Design and Technology

D&T is a subject which is focused on the wider world including products, manufacturing and business as well as people, culture and sustainability.

The course is split into two halves; the NEA (non-exam assessment) and the final exam. You will produce a practice NEA in year 12. Followed by your real one beginning near the end of year 12, continuing through Year 13. The content for your exam will be covered across both years 12 and 13. Both areas of the course are worth 50% of your overall grade. An example of the NEA is also in these bridging materials.

There isn't a requirement to have done GCSE D&T, but if you haven't, it will help to work through the GCSE specification to pick up the basics and terminology.

The NEA is a skill-based piece of coursework which is heavily weighted towards your design and development skills, backed up with research, analysis and evaluation.

Some advice from our current year 12's:

"Don't get rid of your GCSE work, especially your theory notes, you will need them to refresh your memory"

"Work on your sketching over summer and throughout year 12 so it's a high standard for your NEA"

"Pick a problem that you enjoy looking into, so you find it easier to put the time into coursework"

THE CLIENT AND THE COMPANY

Introducing theClient

My client, Thanatta (Nan) Tiyawongmana (on the left in thephoto on the right) is thefounderof the "Chococrunch Bakery Shop". Khun Nan started baking cookies when she was studying abroad in the USA, and then came back to Thailand and started baking other things as well with her mum.

Chococrunch, founded in 2010, sells low sugar home-made bakery, such as cookies, brownies and tarts etc. Khun Nan started off from baking and giving cookies away during special occasions such as New year and Christmas, and due to the vast amount of compliments and good responses received, she decided to become more serious and started selling her cookies online. In 2015, she expanded the variety of bakeries she sold, from only cookies to brownies, scones, tarts etc., and also started selling in the Bangkok Farmers Market at K-village and now at Gateway Ekamai as a part-time job. However, due to the workload from her main job in a marketing role for "The Mall Group", she only sells on the last Saturday of every month.

The Bangkok Farmers Market, first started in 2013, has a mission to build a community focused around healthy living. Their primary goal is to "help build strong foundations for communities and focus on life. Working towards sustainability for future generations and our home planet Earth."

Initial Client Interview

"I would like to have something which would help with the layout of my bakeries, especially in the middle section of the table. It would be very nice if there could be layers as well because I feel like everything is on the same level right now and so it might be difficult for the customers to look at all the products clearly. In my opinion, the thing that attracts customers the most is the way the products are presented. This is because it is the first thing that customers see whilst walking around and to me, first impressions matter. Therefore, I think having a better display for my bakeries would be really beneficial for the shop in attracting more customers. I think this would allow my products to gain more attention and also perhaps it might also let people look around more easily, to find what they might be interested in buying. Moreover, I want to show all my products but then there are flies and so it is quite difficult to do so and so I hope the display would help me solve this problem. It would also be pretty cool if Chococrunch's logo can be put somewhere on the product, and if its portable because I need to carry it to the car."

*All of the client's responses have been translated from Thai

CHOCO CRUNCH
WE SERVE THE BEST IN EVERY BITE.

CHOCO CRUNCH
081 834 2694
087 806 2673

MIDDLE SECTION

Choco Crunch's Contact

Founder: Khun Thanatta (Nan) Tiyawongmana
Slogan: We serve the best in every bite.
Founded: 2nd September 2010
Email: chocochoco.crunch@gmail.com

Tel.:+66 818342694and +66878062673

The Problems

The store is outdoors, and so it is out where hygienic factors must be considered, due to the amount of dust in the air and the flies/ mosquitoes which may bring diseases, especially for the tarts and for the scones that don't have individual wrappings. Khun Nan has discovered that this had previously made customers reluctant to buy her bakeries, not knowing that the products they'll actually receive are packed in boxes behind the counter. This means that my display should eliminate this problem to increase the customers' confidence in the products they'll be buying, through having something which would cover it but then this might make the product hard to be seen clearly, creating another problem.

Another problem discovered is that the current display doesn't have many layers and so her products are mostly on the same level, causing it to be inconvenient for the customers to look at all the bakeries. This means that some customers that may just be walking through the fair may not be interested due to them not seeing it properly , reducing the amount of potential customers.

The client also stated that she has problems of putting her tarts on display because the ingredients inside the display melt from the heat. Also, the farmers market is outdoors and so the tarts on display may sometimes not look as tasty and appetizing as the ones the customers will actually be receiving. The client believes that this contributes to the amount of tarts they are able to sell. Right now, to solve this problem, ice packs are put below a stone platform but she thinks that this is unattractive. Also, as the ice pack slowly melts, water tends to collect on the tray underneath and it is quite troublesome to pour the water out as the tarts will have to be taken away and the ice packs removed.

Design Possibilities

Through discussions with the client, we came up with ideas to tackle the issues previously stated, and things that may be beneficial to Choco-crunch and my client.
We came up with 4 possibilities:

1) The first is a display that would be put on top of the table in the middle section that was discussed in the initial interview. This display would provide different levels for the products, making it easier for customers to see the bakeries, and attract more customers as the client believes that display is one of the most important factors in selling things. The display should also solve problems such as things like looking unhygienic by making it being cleanable, and by covering up the bakeries in a way where the bakeries can still be seen by the customers, such as using a clear acrylic barrier. This should also be designed so that it is portable and easy to carry around.

My interests and expertise: I believe that the way products are presented is a crucial part of selling products and so I am interested in this possibility.

2)The second is a platform and box-like thing that can hold dry ice or ice packs that would allow the displayed tarts to remain fresh and not melt throughout the day. This possibility must provide a display for the tarts and also an insulated box-like component that would be holding the cold packs/ dry ice. It should also be designed so that water from the melted ice packs or from condensation can be poured out conveniently.

My interests and expertise: If I make this possibility, I would need to ensure that the product manufactured would actually work, as the coldness from the ice below the plates would have to reach the tarts and this may be quite difficult, due to cool air falling instead of rising. Also, if materials like foam are used for the insulation of the boxes, the products may not be durable which means the product won't be useful for a long time.

3)The third possibility is to make a separate stand that would be stood next to the table instead of on the table and so it would have to be quite tall. The purpose of this is for the store to be seen by more people, to attract more customers, and also for more products to be displayed and some decorations to be placed.

My interests and expertise: This may need to be quite big and so it might take quite a while to make which isn't very practical for me due to the short period of time I have in the manufacturing of the product, due to me wanting to make the product high quality.

4)The fourth possibility is for a better sampling section to be made, a sampling stand may be made so that the samplings stand out more, encouraging more people to taste it. This is because the stand could be higher than the table, making it nearer to people's eyesight. This possibility was thought of when me and the client both observed that most of the people who stopped to look at the products would taste the products before buying them and so we have both concluded that it is an important thing in the selling of bakeries, and so making it look more attractive may captivate more attention and make people want to taste the bakeries more.

My interests and expertise: I think this would be quite useful for the store but the existing samplings already look quite attractive.

PRODUCT ANALYSIS

ANALYSISOFTHECLIENT'SCURRENT DISPLAY

CLIENT'S OPINION

"I thinkmy current display is quite boring and unattractive, this is because as I've said before, everything is on the same level and so when customers walk past, nothing stands out and so they can only look at the whole display as a whole and the bakeries in it. Though I've been trying to stack up boxes to create layers, I think it still lacks it and as I've noticed, it is relatively hard for the customers who stops by to actually look at everything because they have to bend over and look sometimes. Also, I think that the display is quite untidy and the sampling section can get quite messy sometimes due to people tasting the products, and some customers are reluctant to buy because they think these are the only bakeries left and they are exposed to flies and dust. So as I've said before, I think improving the middle section of the display would be nice so that it would attract more customers, from people walking by and also the ones just walking through the farmers market, potentially from another section."

CUSTOMER'S OPINIONS

"It looks good overall but the samplings section is a bit untidy"
"To me, I think it looks untidy and unhygienic."
"It looks pretty nice but is probably unpractical, though I really like the wooden plates and things."
"All the products blend in together and so its quite hard to choose what to eat"
"It doesn't look that interesting because of the lack of colour diversity"
"The part on the left of the table looks organized and tidy"
"The products are kind of hard to see properly and I have to bend down quite a lot to see the ones behind."

MY OPINION

Iagree withmyclient's opinion that the display is quite hard to look at because things are on the same level. I also think that the middle section looks boring because of how the products are put; there's nothing separating them to make any of them stand out. The right side of the table also looks crowded and the labels are blocking the view of the front of the cookie which may be impractical for the customers, especially when Choco-Crunchs cookies are unique flavoured.

ANALYSIS OF THE CURRENT TARTS SECTION

CLIENT'S OPINION

"Initially, the tarts were placed on display without any icepacks underneath the platform and so this has caused it to melt, become soft and not tasty. This has made customers reluctant to buy the tarts and so I decided to put ice packs underneath the stone platforms. However, this made the tarts section looks kind of unattractive when looking at it from further away or from anywhere which isn't from the top. This is because we can see the blue ice packs underneath, thought the tarts now can last longer. This wasn't long before we found another problem where the ice packs were melting and making the trays underneath wet. Water from this was hard to remove due to the tarts and platforms being on top of it and so it wasn't very convenient."

Unattractive

CUSTOMER'S OPINIONS

"The tarts look fine,without looking at it from the sides, I couldn't tell that there were ice packs underneath the black plates"
"The tarts look delicious nevertheless"
"The display looksnatural and attractive"

MY OPINION

When I firstlookedat the display, I didn't even notice the ice packs below the tarts and thoughtthat the tarts display was pretty attractive, with the lights to help as well.Thewater from condensation of the ice packs also don't get to the displays andsoitisn't much of a problem. However, from looking at how the platforms are placedand how the ice packs are placed below the platforms, I don't think much ofthecoldness reaches the tarts, especially for the one on top the wooden platform,and so the tart display may be inefficient in this aspect.

ANALYSIS OF THE BIG DISPLAY

CLIENT'S OPINION

"The big display doesn't currently exist, but I think having it would potentially attract more attention from the customers because obviously it would be bigger (height wise) than my current display. I believe that gaining more attention from customers would possibly cause an increase in the amount of sales"

MY OPINION

Though I agree about the display potentially attracting more customers. I think that if a bigger display is to be made, a larger variety of products may have to be made and so this may increase my client's workload all the bakeries are homemade.

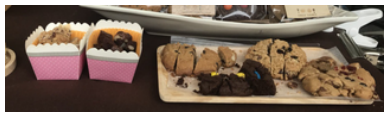
CUSTOMER'S OPINIONS

"I think things on the tables can be put on the it insteadwhichmaymakethetablelookmoretidy"

ANALYSIS OF THE SAMPLINGS SECTION

CLIENT'S OPINION

"I think samplings are very important because it allows the customers to decide whether they like the bakeries or not. I think making this part more attractive would encourage more customers to try my bakeries and so this would increase the amount of potential customers. The current sampling section tends to get untidy at times when parts of the samplings are dropped off the plates and onto the cloth, and this makes the table look very messy and unclean, giving me extra work each time to clean it."



CUSTOMER'S OPINIONS

"I like the way the samplings are together as this makes it easier to taste"
"The samplings keep falling off the plate when I try to get them up"
"I think there should be labels for the samplings so that I'll know what I'm tasting"

MY OPINION

"Overall, I think the samplings section can be seen clearly as they're in front of the bakeries which is a practical thing. I like the way each of the samplings are separated on small plates as it looks attractive. The colours of the plates are also quite nice, for the cream colour and the dark brown one but I think the pink compartment should be changed because it doesn't really fit in with the display. Overall, I think that the samplings section is good enough and adapting my design so that it can be presented with the client's current one might be a good idea."

JUSTIFICATION OF DESIGN POSSIBILITIES

To finally justify a design possibility, I would rate each of the possibilities against it's benefit to the store, which was discussed on the previous page, the amount of problems the current products have, the importance of each possibility, the client's interest would be based on their own ratings out of 10, customers interest which would be taken from the customers opinions on the products and finally my interests and expertise. They would be given a rating out of 10 and the one with the most total score would be the one being designed and manufactured for the client after further analysis in the next few pages.

	MIDDLE SECTION DISPLAY	TARTS SECTION	BIG DISPLAY	SAMPLINGS
BENEFIT TO STORE	9	9	7	7
CUSTOMERS INTEREST	9	9	5	7
CLIENTS INTEREST	6	4	6	9
MY INTEREST	8	6	3	5
TOTAL	~~32~~	~~28~~	21	~~28~~

INTERVIEWS AND QUESTIONNAIRE ANALYSIS

Interviewing the Client

After the initial interview with the client about her basic needs, I further interviewed her with questions relevant to the design considerations of the display she wants in order to get a better understanding of her needs, wants and values.

To make it portable, would you rather have it so that it can be folded, taken apart, dragged around with wheels or do you just prefer it to be small and light?

Iwould prefer it if itcan befoldable or taken apart because it'll be easier for me to take it around; to the fair and home as there are also other things that I need to carry, such as the cooler box containing bakeries required to be cooled, and also other boxes containing other bakeries and the display for the side sections. I normally use a trolley to carry things to the car and the display should fit the trolley as well.

What's the average size of your bakeries and also what is the size of the table and the middle section of the table in which the display would be placed?

The smallest bakery is around 3cm and thebiggest and isaround 10cm. Thesize of the table is around 1.50m x 1.90m wide, and 70-75cm tall. The middle section is around 40cm x 50cm wide. Also, the display can be placed on something else that we have and so it doesn't have to be that tall, around 30cm would be alright because I don't want it to block my sight of the customers. Also, it shouldn't be too wide so that it wouldn't take away too much space from the other sections as well.

Do you have a personal preference in terms of colour schemes and material?

I would prefer it to be quite modern but I want the display to be mainly made out of bright coloured wood, that would go well with the colour of the table cloth. The colours I want would be something like shades of brown and maybe a creamy colour that can be seen on the logo, so that it would also match the packaging.

Should the display be opened from the front or the back?

I think it would be best if the display can be opened from both the front and the back, incase the customer wants to choose a certain piece and so that I can also take them out for the customers.

Are there any other functions that you want to be included in the display?

Other than the display being able to present my products efficiently and having the food samplings section, and/ or the tarts display, I don't think I need anything else because I already have a separate place to keep the money and everything else.

Oh, but I think having a chalkboard on it would also be useful to inform the customers of the month's special menu etc.

How many layers do you prefer the display to have?

I think 3 layers should be enough, because there are 2 more sections of products being displayed and so if it's too tall it might take all the attention away from the other sections.

How much are you willing to spend on a display like this?

No more than 1000 baht.

How much do you value the environment and the use of plastics?

My store is in the farmers market and so the usage of plastics is highly valued here, and so minimum plastic to should used.

Questionnaire for the Customers

The purpose of the display is to attract customers and so I believe that the customers' opinions should also be highly valued in the designing process. I believe I can achieve this by giving out questionnaires to Choco-crunch's customers and the people walking around the farmers market, in which they can fil in both on-line and through hand outs. Moreover, the responses can also be used to determine the user group of the display as well.

1.What is your gender?
- A. Male
- B. Female

2. How old are you?
- A.Under 18
- B.18– 25
- C.26– 45
- D.Over 45

3.Do you like baking cookies (and/ or other bakeries)?
- A. Yes
- B.No

4.How often do you come to the farmers market?
- A.Oncea week
- B.Couple of times a month
- C.Couple of times a year
- D.Oncea year orless

5.How often do you eat cookies/ tarts/ scones etc.?
- A.2-3 times a week
- B.2-3 times a month
- C.2-3 times a year
- D.On occasionssuchasChristmas,Newyearetc.

6.Have you ever tried a product from Choco-Crunch?
- A. Yes
- B.No

7.Has a product display ever affected your decision to take a look at the merchandise?
- A. Yes
- B.No

8.Have you ever bought a product just because the display looked nice?
- A. Yes
- B.No

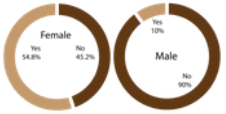
9.Which display of bakery samplings are you most likely to taste?
- A.Someone givingoutsamplings
- B.Samplings on demand
- C.Samplings on show

Analysis of Responses

YES
NO

The first 3 questions can be used to find an idea of the target user group for the display. This is because the display is targeted at people who are similar to my target user, Khun Nan who has developed her love for baking into a part-time job of selling cookies and bakeries.

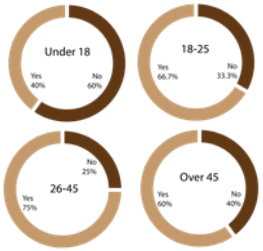
The first and third question would tell me the percentage of males and females that likes to bake, informing me the target gender for the display, and the second question would inform me about the ages of people who likes to bake and would therefore be more likely to set up a bakery stand, telling me the target age groups.



These two charts show percentage of the responses to the third question, asking about whether they like to bake or not, for females and males separately.

According to this questionnaire, 90% of men dislikes baking and only 10% likes to bake. Whereas 54.8% of the women likes to bake and only 45.2% of the women dislikes baking. To conclude, women are more likely to enjoy baking than men, and so my target gender would be women.

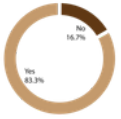
Combining the second and third question would allow me to find the target age group where I would consider the percentages of people who likes to bake in each age group because the number of people filling in the questionnaire from different age groups aren't the same and this may affect the results if they were all considered together as the count of liking to bake may be higher for the group that has more respondents.



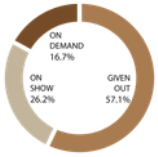
From the results, we can see that the percentage of people that dislikes baking only exceeded the amount of people who likes to bake for the people under the age of 18. The age group that has the highest percentage of people that likes baking, of 75% is the group of people with ages in between 26 and 45 years old, followed by the people in the 18-25 years old group, of 66.7%.

This suggests that my target age group with be middle-aged people, of ages in between 26 and 45.

Questions number 7 and 8 would inform me of the effectiveness of the display towards customers, from their past experiences and opinions on the display of products. This is because if the client believes that display is a huge factor in selling and customers also has had previous experience(s) in wanting to buy a product because of the display then I believe designing and making a display for my client would be a very useful thing for them.



The percentages for the answers of both the questions are the same but some people did not give the same answer for both the questions. As 83.3% of the respondents believe that the way products are presented affects the likeliness of them purchasing a product, this suggests that display is indeed an important factor that needs to be considered when selling products.



The last question was asked to find out the sampling method that is the most efficient in attracting customers to taste the products. This can be used to help determine the way the sampling holder can be included in the display.

As 57.1% of the people said that they would be likely to taste the products if they were given out, I have considered making the sampling holders removable on the display so that they can be on display and can also be given out by hand.

DESIGN POSSIBILITY AND RESEARCH

JUSTIFICATIONOFDESIGNPOSSIBILITY

Apart from the ratings,me and theclient alsothoughtof thenecessity of the products to ensure that we will be making the right decision on the final design possibility.

Me and the client has agreed that making the tall display that would be stood next to the table is unnecessary because the client wants to work on the things on the table first, and she agreed with me when I told her that her workload may possibly increase when finding products to put on the extra display.

For the samplings section, though people said it they prefer the samplings to be given out by hand, this may be difficult because the client tends to sell the pastries alone and so selling and giving out samplings at the same time may not be ideal when it is crowded; especially with the number of samplings that Choco-Crunch have. Moreover, the aisles and the spaces in between each "booth" is quite small and so therefore the likeliness of her blocking the way whilst giving out the samplings is also quite high, increasing the chances of accidents as well. Therefore if the samplings section was to be made then it should just be removable so that it can be cleaned.

For the tarts section, it would make setting up the tarts section and removing the water easier, and the tarts would possibly look fresher due to them not melting in the heat. However, its necessity was discussed with the client and we came to a conclusion that the middle section would solve more of the client's "most important" problems.

There aren't many drawbacks for making the middle component and it solves the most problems out of all of the other designs, such as it making the display more hygienic, more organized, build up layers etc., it also had the highest rating out of all the other possibilities.

To conclude, we have decided to design and manufacture the middle section display, whilst also ensuring that it would include places where the samplings can be put. This middle section would have to be designed and made so that it suits the requirements of the client, so that it will solve their problems an so that it would be useful for her and Choco-Crunch.

Design requirements

- Has different levels
- Pastries can be seen clearly and components can be easily clean
- Able to organize bakeries to make them look attractive
- Portable
- Has colours matching the store's colour scheme– brown, cream etc.
- Captivate customer's attention

PRIMARYRESEARCHOFDISPLAYS

For primary research of exiting products, I went aroundBangkok to find different bakery stores, to look at the way they present their products in order to get inspiration and to also get ideas of the client's wants and interests.

1.This is a display at starbucks; it is quite simple where layers were built from the simple wooden box in the middle and the height different which made it quite interesting to look at was from the cups which were quite tall. Though my client's products can't be put like this, this was a good example of how different levels were used to make the display look more attractive. Upon presenting this display to my client's she has agreed that the layers built from the products were quite attractive.

2.This display is from a store called "Larna House", though the use of levels wasn't good, the acrylic cover for the cakes can be an idea that can be used for the display, to solve the problem of things being unhygienic.

"This might not be practical because I would have to put the products into bags as well and so I would have to find a place to put the cover when I'm doing that. But on second thought, I would probably be using the products from behind the counter and so I don't really mind how the products are covered."

3.This display from the store "Little Mermaid" presents the bread in a quite a cool way, similar to the third product in the secondary research. I think bakeries like sconescan perhaps be stacked on circular components which would probably be smaller than this and would be presented in a similar way to the bread in here.

"Yeah, it might be cool to put things that can be stacked such as the scones on something that looks like this. I think it might go well with the acrylic cover you showed me earlier, (no. 2) just that it would be circular."

4.This display from "Yamazaki" is a good example for the acrylic cover in front. This can be used for behind the display as it is quite easy for the client to open and unlike the one that needs to be lifted, this one can be opened and it would rest on the top metal rod.

"I think this would be quite a useful thing to be included and I really like how it can remain on top of the thing, it is simple yet quite effective."

SECONDARY RESEARCH OF DISPLAYS

1. This product is 33cm in height, which is similar to the height of the display the client wants. It also gives me an idea of how the layers can be built up, and also how there can be a separate stand and a removable tray that might help with keeping the display clean and also to make the parts removable.

"I really like how the trays can be removed and how the stands are quite thin and so they can be easily carried around. However, this may be quite plain and unattractive."

2.From this product, the legs on the stands can be extended and shrunk and is another idea for how the display can be made smaller and portable. However, because the display is to made out of mainly wood, it may be quite difficult for it to be made into this way.

"I really like the way the legs can be adjusted because with this, I can customize the way my products are presented, with the height

3.I presented the idea of the display being separated into smaller components instead of just being rectangular like the other designs above with the intention that if the bakeries are separated, then it might be easier for the customers to look at the different bakeries.

"I feel like this shape might attract more customers too, due to it being unique and different from the other store's display."

4.This display was chosen as another example because I thought it solves many of my client's problems such as it being covered and having layers.

"I think that this is good for stocking products for the customers to see whilst also looking attractive for passersby. However, I think it would be more practical if the front part was flat."

5.This was an idea for the samplings part where the labels can be put behind them in the slots in which I think would be helpful for the customers to find the correct samplings and for them to easily address it to the seller.

"This looks really good and I really like the labels. The place for putting the samplings should be easy to clean because it tends to get quite messy. I also want it to be light in colour; maybe cream or white."

DESIGN IDEAS AND DEVELOPMENT

Theacrylicboxeswhichare liftedupin thisexampleinspiredmeto turn them into permanent boxes poking out from the shelf so that the pastries would attract more attention.
This behind of this display is opened and so the client can easily adjust and organize the bakeries

"I really like this idea because it has dimensions but the boxes should start from the second level because it might be in the way of the samplings which are placed in front."

Acrylic box– used for displaying pastries.

Method of manufacture: Hot wire strip machine used for bending acrylic.

Lapjoint,possiblyfinger joints.

Wood– more research into woods which are light in weight but are durable required.

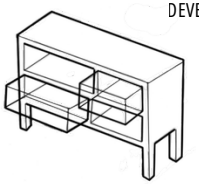
Other compartments might have a clear acrylic cover . Attached by routing the wood and fitting the acrylic in.

Opened from behind– maybe use acrylic cover so that the pastries are protected. Maybe use hinges.

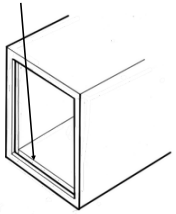
Method of attaching acrylic to wood: maybe make the acrylic boxes separate from the wood and make it so that it fits into the holes.

This part would end up against the wood and would prevent the box from moving out too far forwards.

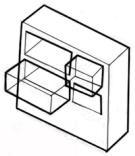
DEVELOPMENTS

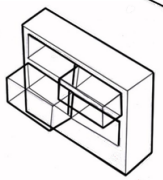


This design doesn't make it look like it'll fit the purpose of displaying bakeries– it looks like a TV stand.



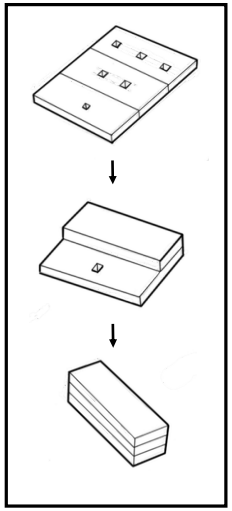
I decided to remove the legs and open it up from behind so that the client can store things such as money and the bags for the bakery.





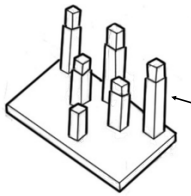
"The sizes of the "pop out" boxes should also be a bit bigger so that the brownie scones can be displayed– maybe make some boxes bigger and some smaller."

"Smaller boxes should be on the top so that it will look more balanced and so that they would block less view of the shelves below."

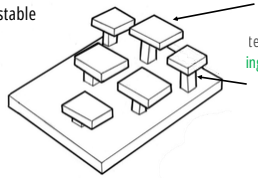


"The display might be tall too and so I think it should be wider and shorter."

This design was inspired by the adjustable legs in this example of product.



Adjustable legs– possibly made out of steel. Method of manufacture– use different sized rods and put together, drill holes and use mild steel rods to lock.

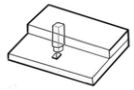


Separate platforms– made out of wood or acrylic. These can be attached to the legs using the mortise and tenon joint if the legs are made out of wood. However, making it out of wood would be more sustainable and would fit in withthe otherpartsof thedisplay more.

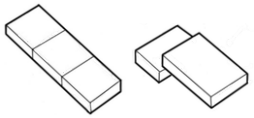
Adjustable legs– possibly made out of wood. (Or steel) More research is required to figure out the method of joining the platform and leg together.—Maybe mortise and tenon joint.

"It seems quite big and hard to carry around because of its shape though."

"I like how the platforms are adjustable as I can customize it depending on the pastries I'll be putting on it. I think the platforms should be very close together, so that it can be created into a bigger platform."



In response to my client's comment, I decided to make the platform and the legs removable so that the base can be folded 3 times. It can also be used as a platform (when its partly folded) as well.
*(Can be seen on the left)



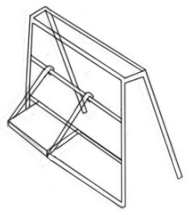
Platform without the legs... The platforms can be placed together that that it forms a bigger platform so that bigger pieces of pastries can be placed on the platforms as well.

