – These are the measurements I tried to work to however with the added materials such as the aluminum trim these measurements are slightly off however don't effect the product in a negative way or effect the way it functions

"It will be constructed from Hardwood (Maple)" – I had to follow up my product with my back up material which is beech due to the expense of maple, I wanted to create a product that was not only light in tone but also a fair price, even though maple has the perfect tone to it to create the modern look I wanted to create it was too expensive. Therefore I used beech which is similar is a lot of traits to maple, it is a hardwood and one known for its incredible durability as well as a light tone in color

Evaluating Specification

Timescale: "The deadline completion is for Easter Holidays 2019" – My product has been finalized and my coursework is on it's last pages of being complete, all I need to do now is improve on my coursework and finalize my conclusions and gain more feedback on my work and how I can improve it further if I was to recreate the product again

Target market: "The client is my 20 year old sister, a qualified nail technician, who would benefit from this product and is a prime example of someone who works with cosmetics" – I have asked people of the same age as my client and who are of the same profession

Function: "To make those who work with nails to be able to hold their equipment in a safe storage place and be able to carry this product easily to wherever they need to do business or see a client of their own" – I believe I have successfully created to product to achieve this, it stores equipment efficiently and securely as well as an easy method to carry equipment around due to its light weight body, sturdy wheels and back handle, which provide an effortless way of travelling from client to client. The 4 shelves are ideal to be able to store large and small equipment as well as be secured by the doors and catch, not only reducing the risk of damage to the product and equipment but reduces the rattling and sound of the product travelling on ground. The four wheels can hold up to 70kg and are perfectly and evenly spaced to not only allow balance to the product but also provides an efficient way of maneuvering the product

Product size & weight: "The product will be (estimated) 450mm x 250mm x 400mm (Height x Width x Depth)" – I have kept as close to these estimations as possible during the designing and manufacturing of my product, these measurements were perfect to create a mobile storage unit as the required materials needed to make it would not be so heavy to make the product unable to move easily (which was necessary) but also is enough storage to supply lots of nail equipment needed to be transported from client to client

Durability: "This should make it easier for her to carry things and around and store them safely and efficiently" – The storage unit was designed and created to store equipment safely and provide durability so that the product would also not get damaged, using hardwood was the best method, especially beech as it is known for its good durability. The aluminum trim lining all the edges also provides additional protection when travelling. The manufacturing process is also important when it comes to durability, a fault in the joints or gluing process can lead to a weakly made product, meaning I payed close attention when creating every joint on my product as well as protecting the wood and ensuring the product was glued securely and left to dry for a fair amount of time

Aesthetics: "The style of my product will be evidently be modern, sleek and to my clients desire. My client has specified that she wants the product aesthetics to correspond with her existing furniture and therefore be of the same style. She likes white themes, which are stereotypically seen as modern, and she has mentioned previously that she would like an aluminum trim to conclude the look (and durability) of the product" – The product from the start always was going to have a modern aesthetic to it, through designing I decided to have a boxy look while choosing a light tones wood and an aluminum trim, all these features have connotations of 'modernism'. The product successfully fits the criteria of being of a modern aesthetics, I have achieved this by keeping up to date with my client and her preferences on the looks of the product, this includes my final decision on an aluminum trim which adds to the evident modern and sleek look

Ergonomics: "to be able to hold their equipment in a safe storage place and be able to carry this product easily to wherever they need to do business or see a client of their own" – The product has been made to be as comfortable to maneuver as possible due to its purpose of being comfortable enough to take from place to place, I've made the handles the right length and shape to be held easily and comfortably by my client, and made the back handle of the appropriate height to my client so it can be moved around in any angle effortlessly. The four wheels provide an easy way of standing the product on all four wheels, travelling at a level manner on all four wheels and being able to drag the product from behind on two wheels (like a suitcase) comfortably

Materials: "Materials vary from the actual box to the added designs and features, The wood I need to use must fall under my client's needs, I concluded that the best hardwood that is the lightest in color and affordable is maple wood. When I have finished I will use an aluminum trim (this may change over time depending on how I deign the shelves/storage)" – In the end I decided to go forward with my back up idea for the material I will use for the wood and main box shape, before I wanted to construct out of maple as it is durable, a hardwood and is an appealing light color which would look perfect on my product, however due to expenses and my client wanting a product also as cheap as is possible, I decided to manufacture out of another hardwood in a light tone, beech was the best wood to replace maple and not only does it share similar qualities but its known for its extra durability which is essential for my product and its purpose