This design was inspired by the curved surfaces of this existing product. Instead of making every level curvy, I decided to just use one curve, covering the whole display.

"This design looks like ones that we see in restaurants that sells cake, but smaller. The part that sticks out of the display is on the same level as the second platform and so I think it might be inconvenient for the customers to see all the pastries.

I used the idea of metal rods and turned it into a vertical display. However, I doubt that it'll work due to its difficulty of being balanced. I decided to use wood instead so that its surface area would be larger, allowing it to stand. The idea of this design is that the client would get the chance to customize her display by fixing the platform onto the wooden bars.

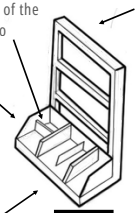
"I think this design is nice and tidy but there might be difficulty in accessing the products from behind. However, I really like the way that I can customize the platforms and the storage part according to my wants."



Acrylic/woodlaminarseparation –mayberemovableso thatthe client can adjustthesizes of the different sections to

This part maybe used for the client tostorethings such as money, bags and any other equipment required. This part would be hidden from the customers.

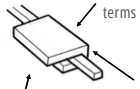
This aids the display in balancing, and so it shouldn't be too light.



BACK

Possiblypinewood– as it iseasyto workwith. However,Ishould research moreintomorewear-resistancewood.

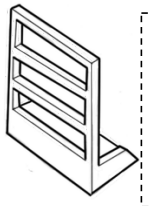
Should bemade intovarious different sizesin terms of length.



Example of platform that would be fitted onto the bars

Method of manufacture: use 3 separate pieces of wood and then join them together using possibly finger joints or half lap joints

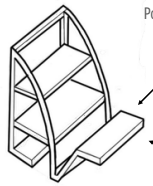
FRONT



"I am also quite scared about the balancing of the display because it will create lots of problems if it tips over"

To solve my client's concern, I design it so that there is a compartment for weights to be placed so that it would balance better. I think the weights should be removable so that it can be taken around more easily.

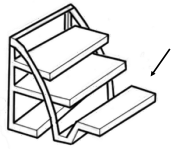
Mild steel frame manufactured by brazing.



Possibly a platform for samplings.

Steel would be supporting the wooden platform from underneath.

A drawback of this design is that the curved part may be quite hard to manufacture.



This platform is lifted up so that it can also be used for displaying pastries. (The client's comment from the other idea stated that the very bottom layer would be blocked by the samplings in front.)

I developed this design by making small changes such as changing the proportions of the design– making it shorter and slightly wider. The platform for the samplings are also made to be on a lower level so that it won't block the view if the products displayed behind, which was suggested by the client.

I like the way the trays are further out than the curvy part as this creates more dimensions and gets rid of the "trapped" feeling I had when I was looking at the previous one. I think this design also looks compact which is good.

ANALYSIS OF FINDINGS

ANALYSISOFINITIALINTERVIEWANDPRODUCT ANALYSIS

From the initialclient interview, I have concluded that the client is in need of a bakery display that has specific components and characteristics which relates to her wants and needs. The display would be placed in the middle section of the table and would replace the current display.

The display must help with the layout of her bakeries and must have layers to allow customers to see all the pastries more clearly and easily. The client believes that "the thing that attracts customers the most is the way the products are presented" and so therefore I believe that the display must also present her products in an attractive way and as it would also be a factor for "attracting more customers". In order to attract more attention from the "people walking by and also the ones just walking through the farmers market, potentially from another section.", I believe that the display must perform its job of presenting products efficiently and itself must also look attractive and possibly have a unique point that would captivate attention. She also mentioned that her current display is "quite boring and unattractive", which is possibly due to the lack of levels and so it may be difficult for customers to view all the products and so "nothing stands out and so they can only look at the whole display as a whole and the bakeries in it."

To help the customers see the products clearly, the display would have to be a bit tall so that customers would be able to view the products easily, without have to "bend over and look". However, the client only wants the display to be around 30cm tall and so more discussion is required to come to a conclusion to the display's final height.

The client then presented me with another problem of her wanting to show all of her products but there are flies, mosquitoes and dust and so she is unable to do so efficiently without making it look unhygienic. To achieve this, my display would have to have a cover, either for her individual pastries or for the whole display. The cover would have to be transparent, just like glass so that the customers are still able to view the pastries displayed and so materials like clear acrylic might be used.

As the product has to be portable so that the client is able to carry it to the car, the product should be light in weight and also easy to carry. This would have an impact on its form, size and weight, though there are many ways to make the display portable such as making it foldable etc. which have been mentioned in the previous pages.

The client also mentioned that the "display is quite untidy and the sampling section can get quite messy sometimes due to people tasting the products" and though it would be quite difficult to prevent this due to it being caused by the customers, the sides of the samplings section might be taller to prevent the samplings from spilling when the customers are trying to pick up the sampling, or they can be placed on a higher level so that customers won't have to bring them up too high.

SUMMARY OF ANALYSIS

The display must be able to present the products on different levels in an attractive way and must also have a unique point to attract attention. The levels would allow the products to be seen more clearly and a cover must also be used to protect the pastries from dust and flies. The client would have to carry the display around and so it must be portable and relatively lightweight, but it shouldn't be too short as it would be inconvenient for people to look at the products. The sampling section tends to get untidy and so I must design something that would allow people to taste the samplings without spilling them.

ANALYSIS OF CLIENT SELLING IN THE FARMERS MARKET

As the client is selling in the farmers market, the overall theme there is a homely , organic feeling and so I think this gives me a limit to my designs and ideas, and environmental factors are also very important as they encourage the least use of plastics and so I think that my display would be wood-based, though some plastic components would still be required such as the cover part mentioned above, in response to the hygienic problems.

ANALYSIS OF CLIENT'S INTERVIEW

The first question was about ways in which the display can be made to be portable. The client responded that she wants it to be foldable or taken apart and doesn't want it to have wheels to be dragged around. This suggests that she would be carrying the display on the trolley alongside other things and so she doesn't something else to drag around as well. To efficiently make it portable, I believe that the display should be designed so that it can in the end turn into a compact shape with a flat surface on top so that more things can be possibly stacked on it as well.

For the second question, I asked my client about the sizes of her bakeries and the table. This was so that I would have an idea of the sizes of the platform and boxes storing the bakeries and also the size of the display. The pastries are 3-10cm wide in diameter and the table is 1.50m x 1.90m wide, and 0.7-0.75m tall. The height of the table is used for finding a suitable height for my display as it shouldn't be too tall that it'll block the client's view of the customers and also as the client has mentioned before, it shouldn't be too high or else it'll take away all the attention from the other sections on the table. In addition, she also told me her preference of the size of the display which is 30cm tall and that she wants the display to have 3 layers.

The third question was on colour schemes and materials. The client prefers it to look quite modern and made out of bright coloured wood. From observing her current display, her trays are all bright coloured wood and are possibly made out of pine wood. I believe she wants it to be made out of the same wood so that the display for the middle section wouldn't look out of the place. By her mentioning "shades of brown" and "creamy colour", I believe her colour scheme would be homely and warm, matching her current theme. I think that focusing on the usage of wood and natural materials would be a good choice where it is also better for the environment when being compared with other materials, in which the client highly values. (Asked in the last question)

The client prefers the display to be opened from both the front and the back so that both her and the customer can have access to the products. Though letting the customer have access to the pastries too might be helpful, they might end up making it messy and so I will firstly focus on designing it to be opened from the back. Though the client suggested there to be a chalkboard, I think that if it was on the display then it may dirty the display, especially as it turns into dust after the board is erased and so therefore I don't think it's a really good idea.

The fact that the client is willing to pay no more than 1000 baht suggests that the materials can't be expensive and so wood like pinewood should be considered.

SUMMARY OF ANALYSIS

The product would be carried in the trolley and so it should be portable in a way that will allow it to be stacked efficiently with the other items. The size of the compartments in the display would have to be designed according to the preference of the sizes mentioned above and should consists of 3 layers. The display would have a natural and homely theme and so it would be mainly made out of wood that is relatively light and not expensive. It would also be opened from behind.

ANALYSISOFCOMMENTS ON EXISTING PRODUCTS

A general view of the client'sresponses to the existing products I presented to her indicates that she is quite open minded about the different designs and that unique shapes apart from rectangles also interests her, as she thinks it would attract more attention from it being different from the other stores. Her responses on the different methods of covering the displays are also positive and so this implies that she doesn't mind how the pastries are covered as long as they are covered and protected. She also seemed to be excited by the idea of being able to customize the height of the display and so I should design the display so that she can change it in some way every time she uses it.

ANALYSIS OF INITIAL PROPOSALS

Her responses on the design ideas and developments suggests that she like designs that have dimensions like the idea of the acrylic boxes poking out more than ideas that are plain and simple like the one on the right.

The client also wants the sizes of the trays, boxes, platforms etc. to vary so that different sized pastries can be displayed effectively.

One of the main problems from the ideas presented was that the pastries are sometimes hard to access from behind as they are more like stands and so this might be inconvenient for the client.

When developing initial ideas later on, I think I should focus more on this and on methods to cover up the pastries. Also, a stable and balanced display is very important due to the display being outdoors and there might be occasional strong wind. There is also a risk of people bumping into the table when its crowded and so I think this is a very important point.

SUMMARY OF ANALYSIS

The display shouldn't look too simple and should have dimensions to it. This may be achieved through the different sizes of the platforms and boxes for storing different sized pastries.

The ways the client can access the pastries is also very important and the ways in which the pastries are covered up, though the method of achieving this can vary.

A stable display is also very important.

RESEARCH

THAILAND'S TRADITIONAL MARKET; THE FLOATING MARKET.

From the photos, we can see that the food are placed in an efficient way within the small space provided. They are put on steps and this helps the seller as they have to reach for the ingredients frequently, whilst allowing the components to be placed in a neater way.

Relevance to project: idea for how pastries can be arranged so that the client can interact with it more easily.

"I think getting ideas and inspiration from the floating market is quite a good idea because the products being sold in there are also fresh and homemade, though they focus more in fruits and actual food, rather than pastries. Also, I would probably have to interact with the pastries only once for twice– setting up and packing up and so designing the display "for the customers" should be the main focus."

BANGKOK FARMERS ' MARKET: WHERE THE CLIENT SETS UP HER STORE.

From looking at the other stores in the market, their set-up gave me the impression that the bakeries/ pastries came straight from the oven and the vegetables etc. straight from the farm; just as the theme of a farmers market suggests. This is due to the containers that they are in, the way they are presented and also the overall colour theme of the tables/ displays. The client's current display certainly conveys the same feeling and this must be continued in my display. However, this brought up the question of whether the display should be covered up or not—as this may have some negative impacts on the display (listed below).

"I agree with this, the tones and the colours should be based on shades of brown and cream; natural wooden colours. The display must fit in well with the other parts of my table so that my overall display would look nice"

"From considering the pros and cons of covering the pastries, and the extra research you made, I think that customers being able to smell the pastries is in fact an important way of advertising the products as well and contributes greatly to attracting customers. I also got comments about my pastries smelling good occasionally and so though I didn't think of it before, I think leaving them out in the open may be a the better option.

DISADVANTAGES OF COVERING PASTRIES:

- May not allow certain pastries to stand out from the others.
- Hard to see pastries
- Displayed pastries not being eaten/ bought anyway therefore find alternative ways to ensure that customers won't be bothered by hygienic problems may be a better solution to this problem.
- Covers may stop the smell of freshly baked pastries from reaching the customers– is the smell part
- Eliminate the need for acrylic covers; more sustainable as less plastic used.

From this, I went around and asked some customers at the farmers market about what attracts and influences them to purchase pastries more, in between them being able to smell the pastries or the pastries looking hygienic.

As a result, the majority chose the option of them being able to smell the pastries because it is what initially made them want to taste the pastries. Some also commented that it's a farmers market and so not covering them goes better with the atmosphere.

CLIENT'S ERGONOMICS INFORMATION

The importance of the client's ergonomics information would be discussed in the next page.

Length of...

Thumb: 55mm
Pointing finger: 70mm
Middle finger: 73mm
Ring finger: 65mm
Pinky: 52mm
Hand: 170mm *From the tip of her middle finger to her wrist
Width of hand: 100mm
Height of fist: 90mm

The height of her fist was considered because the movement she will be making inside any small boxes would be her gripping a pastry and so this is a very important measurement to have.

SOME OF THE CLIENT'S BAKERY SIZES

Diameter of cookie: ±63mm

Length of cookie package: ±90mm

Diameter of tarts: ±90mm

These are beneficial for when the sizes of the platforms are being determined.

DESIGN BRIEF

I will design and manufacture a pastries display that would be used by Choco-crunch at the farmers market. The display would allow the pastries to be displayed in a more effective way, through the use of different levels. It would be easily cleaned by the client to ensure that her display looks hygienic. The design would be targeted towards middle-aged people. The overall aim of the product is to attract more customers for Choco-Crunch and to increase the client's revenue. Moreover, the display must be portable so that it can be carried to and from the farmers market easily. The display must also be designed and manufactured so that it will fit in well with the clients existing display, as it is only a part of her overall display.

This design brief was established from having fully investigated, discussed and recorded the client's wants and values.

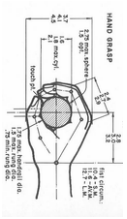
RESEARCH

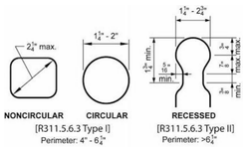
ERGONOMICS AND ANTHROPOMETRICS

Taking ergonomics and anthropometrics into consideration whilst designing is crucial for ensuring that the product would be comfortable to use and that it can be used efficiently.

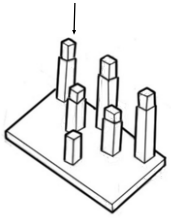
GRIP

Ergonomics of power grip should be considered so that the client would have a comfortable grip for when dissembling the display. An example of this may be the design that was proposed earlier where the legs are removable. The diagonal distance of rectangular rods shouldn't be any larger than 57mm and the diameter of any legs shouldn't be larger than 31-51mm. The legs also shouldn't be too thin as it may be difficult to hold and so removing the legs would be more difficult.



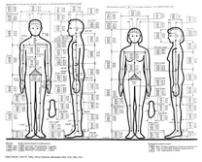


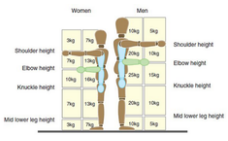
Removable legs



LIFTING

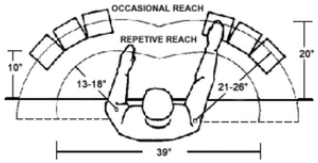
The different weights that can be lifted at different heights and different distances from the body is important for when the client has to lift the display to transport it around. This would help ensure that the client won't be injured by this process, the ergonomics and anthropometrics of this must be considered, ensuring that the weight of the product is sensible. The appropriate weight for a distance away from the body is important because the display may be dirty sometimes from the spilled pastries and so the client may be carrying the display further away from her body than usual. According to the anthropometrics data, the display shouldn't be any heavier than 7kg, though realistically it should be even lighter than this to allow the client to lift the product up easily and comfortably.





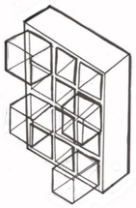
ARM SPAN

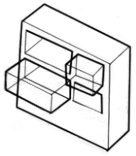
Measurements of arm span is important because the client would be occasionally removing and inserting pastries into the display.



Instead of only displaying products, the display might be able to store products that would be given to the customers as well. To ensure that the client would be able to access the products efficiently, the products for sale would have to be in the "repetitive reach" zone and whilst the ones displayed would be in the occasional reach" zone.

For example, in this design, the displayed items would be in the clear acrylic boxes which are poking out. In between where the acrylic and the wooden box joins, a frosted acrylic or a wooden laminar that can be opened might be put there so that more products can be stored behind. In this case, the clear acrylic boxes might be in the "occasional reach" zone and the wooden box would be at the "repetitive reach" zone.

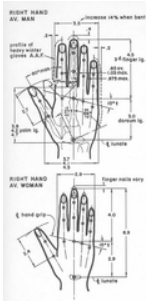


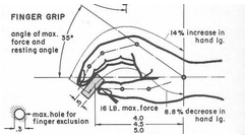


HAND

The measurement for the hands are important to ensure that if the display has boxes, then the user's hand would be able to be inserted easily into the box whilst also allowing movements such as moving the pastries around– arranging them in the way she desires and cleaning the boxes. This means that the user's hands should be able to fit in the boxes and also that she can see what her hands are doing.

The client's hand ergonomics can be found in the previous page.





HAND DATA	MEN			WOMEN		
	2.5 % tile	50. % tile	97.5 % tile	2.5 % tile	50. % tile	97.5 % tile
hand length	6.8	7.5	8.2	6.2	6.9	7.5
hand breadth	3.2	3.5	3.8	2.6	2.9	3.1
3rd. finger lg.	4.0	4.5	5.0	3.6	4.0	4.4
dorsum lg.	2.8	3.0	3.2	2.6	2.9	3.1
thumb length	2.4	2.7	3.0	2.2	2.4	2.6

FORM

From the analysis in the previous page, it has been suggested that the form of the display should be unique from any other displays that can be found in the farmers market. This is because the client believes that a unique display would attract more customers. Question 8 in the questionnaire directed towards the customers also suggested that 83.3% of the respondents has bought a product just because the display looked nice.

However, the display must be designed so that it is portable and is able to be put on a trolley efficiently alongside other items. This means that the display might possibly be flat-packed so that it can be packed into a box before being put on a trolley, or it can be folded or taken apart. If it was to be packed into a box then though the box might consume more space on the trolley, it would protect the display from potential damages caused by other things being stacked on it and it would also provide a flatter and stable platform for the other items to be placed on. Moreover, this is good for its end of life where if the parts can be easily removed, then it can be reused and recycled more easily, making the product more sustainable.

The display would have 3 layers and would be around 30cm tall. However, further discussions with the client is required to confirm the height of the display as it might be difficult for 3 layers to fit into this 30cm, especially when the bottom layer might have to be discarded due to it being in the way of the samplings in front.

The display should also be stable, again mentioned in the previous page, to eliminate the risk of the display falling over and the damages that this may cause. This point is very important, due to the outdoor wind from storms etc., and the risk of people bumping into the table. A point which wasn't mentioned before is that the table that the display would be placed on might not be stable due to slightly unequal ground or its legs might be bad and so therefore the base of the display should be really stable to ensure that the display would balance well on the table.

"About the height of the product, I agree with you and think that 30cm might be abit too short for 3 layers because I like to stack my scones and so each layer might have to be relatively tall. I think the part about balancing the display is a very important point because a couple of weeks ago, there was a storm with very strong wind but luckily my current display is short and so no harm was done to us."

FUNCTION

The client wants the display to present her pastries in a more attractive way to captivate more customers attention, through the use of different levels and platforms. A chalkboard might be included to help notify the customers of any new/ special products and the display might also include a samplings section, to make the table look neater. Some designs might also include spaces for the client to store her other items such as the packaging for the pastries and money as well.

"I like all of these functions but if the spaces for me to keep my things can't be included then its fine. I like the idea of the cool air blowing towards the tarts section but I still want the tarts section to be next to the middle section"

One of the design possibilities before included something that would cool the tarts displayed, preventing them from melting. I might consider adding this in the display where a part of it might possibly blow cool wind towards the tarts but more research would be required if the client agrees on this.

MATERIALS

MATERIALS

From the development of existing products into my own ideas and designs, and also the previous interviews with the client, I came across many things that requires more research on such as the different types of materials that have specific characteristics and properties.

WOOD

Client's need:

- Bright colored
- Light weight
- Easy to clean
- Durable
- Price: Not expensive

HARDWOOD

Hardwoods come from broad-leafed trees. They generally grow very slowly and so are expensive

Environmental issue of hardwood: They take around 80-100years to mature and so they take a very long time to replace after being cut down. Therefore this may contribute to the overharvesting of hardwood.

SOFTWOOD

Softwoods come from coniferous trees. These trees are fast growing (they take around 30 years to mature) and so less expensive than hardwoods. They also tend to be easier to work with when compared to hardwood.

MANUFACTURED BOARD

Manufactured boards are man made and are readily available in many different sizes. They are cheaper than timbre but looks unattractive.

They are sometimes made from wastematerialwhich isan effective way toreducing waste.

The most commonly used hardwoods are oak, ash, mahogany, teak, walnut and beech.
In my opinion, hardwoods aren't a good match for my client due to their weights and their price– lighter in weight hardwoods such as ash are typically very expensive and are very hard to find. Therefore, my research would be based on softwoods and manufactured boards.

SOFTWOOD

PINE WOOD

Advantages
-Cheaper than hardwood
-Light weight
-Attractive grain options
-Resists swelling and shrinking

Disadvantages
-Vulnerable to scratches and dents
-Easily damaged
-Knots and knotholes

Pinewood is thematerial for the current boxes and so I think if pinewood was used then it would fit in very nicely with the other sections of the table.

Ithink pinewood is a good choice of material for the display as it fits in with many of my clients needs such as it being light in weight and colour. As it is the same material that is used for my client's other boxes too, I think it would fit in really well with the other sections on the table. It is also commonly used for displays such as this one on the left and so this suggests that it is well suited being made into displays.

Pine trees arevery fastgrowingand sothey canbe replacedvery easily and quickly. Therefore this is a better choice than hardwood.

EUROPEAN REDWOOD

Advantages
- Strong
-Not expensive
-Durable when preserved

Disadvantages
-Not durable
-Prone to corrosion

European redwood looks old and reminds me of a furniture and so I don't think its suited as a display. Pinewood is more natural and calm and goes well with my tablecloth.

European redwood is prone to corrosion and also not durable and so I think that it shouldn't be used for making displays, especially when presentation and then hygiene of the display are very important factors to consider. (A corroding display wouldn't attract any customers.) Therefore, I believe that pinewood would be a better choice to use for the display. I think European redwood would be better suited for furniture than displays, just as the client has mentioned.

MANUFACTURED BOARD

MDF

Made bycombining wood fibres with wax and resin binders athigh temperature andpressure

Advantages
-Smooth, even surface
-Easy to work with
- Cheap

Disadvantages
-Soaks up liquid and will swell
-Doesn't hold screws well
-Very heavy

MDF doesn't look natural and so I don't really like it because I want the natural colours of wood.

MDF shouldn't be used because it soaks up water and swell, this is especially bad when the display would have to be cleaned frequently. It can be painted as a finish to solve this issue but it may also be toxic to the pastries after a while of usage.

PLYWOOD

Madebypressing and binding sheets of wood veneer together into one solid piece.

Advantages
- Very strong - Lesssusceptible to water damage
-Holdsscrews very tight

Disadvantages
-More expensive than MDF
-Splinters when cut
-Contains VOCs

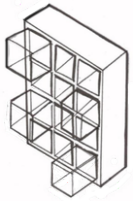
I like plywood more than MDF but I personally like timbres more than manufactured boards.

Plywood may be difficult to work with due to it containing VOCs and so this is inefficient. However, I think it can be used for some small compartments where it can be stained to create the feeling of natural wood.

ACRYLIC

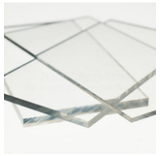
Due tomyclients store being located in the farmers market, the least amount of plastics should be used and so I believe that research on plastics relevant to my client's needs would be clear acrylic which would be used for covering the displays whilst still allowing customers to view the products inside. This is an important part of the display because one of the client's current problems is that her pastries are out in the open and so it isn't hygienic, reducing the amount of customers she receive. Using clear acrylic as part of the display would be my solution to this problem.

From the clients response to the idea I proposed that has acrylic boxes poking out from the wooden shelf for displaying her products, she was fine with the use of acrylic and thought it was quite a good idea.



Advantages
- Transparent
-Resistant to sunlight and weatherability
-Rigid, good impact strength
-Easy to work with

Disadvantages
-Poor solvent resistance
-Cracks under stress
- Combustible
-Easily scratched



Though I think clear acrylic is a good choice of plastic to use for covering the pastries, it can be easily scratched and if the scratch somewhere that is visible when customers are viewing the pastries then it might be quite unattractive.

To solve this problem, I think spare acrylic parts might have to be made and the parts in the display should be removable so that any scratches can be get rid off easily.

Acrylic looks nice and seems to do the job of showing things well because it is very transparent.

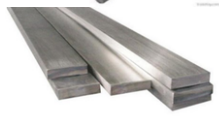
Thicknesses available: 1mm, 1.5mm, 2mm, 3mm, 4mm, 5mm, 6mm

MILD STEEL

Mild steel iscan possibly be used instead of wood for the base of the display and might act as legs for the display. I think the corporation of many materials in the design would make it look more interesting, though this may not be good towards the environment and so might not be the best idea.

It is available in many forms, such as the circular rods, flat rods, square hollow sections and many more.

Flat rods might be used for the legs as its larger surface area would reduce the pressure it exerts on the table and it would also be more stable when compared to using the circular rods.



The circular rods can be used for the covering of the pastries, as shown in the 4th example of the existing products in the other page.

The squared hollow sections can be used for the adjustable legs, by using these of different sizes.

Advantages
-Recyclable
- Lighter in weight than high carbon steel
- Easy to machine
- Affordable

Disadvantages
- Weak tensile strength
- Not strong for its weight
- Rusts easily
- Not durable
- Limitation to heat treatment

From looking at its properties, it may not be suited to be the legs for the display due to the stress the display itself and the pastries would exert.

LEVELS OF PRODUCTION AND SUSTAINABILITY

LEVELS OF PRODUCTION

The current level of production for my display would be one-off due to it being specifically designed for my client, according to her needs, wants and values.

If I was to manufacture my product on a larger scale, so that it would be sold to other people selling bakeries as well then I think that the demand for this would be no more than 50 pieces in Thailand. This is because the display won't be very big and so there is a limitation to what and how much it can display, and so it might be wanted by others in the farmers market, or other stores in temporary markets.

Because this is currently a one-off product, the manufacturing methods are very labour intensive– all the wood joints would be done by hand and the machines used would also be controlled manually, such as the lathe machine, the milling machine etc. and so manufacturing this on a bigger scale would mean that more CAD CAM would be used, involving the use of CNC and the laser cutter.

For instance, in making the finger joints for the wood, it would be drawn on 2D design and then printed onto the wood using the CNC.

This would make the manufacturing process easier and more efficient because using automated machines would mean that all the pieces would come out in the same way, with the exact same sizes and the same quality. This also suggests that less mistakes would be made, when compared to making every piece by hand and so this means that waste would be reduced. Also, the pieces can be arranged in a more efficient way due to the accuracy of the machines, again reducing waste and making the production cleaner.

SUMMARY

The display is a one-off product but to manufacture it on a larger scale, the demand of the product shouldn't exceed 50 pieces and so the method of production should be made to be more efficient such as increasing the usage of CAD and CAM, on machines such as the laser cutter and CNC.

PRODUCTLIFECYCLEANALYSIS

Looking at the from the cradle to the grave' life cycle of the product, the product can be made to be cleaner through the reduction of materials used, or the change in the materials selected and used in the manufacturing of the product. For example, the product would be mainly made out of softwoods as they are more renewable than hardwoods, and can also decompose naturally and so this is a good thing. There would be a minimal usage of plastics and mild steel because plastics are made out of crude oil, which is non-renewable material and the process of turning crude oil into plastics require a lot of energy and also pollutes the environment. Plastics are unable to decompose and so they are also a bad choice of material to use. Mild steel is a composite of different materials, including iron and carbon. The process of making mild steel also requires a lot of energy and gives out poisonous gasses into the environment. However, unlike plastics, it is able to decompose and can be recycled easier, implying that it is cleaner than plastics. However, the use of acrylic is essential for the display because the client wants the display to be covered yet she still wants the pastries to be seen by the customers.
During the manufacturing process, as mentioned before, the usage of CAD and CAM would increase and so this would reduce waste materials and would allow the resources to be used more efficiently from components being arranged well.