Safety: "Safety requirements will include rounding off edges to reduce the possibility of accidently cutting yourself, I will sand it down with p80, p120 and p360 and wet and dry paper to reduce splinters and then I will provide handles for easy lifting so that the possibility of dropping the product is reduced" – instead of rounding off edged I needed to leave them due to the trim I wanted to add, however this does add to the safety aspect of the product as the edges are extra durable and during travel there will be a lack of damage. After sanding the whole product, I have added vanish and a generous amount of layers of black bison wax polish, this has created a smooth even surface which with no splinters. There are evidently no potential hazards that can be caused with the product to the client of damage to the product

Costings: "Manufacturing this product will probably cost around 25 pounds, which includes buying the supplies and producing the product. Then selling it onto my client it will be 50-60 pounds to gain a good profit" – I have tried to make this product as cheaply however appealing as possible, through choosing materials and designing the overall outcome by using as less material as possible. I went with the sensible approach of using another material for my wood (from maple to beech) and this made my product more affordable, as I would want my product to be something that all people in the profession of my client can buy and use to help them in there day to day life during their work

Manufacture and Quality: "To make this product, I will replicate constructing a normal opening/closing box then add the additional features. I will construct the box using lap joints then seal is together with PVA. When dry I will make the shelving and test out an example nail polish to see if it works. Then I will apply the wheels and an existing extendable handle by screwing them into the storage box, finally testing the product out by moving it around an area. In the final hours, if the product is constructed at a satisfying standard, I will sand it down with P80, P120 and P360 with a final finish of wet and dry paper. To seal this off, to add a nice finish and to stop rotting, I will wax the all the maple wood on the finished storage box." – I have evidently constructed this product to the best of my abilities, through this I have made the joints to the best I could and left them to dry for an appropriate time and screwed all fittings and features in so they are secure, and if anything was not secure I would cut down any screws so they fit perfectly in place. There was no rush to product being made and therefore everything was done safely and accordingly and the overall outcome not only looks pleasing but also meets the specification. During coursework and finalizing my product was stored safely therefore no damage could possibly have been done to the final product and therefore stayed at a high standard of quality. The testing was done through out the manufacturing process to ensure that the product still met to it purpose and when I was happy with the outcome I ensured it was sealed off with a finish all over the product to protect further

Packaging: "The product can be made to be just a box with the handle un attached or unextend, I will use bubble wrap to minimize damage and maybe even include bubble wrap inside to make it even safer. Then finally packaged in a cardboard box" – I still stand by this statement as my product is already very durable and does not need a lot of extra safety materials or plastics to help with the journey from the seller to the client

Testing: "To finally test the product and evaluate it, I will give it to the client to use for 7 consecutive days and then get feedback from the client about; the pros, what I could have done to improve it and a conclusion" – I not only am going to do this conclusion with my client but I also tested the product through its manufacturing stage and even before during designing I had made a model of the product. Through every stage of construction I teste the product against the specification and every time I ensured that it 100% successfully did this, for example, after fitting the shelving in I had taken equipment and judged how well the equipment could be placed and also how safe it could be stored

Environmental Issues

"The box will be made out of maple, which is a familiar hardwood, which is very durable and is a good material to use for my product. Hardwoods are good for the environment because products that are manufactured out of hard wood are usually more durable and lasts for a considerable amount of time compared to light woods, the off cuts are more sustainable, they are denser and therefore they will not break as easy and need to be replaced by more wood" – Even though I replaced maple with beech, it still stands by this statement in my specification as it has similar features and is even more durable. I feel I have successfully created my storage unit to be as environmentally friendly as possible; here is an example of this through the 6 R's and how my product meets them:

Reduce: I tried getting the product right the first time therefore there was no extra material needed to make anything and I also designed the product with as less material as possible
Reuse: It is made for everyday life for a nail technician therefore is evidently reusable
Recycle: The timber can be reclaimed and reused after plaining wax and vanish off
Refuse: For the future I will refuse an aluminium trim as it has had a lot of energy put into manufacturing it for my product
Rethink: I could have replaced the hardwood with softwood however because soft wood is not durable enough I went forward with hardwood
Repair: To some extent the product can be repaired provided there was a lack of damage to the wood, however due to its durability there is not a high probability that the product will get damaged