As one of the client's wants included the display being portable and as discussed on the other page, the display should be designed and made so that it would be able to be stacked efficiently with the client's other things. This means that when considering the distribution part of the product's life cycle, the product would be able to be transported efficiently, as they can be stacked and transported with the minimal amount of wasted space also, if this was to be made on a larger scale, a larger quantity of the product can be transported at the same time, reducing emissions of harmful gasses. The client also wants the display to be relatively light as she has to transport it around and so this would also make the distribution of the product more efficient.

The usage of the display doesn't produce any waste, unless the client decides to put plastics or paper underneath her pastries to prevent them from dirtying the display. However, one of the criteria's of display is for it to be easily cleaned and so the client shouldn't need to do this. But if this happens, then the problem can be solved through the usage of little trays alongside the display so that the trays can be removed and then washed easily. Moreover, the display has no 'built-in obsolescence' and so it can be used until the materials wear-off.

Reaching the end-of-life of the display, parts of the display might be removable to make it more portable which is my client's need and so I think that this plays a part in making the display easier to recycle. The plastic components might also be separate to the other materials so that it can be separated from the other parts of the display, allowing the rest of the display to be recycled easier. As the display would be mainly made out of wood, it should be able to decompose naturally and it can also be recycled.

SUMMARY

EXTRACTION OF RAW MATERIALS:

-Mainly focused on the use of softwood. This is more efficient due to wood being renewable.

-Only use plastics when necessary: acrylic used to cover the pastries.

MANUFACTURING:

-Usage of CAD and CAM would reduce waste materials and increase efficiency.

PACKAGING AND DISTRIBUTION:

-The client's want of the display to be portable and lightweight helps make the distribution of the product more efficient.

SUMMARY

USEANDMAINTAINANCE:

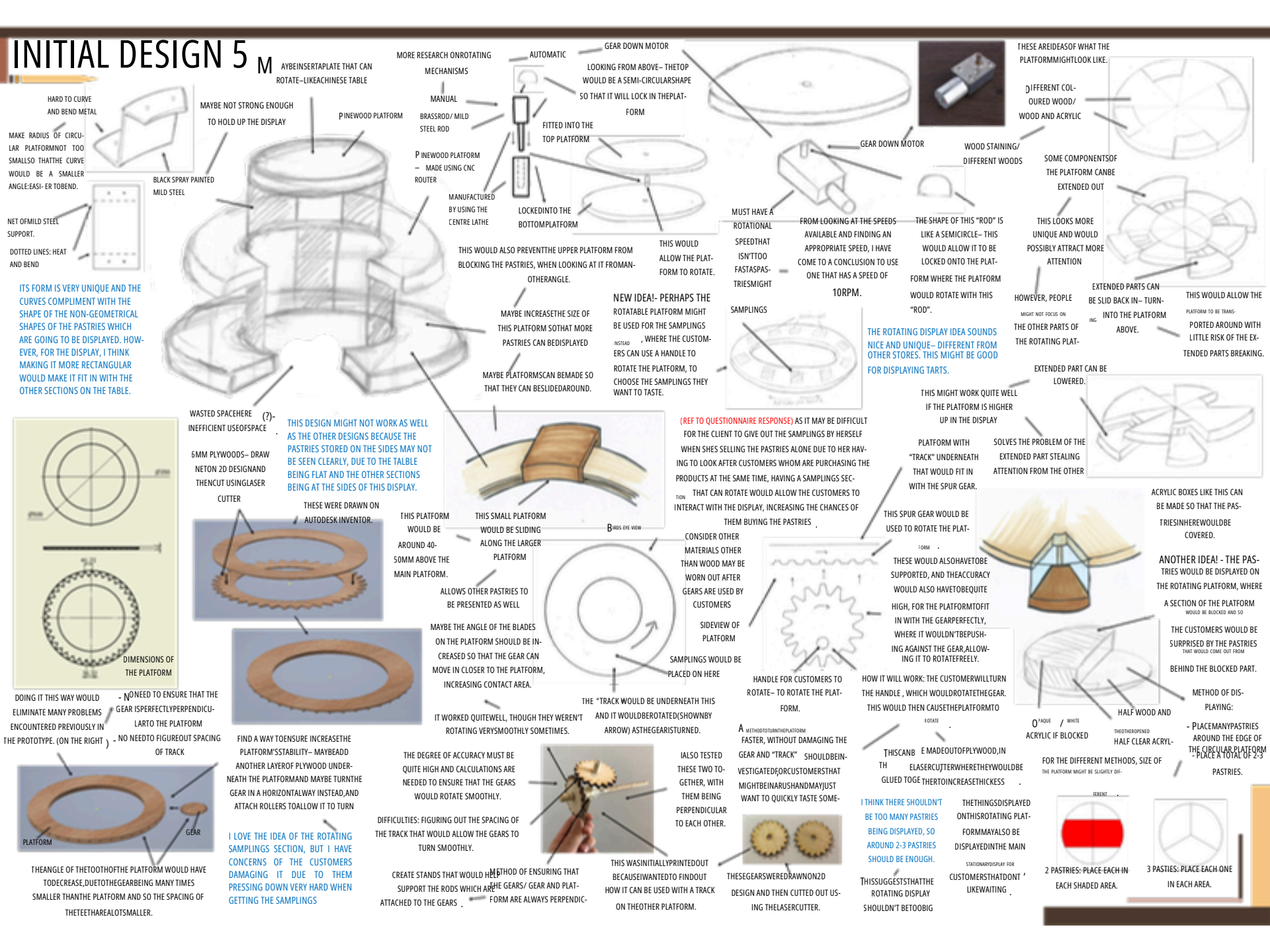
-No waste is made specificallyfrom the display as it is used.

END OF LIFE:

-Components of the display are removable and so it can be recycled more easily.

-Wood and metal can decompose naturally.

INITIAL DESIGN 5



SPECIFICATION

ERGONOMICS

Thesizes of the components such as the legs for dissembling should be a size that would allow the client to grip on and pull them apart comfortably. If the legs are rectangular then the cross-sectional diagonal length should not exceed 57mm and for circular legs, the cross-section diameter should be around 32mm and 51mm. The display might be lifted up to around the client's elbow height and so its weight would not be any more than 7-10kg. The sizes of the different boxes and components that the pastries would be displayed in would vary according to the sizes of the pastries but it must be ensured that none of the boxes are smaller than 100mm, due to the 97.5% tile of women hand being around 79mm and so the extra 21mm would allow movement as well, so that the smaller components in the display can be accessed easily and can also be cleaned effectively.

Qualitative testing: The client would try dissembling the products and comment on how comfortable it feels. She would also be required to lift the display up, placing it on a table that has the same height as the table used at the farmers market and would again comment on how hard she found it. Lastly, she would have to try to put her hand inside the smaller compartments and move her hand around, trying out gestures such as moving pastries around, and cleaning the box.

Quantitative testing: The legs of the display that needs to be dissembled would be have a diagonal length of no more than 57mm if rectangular and a diameter that is in between the ranges of 32-51mm. The weight of the display should not be any more than 10kg maximum and the smaller compartments should not be any smaller than 100mm.

HEALTH AND SAFETY

The display should be stable when put on the table to ensure that it won't fall over easily, especially when there is a high risk of people bumping into the tables when the market is crowded. There shouldn't be any sharp edges on the display as the client would be interacting around the display on the other sections on the table and so therefore there shouldn't be any sharp edges that might potentially harm the client in any way. All the food being displayed should also be covered so that they are not exposed to the dust, bacteria, viruses etc., and they shouldn't be opened from the front ensuring that customers would not touch the pastries. Moreover, due to the requirements of regulation (RC) No. 2023/2006, I must make sure that the chemicals from the display would not transfer onto the pastries. This means that food-safe paper might be required to be put underneath the pastries to ensure the hygiene of the pastries. This is also beneficial for ensuring that the display is kept clean, to prevent the build up bacteria in the long term. Finally, the specifications for display of food products- BS 3053:1983– should be considered. However, this is a specification for the UK and is not relevant to Thailand and the client has also agreed to specify her needs in relation to Hygiene specifications.

Qualitative testing: From observing and touching all the joints and components that may be sharp, there shouldn't be any sharp edges. To test its stability, the display would be placed on an unstable table and the table would be wobbled at different paces to ensure that it won't fall over. The finishes used should all be tested and ensured that it does not give out any chemical toxins after 5 days of being put in and that no chemicals would be transferred upon contact.

MANUFACTURE

Various process would be used in the making of the display where some machines would be controlled manually and some others such as the CNC and the laser cutter would be used, where the components would be initially drawn on the 2D design. Though the use of these machines may consume more energy, it would eliminate waste materials due to it being more accurate and so therefore there would be less mistakes. The components made on this can also be arranged in a more efficient way, again reducing waste. However, most of the components would be hand crafted and all the finishes, including the components that was made from CAD and CAM would be finished and polished by hand to ensure the finest quality.

CLIENTFEEDBACK ON THE SPECIFICATION POINTS

PURPOSEAND FUNCTION

"I agree that the display must be able to attract more attention because it will be the customer's first impressions and so if the display is nice then they might be more willing to buy my products. The different levels would add design and dynamic to the display and so I love this idea. We always have to clean up at the end of the day and so I agree on the point you mentioned about the display being easy to clean and. I think one of the most important points would be the display being portable– and as I've mentioned before I would prefer for it to be foldable/ able to be disassembled so that I can carry it around."

AESTHETICS

"I agree with all your points, I want the display to captivate more attention and I also want it to stand out from the others."

SCALE OF PRODUCTION

"Yes, I would love it if the product was made so that it would be customized especially for me, to solve my problems according to my needs and wants."

SIZE AND WEIGHT

"I have lots of things to carry and so the smaller it can get, the more convenient is for me to carry it around. I agree about the display not being too tall so that it won't block my view of the customer. The table is 80cm tall and my height is 160cm. Also, I think the product should be lighter, so like around 3-4kg."

MATERIALS AND SCHEMES

"Using bright coloured wood would match with the other sections and I think this would help it blend in. I agree with your idea of using clear acrylic to cover up the pastries and I also like how it'll be focused on a warm tone– I think it'll display my products better due to it looking more natural"

COSTS

"Yes, 1000 baht is fine"

INSTRUCTIONS

As the product would be either foldable, a flat packed furniture or some components might be removable, I think an instructions booklet explaining how the different components are to be removed and put together/ how to fold/ assemble and dissemble then it would be quite useful for the user, to prevent damages caused by mishandling the components and the product, and to also ensure that the user/ client would be able to set up the display without confusion from lack of knowledge. However, the user/ client should be able to learn and achieve this in a short period of time because it might be too time consuming for her to set it up if it takes a long time and so this doing this should be quick and easy. The time taken for her current display to be put together is 6 minutes, and so therefore she must be able to construct the new display within the same time, to ensure that the same amount of time is used on selling the product and no extra time is wasted on setting it up.

Quantitative testing: Client should be able to set up display using manual within 6 minutes.

QUALITY

"I agree with the finishes being high quality. I also want it to be high quality in terms of it lasting a long time. I also agree with the manufacturing processes being done carefully, especially for the wood joints because each layer must be strong enough to hold all my pastries."

DURABILITY

"Yes, the products are often exposed to heat, sun, wind and sometimes rain, although it is unlikely for the display to get wet, unless there is a storm. The stand should be strong enough to hold against customers pushing it. I would love it if I get replacements for some of the parts."

ENVIRONMENTAL IMPACTS

"Environmental factors should be highly valued. I agree that little plastics and metals should be used, but I still want clear acrylic to be used for covering up my pastries."

ERGONOMICS

"I agree with all the points you mentioned. I believe that if ergonomics are considered then I would be able to use the display with more comfort. However, as I've said before, I would prefer it if the display was only around 3-4kg heavy."

HEALTH AND SAFETY

"I agree with everything you mentioned, but the main risk for the display to fall over is normally the strong wind and storms that sometimes shake the table."

MANUFACTURE

"I like the way you would be manufacturing it with a method that would reduce waste materials, and the least amount of energy would be used."

INSTRUCTIONS

"I think being given instructions on how to handle the display would really benefit me. Yes, I agree on it being quick and easy to dissemble/ assemble the display. I think getting a demonstration on how to do things would be quite beneficial."

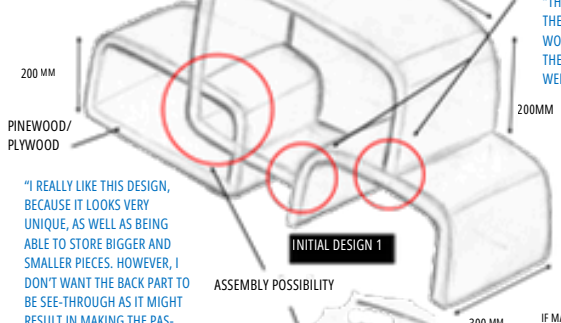
INITIAL DESIGNS 1&2 + DEVELOPMENT

BRIEF PLAN IDEA

THE "LEG" CANBE ROUTED SO THATIT CAN HELP SUPPORT THIS PLATFORM – JUST TO ENSURETHATIT WON'T SLIP DOWN-

ALSOINSPIREDFROM THIS1960S WALLPAPER DESIGN, FROMTHE ARRANGEMENTOF OVER-LAPPING BOXESOF DIFFERENT SIZES.

THICKNESSOFMATERIAL CONSIDERATION :
- THICK HEAVY
- THIN: WEAK —MAY DEFORMWHEN PRODUCTSAREPLACED ON



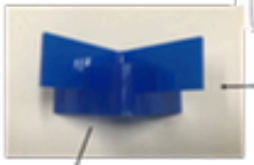
PLATFORM TO DISPLAY

DIFFERENT KINDS OF JOINTS FOR THESE PARTS

"I REALLY LIKE THIS DESIGN, BECAUSE IT LOOKS VERY UNIQUE, AS WELL AS BEING ABLE TO STORE BIGGER AND SMALLER PIECES. HOWEVER, I DON'T WANT THE BACK PART TO BE SEE-THROUGH AS IT MIGHT RESULT IN MAKING THE PAS-TRIES STAND OUT LESS, DUE TO THE UNCERTAIN AND CHANGING BACKGROUND COLOUR."

INITIAL DESIGN 1

ASSEMBLY POSSIBILITY



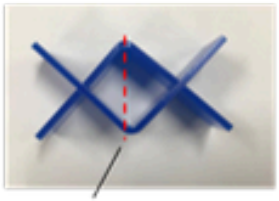
I HADTROUBLE SLOTTINGTHETWOACRYLIC STRIPSTOGETHER AT FIRSTDUETOTHEM BEING BENTATSLIGHTLY DIFFERENTANGLES.

HOWEVER, NOT FITTINGIN THESTRIPS COMPLETELY IN BROUGHT OUTANEW IDEA AS IT ALSO LOOKSQUITEATTRAC-TIVE, AS WELL AS DECREASINGTHE DEGREE OF ACCURACYREQUIRED FOR MANUFACTURING .

THESE WERE DRAWN OUT ON 2D DESIGN AND WERE CUT OUT USING THE LASER CUTTER

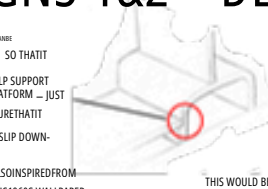
NOTE : IFTHIS WASDONE ON ALARGER SCALE, THENIT MIGHTBEHARDERESPECIALLYWITH WOOD WHERETHE WOODBENDING METHOD IS STILL BEING CONSIDERED .

FROM USINGMOREFORCETHOUGH I , DAMANGED THE ACRYLIC A BIT, THESLOTSFITTEDTOGETHER THOUGH THIS IS NOT ACCEPTABLE IFIT WASDONEON THE ACTUAL PRODUCT DUE TO THE REDUCTION IN ITS QUALITY .



THOUGH THESTRIPSFITTOGETHERTHE DIFFERENCE INTHEIR ANGLES HAS RESULTED INMAKINGITNOT AS AESTHETICALLY PLEASING – THE SQUARE IN THE MIDDLELOOKSDEFORMED ANDUNSYMMETRICAL .

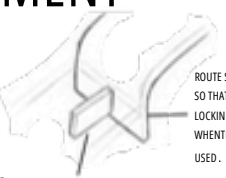
POSSIBLE SOLUTION: A JIG/ MOULD MIGHT BE MADE TO ENSURE THAT THEYARE BENT TO THE EXACT SAME ANGLES.



THE "LEG" CANBE ROUTED SO THATIT CAN HELP SUPPORT THIS PLATFORM – JUST TO ENSURETHATIT WON'T SLIP DOWN-

NOTE:IFTHETOPPARTIS CON-

THENTHEWHOLE "BOX"WOULD NEEDTOBEJOINEDWITH SO THE JOINT ON THE SIDE SHOULD BEMADESOTHATIT'LLFITIN FROM THE TOP .



THIS WOULD BE PERMANENTLYSTUCK ON ONE OF THE PLATFORMS SO THATTHEYARE REMOVABLE FROM EACH OTHER. HELPSWITHIT BEING PORTA-BLE.

DOWEL JOINTS

PROBLEMSDISCOVEREDFROMCLIENT FEEDBACK :
- SHOULDN'T BE SEE THROUGH
- TOO WIDE
- HARDTOVIEWPRODUCTS

"THIS MIGHT BE TOO WIDE FOR THE MIDDLE SECTION, AND IT WOULD TAKE UP SPACE FROM THE OTHER SECTIONS AS WELL."

SOLVE : ADJUST DESIGN ANDMAKEITTALLER AND LESS WIDE .

"IF THE TOP SURFACE IS MADE OUT OF WOOD, THEN IT MIGHT BE HARD TO THE PRODUCTS BEING DISPLAYED, DUE TO THE ANGLE THAT THE CUSTOMERS WOULD BE VIEWING THE PRODUCTS. (NOT EYE-LEVEL)"

SOLVE : REPLACE TOP SURFACE/ BOX WITH ACRYLIC (?) —MAY NOT WORKBECAUSE ACRYLICCAN BE EASILYSCRACTCHED + DISPLAY WOULDBEMOVED AROUNDFREQUENTLY .

IF MADEOUTOFWOODTHEN THEJOINT MAYLOOSEN AFTER AWHILEDUE TOIT BEINGASSEMBLEDAND DIS-ASSEMBLEDFREQUENTLY.

REMOVABLECOMPONENTS MAKE CLEANING EASIER.

HARD TO MANUFACTURE DUE TO HIGH ACCURACY NEEDED IN BENDING THE WOOD WHILST ENSURING THAT THE SLOTS CAN FIT TOGETHER. PROVED FROM THE TESTING BELOW.

MILD STEEL ROD

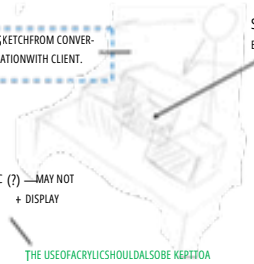
OUTSIDEBOX DRAWN (OTHER BOXES NOT DRAWN BUT AREINSIDE .)

ROUTE SURFACE IN SLIGHTLY SO THATTHE BLOCKWILL LOCKINPLACE–WON'T MOVE WHENTHE DISPLAYIS BEING USED .

3 LOCKUNDERNEATHTHE PLAT-FORMTO SUPPORTTHEPLAFORM (MOREAND IS BETTERTHAN THE OTHERIDEA ON THELEFT)

TOMAKE THE DISPLAYPORTABLEIT , MIGHT POSSIBLY BE PACKED IN THESE WAYS. THE DIFFERENTCOLOURED WOOD REPRESENTS THE DIFFERENT SECTIONS OF THE DISPLAY. HOWEVER, THE RATIO OF THE DIMENSIONS HAS TO BE CONFIRMED SO THAT WE WILL GET A BETTER IDEA OF HOW THEY CAN BE PACKED, WHILST ALSO LOOK GOOD AFTER BEING ASSEMBLED .

"I REALLY LIKE THIS IDEA OF IT BEING PACKED TOGETHER AND I THINK IT WOULD REALLY BENEFIT ME, AS I WOULD BE ABLE TO MOVE IT AROUND WITHOUT THE FEAR OF DROPPING THE OTHER COMPONENTS THAT ARE INSIDE THE BIGGEST BOX."



SKETCHFROM CONVER-SATIONWITH CLIENT.

THE USEOFACRYLICSHOULDALSOBE KEPTTOA MINIMALDUETOENVIRONMENTALREASONS . HOWEVERIFITTHETOPBOXIS ACRYLIC THENIT MUST BEREMOVABLEFROMTHE OTHER PARTSTO AID RECYCLINGOFTHEOTHERPARTS AT THEEND OF LIFE OFTHEPRODUCT .

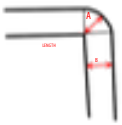
CAUSESTHETHICKNESSOF THE WOOD TO BENONUNIFORMACROSS THE WOOD– UNLIKEINTHEDESIGN.— MIGHTBEUNATTRACTIVE(?)

ANOTHERMETHOD OFCURVING THE EDGES OFTHE BOXESUSEJOINTS SUCH AS FINGERJOINTS TOJOINTWO PIECES OF WOODTOGETHERANDTHEN SAND THEM DOWN SO THATTHEJOINT IS CURVED .

IF THE JOINT WAS SANDEDTHEN THE SURFACE AREAOF THE JOINTSTHAT ARE GLUED WOULDDECREASE .

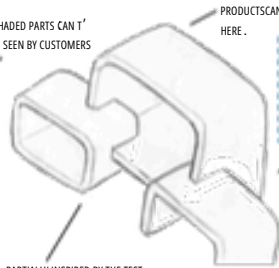
JOINT MIGHT WEAKEN (?)- THERE-FOREMAYBESUPPORTISNEEDED.

THIS MIGHT ALSO BE THE CASE FOR INITIAL DESIGN 2, FOR ITS CURVED WOODEN SURACES .



"FROM THIS CONCERN , I ASKED THE CLIENT FOR HER OPINIONS ON THIS AND SHE SAID IT WOULD PROBA-BLY BE FINE."

SHADED PARTS CAN'T BE SEEN BY CUSTOMERS



PARTIALLY INSPIRED BY THE TEST-ING AND TRIALING FOR THE ANGLE AND SLOT JOINT THAT FAILED AT FIRST AND THEY ONLY WENT IN HALF WAY.

"BAKERIES MAY BE HARD TO SEE IF THE DISPLAY IS NOT TALL ENOUGH. (SAME ISSUE AS THE OTHER DESIGN.)"

600 MM

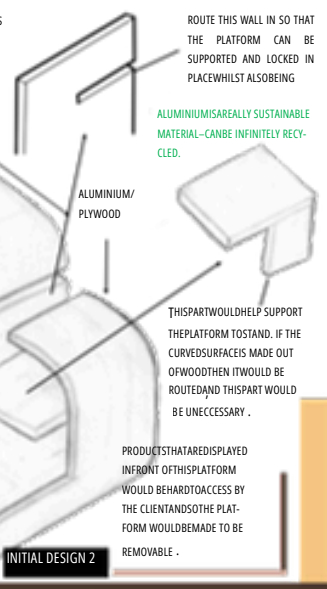
PLYWOOD/ PINEWOOD

"THE SHELVES MIGHT BE QUITE TIGHT, ESPECAILLY WHEN PAS-TRIES ARE PLACED ON IT, DUE TO THE SOME PASTRIES BEING STACKED AS WELL."

"I THINK THIS DESIGN IS TOO RECTANGULAR; IT REMINDS ME OF A BLOCK."

CLEARCRLICCOVER – MIXTUREOFMATIERALS HEREWOULDALLOWTHECLIENTTOVIEWALL OF THE PRODUCTS DISPLAYED.

250 MM



THISPARTWOULDHELP SUPPORT THEPLATFORM TOSTAND. IF THE CURVEDSURFACEIS MADE OUT OFWOODTHEN ITWOULD BE ROUTEDAND THISPART WOULD BE UNECCESSARY .

PRODUCTSTHATAREDISPLAYED INFRONT OFTHISPLATFORM WOULD BEHARDTOACCESS BY THE CLIENTANDSOTHE PLAT-FORM WOULDBEMADE TO BE REMOVABLE .

ROUTE THIS WALL IN SO THAT THE PLATFORM CAN BE SUPPORTED AND LOCKED IN PLACEWHILST ALSOBEING

ALUMINIUMISAREALLY SUSTAINABLE MATERIAL–CANBE INFINITELY RECY-CLED.

MOREMETHODS OF BENDING WOOD:
- KERFBENDING
- VACUUM BAG PRESS
- STEAMBENDING

STEAMBENDINGDISPLAY IS TOO BIGAND CANT'BE ACHIEVED AT SCHOOL.

DEVELOPMENTOFINITIAL DESIGN 1: MADE DURINGACONVERSATION WITH THE CLIENT WHENTHE ISSUE OF NOT BEING ABLE TOVIEW THE PRODUCTS EFFICIENTLY CAMEUP.

EXTENSIONSMADEOUTOF ALUMINIUMMAY ALSOBE USED, MADEUSINGTHEMILL-ING MACHINE.

LEATHER STRAP

HOLESMIGHTALSOBEDRILLED SO THAT AMETALRODCANBE FITTED THROUGH ALLOFTHEMENSURING THAT THEY WON'TSLIPAND FALL WHILST BEING TRANSPORTED .

MIGHT AFFECT THE AESTHETICS OF THE DISPLAY– MAYBE TURN INTO A DESIGN

HANDLES ADDED SO THAT THE CLIENT CAN CARRY IT OFF THE TABLE EASILY, AND ONTO HER TROLLEY. MAYBE ATTACH STRAPS TO THE END OF THE RODS TO ACHIEVE THIS (?).

SLOT MADE USING MILL-ING MACHINE.

MILD STEEL HOLLOW ROD

THIS STILL DOEN'T HELP TO SHOW THE PRODUCTS INSIDE THE BOXES.

THEUPPERBOXWASMOVEDBEHIND SO THAT MORE PRODUCTS CAN BE PLACED ON TOP OF THE OTHER BOXES AS THE PRODUCTSCANBE SEEN MOREEASILY HERE .

CAUTION: ROTATIONOFTHEBOXES INSIDE MAY CAUSEITTOHITTHE OTHER BOXES THEREFOREPOTENTIAL-LY CAUSING SOMEDAMAGESREPETI-TIONAL HITTING.

WHEELSCANBE ATTACHED SO THATIT CAN BETRANSPORTED– RESEARCH DETACHABLEWHEELS.

REMOVABLE HANDLE SO THAT ROD CAN GO THROUGH THE BOXES.

MUST LOCK IN TIGHTLY SO THAT IT WON'T FALL OFF WHILETHECLIENTIS USING IT TO WHEEL THE

MAYBE USE LEATHER STRAPS – CAN BE REMOVED.

"IT MIGHT LOOK QUITE DIFFERENT FROM THE OTHER PARTS BUT IT WILL PROBABLY LOOK FINE IF ALL THE CORNERS ARE MADE IN THE SAME WAY."