Conclusion: In conclusion I believe my product fits the specification as close as possible and successfully does so, there are improvements that can be made but this can be seen in a positive light due to the fact any product whether successfully or not can be improved some way. However I believe I have created an appealing product that does the purpose it was initially designed to do which has been designed and constructed in the time frame and completed to a high standard. It meets all requirements in the brief and specification and I am happy with the outcome of this product

Modifications

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Improvements

There were many evident things I could have applied to my work to make it of a higher quality and standard however due to the lack of time to design and construct this I was unable to do so. Because of this there were many improvements that could have been made to my product and can be implemented into a second version of my product which I have designed using CAD. Not only have I considered the improvements that could have been made but I have had my client put forward her ideas on a better considered version of my final problem

Manufacturing Problems

Looking back on the manufacturing process there were a few issues that came with being in a busy and hazardous environment. Here are the things I would be extra careful about if I was to create a better version of my product as they provided small issues during my first manufacturing process:

- **Router –** When creating the dividers in my side pieces who my storage unit for the shelves to sit on, I was not entirely certain where to put the dividers which then proved a problem when marking out where the shelves needed to go. Next time I will be carful when marking where I want my shelves to be and correspond the measurements and of how big the equipment is
- **Frames for doors –** When marking out, cutting and gluing my two frames I had made the error of creating unequal doors therefore I had to repeat the process with one door to then create equal doors that are of a good standard to be placed on my work. Next time to avoid this I will handle the management of lots of pieces of wood better by marking out which piece is which
- **Attaching the catch –** It was extremely difficult measuring out and drilling the catch into my work as the measurements had to be perfect for the catch to be able to work successfully, however when measuring out where the catch was meant to be placed I must have made an error on the height as the catch would not work 100% and to be able to get the catch to work I had to adjust the height which was unneeded extra time and effort. To avoid this next time I will take care to measure the catch better so that it works successfully the first time and no adjustments have to be made
- **Spray painting –** I had never spray painted before so I was aware the maybe the outcome would not be so good, when doing the process I had created various drip marks by accident which then I had to sand off with wet and dry paper and repaint again multiple times. Next time I will be aware that I cannot spray too close to the object as drip marks are bound to appear which will make the object dry quicker as well as have a better even coverage
- **Trim –** I was rushing the trim and if you rush with a hack saw it can sometimes damage the metal and its surface if your not careful, which is exactly what I did. This is something that could have been easily avoided if I had just taken time when cutting the trim

All these could have been avoided with better planning as well as better timing and more experience, due to this and being aware of these errors I can positively say that my repeat of the product would be a lot better and to a higher quality

Timings

Time was short and I had a deadline to meet, therefore I was rushed with creating my product which then lead to problems with the construction. I could have planned out when I was creating each step of my product as well as taken time to do the more difficult bits to my product to avoid problems and time being wasted as well as materials. I could have tested different methods before going straight into my product which would technically add to my experience as well as create a lack of errors for the future of making that product

Accuracy

I could have been a lot more accurate with my work, the measurements were ok however I was maybe unaware of what I really was trying to create therefore may have got lost with the measuring (this goes for the dividers and the poor measuring for those) There is human error involved and through the entirety of the manufacturing process the materials were bound to change due to sanding and other factors. Next time I will think through better when deigning as I should have been more aware of factors that could alter my measurements, using machinery would have also reduced the risk of loosing the original measurements as I was doing a lot of the construction by hand

Overall Quality

The final outcome was successful however improvements could have always been made, the wood had been damaged slightly during the manufacturing process but also the wood that I had been given had already had a risk of being damaged due to its natural knots therefore if I was to create another product I would choose wood that was less likely to break of chip. I may have rushed doing the vanish therefore there seems to be some discolouration which could have been easily avoided. I wanted the product to look professional but obviously it can never look perfect due to the fact its hand made, this is not an excuse as I would next time try even harder as things that are handmade can look professional as long as there is no faults