KERF BENDING MAY LOOK UNATTRAC-TIVEDUE TO DISPLAYMAINLY BEING SEENFROM THESIDES . —THOUGHTHIS CANALSO BE CONSIDEREDA DESIGN.

KNOCKDOWNJOINTSCAN ALSO BEUSEDTOCONNECT TWO PIECESOFWOODTOGETH-ER. HOWEVERTHIS REQUIRES EXTRA TOOLSWHEN ASSEM-BLING AND DISASSEMBLING AND SO IT MAYNOT BE EASY FOR THE CLIENT .

RUBBERCAP– PERMANENTLY ATTACHEDTO THE STEEL ROD .

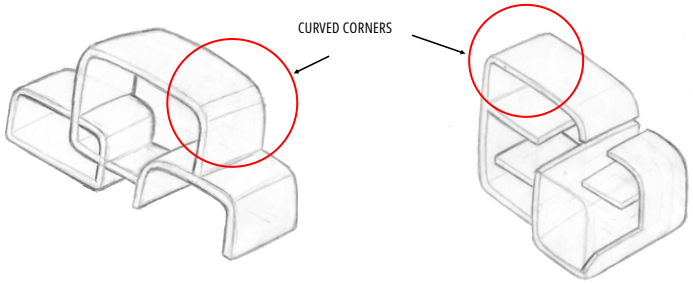
ATTACHES ONTO THE PART OF THE ROD THAT POKES OUT FROM UN-DERNEATH AND LOCKS IT ENSURINGTHATROD WON'T FALL OFF.

ALLOWSTHEDISPLAY BOX TO BALANCE AND STANDVERTICALLY WHEN THE WHEELS HAVE BEEN/ ARE BEING ATTACHED .

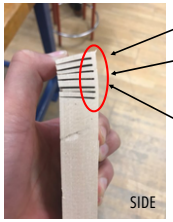
MUST BE SAME LENGTH AS THE DIAMETER OF THE WHEELS .

TRIALLING AND TESTING FOR INITIAL DESIGNS1&2

CURVED CORNER PROTOTYPES



KERF BENDING



THOUGH THE REST OF THE WOOD BROKE OFF, WE CAN SEE FROM THIS IMAGE THAT THE WOOD IS SLIGHTLY BENT.

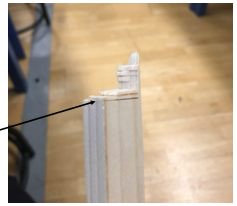
ITIS VERY EASY FOR THE WOOD TO BREAK OFF, DUE TO THE REMAINING CONNECTION OF THE PART IS VERY SMALL.

IT SHOULD ALSO BE CUT TO THE SAME WIDTH AND SO THIS SIDE OF THE WOOD SHOULD BE MARKED.

THIS WOULD ALLOW THE WOOD TO BE BENT UNIFORMLY, RESULTING IN A SMOOTH CURVE.

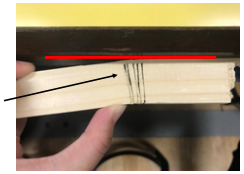
REDUCING THE SIZE OF THE BLADES TO BEND MORE (?) DUE TO LESS GAP IN BETWEEN THE SLICES.

HOWEVER, THE BEND IS VERY SMALL THEREFORE THIS MEANS THAT A LOT MORE OF THE CUTS WOULD HAVE TO BE MADE, SO THAT IT WOULD BEND TO 90 DEGREESSS.



USING SMALLER BLADES—FRETSAW

PIECES WERE WEAK- ER AND ALL BROKE OFF WHEN BENT.



SECOND TRIAL WITH SMALL- ER BLADE BUT INCREASE IN DISTANCE BETWEEN EDGE OF WOOD AND THE CUTS

SHOWS THAT IT CAN BEND MORE.

ACTUAL PRODUCT WOULD BE LARGER, IN TERMS OF LENGTH ANDWIDTH–MIGHT BE A PROB- LEM WHEN TRYING TO FIND METHODS TO MANUFACTURE

CNC (?)

ACCURATE AND CAN BE USED FOR LARGER PRODUCTS BUT BLADES TOO BIG.

IMPORTANT NOTES FOR KER BENDING:
- SMALL BLADE
- EQUAL SPACES IN BETWEEN THE CUTS
- CUTS ARE CUT TO THE SAME DISTANCE

CORNERS SEPARATE TO THE SIDES

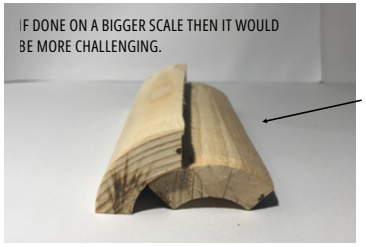
MANUFACTURED US- ING THE WOOD LATHE.

3 PIECES OF PINEWOOD WERE GLUED IN TOGETHER.

THEY WERE PUT ON THE WOOD TURNING LATHE MACHINE AND ARE TURNED INTO A CYLINDRICAL FORM.

POTENTIAL CHALLENGES:
1) ENSURING A CONSTANT DIAMETER WHEN USING THE WOOD TURNER.
2) DRILLING THROUGH THE MIDDLE AND ENSURING THAT IT GOES THROUGH TO THE OTHER SIDE– THE LARGE HOLE IN THE MIDDLE WAS DONE USING THE WOOD LATHE, BUT THE LENGTH WAS EXACTLY THE LENGTH OF TWO FORSTENERS. (INSERTED FROM EACH SIDE TO DRILL THROUGH THE WHOLE LENGTH. —> MUST FIND AN ALTERNATIVE METHOD OF ACHIEVING THIS.

A FROSTNER WAS USED TO DRILL A LARGE HOLE IN THE MIDDLE OF THE CYLINDER– THIS WAS DRILLED IN FROM BOTH SIDES (ONE AT A TIME) DUE TO THE LENGTH OF THE BIT BEING SHORTER THAN THE LENGTH OF THE WOOD.



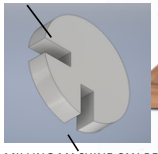
THE CORNER PIECES WOULD BE SEPA- RATE FROM THE SIDES OF THE PROD- UCT. THIS ALLOWS THE MATERIALS OF THE CORNER AND THE SIDES TO BE DIFFERENT– AS THE CLIENT SUGGESTED IN THE PREVIOUS PAGE.

BRASS/ MILD STEEL RODS THAT MAY ACT AS JOINTS FOR THE TWO WOODEN PLAT- FORMS.

SIZES OF STEEL RODS/	WEIGHT/ KG/M
20	2.47
22	2.98
25	3.85
30	5.55
32	6.31
35	7.55
38	8.91
40	9.86

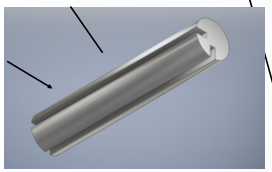
SIZES OF BRASS RODS/
20
24
25
27
40

2-3 OF THESE CAN BE MADE AND USED FOR EACH PLATFORM BEING JOINED.



MILLING MACHINE CAN BE USED TO MILL OUT THE "STRIPS"

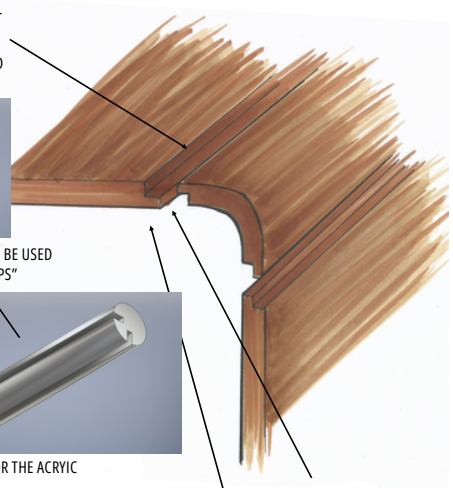
THE WOOD CAN BE PUT AND SECURED IN THESE PARTS



ROUTED PART– FOR THE ACRYIC TO BE FITTED IN.

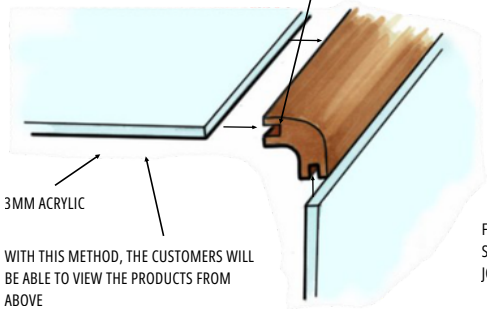
MAYBE CREATE A JIG THAT WOULD HELP ACHIEVE THIS, BECAUSE THE CORNERS ARE CURVED AND SO IT MIGHT NOT BE ACCURATE

OTHER MATERIALS CAN POTEN- TIALLY REPLACE THIS



THE CORNERS CAN BE ROUTED, AND TURNED INTO A LAP JOINT.

IF THIS JOINT IS USED, THEN IT SHOULD BE THE OTHER WAY ROUND, SO THAT THE CURVY PART IS SUPPORT- ING THE PLATFORM, NOT THE OTHER WAY ROUND.



3MM ACRYLIC

WITH THIS METHOD, THE CUSTOMERS WILL BE ABLE TO VIEW THE PRODUCTS FROM ABOVE

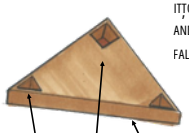
POTENTIAL CONCERNS:
JOINT MIGHT NOT BE STRONG ENOUGH– NOT BIG ENOUGH TO SUPPORT THE UPPER FLAT PLAT- FORM

FIND ANOTHER STRONGER WAY TO JOIN

PROVIDE MORE SUPPORT FOR THE PLATFORM.

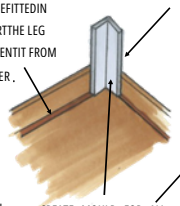
INITIAL DESIGN 3 + DEVELOPMENT

UNDERNEATHTHEPLATFORM CAN BE MILLED SO THAT THE LEGS CAN BEPUTIN PLACE .



SIZEOFTHE LEGS

THISROUTEDPART ONTHE PLATFORM WOULD ALLOW THELEGTO BEFITTEDIN ITTOSUPPORTTHE LEG ANDTOPREVENTIT FROM FALLING OVER .



IT MILLEDTHISWAYTHEN IT WOULDALLOW THE LEGS TOBEFOLDEDIN THOUGHTHEWAY TO ACHIEVE THIS MUST BE FURTHER CONSIDERED .

LEGS STILLLACK SUPPORT

CONSIDER METHODSOF ATTACHINGTHE LEGS TEMPO-RATILY TOTHE PLATFORM (REMOVABLE LEGS)

ADJUST BOTTOMLONG PLATFORM TOBEWID-ER– TO BE THESAME SIZE AS THE SMALLER PLATFORMS ONTOP COMBINED

HEAT UP MILD STEEL BEFORE BENDING FOR BETTER BEND

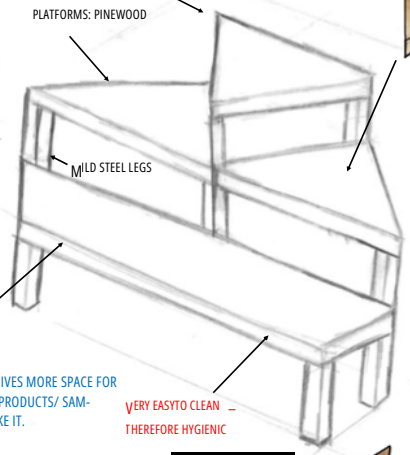
THESEMILLEDIN "BLOCKS" WOULD HELPHOLD THELEGS – THEYWON'TTIP OVER,THOUGHTHE LEGS WOULDNOT BEABLE TO FOLD .

MAYBETURNTHISINTO AN EQUILATERALTRIAN-GLE SOTHATALLTHE CORNERS AREIDENTICAL AND EQUALINDEGREE.

CREATE MOULD FOR ALL THE LEGSTO BEBENTTO THE EXACTSAMEANGLES – INCREASES ACCURACY.

SHARPCORNERS– UNSAFE

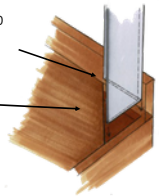
PLATFORMS: PINEWOOD



MILD STEEL LEGS

LOWERTOLOCK AND BRINGUPTOFOLD.

FIND A WAY TO ADJUSTTHEJOINT AND ALSO A WAY TO FOLDIT .



SUPPORTERS– MAYBE ADD LEGS THATCAN BE HIDDEN AND KEPT WITH THE PLATFORM INSIDE THE PLATFORM.

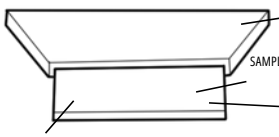
CONSIDERATION: WHEN CUS-TOMRSTRYSAMPLINGS, THEY WOULDBEEXERTING FORCE ON THE PLATFORMAND SO IT MIGHTNOTBESTRONG ENOUGHWITHNO OTHER SUP-PORTS .

THE DESIGN ISN'T AS "WOW" AS THE EARLIER DESIGNS. — THE CLIENT WAS REFERRING TO INI-TIAL DESIGN 1.

MAYBE INSERT AN EXTENDED PLATFORM HERE TO DISPLAY THE SAMPLINGS

THE FRONT GIVES MORE SPACE FOR THE LARGER PRODUCTS/ SAM-PLINGS– I LIKE IT.

VERY EASYTO CLEAN – THEREFORE HYGIENIC



DISPLAY OF PRODUCTS

SAMPLINGS SECTION

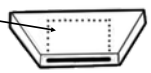
LOCK PLATFORM (?) WHEN BEING KEPT– FOR SAFETY WHILST BEING TRANSPORTED AND LOCK WHEN INUSE TO PREVENT IT FROM SLID-ING OUT/ IN.

EXTENDEDPLATFORM

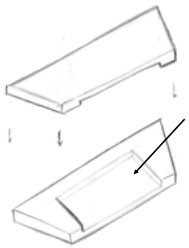
METHODOF MANUFACTURE:
- ROUTING
- MILLINGMACHINE
- CNC

USE TWO PIECES OF WOOD,USE THE MILLING MACHINE TO GET RID OF THE SURFACES AS SEEN IN THE SKETCH AND THEN ASSEMBLE THEM TOGETHER,CREATING THE PLACE WHERE THE EX-TENDED PLATFORM WOULD BE KEPT DURING TRANSPORTABLE AND WHEN NOT IN USE.

PLATFORM WHEN KEPT INSIDE

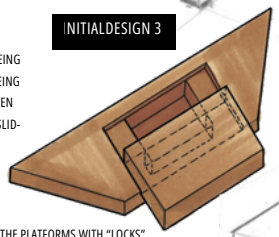


ADD A TAB/ MAKE THE PLAT-FORM LONGER SO THAT IT CAN BE PULLED OUT WHEN NEEDED.

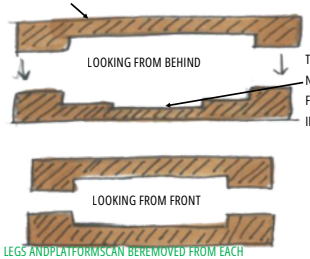


EXTENDED PLATFORM MIGHT BE ACCIDENTAL-LY PULLED OUT COM-PLETELY BY CUSTOM-ERS – SHOULD HAVESOME KINDOF LOCK .

INITIALDESIGN 3



SIDE VIEW OF THE PLATFORMS WITH "LOCKS"

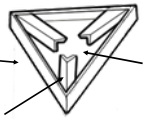


THIS PART UNDER-NEATH THE PLAT-FORMWILLFIT INTO HERE

LEGS ANDPLATFORMSCAN BEREMOVED FROM EACH OTHER AND SO THEREFORE THIS ALLOWS THEM TO BE RECYCLEDAT ITS ENDOF LIFE .

STEPSTO DISSASSEMBLE & PACK THEDISPLAY– POSSIBILITY 1

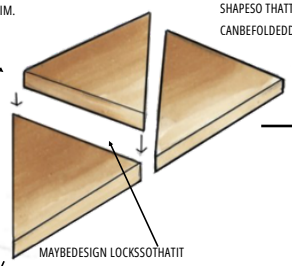
THE LEGSSHOULD BERE-MOVABLEFOR FOLDABLE– MAYBE INTHIS WAY .



LEGSMUST BETHIS SHAPESO THATTHEY CANBEFOLDEDDOWN.

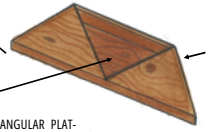
1.AFTERLEGS ARE FOLDED, LOWER THIS PLATFORM DOWN SOTHATITISLEVEL TO THE OTHER FORMINGATRAPEZUIM.

2 PLATFORMS BESIDE IT,

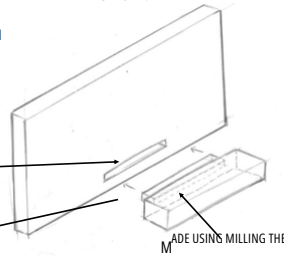


MAYBEDESIGN LOCKSSOTHATIT WOULDBE LOCKED INPLACEAFTER BEINGLOWERED– WOULDAIDOTHER STEPSTOO

THIS DESIGN IS MORE PRACTICAL AND FUNC-TIONAL AND SUITS MY WAY OF DISPLAYING PRODUCTS– I USUALLY DISPLAY 2-3 PIECES OF THE SAME PRODUCT ON EACH PLATFORM.

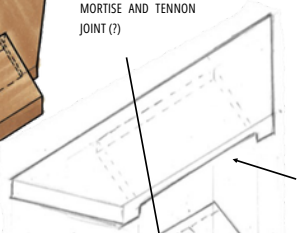


THE UPPER TRIANGULAR PLAT-FORMWOULD BE PLACEDIN HEREWHENBEING PACKED.



MADE USING MILLING MACHINE

BLOCKATTACHED TO PLATFORM BY USING MORTISE AND TENNON JOINT (?)



MADE USING MILLING MACHINE/ ROUTER

PART OF THE PLATFORM'S SUR-FACE REMOVED USING THE MILLING MACHINE

GAP: NEARLY THE THICKNESS OF THE EXTENDED PLATFORM

SUFACE REMOVED ON BOTTOM PLATFORM WOULD REDUCE

INCREASE THICKNESS OF BOTTOM PLATFORM AVAILABLE– FOR THE BLOCK TO BE PLACED INTO HERE.

BLOCKBELOWTHE EXTENDEDPLATFORMWOULD NOT BEABLE TOMOVE THROUGH THIS PARTTHERE-FORE ITWOLDLOCK, WHEN IT IS SLIDED OUT.

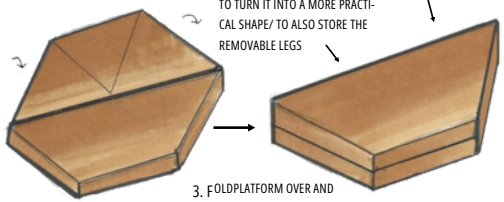
DECREASE WIDTH OF BLOCK SO THAT MORE PLATFORM CAN BE BROUGHT

THEWOODWOULD BE MILLED INUSINGTHEMILL-ING MACHINE TO ALLOW THE LEGS TO FIT IN– THE LEGS CANBEFOLDEDBY SCREWINGTHESIDESOFIT TO THE WOOD .

CONNECTTHETWO PLATFORMS TOGETHER BEFORE FOLDING (?) OR SKIP THIS STEP AND PLACETHEPLATFORMS FROM BEFORE ONTO HERE .

WITHITBEINGFLATIT CANNOWBE TRANS-PORTEDMOREEFFICIENTLY–THECLIENT CANPUTTHISONTOHER TROLLEYALONG-SIDEHEROTHER DISPLAYS.

MAYBE CREATE A BOX FOR THIS– TO TURN IT INTO A MORE PRACTI-CAL SHAPE/ TO ALSO STORE THE REMOVABLE LEGS



2. LOWER AND LEVELTHENEW TRAPE-ZIOUS PLATFORM WITHTHEOTHER PLATFORM BELOW

3. FOLDPLATFORM OVER AND ONTOTHEOTHER PLATFORM

THISDESIGN WASDEVELOPED WITH THECLIENT WHEN SHE SAIDTHERE ISWASTED SPACE BECAUSETHEPLATFORMS ARETRIANGULARANDSO I DECIDEDTOADDMORE PLAT-FORMSON DIFFERENTLEVELS TO ADDMOREDIMENSIONS TO THE DESIGN .

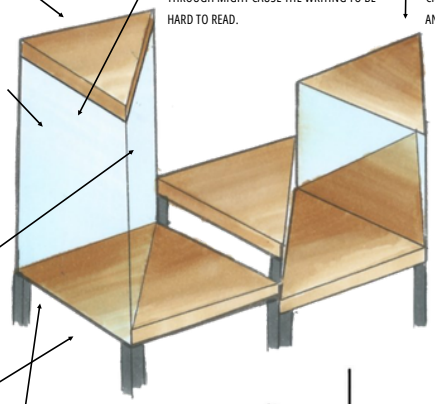
INSTEADOFSEPARATING ALL THE SMALL TRIANGULAR PLAT-FORMS , 2 OFTHEMWOULD BE MADE TOGETHER, AND THE MIDDLEPARTWHERETHE MIDDLE TRIANGLE IS SUPPOSED TO BE WOULDBEMILLEDIN.

MOREPRODUCTSCANBEPLACED ON THIS TOPPLATFORMTHOUGHIFITIS COVERED THENITMIGHTLOOKUNATTRACTIVE.

CLIENT CAN WRITEONTHE ACRYLIC USING WHITE BOARD MARKERS– INSTEAD OF ADDING A CHALKBOARD HISPART IS ALSO REALLY TALL AND SO IT WONTBLOCK THE CUSTOMERS VIEW OF THE PRODUCTS, THOUGH IT BEING SEE-THROUGH MIGHT CAUSE THE WRITING TO BE HARD TO READ.

I THINK THIS ALLOWS SPACE TO BE USED FOR EFFICIENTLY AND I LIKE THE IDEA OF ME BEING ABLE TO WRITE ON THE ACRYLIC PART.

THE IDEAOFTHIS PART BEINGCLEAR ACYLIC IS FOR THE PASSING BY CUS-TOMERS TO SEE THE PRODUCTS MORE EFFICIENTLY FROM MORE ANGLES .



CREATE A BOX FOR IT (?) AND SOFT INNER LINER

IF THIS CANBE TRANSPORTED AROUND, THENEXTRA CARE MUSTBETAKEN FOR HOW TO TRANSPORT THE ACRYLIC PARTSWITH-OUT THE RISKOF THEM GETTING SCRATCHED .

METHODOFJOINING ACRYLIC TO THE WOOD – THIS METHODCAN ALSO ALLOWTHE ACRYLIC TOBE RE-MOVED.

MIGHT BE UNSTABLE FOR THE LARGER ARCYLICS– RISK OF IT COMING OFF– DANGEROUS

BEHINDTHEDISPLAY CAN BE OPENED – MAYBE USE ACRYLIC HINGE– SO THAT THE CLIENT WILL HAVE EASY ACCESS TO THE PRDUCTS DISPLAYED INSIDETHEACRYLIC PART .

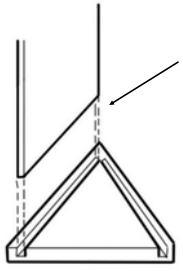
WITH THISDESIGN, IT WOULDBEQUITEDIFFICULT TO MAKEITPORTABLE, ESPECIALLYWITHTHE LARGE ACRYLICPARTS WHICH CANBEEASILY SCRATCHED .

THE SAMPLINGS PART BELOW MIGHT BE DISCARDED, SO THAT THE PLATFORMS WON'T BE TOO TALL, AND TO ALSO BRING THE CUSTOMERS ATTENTION TO THE PROD-UCTS DISPLAYED ON THE SMALLER PLAT-FORMS.

THETRIANGULARPLATFORMS SHOULD BEIDENTICAL SO THAT THEYCAN BEMANUFACTURED MOREEASILYAND CAN ALSO BE STACKED ANDTRANSPORTED MORE EASILY .

MANUFACTUR-ING FOR WOODEN PLAT-FORM : ROUT-ER OR MILLING MACHINE

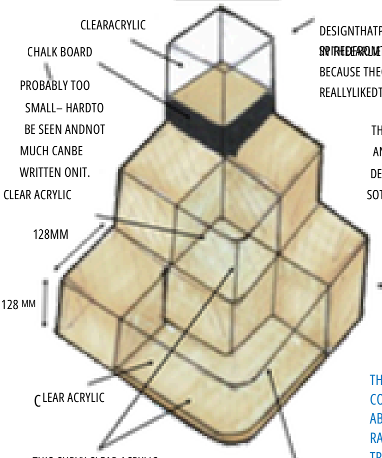
WEAKER PLAT-FORM– ESPECIAL-LY THE SIDES– THEREFORE PLAT-FORM MAY BREAK OVER TIME.



INCREASE DEPTH OF SLOTS

INITIAL DESIGN 4 + DEVELOPMENTS

INITIAL DESIGN 4



THIS DESIGNWAS IN-SPIREDFROMTHE ORIGINAL DESIGNTHATPRESENTED TO THECLIENT BECAUSE THECLIENT REALLYLIKEDTHE IDEA.

THEOLD IDEA LACKED BALANCE ANDSO THE NEW DESIGN WAS DESIGNED WITH A WIDER BASE SOTHAT IT CAN BALANCE BETTER.

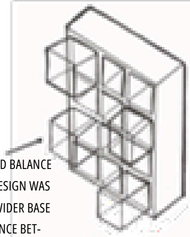
THE NEW DESIGN ALSO PROVIDES THE CLIENT WITH DIFFERENT SIZED PLATFORMS– TO HOLD DIFFERENT SIZED PASTRIES.

THIS DESIGN WOULD BE BETTER IF IT COULD BE CUSTOMIZED– LIKE IF I WAS ABLE TO ADJUST THE BOXES AND ARRANGE THEM ACCORDING TO THE PASTRIES I HAVE ON EACH DAY.

THIS CURVY CLEAR ACRYLIC PARTCAN BEMADEUSINGTHE OVEN.

MOULD CAN BE MADE AND THEN ACRYLIC PUT OVER SO THAT IT WOULD FORM THIS.

THIS"CORNER"MIGHTMAKEIT DIFFICULTFORTHE CUSTOMERS TOVIEWTHE PRODUCTS CLEARLY– THELINEWOULDCUTOFF THECUSTOMERS'VIEW OFTHEPRODUCT.ASTHEY WOULD BE LOOKING FROMAHIGHERPOINTOF VIEW.



IN RESPONSETOTHECLIENT'S COMMENTOF MAKING THE BOXES REMOVABLE, AND CUSTOMIZABLE,ISTARTEDOFF THINKING OF WAYS FORITTOBEREMOVABLE

SIMPLEIDEA, THATWOULDALLOWTHE BLOCKSTOBETAKENAPART, FROM ON TOP, THOUGHMETHODSOFREMOVING THEMFROMTHESIDES ARE STILL UNKNOWN.

I THINK THISLOOKSLIKEAPYRAMID AND LOOKSTOOSTRAIGHT.IFPRODUCTS AREPLACEDINTHEMIDDLE THEN IT CAN'TBESEENFROMTHE SIDES. OVERALL,ITISNOTTHEBEST DESIGN.

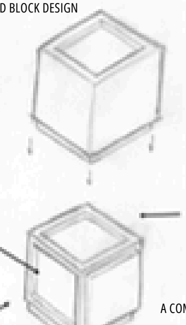
THIS PART ALLOWS THE BLOCK ON TOP TO BE LOCKED (BLOCK ON TOP HAS INVERTED PARTS THAT WOULD ALLOW THESE TABS TO FIT IN.)

THEREISA PROBLEMWITHTHE SIDESOFTHE BOXESWHERETHIS "LOCK"WON'T WORK.

THE BLOCKSCAN'TBEPLACED ON EACH OTHERINAFASHIONABLE WAY, DUE TOTHELOCKS BEING UNATTRACTIVEIFNOTCOVERED.

DOESN'TWORKINLETTING THE CLIENT ARRANGETHE BOXES IN THE WAY SHEWISHESTO.

THIS ALLOWSITTOBE MORE EASILYCUSTOMIZED BY THE CLIENT,THOUGH THE VARIATION ISSTILLSMALL.



THISISSIMILAR TOA MORTISE AND TENON JOINT, THOUGH IT ISVERY WIDE AND THIN.

ASTHE BLOCK IS A CUBE, THE BOXES CAN FIT TOGETHER, FROM ANY SIDE

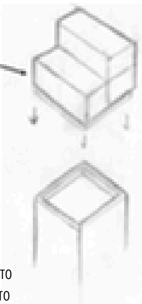
THISISALSOMOREATTRACTIVETHAN THE PREVIOUS LOCK AND CAN BE PARTOFTHEDESIGNWHEN THE BLOCKSARESTACKEDTOGETHER.

TO ALLOW THE CLIENT TOCUSTOMIZETHEDISPLAY MORE, DIFFERENT TYPESOF BLOCKSCANBE MADE. THESE WOULDMOSTLY BE PUT ONTHEVERYTOP OF THE BOXES,TOCREATE A WIDERVARIATIONOF PLATFORMS FOR THE PASTRIES TO BE OUT ON.

SOME OFTHEBLOCKSMIGHTBEMADEOUTOF ACRYLIC TOO– SO THAT THE PASTRIES CAN BE DISPLAYED INSIDE WHERE IS WOULD BE COVERED.

A COMBINATION OF WOOD AND ACRYLIC BLOCKS MIGHT ALSO LOOK QUITE NICE.

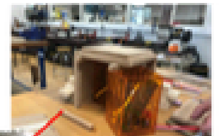
A LARGER BOXCANBEUSED TO STORE ALL OFTHEBLOCKS, TO PROVIDE THECLIENTCONVENIENCE IN TRANSPORTINGTHE BLOCKS.



LARGER BLOCKREQUIRED (?) (JUST FOR THEACRYLIC ONES)

MAY BE HARD TO VIEW PASTRIE

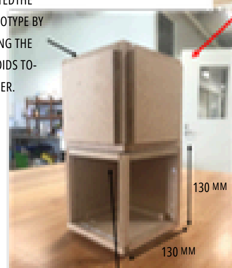
SMOOTH SIDES– THIS WOULD MAKE IT HARDER FOR THE BLOCK TO BE PUT IN AND LOCKED WITH THE OTHER BLOCKS.

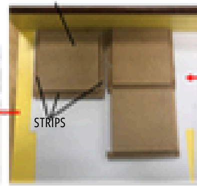


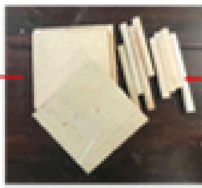
THE STRIPSWEREGLUEDTO THE SQUAREDPIECESTO FORM THE SIDESWITH SQUARES POKINGOUT.

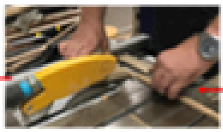
THEY WERE GLUED AND ASSEMBLED TOGETHER, FORMING A CUBOID.

I TESTEDTHE PROTOTYPE BY FITTING THE CUBOIDS TOGETHER.



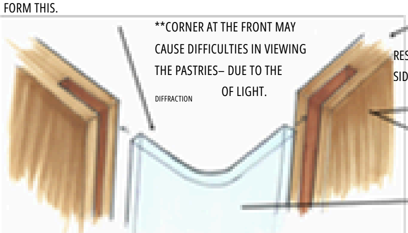


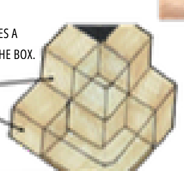




SQUAREDPIECESANDSTRIPS WERE CUTOUT.

THIS IS AN EXAMPLEOFHOWTHE ACRYLICCANBE FITTEDINTOTHE WOOD.





FROMTHISPROTOTYPE,ONLY ONE SIDEOF THEBOXES FITTOGETHER,IN ONECERTAINWAY– SUGGESTINGTHAT HEDEGREEOFACCURACY MUSTBE VERY HIGH.

THREE OFTHESIDESMIGHTBEMADEOUT OFWOOD ANDTHEOTHERTHREEMIGHTBEMADE OUTOF ACRYLIC. THIS WOULD ALLOW THE PASTRIES TO BE SEENFROM ONESIDEAND THEBACKGROUNDBE WOODEN SURFACES– BETTER THAN LEAVING IT TRANSPARENT.

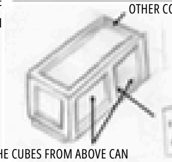
MODULAR DESIGN THEREFORE ALL THE COMPONENTSCANBE PUT TOGETHER.

THISWOULDBEQUITE EASY TO BE MADEONABIGGERSCALE, WITH THEUSEOFCAD/CAM– MANY IDENTICALCUBESMAY BE MADE.

REDUCES WASTE MATERIALS.

TO INCREASE THE OPPORTUNITY FOR THE CLIENT TO CUSTOMIZE HER DISPLAY, I THOUGHT OF SOME IDEAS OF BLOCKS THAT MAY BE

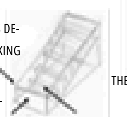
CAN BE FITTED INWITH OTHER COMPONENTS.



THIS COMPONENT IS DESIGNED FOR STACKING COOKIES.

ELEVATED TO ALLOW THE COOKIES TO BE SEEN MORE CLEARLY, IN AN UPRIGHT POSITION.

THE TABS HELP SUPPORT THE COOKIES– PREVENTS THEM FROM PILING ON EACH OTHER AT THE BOTTOM.



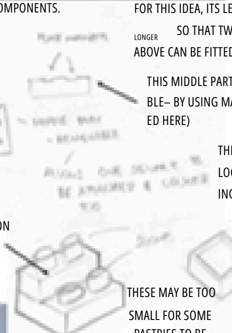
THE CUBES FROM ABOVE CAN BE FITTED INTO THESE

SOME PASTRIES SUCH AS SCONES CAN BE DISPLAYED ON THESECOMPONENTSWHEN STACKED.

FOR THIS IDEA, ITS LENGTH WOULD BE LONGER SO THAT TWO CUBES FROM ABOVE CAN BE FITTED IN.

THIS MIDDLE PART WOULD BE REMOVABLE– BY USING MAGNETS. (AS ILLUSTRATED HERE)

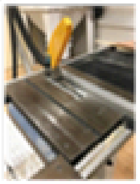
THE MIDDLE PART IS HERE TO LOCK THE SQUARES IN– TO INCREASE ITS STABALITY.



THISISHALFTHEHEIGHT OF THE CUBE.

THESE MAY BE TOO SMALL FOR SOME PASTRIES TO BE DISPLAYED.

THIS IS HALF THE HEIGHT AND ONE LENGTH OF THE CUBES.

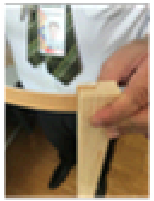


INSTEADOF USINGTHE ROUTER,THIS CANBE USED INSTEAD.

THE BLADE IS 3MM AND SO IT WOULD BE PERFECT FOR CREATING A SLOTS FOR 3MM ACRYLIC.

RIVINGKNIFECANBEREMOVED SO THATLONGERPIECES OF WOODCANBEUSED.THOUGH THIS MAYBEVERYDANGEROUS.

PREVENTS LONGER WOOD FROM GETTING CATCHBYTHE SAWAND SPRINGINGTOWARDS THEUSER.



THIS PROTOTYPE WAS MADE TO SEE HOW WELL IT WORKS.

(A LARGER CLEAR ACRLICE WOULD BE USEDFORTHE REAL THING.)

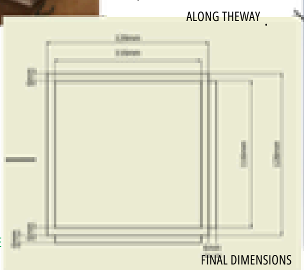
THOUGHTHISWA SMADEOUTOF MDFWHICHSHOULD BERELATIVELY LIGHTWEIGHT, A SINGLEBOX WASSTILLQUITE HEAVY.

MOREBOXESWOULD BEMADE ANDSOITWOULD BE INCONVENIENTFORTHECLIENT TOCARRY THEMAROUND,DUE TO THEIR WEIGHT.

FROMTHESE BOXES THE EDGES LOOKED TOO THICK AND SO I DECIDED TO CHANGE THE PROPORTIONS

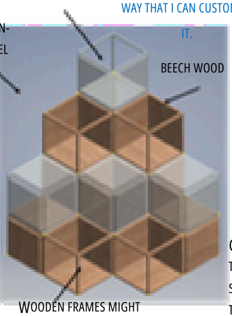
THIS RESULTED INLESS MATERIALSNEEDEDINTHE MANUFACTURING.

FROMMODELLINGTHIS ONUTODESKINVENTOR,IMADE SOMECHANGESTO THEMODEL ALONG THEWAY.

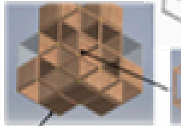


CLEAR ACRYLIC

I LIKE ITS MATERIAL AND THE WAY THAT I CAN CUSTOMIZE IT.



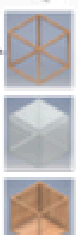
WOODEN FRAMES MIGHT BLOCK VIEW OF PASTRIES.



PROBLEM EXTENDED PARTS OF THE CUBOID PREVENTS THE BOTTOM OF THE DISPLAY TO BE ALL LEVEL.

SOLUTIONS: CREATELARGERVARIATIONOFBOXES – DESIGNED ESPECIALLY FOR THE BOTTOM PART.

ADD SEPARATE PIECE THAT WOULD HELP SUPPORT THE DISPLAY

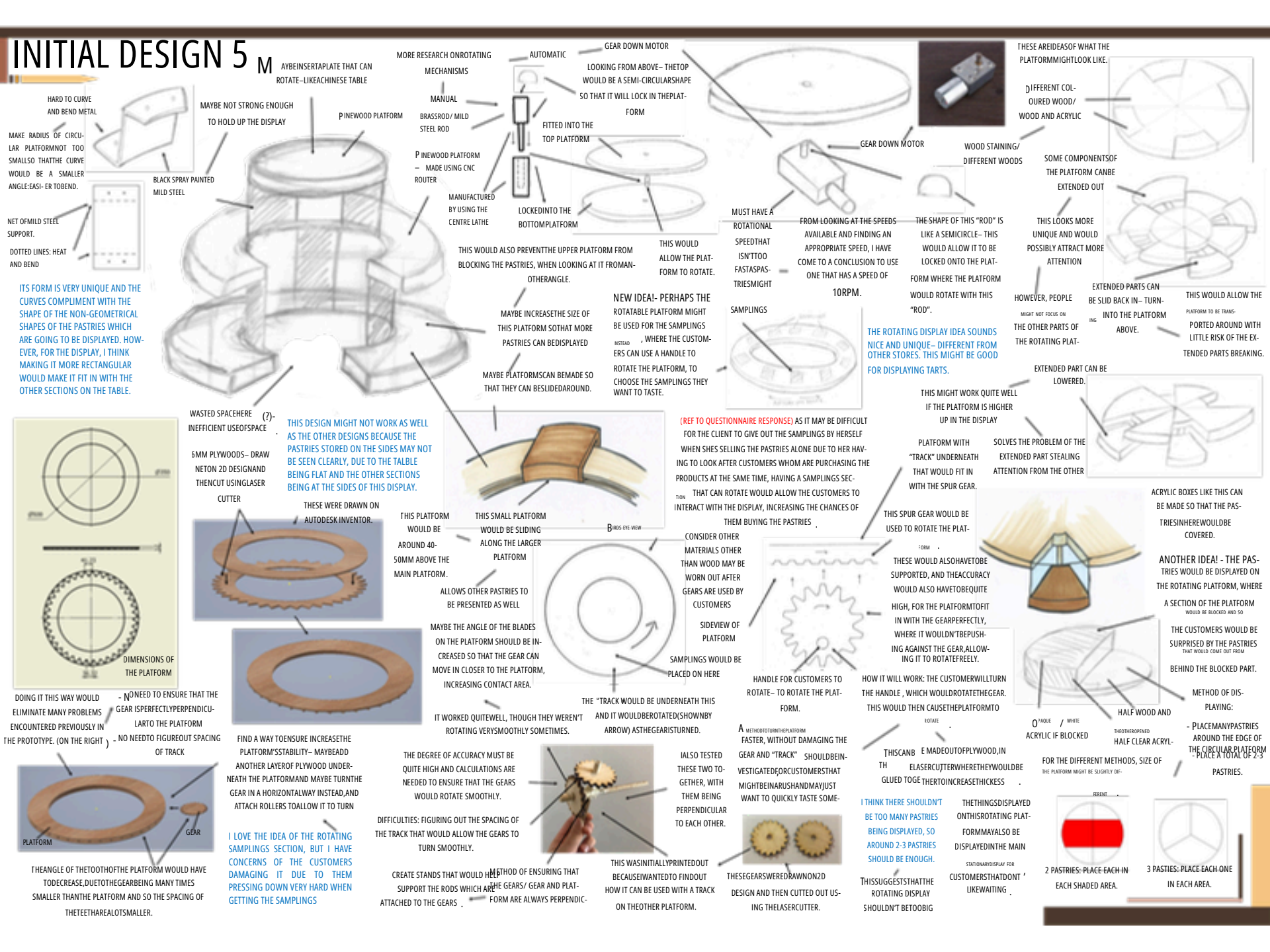


MADE FROM COMBINING THESE 3 BOXES ABOVE

ANOTHER BOX WAS DESIGNED, TO REDUCE THE WEIGHTOFTHE DISPLAY AND TO HELP SUPPORT IT TO ASSEMBLE THE COMPONENTS AT THE BACK WHILST NOT MAKING IT LOOK TOO PACKED.

A MANUAL/ INFORMATIONBOOKLET MIGHTBEMADE, INCLUDING WAYSONHOW TO ASSEMBLE THE COMPONENTS AND ALSO MAYBE AROUND 4 SET EXAMPLES OF HOW THEY CAN BE ARRANGED– DONE ON CAD.

INITIAL DESIGN 5



INITIAL DESIGN 6 + DEVELOPMENT

THIS IDEA WAS INSPIRED FROM THIS FURNITURE, IN THE STYLE OF "DE STIJL"

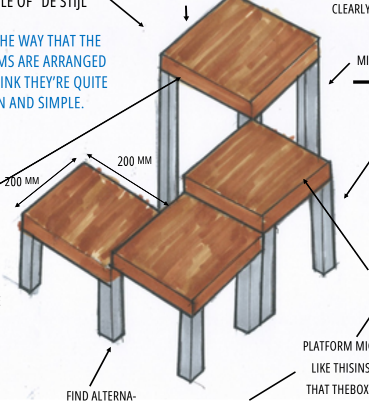
I LIKE THE WAY THAT THE PLTFORMS ARE ARRANGED BUT I THINK THEY'RE QUITE PLAIN AND SIMPLE.

STAINED SO THAT IT HAS A DARKER COLOUR

PINEWOOD

THIS ARRANGEMENT OF PLATFORMS WOULD ALLOW THE PASTRIES TO BE SEEN QUITE CLEARLY DUE TO THE DIFFERENT LEVELS.

MILD STEEL LEGS



THESE PLATFORMS CAN BE MADE TO BE SMALLER SIZED AS ITS HEIGHT IS REDUCED SO THAT THEY CAN FIT UNDERNEATH EACH OTHER– FOR WHEN THEY ARE BEING TRANSPORTED.

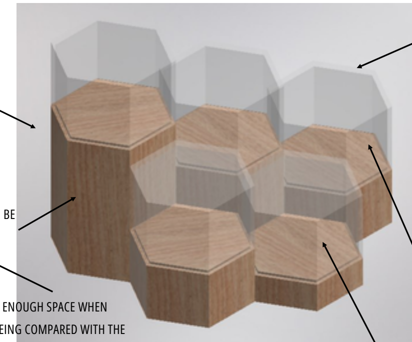
ACRYLIC BOXES CAN BE USED FOR THE PURPOSE OF COVERING UP THE PASTRIES

DUE TO THE CLIENT'S COMMENT OF IT BEING QUITE SIMPLE AND PLAIN, I DECIDED TO DEVELOP IT THROUGH THE CHANGE IN SHAPES OF THE PLATFORMS.

I CHOSE TO USE HEXAGONS BECAUSE THEY FIT WELL TOGETHER AND THEREFORE CAN ALSO BE CUSTOMIZED BY THE CLIENT.

THIS SIDE OF THE HEXAGON CAN BE TURNED INTO A BLACKBOARD

THE SIDES OF THE PLATFORM WOULD BE ROUTED OFF IT HAS ENOUGH SPACE WHEN BEING COMPARED WITH THE OTHER HEXAGONS.



MANUFACTURING OF THE ACRYLIC COVER POSSIBILITIES:

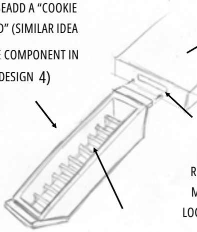
- PRINT OUT THE NET OF THE ACRYLIC COVER ON THE LASER CUTTER
- MAKE A MOULD WHICH IS THE SHAPE OF THE COVER
- PUT ACRYLIC NET INTO THE OVEN AND THEN PUT FLEXIBLE ACRYLIC OVER MOULD.

- USING 2D DESIGN, DRAW OUT A HEXAGON AND A LONG RECTANGLE THAT IS THE LENGTH OF ALL THE SIDES OF THE HEXAGONS COMBINED.
- PRINT THESE OUT ONTO ACRYLIC USING THE LASER CUTTER.
- MAKE A MOULD FOR BENDING THE RECTANGULAR PIECE.
- ATTACH THE BENT ACRYLIC WITH THE HEXAGONAL TOP PIECE.

SOME OF THE ACRYLIC COVERS MAY BE MADE SO THAT THEY CAN BE OPENED BY THE CLIENT.

DOESN'T WORK FOR THE COVERS WHICH ARE IN-FRONT.

MAYBE ADD A "COOKIE STAND" (SIMILAR IDEA TO THE COMPONENT IN DESIGN 4)



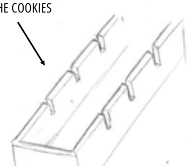
THIS PART ACTS LIKE THE MORTISE AND TENNON JOINT.

REMOVABLE THEREFORE MUST FIND METHOD TO LOCK THE COOKIE STAND IN PLACE.

TABS ALLOW COOKIES TO STAND UPRIGHT AND NOT PILE OVER EACH OTHER

AS IT WOULD BE ELEVATED, THE LABELS WON'T BLOCK THE VIEW OF THE COOKIES IF THEY ARE ARRANGED PROPERLY USING THE TABS TO HELP SUPPORT THE COOKIES

MAYBE THESE CAN BE ADDED TO THE DESIGN– TO ADD LABELS TO THE COOKIES

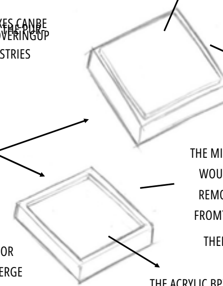


FIND ALTERNATIVE DESIGN FOR LEGS BECAUSE THEY LOOK TOO STURDY AND SIMPLE– RUINS THE DESIGN.

IF ACRYLIC BOXES ARE ADDED THEN THE BOX ON THE SECOND LOWEST WOULD BLOCK THE PASTRIES ON THE THIRD LOWEST PLATFORM.

PLATFORM MIGHT LOOK LIKE THIS INSTEAD SO THAT THE BOXES WON'T FALL OFF.

THE ACRYLIC BOXES FOR THESE TWO MIGHT MERGE TOGETHER AND FORM ONE SIMPLE ACRYLIC COVER.



THE ACRYLIC BOX WOULD COVER THE PLATFORM AND REST ON THE ROUTED PART

THE MILLING MACHINE WOULD BE USED TO REMOVE MATERIAL FROM THE MIDDLE OF THE PLATFORM.

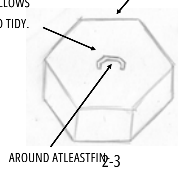
THE ACRYLIC BPX WOULD FIT INTO THE MILLED SECTION.

I LIKE THIS DESIGN MORE THAN THE FIRST ONE– IT LOOKS PREMIUM AND EYE CATCHING

I CHOSE TO MAKE THE HANDLE THIS SHAPE BECAUSE I THINK IT'LL GO WELL WITH THE SHAPE OF THE ACRYLIC COVER ITSELF

ACRYLIC COVERS SHOULD BE EASILY LIFTED UP – DESIGN HANDLE

THIS HANDLE STILL ALLOWS IT TO LOOK NEAT AND TIDY.



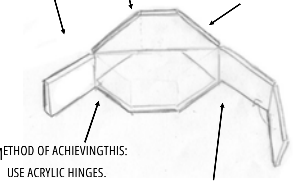
MANUFACTURING:
CUT OUT ACRYLIC STRIP AND BEND OVER JIG/MOULD AFTER HEATED UP ON THE STRIP HEATERS.

AROUND AT LEAST 2-3 FINGERS MUST BE ABLE TO FIT IN.

MAYBE MAKE HANDLE OUT OF MILD STEEL INSTEAD

HALF OF THE HEXAGON TOP WOULD BE LIFTED UP

DESIGNING IT SO THAT IT CAN BE OPENED IN THIS WAY, IT WOULD ALLOW THE CLIENT TO MANAGE THE THINGS INSIDE COMFORTABLY.

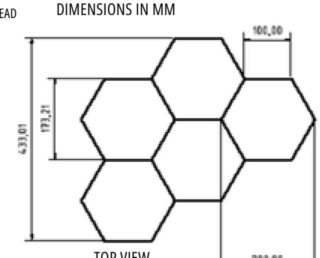


METHOD OF ACHIEVING THIS: USE ACRYLIC HINGES.

THOUGH IT IS FUNCTIONAL, IT MIGHT NOT LOOK VERY NICE AS THE PASTRIES ARE DISPLAYED INSIDE.

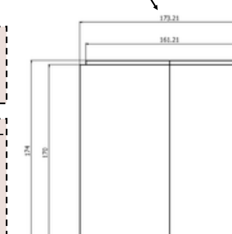
I AGREE WITH YOU– THOUGH IT IS CONVENIENT, IT MIGHT LOOK UNCLEAN. I DON'T THINK THIS IS NECESSARY BECAUSE I DON'T THINK I'LL BE ARRANGING IT FREQUENTLY.

DIMENSIONS IN MM



TOP VIEW

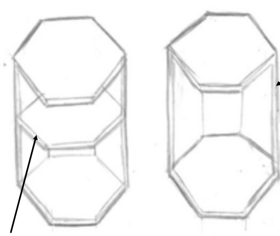
DIMENSIONS OF THE ROUTED PART.



HEIGHT OF ACRYLIC COVERS
-120MM

PLATFORM HEIGHTS:
- 250MM
- 170MM
- 100MM
- 50 MM

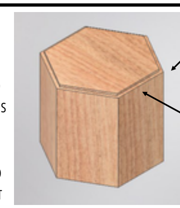
MATERIALS USED IN THIS DESIGN CAN ALL BE REUSED AND RECYCLED AT ITS END OF LIFE THEREFORE IT IS SUSTAINABLE.



LOOKING AT IT FROM BEHIND– THE CLIENT'S VIEW

IT CAN BE MADE TO BE HOLLOW LIKE THIS WHERE THE OTHER HEXAGON PICES MIGHT BE MADE TO BE SMALLER SO THAT IT WOULD FIT INSIDE THIS.

THIS WOULD HELP WITH WHEN THE COMPONENTS ARE TRANSPORTED TOO.



THE HEXAGON PIECES ARE NOT ATTACHED TOGETHER PERMANENTLY AND SO THEY ARE REMOVABLE.

MANUFACTURING:

THE TOP PART OF THE PLATFORM WOULD BE SEPARATE FROM THE OTHER PARTS.

MADE USING CNC MACHINE.

IF ITS ALL WOODEN THEN THE PASTRIES MIGHT BLEND IN WITH THE BACKGROUND AND WON'T STANDOUT.

HOWEVER IF THE REAL PRODUCT IS MADE OUT OF PINEWOOD, THEN THE COLOUR WOULD BE LIGHTER THAN THE COLOUR OF THE WOOD IN THE MODEL.

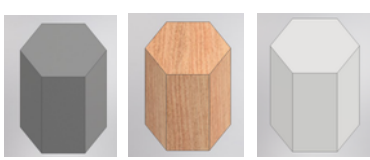
SHELVES MIGHT BE ADDED TO THIS SO THAT THE CLIENT WOULD BE ABLE TO STORE THINGS, SUCH AS THE PASTRIES SHE'LL BE GIVING TO THE CUSTOMERS

MIGHT BE MADE TO BE REMOVABLE IN CASE THE CLIENT WANTS A LARGER SPACE

HOWEVER, IF THE SIZES OF THE OTHER PARTS ARE CHANGED, THEN THIS MIGHT DISTORT THE OVERALL LOOK OF THE DESIGN.

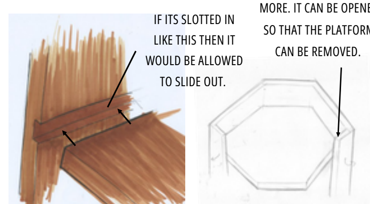
TWO HEXAGONAL PIECES FOR THE TOP AND BOTTOM AND 6 RECTANGULAR PIECES FOR THE SIDES.

AS A RESULT, I PRESENTED OTHER COLOURS TO MY CLIENT TO LOOK AT AND SEE WHICH ONE SHE MIGHT LIKE.



I THINK WOOD WOULD STILL BE THE BEST FIT FOR THE DISPLAY BECAUSE THE OTHER PARTS OF THE TABLE ARE WOODEN.

NOTE: PLATFORM MIGHT NOT BE VERY STABLE AS ONLY HALF THE PLATFORM IS SUPPORTED

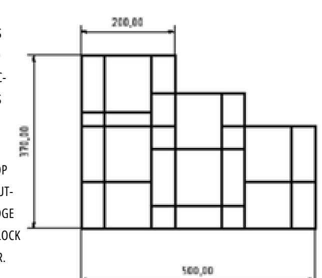


IF ITS SLOTTED IN LIKE THIS THEN IT WOULD BE ALLOWED TO SLIDE OUT.

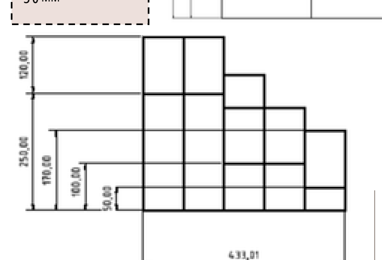
THIS WOULD HELP SUPPORT THE PLATFORM MORE. IT CAN BE OPENED SO THAT THE PLATFORM CAN BE REMOVED.