Functionality

I am glad with the overall function of the product as it perfectly meets the specification through testing and evaluating, but there is always room to improve. The way the storage unit moves and transports it fine therefore there is no need to revaluate the way it travels however the way it stores equipment can be improved, which I have done in my version 2 design. The shelves are quite open and the equipment may be able to move which is a negative, if the shelving system wad more compact then equipment would be less likely to move

Materials

Materials were chosen well, beech is really strong and durable and was a good choice when making the body of my product, however I believe the wood may not add top the modern theme my client was requesting therefore after consideration I looking back on my artist I realised that replacing the plywood back to the doors with a clear acrylic was the perfect idea and I should have done it first but I'm unable to do this so I can only design what it would look like. Not only does it look a lot more modern but it's interesting and aesthetically pleasing as well as a good way to get wood to compliment plastics

Size

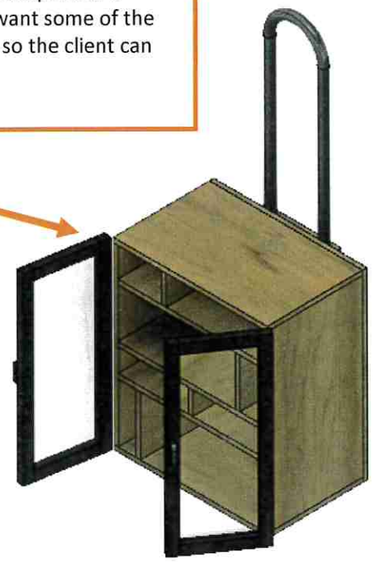
The sizing was ok and I did meet the measurements to some extent without evaluating the factors that might alter these measurements, even though the product is a little off it still functions and stores like the specification intended it should. Next time I would maybe create a slightly taller and thinner product just to make accessing the equipment a little easier however the sizing overall is not that bad

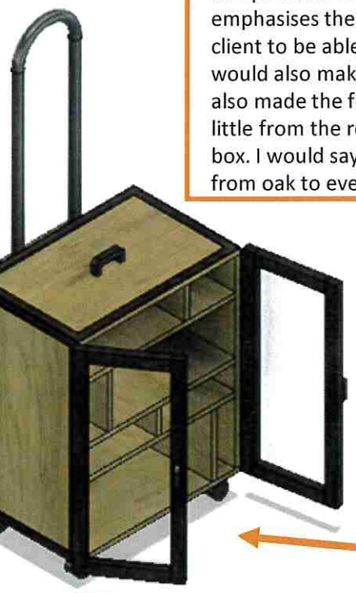
Storage

One of the improvements that could have been made which was inspired by one of my deign ideas was making the storage order and dividers different, not only does it look more aesthetic and modern it also is denser and more compact to make sure that equipment does not move around when being transported. It would be of the same material and wood and I want some of the vertical dividers to be able to slide in and out to so the client can differ between having more space or less

Doors

The doors seemed quite bleak and did not look modern therefore one of my ideas was to create doors with instead of a basic plywood back would have a modern clear acrylic back which compliments the rest of the product. Not only does this emphasises the modern theme my client wanted it also allows the client to be able see what is within the product and I believe would also make the overall quality and look a lot better. I have also made the frames a different wood to make them stand out a little from the rest of the product so it does not look like just a box. I would say the wood is of a darker tone so this could vary from oak to even mahogany





Trim

The trim on my product did look good and help to make the product look more modern for my client however on the environmentally friendly side of viewing it takes up a lot of energy to create and is quite expensive, therefore I would next time go for a wooden trim preferably the same material as the frames which would look professional together (which I want my product to look) This is better for the environment because when cutting down trees you can always give back to the environment however that is not the case with energy. It will be used for the same reason and still be durable enough to maker the product safer to travel with

Draws

At the start of the project I was thinking of adding draws to my product however that ideas was never finalized and therefore never made it to the final design however I still really like the concept of having only some draws to store more valuable or small items and having them be able to be stored smoothly into some compartments of the shelving and the client has the option to have the draws or not. These draws would have a cut in them to allow them to be accessed easily and not having to purchase any handles, and one small idea was to have the sides/back/bottom of the draws to be a different colour just to make the product a little more aesthetically pleasing and interesting /modern