THE HEXAGONAL TOP PIECE WOULD BE ROUTED TO CREATE THE EDGE THAT WOULD HELP LOCK THE ARYLIC COVER.

CUT USING CNC AND CIRCULAR SAW– BOTH VERY ACCURATE AND SO THEREFORE WASTE IS REDUCED.



FRONT VIEW



SIDE VIEW

INITIAL DESIGN 7 + DEVELOPMENT

THIS DESIGN WAS DEVELOPED FROM THECLIENT'S COMMENTHISDESIGN HAS PLATFORMSOFDIFFERENTSIZES AND SPACE IS USED FOR EFFICIENTLY THROUGHTHE INCREASE IN SIZESOF THE PLATFORMS ANDTHECHANGE INANGLES OF EACH PLATFORM (PLATFORMS ARE NO LONGERPERPENDICULAR TO EACHOTHER).

WOODEN PLATFORM— PLYWOOD/PINEWOOD

FRONT VIEW

STAINLESS STEEL TUBES

CLEAR ACRYLIC/ OR WHITE ACRYLIC WITH CHOCO-CRUNCH LOGO

ETCHING ON ACRYLIC/ SUBLIMATION (IFSUBLIMATOIN

MAYBE SHINE LIGHT THROUGH IT FROM THE BACK TO MAKE THE LOGO STAND OUT AND CLEARER TO SEE. THOUGH THIS MAYCAUSE THESIDE TOBETOO THINKAS A CIRCUIT WOULDBE NEEDED.

"I THINK IT MIGHT BE QUITE HARD FOR THE CONSUMERS TO SEE THE LOGO, DUE TO IT NOT FACING THE FRONT DIRECTLY."

"IWANT THE LAYERSTO HAVE AVARIETY INTHEIR SIZES; BIG AND SMALL. I WON'T BE ABLE TO DISPLAY MANY PASTRIES IN THIS DESIGN AND I THINKIT IS ABITTOO SPACE CONSUMING, UNLESS SOME THINGS ARE ADDED TOIT TO ALLOW SPACE FOR MORE PASTRIES TO BE DISPLAYED."

THIS DESIGN HAS THREE LAYERS. EACH LAYER IS FLAT AND IS PLACED DIAGONALLY TO EACH OTHER.

PASTRIESCAN BEPLACED ON THEWOODENPLATFORMS

ANOTHERDESIGN FORTHE CONNECTION OF THE PLATFORMS.THISDESIGNWOULDMAKE THE OVERALL DESIGN LOOKLESS "DESNSE".DUE TO THE STEEL RODS BEINGSMALLERTHAN THEWOODEN FRAMES

STEEL RODS

MILD STEEL RODS

ACCUATE,NEAT ANDSTRONG

WOODEN

CAN BE MADE USING THE CNC ROUTER

ORSTRIPSOF WOOD ANDBE CUTOUT AND STUCK TOGETHER

MANUFACTURED USING2 PIECES OF WOOD

ACRYLIC WOULD BE SLOTTED INAND CAN BE REMOVED TO CLEAN/IFIT GETS SCRATCHED.

ACRYLIC

PRINTINGTHEFINGERJOINTS SOTHAT THE SIZES AREEXACTMADETHE JOINTSHARD TO FIT IN TOGETHERWITHOUT CHIPPINGTHE PLYWOOD.

THEREFORE MOREWORK MUST BE DONE SOTHAT THE JOINTS WILLFIT WITHOUT DAMAGINGTHE WOOD.

PRINTINGITSOTHAT THEREISA 0.1MMGAPFORTHE FINGERTOBESLOTTEDIN EASILYALLOWEDTHEFINGER JOINTSTOBE PUTTOGETHEREASILY,THOITWAS NOT PERFECTDUE TO THESMALL3MM CURVEDINNER EDGES.

LEAVINGTHIS AMOUNTOFGAPMAYBETOO LARGE FORIFTHE FINGERJOINTSAREGOINGTO BE JOINEDPERMANENTLYDUETOTHEJOINT BEING QUITELOOSE.

TOO BIG TO BE USED ON 10MM PLYWOOD (?)

KNOCK DOWN FITTINGS

WOOD

BRASS

DOWEL JOINTS

THIS WOULD MEAN THAT THE FINGER JOINTS WOULD BE HERE FOR DECORATION/ TO HELP STABALISE THE ADDITIONAL JOINT

IT MAYBEGOOD IF THE JOINTSARETOBE REMOVABLE, THOUGH ANOTHER METHOD OF JOINING MUST BE CONSIDERED.

PARAWOOD

THICKNESSES : 12MM, 16 MM,20 MM

WANTED THICKNESS : 10-12 MM.HOWEVER, 12 MM PARAWOOD ISSPECIALAND SO ITS PRICE IS 3X THE PRICEOF NORMALPARAWOOD AND SOIT IS QUITE EXPENSIVE . A DOESN'T WANT THE PRICE OFTHEPRODUCT TO EXCEED £25, PARAWOOD MAYNOTBE THE BEST MATERIAL TO USE.

PLYWOOD

THICKNESSES : 6MM,10 MM

WANTED THICKNESS : 10-12 MM

DISADVANTAGES: CAN BEEASILY CHIPPED

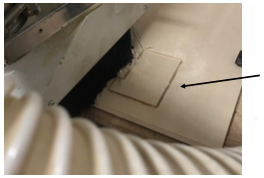
ADVANTAGES: LIGHTERINWEIGHTTHAN PINEWOOD

WEIGHT ANDAVAILABILITY OF WOOD MUSTBE CONSIDERED.

PINEWOOD/ PLYWOOD/ PARAWOOD

"I THINK USING MILD STEEL WOULD ALLOW THERE TO BE A CONTRAST BETWEEN THE WOODEN PLATFORMS AND THE SUPPORTING RODS, MAKING IT MORE ATTRACTIVE."

MAKINGTHESE FINGERJOINT PROTOTYPES WOULDALSOBE USED TODETERMINETHESIZES OF THEJOINTS–TOSEEHOW WELL THEYWOULDFITTOGETHER, ANDTHE AMOUNTOFFILING/ FINISHING NEEDED.



BRASS RODANDMILD STEEL ROD TURNEDONTHE CENTRE LATHE.

WOOD TURNED ONTHE WOOD LATHE

BRASS RODS/ MILD STEEL ROD/ WOOD/ ALUMINIUM TUBES

PINEWOOD/ PLYWOOD/ PARAWOOD

PLACE FOR PLACING SAMPLINGS/ TALLER PASTRIES

FINGERJOINTSMADE USINGCNC ORFRET-

FINGER JOINT/ LAPJOINT

FINGERJOINTS ARE MORE "TRADITIONAL"- MAY REFLECT HOW FARMER MARKETS QUITE TRADITIONAL.

PINEWOOD/ PLYWOOD/ PARAWOOD

THIS PART IS TO ALLOW MORE PASTRIESTOBE DISPLAYED .

IT ISCURVEDAT AN ANGLETO COMPLIMENT THE CURVE OF THE CIRCULAR PLATFORM.

MAKING THIS DESIGN PORTABLE

MORE DEVELOPMENTFOLLOWING PAGE

REMOVABLE COMPONENTS

SOMEPARTS CANBE FOLDEDE.G THE BASE, THE PLATFORMS

ROTATING PLATFORM

"I REALLY LIKE THIS DESIGN– I FEEL LIKE I WILL BE ABLE TO MOVE MY PASTRIES AROUND MORE AND IT ALSO HAS A UNIQUE SHAPE AND LOOKS INTERESTING"

AS ITINCLUDESA ROTATING PLATFORMFORTHETARTS AS WELL, IT WOULDBEUSEDFOR TWO SECTIONS OF THETABLE INSTEAD OF JUST THE MIDDLESECTION. (REF TO DESIGN POSSIBILITIES)

CIRCULAR ROTATING PLATFORM

FOR CLIENT TODISPLAY TARTS

CONSIDER WAYSTO ENSURE TARTSCANBE KEPT COOL .

WATERPROOF MATERIAL (?)

WATERPROOF GLUE (?)

PLASWOOD

PLASTICS E.G

PVA GLUE

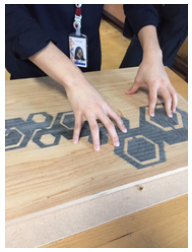
"TITEBOND"

PLASWOOD IS A REALLY SUSTAINABLE MATERIAL DUE IT ITS BEING MADE OUT OF RECYCLED PLASTIC.

SUBLIMATION TESTING

LOGO IS PRINTEDOUT USING A SPECIAL PRINTER FORSUBLIMATION, ON SPECIALPAPER.

PRINTED PAPER ISPLACEDONTO THE HEAT PRESS ANDTHE TIMEIS SET.



WOODISPRESSEDONTOPOF THE ACRYLICAND LEFTTOCOOL.THIS WOULDENSURE THATTHE ACYLICIS FLAT.

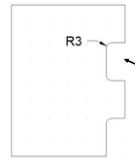
THEPAPER IS REMOVEDNK HASBEEN ABSORBED INTOTHE ACRYLIC.

WHENTHE LOGOISPRINTED,IT MUSTBE INVERTEDBECAUSETHEPICTUREPRINTEDWOULD BELIKE LOOKING INTOAMIRROR.

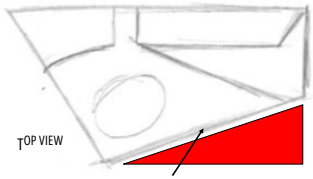
"I THINK THIS IS A NICE WAY TO CREATE THE LOGO, THOUGH IT MAY MAKE THE DISPLAY LOOK OVER CROWDED."

MIGHT BE SLIGHTLY BIGGER THANTHEONE ONTHE TOP

MAYBESOME MORE SUPPORTING POLES ARE NEEDED TOENSURE THAT IT WON'TCOLLAPSE



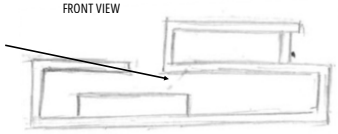
TRIALANDTESTINGOF FINGER JOINTS PRINTED USING THESLIGHTLY CURVEDCNC MUSTBE TESTEDDUETOTHE SLIGHTCURVE ATTHEINNER CORNERS. THISWOULDBE CAUSED BY THEDRILLBIT AND SO THE SMALLESTPOSSIBLE DRILL BITMUSTBE USED (3MM).



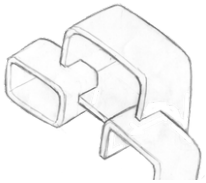
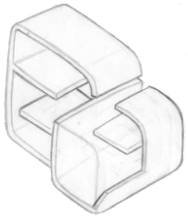
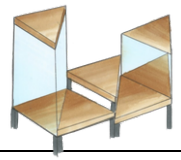
TOP VIEW

ASTHISPARTISAT AN ANGLETOTHETABLE,SOME SAMPLINGSCANALSOBEPLACEDONTHE TABLEHERE (SHADED AREA). THE DISPLAY WOULD THEN ALLOW SOME OFTHESAMPLINGSTO BEDISPLAYEDONADIFFERENT LEVEL.

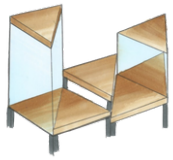
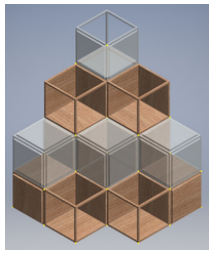
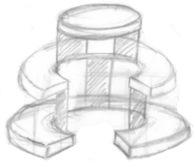
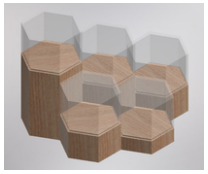
FRONT VIEW



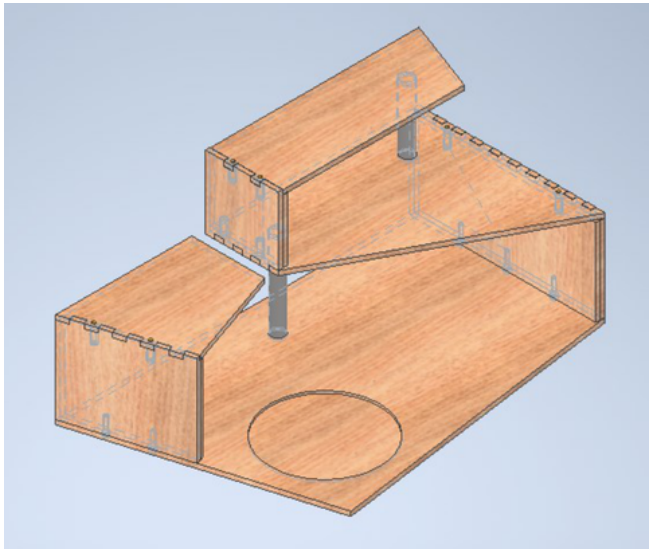
EVALUATION OF IDEAS AGAINST SPECIFICATIONS

DESIGN		CLIENT'S COMMENT	PURPOSEAND FUNCTION	ENVIRONMENTAL IMPACTS	SCALE OF PRODUCTION	SIZE AND WEIGHT	DURABILITY
DESIGN 1		"I REALLY LIKE THIS DESIGN, BECAUSE IT LOOKS VERY UNIQUE, AS WELL AS BEING ABLE TO STORE BIGGER AND SMALLER PIECES. HOWEVER, I DON'T WANT THE BACK PART TO BE SEE-THROUGH AS IT MIGHT RESULT IN MAKING THE PASTRIES STAND OUT LESS, DUE TO THE UNCERTAIN AND CHANGING BACKGROUND COLOUR." "I REALLY LIKE THIS IDEA OF IT BEING PACKED TOGETHER AND I THINK IT WOULD REALLY BENEFIT ME, AS I WOULD BE ABLE TO MOVE IT AROUND WITHOUT THE FEAR OF DROPPING THE OTHER COMPONENTS THAT ARE INSIDE THE BIGGEST BOX."	The development of the display has increase its ability to display pastries. However, it is still unable to display pastries in the most effective way, due to small amounts of surfaces available for the pastries to be placed on. The pastries can be displayed on many levels and its design is unique, causing it to be aesthetically pleasing. It would also be quite easy for the client to remove and insert pastries on the upper parts of the display. As it can be disassembled, the display would be easy to clean and relatively portable for the client to carry around.	It is mainly made out of wood and its method of manufacture mainly includes the usage of the CNC machine. This suggests that waste material would be reduced from less mistakes, due to the CNC machine being very accurate. Furthermore, the components can be arranged in a way that would efficiently use up the material, again reducing waste material.	This display has the potential to be produced on a large scale due to it being produced mainly using the CNC machine. This is especially true if the material of the display is changed into something like acrylic because if it is made using wood, human labour may be required in the making of the corners. In contrast, acrylic can be simply heated up in an oven and placed over a mould to achieve it.	As the display can be disassembled and packed together into a box, with possibilities of it being transported developed, the size of the display is fine for it to be taken around by the client. However, the display is too long (sideway length when looking at it from the front) this is due to the requirements being only 500mm wide. If the whole display was made to be this small, it would be unable to display pastries due to the platforms being very small. Therefore, the dimensions do not work. Lastly, the product requires the usage of a lot of materials and would therefore weigh more than 4-5kg (the required weight). However, as components are removable, the weight of each part may be less than this.	The display would be assembled and disassembled every time it is used by the client and this may cause the joints to wear off over time. As a result, the display may not be able to be connected together effectively over time, decreasing its stability. Moreover, this might cause the aesthetics of the display to worsen, due it getting worn off quite fast. However, if the display is not assembled and dissembled a lot then its durability would be relatively high. However, this also depends on other factors such as how often the client cleans the surfaces of the wood and how much it is interacted with.
DESIGN 2		"THE SHELVES MIGHT BE QUITE TIGHT, ESPECAILLY WHEN PASTRIES ARE PLACED ON IT, DUE TO THE SOME PASTRIES BEING STACKED AS WELL." "I THINK THIS DESIGN IS TOO RECTANGULAR; IT REMINDS ME OF A BLOCK."	This display displays pastries quite well, due to the different levels and the size of platforms. Pastries displayed can also be inserted and removed quite easily due to the spaces in between the platforms, which also makes it easy to clean. Its rectangular shape and flat surfaces allows it to be transported quite easily with other things, but as the two parts of the display are different shapes, the client might find difficulties in fitting them both in her trolley. The pastries can also be covered, with the addition of little things. Overall, the display performs is fit for purpose though it some functions are still missing. The different platforms on different levels allow the pastries to be displayed effectively. The acrylic sides can be used like a chalkboard and so this allows the client to write up any notices and specials. It can be disassembled and so therefore it is easy to clean.	It is mainly made out of wood which is a sustainable material and so therefore it is quite eco friendly. However, some the part on the right of the display might have parts where aluminium is combined with acrylic, and so it might be harder for aluminium to be recycled at its end of life, unless they are removed from each other.	This can be made on a larger scale if the right part of the display is made out of wood. This is because most of the components can be made using the CNC machine. However, the manufacturing of the corners might require human labour, causing it to be harder to be made on a larger scale, though the method of manufacturing the joints can be changed to still achieve this.	This product is very big and heavy, as mentioned before and so the client might come across some problems whilst transporting it. unlike the first design, it doesn't have to be disassembled every time it is used. It platforms are quite close to each other and so as mentioned by the client, it might look too tight. However, this problem might be resolved if the display takes over another section on the table, allowing the sizes of the platforms to increase. However, this must be discussed with the client.	If good finishes are used then the product should be quite durable. This is because However, due to its big size, there is a high possibility of it falling and hitting other things. This might decrease its durability.
DESIGN 3		I THINK THIS ALLOWS SPACE TO BE USED FOR EFFICIENTLY AND I LIKE THE IDEA OF ME BEING ABLE TO WRITE ON THE ACRYLIC PART.		It is made out of many materials and so therefore this makes it less sustainable.	Human labour is only required in the assembling of the product and so therefore it can be produced on a larger scale.	This display is medium sized, though it is quite long and so it would have to take up space from the other sections of the table. However, as it is quite thin and is raised, other products from the other sections can be displayed in front of it instead.	The durability of the platforms and the metal legs are high, but as mentioned before, acrylics get scratched very easily and so therefore the display as a whole might not be very durable.

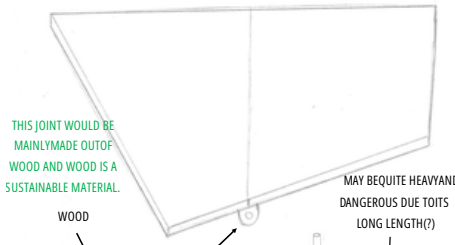
EVALUATION OF IDEAS AGAINST SPECIFICATIONS

DESIGN		CLIENT'S COMMENT	PURPOSEAND FUNCTION	ENVIRONMENTALS IMPACTS	SCALE OF PRO-DUCTION	SIZE AND WEIGHT	DURABILITY
DESIGN 3 (CONTINUED)		THIS DESIGN IS MORE PRACTICAL AND FUNCTIONAL AND SUITS MY WAY OF DISPLAYING PRODUCTS– I USUALLY DISPLAY 2-3 PIECES OF THE SAME PRODUCT ON EACH PLATFORM.	However, the acrylic part makes it quite difficult to be packed and transported around, especially as acrylic can be very easily scratched. The unique triangular platforms combined with the acrylic cases also makes it quite attractive. Overall, it quite functional and is fit for purpose if it is to only be displayed and not transported around.	However, the triangles can be printed like tessellations and so therefore this eliminates waste materials.	This is if CNC machines and are used for cutting the wooden platforms and laser cutters are used for cutting the acrylic pieces.	As the platforms are quite and acrylics are quite thin, it shouldn't be very heavy. However, the mild steel legs might add a lot of weight to the display and so the legs might be changed– in order to keep it light-weight.	The acrylic parts are also very important because the customers would be looking through it and any scratches would be visible on its surface, making it unattractive. This suggests that even if the rest of the display still works fine but the acrylic part is scratched then it might not work at all.
DESIGN 4		I THINK THIS LOOKS LIKE A PYRAMID AND LOOKS TOO STRAIGHT. IF PRODUCTS ARE PLACED IN THE MIDDLE THEN IT CAN'T BE SEEN FROM THE SIDES. I LIKE ITS MATERIAL AND THE WAY THAT I CAN CUSTOMIZE IT.	This display can display products quite effectively, due to the client being able to customize the boxes in any way that she wants, therefore smaller and larger, and higher and lower platforms can be made to suit the pastries being displayed. Some of the pastries are also covered, though alternative methods of ensuring the pastries inside in be seen must be considered to make the design work. The boxes can be cleaned individually and so this would keep it hygienic.	All the small boxes are nearly identical and so therefore it can be made very easily, with less mistakes and less wasted materials. However, many acrylic components would be made, which prevents it from being very sustainable.	It can be made on a large scale as most of the boxes are identical, and so not a lot of processes are required to make it.	The size of the display can be varied by the client, depending on how she decides to stack the boxes and so it can be arranged so that it can be transported easily. Each box is big enough for pastries to be displayed in and so this allows it to display pastries effectively. The weight of the wooden boxes combined would be quite heavy. This was proved from the prototype made. However, the dimensions were developed to be thinner and this would contribute greatly to the overall weight.	The wooden boxes may wear off over time from the stress caused by the boxes being stacked on each other. The acrylic boxes can also be easily scratched in the process and so this would decrease the durability of the boxes.
DESIGN 5		ITS FORM IS VERY UNIQUE AND THE CURVES COMPLIMENT WITH THE SHAPE OF THE NON-GEOMETRICAL SHAPES OF THE PASTRIES WHICH ARE GOING TO BE DISPLAYED. HOWEVER, FOR THE DISPLAY, I THINK MAKING IT MORE RECTANGULAR WOULD MAKE IT FIT IN WITH THE OTHER SECTIONS ON THE TABLE.	This design was developed so that the platforms can be rotated. This increases the amount of pastries that can be displayed and also improve its aesthetics. It has different levels, though the curves parts might make it difficult for the customers to view products which are on the sides. The idea of it having a rotatable samplings section would give the customers an opportunity to engage with the display, increasing the chances of them trying out the products.	The combination of metal and wood, without any plastics make it quite sustainable, where the parts are attached using screws and so they can be disassembled at its end-of-life to be recycled.	The display can be made on a larger scale as the wooden platforms can be easily made, though the difficulties lie in the way that the mild steel supporters are bent. Also, human labour might be required in the process of putting the gears of the rotating platform together.	This display is quite big and would be quite hard to be transported around, though the circular platforms can be disassembled and placed together in a way that would allow it to be transported easier. Its size and proportions would also allow it to fit in the middle section of the clients' table. However, it might be quite heavy, due to the large wooden platforms and the mild steel supporters.	This should be quite durable, due to the materials that it is made out of; wood and mild steel.
DESIGN 6		I LIKE THIS DESIGN MORE THAN THE FIRST ONE– IT LOOKS PREMIUM AND EYE CATCHING	This design has many levels and layers and the shape of the platforms are attractive and unique, whilst also covering the pastries. However, it might be difficult for the client to reach the pastries being displayed at the front. They can be stacked/ put inside each other so the client can transport them around. A chalkboard can also be put on the wooden surfaces too.	It is mainly made out of wood and the shape of the platforms are identical. The hexagonal shapes also tessellate each other, eliminating waste material.	This can be made on a larger scale, due to them being nearly identical, and human labour is only required in the assembly of the display.	The overall size of the display allows it to fit perfectly in the middle section of the table. The sides of the of the hexagon platforms are hollow and so they are lighter than how they look.	This main wooden display part should be quite durable, but the acrylic covers might get scratched and this may make the display look old.

FINAL DESIGN DEVELOPMENT



1)METHOD OF MAKING DESIGN FOLDABLE



THIS JOINT WOULD BE MAINLYMADE OUTOF WOOD AND WOOD IS A SUSTAINABLE MATERIAL.

WOOD

FINGERJOINTUNDERNEATH THE BASEACTSAS A HINGE

RODWOULDGOINTOTHE HOLE IT CANEITHERBEREMOVED SO THAT THEBASECANBEDISASSEMBLEDOR ITWOULDALLOW THE BASETO BEFOLDEDIN HALF.

FINGER JOINT PIECES

MAY BEQUITE HEAVYAND DANGEROUS DUE TOITS LONG LENGTH(?)

MILD STEEL

MORE DURABLETHANWOOD _ DOESN'T GETWORNOUT AS EASILY ANDQUICKLY

ROD — WOOD — SAFER AND LIGHTER(?)

SIDE VIEW OF JOINTS

WHEN FOLDED PROPERLY

SIDE

FOLD DOWN

*WILL IT BE ABLEFOLD PROPERLY (?)

THE CIRCULAR PARTOF THE PART STICKING OUT MIGHT BE BLOCKED BY THE FLAT PART OF THE PLATFORM.

REDESIGN OF JOINT

BOTH PARTSTICKINGOUT TO ENSURE THATITCAN BEFOLDED.

WHEN FOLDED PROPERLY

"I THINK IT'S A GOOD IDEA TO MAKE THE BASE FOLDABLE DUE TO IT BEING THE LARGEST PART OF THE DISPLAY. ALSO, I LIKE THE IDEA OF THE ROD GOING THROUGH THE FINGERS BECAUSE THIS WOULD GIVE ME THE OPTION TO EITHER FOLD THE DISPLAY OR TO TURN IT INTO TWO SEPARATE COMPONENTS."

MANUFACTURE OF "FINGERS"

START OFF WITH A BLOCK OF WOOD

USEAROUTERTOCREATE THE 20 MMRADIUSCURVED EDGES (ASTRACEDONTHE BLOCK)

ROUTER BIT AVAILABLE:

20MM

25 MM

Ø 20 MM

40 MM

R= 20 MM

FORSTNERBIT USED TO DRILLHOLE.

PROBLEM : THIS IDEA MAY NOT WORK AS THE OTHER PLATFORMSARE ALSOQUITEBIGANDAREDIFFERENT SHAPES THEREFORE FOLDING THE PLATFORM MAY NOT ALLOW IT TO BE STORED AND TRANSPORTED AROUND EASIER. ALSO, AS IT WULD STIL BE HARD FOR THE CLUENT TO CARRY THIS AROUND, DUE TO ITS IMPRACTICAL SHAPE. AS THISISQUITEBIG, THERISKOFTHEDISPLAYBANGINGTO THINGS AND GETTING DAMAGED IS REALLY HIGH TOO AND ALSOWHENITIS PLACEDDOWN,SOMEPARTSOFTHE DISPLAY WOULD HAVE TO BEAR QUITE A LOT OF THE WEIGHT AND SOIT MUSTBE MADETOBEVERYSTRONGSOTHATIT WOULD BE DURABLE.

"I AGREE WITH THESE PROBLEMS, BECAUSE I WOULD HAVE TO CARRY THESE COMPONENTS ON A TROLLEY WITH MY OTHER THINGS AND SO IF IT IS FOLDED LIKE THIS THEN IT MIGHT BE HARD TO STACK EVERYTHING TOGETHER, ESPECAILLY AS STACKING OTHER STUFF ON THE DISPLAY MAY DAMAGE IT , AS IN IT MIGHT GET SCRATCHED AND ALSO MY OTHER THINGS CAN BE QUITE HEAVY SOMETIMES, DUE TO THE GLASS COVERS AND THE COMPONENTS FOR THE OTHER PART OF THE PLATFORM."

AS THIS IDEAASUNSUCCESSFUL, ANOTHERIDEA WASTHOUGHT OF, WHERETHECOMPONENTS WOULD BEREMOVABLEUSING THEFOLLOWING JOINTS DOWNBELOW.

METHOD OF DISSASSEMBLING DESIGN

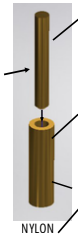
KNOCKDOWN FITTINGS

DOWEL JOINT WITH FITTING

ADDITIONAL TOOLSREQUIRED TO ASSEMBLEAND DISSASSEMBLE THECOMPONENTS

MAYBE QUITE TIMECONSUMINGTODISASSEMBLE EVERYTIMETHEREFOREITMAY NOT BEVERY SUITABLEFOR PRODUCTSTHAT MUSTBEDISASSEMBLEDFREQUENTLYSUCH AS THE DISPLAY.

"I DON'T MIND USING OTHER TOOLS TO DISSASSEMBLE THE PRODUCT AS LONG AS THE TOOL ISN'T TOO BIG AND I CAN MANAGE IT WITHOUT ANY HELP, THOUGH I WOULD PREFER IT IF NO OTHER TOOLS ARE USED."



ROD — WOOD — NOT STRONGENOUGH ANDMAY BREAK– POSSIBLY FROMTHE SRAIN FORMSUPPORTINGTHE PLATFORMS

BRASS

NO ADDITIONAL TOOLS REQUIRED AS THE ROD CAN JUST BE SLOTTED IN AND PULLED OUT. — QUICK, EASY AND EFFICIENT FOR THE CLIENT.

FITTING — BRASS — HAS LOW FRICTION PROPERTY AND SO THEREFORE IT WOULD ALLOW THE ROD TO SLIDE IN

NYLON — 2 LENGTHS OF FITTINGS ARE REQUIRED (10MM FOR BASE AND 30MM FOR OTHER PARTS)

HAS EXCELLENT ABRASIONRESISTANCEAND SO THEREFORE MIGHT BE A SUITABLE MATERIAL FORTHISPART. THIS ISBECAUSETHEROD WOULDBETAKENOUTAND SLOTTEDINQUITE FREQUENTLYBYTHE CLIENT.

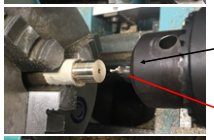
ALREADYAVAILABLE NYLON ROD AT SCHOOL DIAMETER: 40MM

THE DIAMETER OF NYLON ROD AVAILABLE IS QUITE BIG AND SO LOTS OF MATERIAL WOULD BE WASTED . THIS IS INEFFICIENT.

TESTING WITH BRASS RODS

TESTING WITH NYLON RODS

AMOUNT OF NYLON NEEDEDIS CUT USING A HACKSAW.



1. THE ROD IS"FACED OFF " SO THATTHE ENDIS SMOOTH . THE LENGTH OF ROD + SIZEOFCUTTING TOOLBLADE ISMARKEDANDTHE CENTRE LATHEIS USEDTO TURN DOWNTHE DIAMETEROFTHE RODTO 13MM.

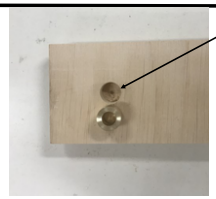
CENTRE DRILL–THISPRODUCES A SMALL HOLEINTHEMIDDLE OF THE ROD, ACTSLIKEAPILOTHOLE AND GUIDESTHEDRILLBIT IN.

CENTRE DRILL

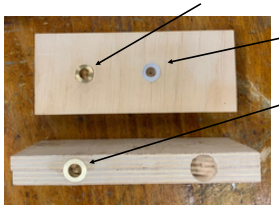
8MM DRILLBITISUSEDTO DRILL A HOLE THROUGHTHEMIDDLE OF THE ROD– THISWOULDALLOW A SMALLER ROD TO BE PASS THROUGH.

CUTTING TOOL

THE TOOLISCHANGEDSOTHAT THERODCAN BECUT.



BRASS FITTINGS



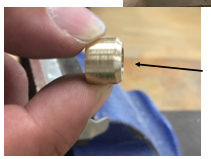
NYLON FITTINGS

DRILLING AND FITTING ONEDGEOF WOOD

FORSTNERBITISUSED TO DRILL A HOLE WITH A DIAMETEROF13MM

BRASSFITTINGSFITTED INTO WOODBYUSING THE VICEANDBYCLAMPING THE SIDESTOPREVENT THE WOOD

ANOTHER REASON WHYBRASS WOULD BE A GOOD MATERIAL TO USE IS THAT IT IS MAINLYMADE OUT OF RECYCLED SCRAP,THEREFOREITISSUSTAINABLE .



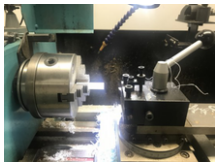
CHAMFERED EDGE: HELPS GUIDE THE ROD INTO THE WOOD.

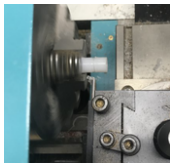
"I WOULD PREFER THE ROD FITTINGS BECAUSE I THINK IT LOOKS BETTER WHEN BEING COMPARED TO THE NYLON FITTINGS. ALSO AS YOU SAID IT CAN BE SLOTTED IN A REMOVED EASILY, I THINK THE BRASS FITTINGS WOULD BE THE BETTER OPTION , BECAUSE I DON'T WANT TO SPEND A LOT OF TIME TRYING TO PULL THE PARTS OUT.

THECENTRELATHEISUSEDTO TURNDOWNTHE DIAMETER OFTHERODTO13MM, TOPRODUCE THEPART WHERETHERODWOULD BEFITTEDIN.

A CENTRE DRILLBIT ISUSEDBEFORE AN8MM DRILL BIT IS USED TODRILLAHOLETHROUGHTHE MIDDLE OFTHEROD.

THE BLADEONTHETOOLIS CHANGEDSOTHAT THE NYLON CAN BE CUT.





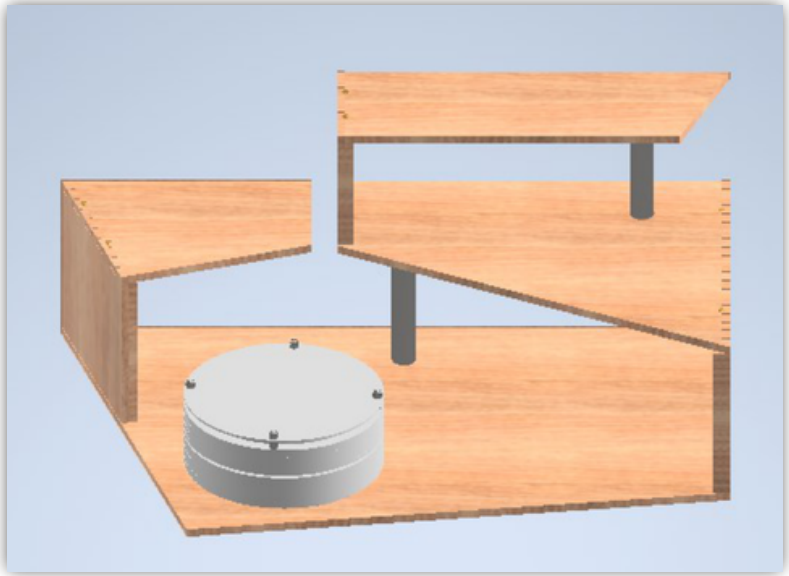
NYLON FITTING: QUITE HARD TO PUSHBRASSRODINDUE TO FRICTION.

QUITE HARD TO CUTUSING THE LATHE DUE TOITMELTING, AND ALSO HARDTOCUT IN A STRAIGHT LINEUSING A SAW.

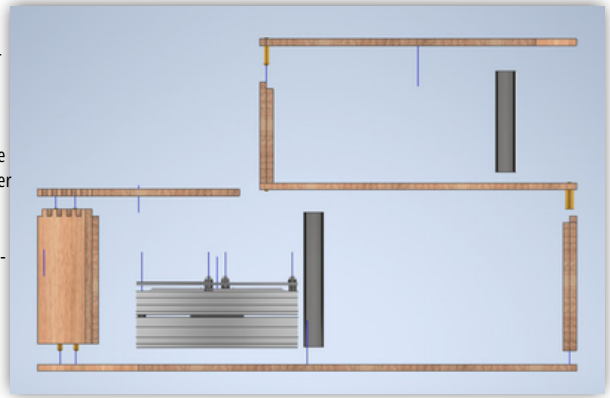
BRASS FITTING: RODCAN BE EASILY INSERTEDAND REMOVED– BETTERAS PRODUCT WOULDBE FREQUENTLY ASSEMBLED AND DISASSEMBLED.

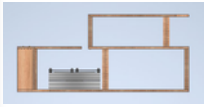
TURNED AND CUT EVERY EASILY ON THE LATHE.

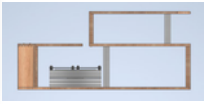
3D CAD OF FINAL DESIGN & DEVELOPMENT (1)

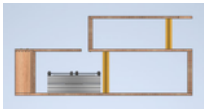


This isthe CAD of the whole display, with the final height being 358mm and the width being 800mm. The exploded view of the different parts that can be removed is shown on the right hand side. (The rotating platform can be removed into three different sections and is shown below but is counted as one piece on this exploded view). The dimensions were confirmed with the client, along with the sizes of the different platforms. I presented this 3D model to her and asked for her opinions on the thicknesses of the wood, the material that the poles should be made out of in between wood, brass and aluminium, and also the colour of the rotating platform. However, as the material rendering in the model does not clearly and accurately show the colour and texture of the actual material, I also showed her an example of the real material.

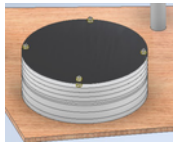


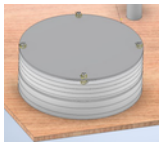




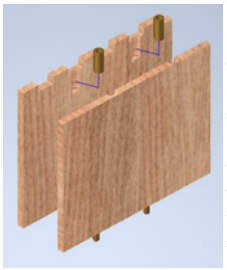


The client said that the thicknesses of the wood is fine because if it was thicker than this, then it might look too sturdy and the display might weigh too much. About the material of the poles, she commented on how wooden poles would look really plain on the display and brass would be too heavy and so aluminium poles would be the best option, as it is also the lightest out of all the other materials and it also creates a good contrast in the colours of the platform. For the colour of the rotating platform, she prefers it to be white because she wants it to look clean and white is a plain colour that would also allow her tarts to stand out.

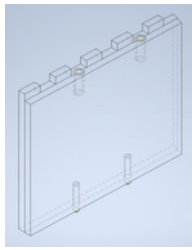


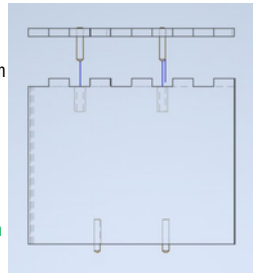


The rotating platform must be made out of three parts because the section that has the motor and the circuit should be separate from the part where the ice packs/ ice/dry ice goes in to prevent any contact of the circuit and water, as this may be very dangerous. The last part would be the lid which should be removable so that the client is able to change the cooling components.

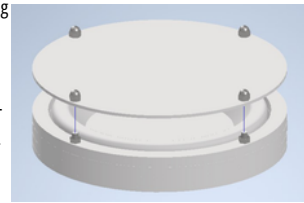


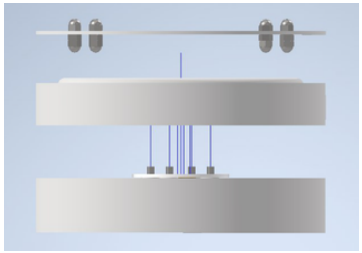
Each wooden component would be cut using the CNC, where it would be arranged in a way that would make out the most out of each piece of plywood, to reduce the amount of waste. All the components would be drawn at the same time so that pieces can be arranged on the wood in a flexible way and they would be printed in the least amount of times possible to save energy as all components can't be printed at the same time due to the size the 10mm plywood. Each joint is joined using brass rods and brass fittings which would be made using the centre lathe. Initially, the length of the fitting was going to be 50mm to ensure that the rods are stable, but further testing showed that it is enough for the fitting to only be 30mm and for the rod inserts to be 40mm, saving material. The idea of the components which connects each platform together is that it would be constructed with 2 pieces of 10mm plywood. The extra thickness would allow the "brass fittings" to be put in, so that the brass rods can be inserted into it. The outer piece would have finger joints because these fingers would allow help stabilize the joints and ensure that the joint is strong enough to support the platforms. An exploded view of one of these parts is shown on the left, and the image below it shows the insides of the component. The image on the right shows this component and the platform above it, demonstrating the how the rods would be fitted into the brass fittings. For the poles that would support the platform, it was decided that aluminium tubes would be used because it is a really light material and is also strong. Moreover, aluminium is really sustainable due to it needing very little energy (5% of the energy needed to extract it from its ore) to recycle.

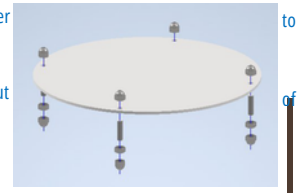




The circular walls would be made out of layers of "rings" of plaswood, cut out using the CNC machine and to reduce waste, the plaswood rings would be arranged on the CNC in the least space consuming way and the insides of the rings can also be used for testing out processes on plaswood. I believe that is more energy efficient than if a thicker piece of plaswood is used and the insides were removed. The lowest piece of each platform would be cut out to a depth of 2-5mm so that it acts in a similar way to a tenon joint. The lid can either be made out of a sheet of aluminium or acrylic. The initial design for the lid was for the threaded rod to be screwed in the wood, and a hex nut was to be used to lock it in place and to also allow there to be a gap in between the lid and the platform so that if the client decides to use dry ice, then the smoke can escape. Lastly, a cap nut would be screwed in above the lid and this would have to be screwed in by the client every time she wants to remove the lid. However, after discussions with the client about how it might be hard for her screw the four cap nuts on the lid every time she wants to remove the lid, we decided that it was not practical for her and that she might lose the cap nuts whilst pouring water out of the component.

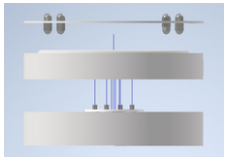






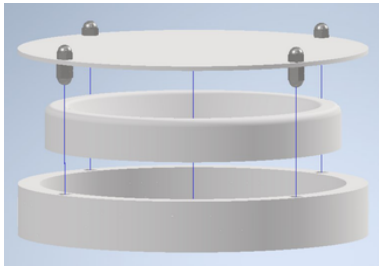
As a result of this, it was decided that another cap nut would be fitted underneath the hex nut and the thread would go through all of these components (as shown in the image on the right). The holes drilled on the plaswood would be enlarged so that the cap nut can be fitted in and removed easily.

3D CAD OF FINAL DESIGN & DEVELOPMENT (2) + 2D CAD PLANS



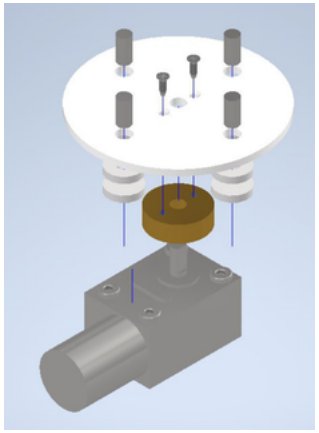
The second level of the platform would be where ice packs/ ice/ dry ice would be put in. For this, I would vacuum form over the blue foam so that the foam can act as an insulator for the cooling packs, due to its good insulating property. This is an efficient way of using material as the same blue foam would be used as the mould for vacuum forming as well. This model on the right shows the exploded view of the second platform and the lid.

The client has requested for the foam to not be stuck onto the plaswood underneath so that she is able to remove the foam to pour out water from the melted ice packs.

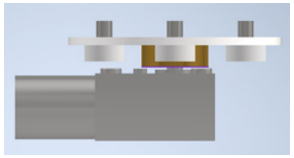


On the last layer of the rotating platform, the circuit and the motor would be placed.

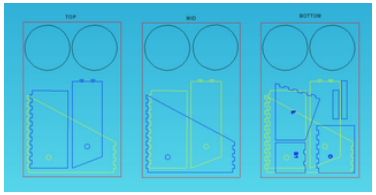
The exploded view on the bottom shows how the motor would be connected to the pegs that would fit into the holes. A brass piece would be made and locked onto the spinning part of the motor using a horizontal screw to the sides and then the holes drilled in on top of it would be tapped, allowing the screws to fit in from above the acrylic circular piece. This acrylic piece would act as a platform that would support the pegs where the smaller circular acrylic pieces would allow the pegs to be glued in and supported vertically in the holes. It is important that the pegs are vertical because it may affect the angle of rotation of the platform above. These pegs would then fit into the holes which are drilled on the base of the platform above this.

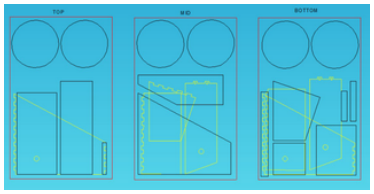


The motor would then be soldered to the circuit and the switch would be stuck onto one of the plaswood "rings" where a part would be cut out for it. These would then be stuck onto the platform, where a piece of plaswood (from the unused inner part of the ring that was cut out previously to reduce waste) would be used and the insides would be cut out in the sizes of the motor and battery holder so that we would ensure that the rotating part of the motor is in the middle of the platform and so that the battery holder can be supported in place whilst also being removable.

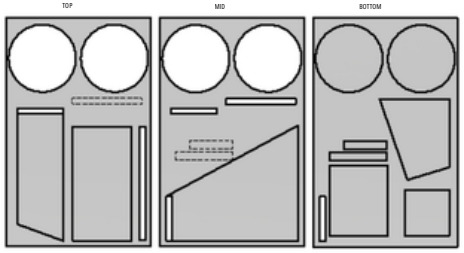


As the display was designed so that it can be removed and turned into a flatpack, a box where the components would fit in must be designed and made as well. For this to be successful, I decided to separate pieces "A" and "B" because them being attached together would cause the box to be too thick. The 2D plan on the right shows how the different components can be arranged on 3 different layers which would be fitted inside a box, where each layer is 820x520mm. The red lines represent the edge of the layer, the blue lines represent the component that would be on the layer and the yellow lines represent the component that would be below that layer. The yellow lines must be there due to the pegs at the end of some of the components that may have to poke up through the layer above/ below. I was able to arrange the components more easily with these lines. These pegs also prevented everything from just being stacked on top of each other and the other ideas that was presented because of how the pegs are pointing both up and down on one of the components and may get damaged.

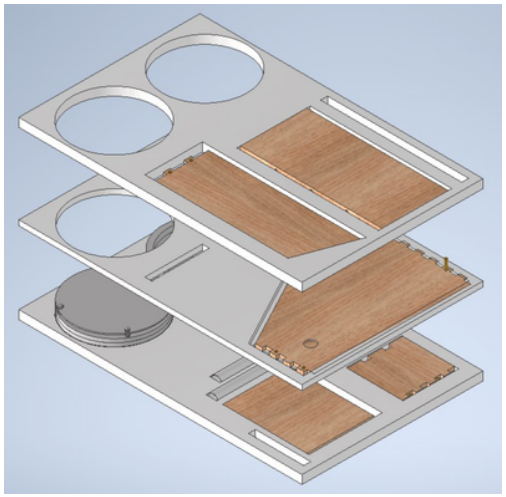


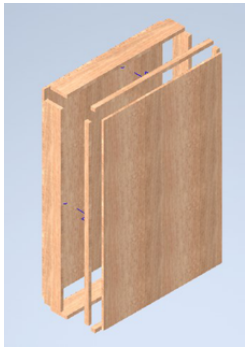


The client really likes the idea of a box being made for the display and for the display to be turned into a flatpack because if it is a box, then the other pieces that she must also bring can be stacked onto it.



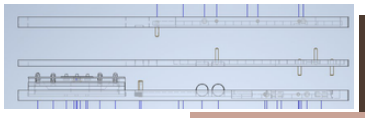
This plan on the left shows the sizes of the boxes that would allow the pieces to be fitted in, where 2-3mm would be offset from the edge of the components so that they can be slotted in and taken out easily. This plan also includes the boxes that would be cut out to allow for the pegs poking through. I then drew it out on 3D CAD and realized that it doesn't work. Therefore I developed the plan more, flipped some components around and ended up with the final plan on the right. The dotted lines show the cut out behind the foam pieces which can't be seen from the front. These cut outs behind must be there because of either the thickness of the material (the aluminium poles) or the pegs that would be poking through. The parts which aren't shaded shows the parts that would be cut out completely. The dimensions of these layers are labeled in one of the following pages. The base of the display would be placed on the lid of the box. The initial idea was that the base would be locked onto the wood but after further discussions with the client, it was decided that the base would be placed on another foam layer that would be fitted into the lid of the box where straps would be put around it to lock it in place when opening and closing the lid. To reduce wastage of material, the minimum amount of foam would be used for the layers and the arrangement of the components on the foam would be arranged in the way that is space efficient.





The method of making and the type of foam to use was discussed and then in the end, it was concluded that 5mm thick foam would be used and stuck together to form one big layer. The insides of the foam would be cut using a cutting knife and the glue used to stick the foam together must be tested out. This method is labour intensive but is energy efficient. To minimize waste, if a 5mm layer wasn't perfect but can still be used, it can be put in the middle between the other layers where the faults would be hidden.

These foam layers would then be put into the wooden box that would be constructed out of 15mm pinewood, with the its front and back being made out of 10mm plywood. The exploded view on the right shows the different pieces that would be used in the construction of the box. Holes would be drilled on the sides of the pieces and then it would be glued and clamped together before screws are screwed in to make it more secure. The box would be able to be opened from the longer side and 3-4 hinges would be used to achieve this. Locks would also be used, from the front and possibly the sides depending on how strong they are and possibly 2 handles would be attached on it; one on top and one on the side.



COMPARISON OF FINAL IDEA WITH EXISTING PRODUCTS

This idea has many platforms, different in sizes and dimensions. These platforms are placed in a way that would build up many layers, with the higher layers further away from the customer which allows the pastries to be looked at easily– similar to my display. The space was also efficiently used, though it is much taller than my display due to the merchant not being behind it. However, this display was made so that it would display all of their pastries so that people can just take what they want from the platforms whereas for my client, the pastries being on the platforms are just there for display and only some pieces are placed there. Therefore, the aim of the platforms are different in some ways.

When compared to my specification points, it is able to display pastries in an efficient way, with the use of many layers. It also seems like they can be rearranged easily and so it is quite flexible. However, the material of the components make it seem more high end and heavier and so it may not be suited for a farmers market.

Although the pastries look really tasty form the way that many of them are placed together, I feel like there's too much to look at and it may make some people feel uncomfortable if they must quickly choose something to buy. Therefore letting the platforms spread out more like my design may be a better way to display pastries as it would also allow the pastries to stand out more.

This display is quite unique, and the formation of platforms is similar my initial design number 6 before the development. Unlike the other designs, this the build up of layer is only to one side and so it may be easier to follow through the display and the things being displayed on it.

The combination of wood and steel poles is also similar to my final design, although aluminium poles will be used on my design and so this example shows that this combination of material would work well.

Comparing it to my specification points, it has a build up of layers and has different sized platforms. As the build up of layer can be seen in all of the examples of pastries display, this implies that it is a really important factor for displays. The durability of the display would depend on how strong the supports for the wooden platforms are but as pastries tend to be quite light (if used without plate underneath) and so it should be strong enough and would end up being durable.

The platforms are quite spaced out unlike the one above and in my opinion, it is more comfortable to look at. Most of the platforms are circular, even when non-circular pastries are being displayed on it. This shows that other pastries apart from the tarts can also be displayed on the rotating platform.

Although this display looks quite fancy, the whole display doesn't really go well together because it is formed from many types of platforms being put together (the materials of the platforms aren't the same). Therefore, although it works well in displaying the pastries so that they can be clearly seen, they all look like they have been put together from a variety of sources and aren't supposed to be displayed together. Applying this to my display, it shows that it is really important that my display is made out of a material that is the same colour or is similar to the client's existing display so that they would go well together and look like one whole display instead of many being put together.

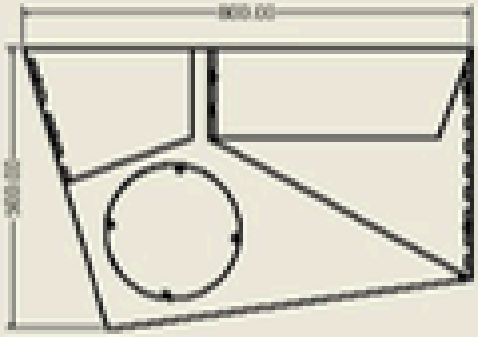
This idea is similar to my idea because of the material that it is made out of, and also how it can be disassembled into a flat-pack. It can also be used to display pastries on different levels, though the platforms are quite boring on here as the shapes and sizes are the same and from the image above, the pastries can't be put on it really well due to the platforms being too small.

This idea fits my specification of it having different levels, being portable and being easy to clean. However, it may not be very durable if it was to be assembled many times as the joints may wear out in the long term. Therefore, my idea of using two types of joints would ensure that it is stronger.

ORTHOHRAPHIC PROJECTION OF FINAL DESIGN + EVALUATION AGAINST SPECS.

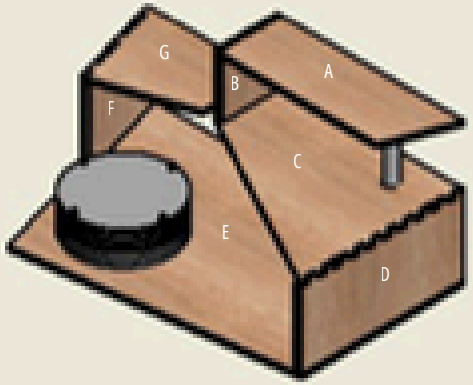
PURPOSE AND FUNCTION

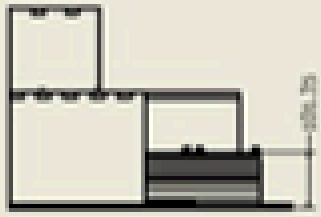
-Has many platformson different levels
-Has place for samplings to be placed
-Easy to clean
-Tarts section included
-Easy to transport (can be disassembled)

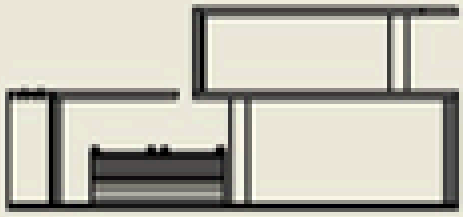


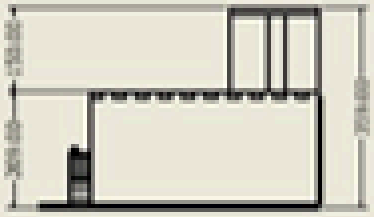
DURABILITY

-Plywood is really durable material.
-Two joints used so joints are more durable.







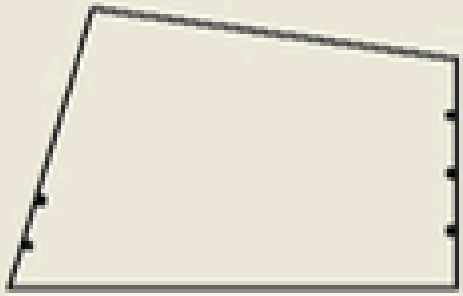


SCALE OF PRODUCTION

-Can be madeona larger scale as CNC is used to print out the components.
-Brass components can be made on the automatic lathe machine.
-However, manual labour may still be required for the brass components to be fitted into the correct pieces.

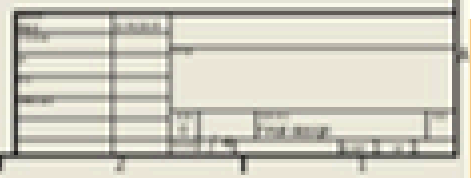
SIZE AND WEIGHT

-Canbe disassembled and so sizes are reduced
-Weight: may be quite heavy, though actual weight is still uncertain, but box would have wheels and the parts can be separated and so this should not be a problem in terms of transporting it.

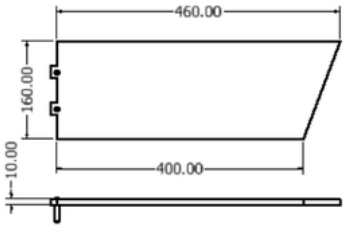


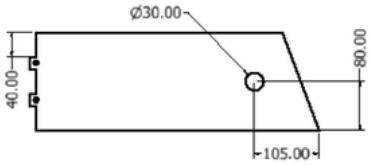
ENVIRONMENTAL IMPACTS

-Madeout ofwood andsotherefore it can be recycled/ reused at its end of life
-Minimal amount of plastics used.
-However,foamisusedinsidethebox,butmethodsofusingtheleastamountof this would be applied.



FINAL DESIGN COMPONENTS (1)



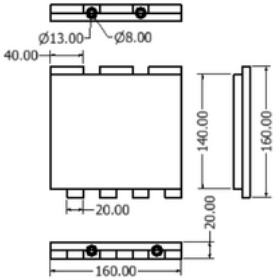


Topplatform– labelled"A"

- Cut using CNC router, made out of 10mm plywood

Has a ø= 30mm and depth = 5mm hole drilled in using forstner bit to support the aluminium holes.

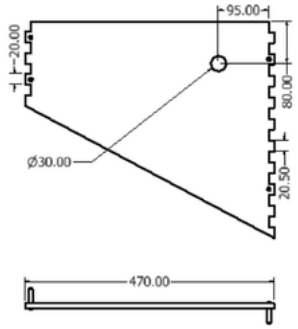
Has two 8mm holes for the brass rods.

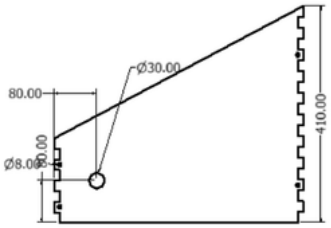


Supporter– labelled "B"

Made out of two pieces of 10mm plywood stuck together. One with finger joints, cut using CNC router

- Has four holes of ø= 13mm, depth 30mm for the brass fittings to be fitted in.





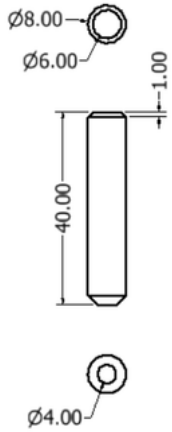
Supporter– labelled "F"

Made of two 10mm plywood glued together.

- Two ø13 holes and two ø8mm holes

Second platform,- labelled "C"

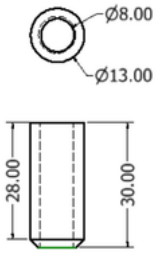
- Cut using CNC router, made out of 10mm plywood
- Has a ø= 30mm and depth = 5mm on the top and bottom to support the aluminium poles.
- Has a total of four 8mm holes for the brass rods to be fitted in.



Brass rods x13-

- Cut using hacksaw/ centre lathe

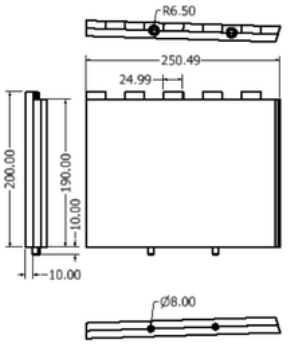
Chamfered so that it can be guided into the fittings.

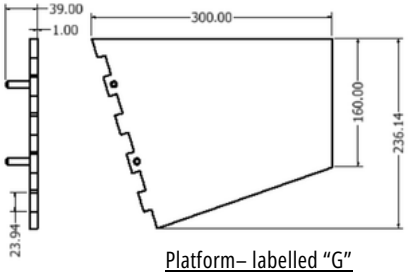


Brass fittings x8-

- Turned and cut using the centre lathe.
- Has a hole of ø= 8mm through the centre so that the rod can be fitted through.

Bottom is chamfered so that it is guided into the wood.





Platform– labelled "G"

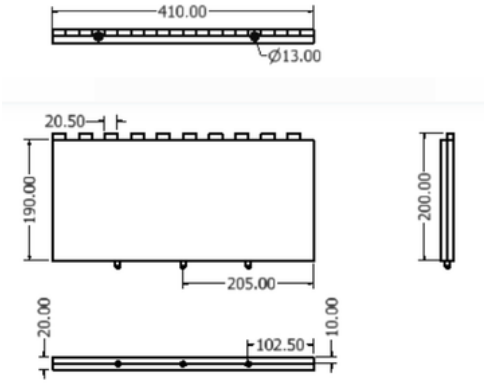
10mm plywood

Two ø8mm holes for brass rods.

Supporter– labelled "D"

Made out of two pieces of 10mm plywood stuck together, cut out using CNC router.

- Has two holes of ø= 13 on top and three holes of ø= 8 on the bottom.



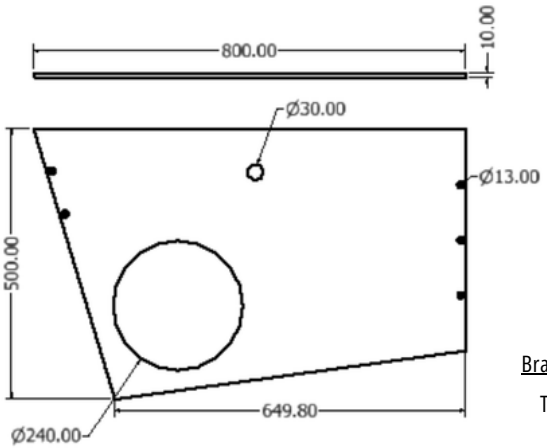
Base– labelled "E"

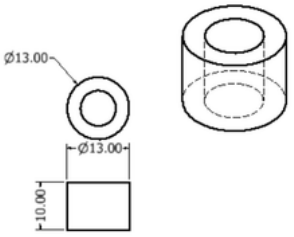
10mm Plywood.

Five ø= 13mm holes, depth 10mm for brass fittings

- One ø= 30 hole, depth 5mm to support aluminium poles

One ø= 240mm depth 5mm for rotating platform to be placed.



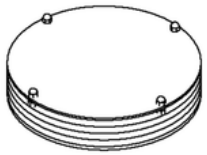


Brass fittings– for base

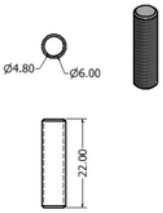
Turned and cut using centre lathe.

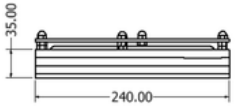
FINAL DESIGN COMPONENTS (2)

Topplatformof rotating display



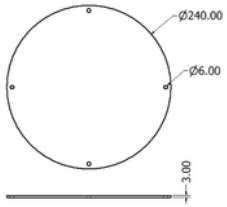
Threaded rod x4





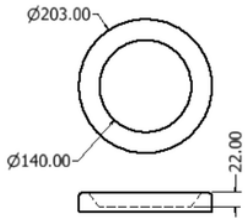
Acrylic lid–

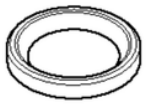
- Cut out using the laser cutter
- Has four ø6mm holes for threaded rod and cap nuts and hex nuts to be screwed on.



Cap nuts x8

Hex nuts x4





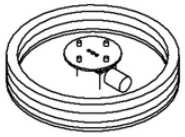
Insulating foam

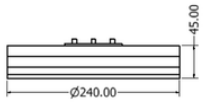
Made on the wood lathe machine

HIPS plastic vacuum formed over

Second platform

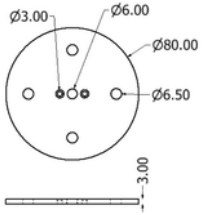
- Motor x1





Acrylic -

- Cut using laser cutter
- Ø6.5 —> x4
- Ø3 —> x2 (countersunk)
- Ø6 —> x1

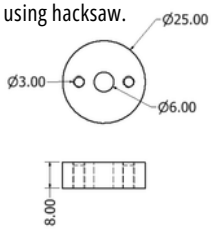


Brass x1

- Cut using centre lathe

Mild steel pegs x4-

- Cut using hacksaw.

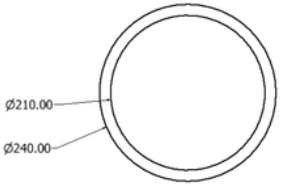


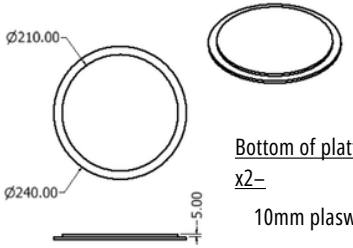
3mm screws x2

Rings of Plaswood–

Thickness= 10mm x4

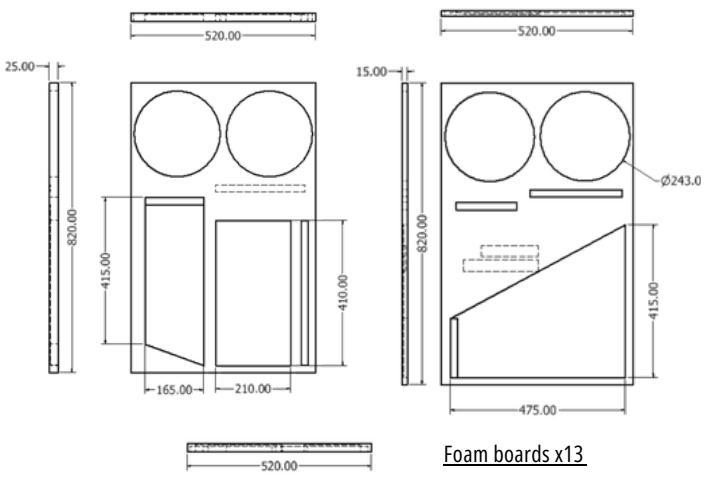
Thickness = 15mm x2





Bottom of platform x2–

10mm plaswood



Foam boards x13

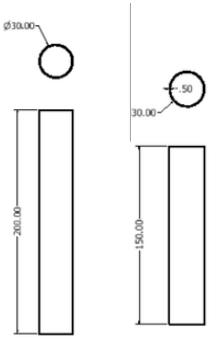
5mm thick each

- Cut out according to the diagram using a cutting knife

Bought components:

- Handles x2
- Hinges x4
- Locks x2

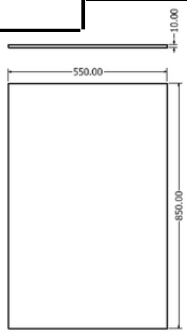
Wheels x4



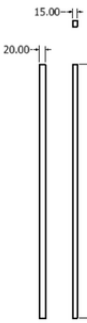
Aluminium poles

Made out of aluminium tubes

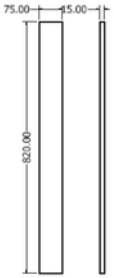
- Cut using tube cutter



Top and bottom of box– 10mm Plywood x2

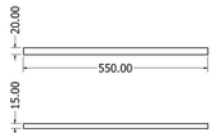


Top side– Pinewood x2



Bottom side– Pinewood x2

Bottom side– Pinewood x2



Top side– Pinewood x2

GAANT CHART (1)

: PLANNED X : ACTUAL X : PLANNED = ACTUAL

Processes (One box= One hour)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Drawing out all "wooden components" on 2D Design.	X																																		
Setting up CNC and Printing 10mm components		X	X	X	X																														
Gluing and Clamping "B1" with "B2", "D1"with "D2" and "F1" with "F2".							X	X																											
Filing the finger joints and sanding pieces and that the sides are level.												X																							
Drilling 8mm and 13mm holes into wooden components.													X	X	X																				
~~Using the centre lathe to turn down the diameter~~ of brass rods to 13mm		X	X	X	X	X	X																												
~~Drilling 8mm hole through the centre of the brass~~ rods and cutting them to the length of 30mm and 10mm								X	X	X	X																								
~~Cutting 8mm brass rods down to the length of~~ 40mm and then chamfering the edges																X	X	X																	
~~Polishing brass rods using wet and dry paper and~~ then Brasso.																			X	X															
~~Fitting brass into wood~~																					X	X													
Drilling, fitting and gluing small pegs through the ends of the wood and the brass rods.																							X	X											
Cutting Aluminium tube to desired length and smooth the ends using a "Handiburr"																									X										
Polishing using wet and dry paper and then Brasso.																										X	X								
Drawing rotating platform components onto 2D design.																												X							
Setting up CNC machine and printing out components.																													X	X	X				
Sanding the edges and then gluing the plaswood components together.																																X	x		
Solderwiresand motor,switch andbatteryholder together to complete the circuit																													X						
Cutting out part that would lock the circuit in place on the fretsaw and gluing it in to lock circuit in place.																														X					
Cutting out the "lid" and the smaller acrylic component joining the pegs to the brass piece on the laser cutter																																		X	
Cutting out threaded rods to the correct length and fitting in the cap nuts, hex nuts and the lid.																																			X
Drilling holes on the upper layer of the plaswood and underneath for the pegs to fit in.																																		X	

GAANT CHART (2)

Processes (One box= One hour)	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
Cutting the blue foam using the hot wire foam cutting machine into a circular shape.	X																													
Sticking to MDF and then turning the diameter down and creating the slump in the middle on the wood lathe.		X	X	X																										
Sanding to smoothen out foam and then cutting it					X																									
Drilling holes and vacuum forming over it.						X																								
Cutting out brass piece and drilling holes through it							X																							
Cutting out mild steel to make pegs and gluing peg to acrylic piece								X																						
Screwing brass piece with acrylic piece and the motor.									X																					
Putting the upper part of the rotating platform on to the lower part– on the mild steel pegs.									X																					
Cutting out individual foam layers using cutting knife.										X	X	X	X	X																
Gluing certain foam layers together to form															X	X	X													
Cutting out and gluing the sides of the box to the base and top part.																		X	X	X										
Countersinking holes and screwing screws into the box.																					X	X	X	X						
Drillingholesandscrewin hinges, handles and locks onto the box and wheels.																									X					
Making and sticking the straps onto the foam for the "base" of the display																										X				
Sanding and Waxing box and display																											X	X	X	
Inserting Foam and fitting every other component into the box																														X

FLOW CHART (1)

NO
YES

START

Draw out all main display wooden components on 2D design.

Transfer files to the CNC router, with components arranged efficiently.

Set 10mm plywood onto the CNC router.

Is the wood large enough for the required parts to be printed on?

The parts are then printed on the CNC router.

Were the parts printed to a tolerance of ±2mm

Sand down the sides and the surfaces, especially where the wood is chipped of the component.

Are the sides smooth?

Glue and clamp parts "B1 + B2", "D1+D2" and "F1+F2".

File and sand the sides so that they are flushed.

Are the woods glued on to the correct side?

Are the woods aligned and the sides flushed to a tolerance of ±0.5mm?

File the finger joints so that the platform fits well into the wooden supporters.

Can the platforms be fitted in and taken out of the supporters easily?

A dowel can be fitted into the hole and sanded so that the ends are flushed with the surface of the wood.

Are the holes drilled at the correct positions to ±0.5mm?

Drill 8mm holes into the wooden platforms.

Bring drill bit down and check against wood; is the depth correct to ±0.5mm?

Set the drilling machine so that the drill bit can move down to the depth of 30mm.

Clamp the wood where the holes would be drilled to prevent them from splitting and place wood into a machine vice.

Use a mallet and centre punch to mark out where to drill.

Mark out where the 8mm holes must be drilled using a pencil.

Are the depths correct to a tolerance of ±0.5mm?

Drill 13mm holes into the supporters and base using a forstner bit.

Set up the drilling machine

Place wood into the machine vice and then clamp the sides of the woods to prevent them from splitting when drilled

Fit the platforms onto the wooden supporters and then mark out where the 13mm holes should be drilled in.

Are any edges of the wood chipped?

Use a chisel to remove the chipped part.

Cut out a piece of veneer that is the size of the chipped part.

Glue veneer onto the wood where it is chipped and then clamp.

Sand it so that the veneer is flushed with the surface of the wood.

Is the veneer flushed with the wood to a tolerance of ±0.25mm?

Sand all pieces so that all the surfaces are smooth.

END

START

Mark out (30mm + size of the blade) onto a 15mm brass rod for the brass fittings.

Insert and lock a brass rod into the centre lathe machine.

Face off the end until it is smooth and the brass is ready to be worked with.

Turn down the diameter to 13mm

Is the diameter correct to a tolerance of ±0.05mm?

Change the tool bit to a cutting tool.

Cut the rod out at the length of 30mm.

Is the length of the rod correct to the tolerance of ±0.5mm?

Mark out (10mm + size of blade) onto the sides of a 15mm brass rod.

Are there 8 of these 30mm long brass fittings?

Chamfer one side of the end to 60 degrees.

Is the length of the rod correct to 10mm to the tolerance of ±0.5mm?

Cut the rod out at the length of 10mm

Change the tool bit to a cutting tool

Is the diameter correct to a tolerance of ±0.05mm?

Turn down the diameter to 13mm

Face off the end until it is smooth and the brass is ready to be worked with.

Insert and lock a brass rod into the centre lathe machine.

Are there 5 of these 10mm long brass fittings?

Chamfer one side of the end to 60 degrees

Finish all brass fittings with wet and dry paper and then polish with Brasso.

END

START

Mark out the a length of 40mm on the brass rods. (diameter = 8mm)

Cut them out using a hacksaw leaving a little gap from the desired length and then file down to correct length.

Are the lengths correct to the tolerance of ±0.5mm?

Chamfer the edges to an angle to 45 degrees using the centre lathe.

Finish off using wet and dry paper and then polish using Brasso.

END

START

Assembling the brass and the wooden components.

Put wooden component into vice and then clamp around where the brass fittings are going to be inserted in.

Use Clamps to push the brass rods and fittings into their designated holes.

Are the brass fittings flushed with the surface with the tolerance of ±0.5mm?

File the end of the brass fittings

Can the platform and supporters be assembled together?

Increase diameter the hole in the brass fitting slightly

START

Mark out the desired length of the aluminium tubes.

Use a tube cutter to cut the aluminium tubes.

Is the length correct to the tolerance of ±1.0mm?

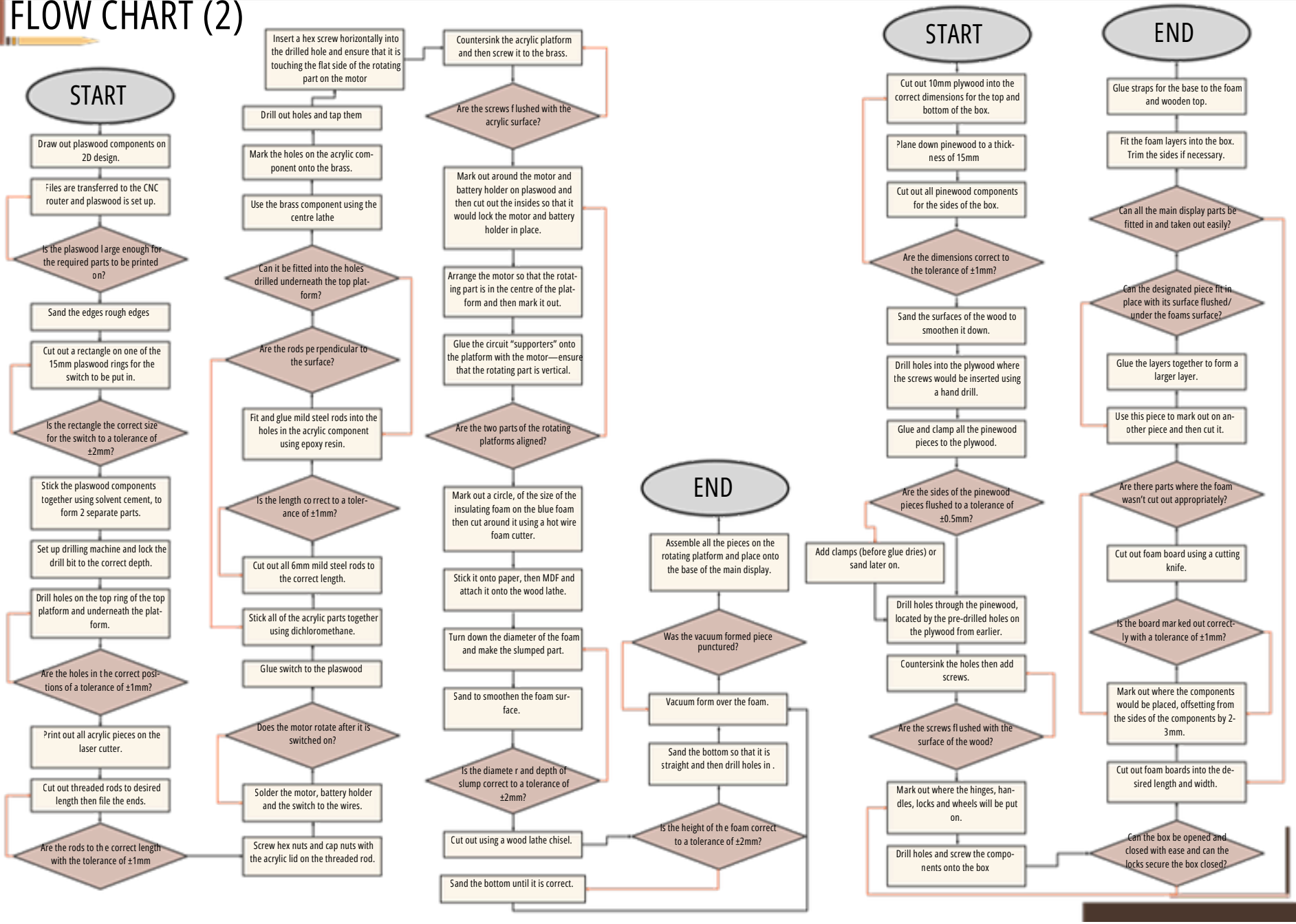
Use a "Handiburr" to smoothen the jagged ends.

Are the ends smooth enough to not cause injuries?

Finish off using wet and dry paper and then polish using Brasso.

END

FLOW CHART (2)


START
Draw out plaswood components on 2D design.
Files are transferred to the CNC router and plaswood is set up.
Is the plaswood large enough for the required parts to be printed on?
Sand the edges rough edges
Cut out a rectangle on one of the 15mm plaswood rings for the switch to be put in.
Is the rectangle the correct size for the switch to a tolerance of ±2mm?
Stick the plaswood components together using solvent cement, to form 2 separate parts.
Set up drilling machine and lock the drill bit to the correct depth.
Drill holes on the top ring of the top platform and underneath the platform.
Are the holes in the correct positions of a tolerance of ±1mm?
Print out all acrylic pieces on the laser cutter.
Cut out threaded rods to desired length then file the ends.
Are the rods to the correct length with the tolerance of ±1mm
Screw hex nuts and cap nuts with the acrylic lid on the threaded rod.
Solder the motor, battery holder and the switch to the wires.
Does the motor rotate after it is switched on?
Glue switch to the plaswood
Stick all of the acrylic parts together using dichloromethane.
Cut out all 6mm mild steel rods to the correct length.
Is the length correct to a tolerance of ±1mm?
Fit and glue mild steel rods into the holes in the acrylic component using epoxy resin.
Are the rods perpendicular to the surface?
Can it be fitted into the holes drilled underneath the top platform?
Use the brass component using the centre lathe
Mark the holes on the acrylic component onto the brass.
Drill out holes and tap them
Insert a hex screw horizontally into the drilled hole and ensure that it is touching the flat side of the rotating part on the motor
Countersink the acrylic platform and then screw it to the brass.
Are the screws flushed with the acrylic surface?
Mark out around the motor and battery holder on plaswood and then cut out the insides so that it would lock the motor and battery holder in place.
Arrange the motor so that the rotating part is in the centre of the platform and then mark it out.
Glue the circuit "supporters" onto the platform with the motor—ensure that the rotating part is vertical.
Are the two parts of the rotating platforms aligned?
Mark out a circle, of the size of the insulating foam on the blue foam then cut around it using a hot wire foam cutter.
Stick it onto paper, then MDF and attach it onto the wood lathe.
Turn down the diameter of the foam and make the slumped part.
Sand to smoothen the foam surface.
Is the diameter and depth of slump correct to a tolerance of ±2mm?
Cut out using a wood lathe chisel.
Sand the bottom until it is correct.
END
Assemble all the pieces on the rotating platform and place onto the base of the main display.
Was the vacuum formed piece punctured?
Vacuum form over the foam.
Sand the bottom so that it is straight and then drill holes in .
Is the height of the foam correct to a tolerance of ±2mm?
START
Cut out 10mm plywood into the correct dimensions for the top and bottom of the box.
Plane down pinewood to a thickness of 15mm
Cut out all pinewood components for the sides of the box.
Are the dimensions correct to the tolerance of ±1mm?
Sand the surfaces of the wood to smoothen it down.
Drill holes into the plywood where the screws would be inserted using a hand drill.
Glue and clamp all the pinewood pieces to the plywood.
Are the sides of the pinewood pieces flushed to a tolerance of ±0.5mm?
Add clamps (before glue dries) or sand later on.
Drill holes through the pinewood, located by the pre-drilled holes on the plywood from earlier.
Countersink the holes then add screws.
Are the screws flushed with the surface of the wood?
Mark out where the hinges, handles, locks and wheels will be put on.
Drill holes and screw the components onto the box
END
Glue straps for the base to the foam and wooden top.
Fit the foam layers into the box. Trim the sides if necessary.
Can all the main display parts be fitted in and taken out easily?
Can the designated piece fit in place with its surface flushed/ under the foams surface?
Glue the layers together to form a larger layer.
Use this piece to mark out on another piece and then cut it.
Are there parts where the foam wasn't cut out appropriately?
Cut out foam board using a cutting knife.
Is the board marked out correctly with a tolerance of ±1mm?
Mark out where the components would be placed, offsetting from the sides of the components by 2-3mm.
Cut out foam boards into the desired length and width.
Can the box be opened and closed with ease and can the locks secure the box closed?

MANUFACTURING SPECIFICATIONS

MAIN DISPLAY

MATERIALS USED

- 10mmPlywood: Plywood is available in my school's workshop and it is also relatively cheap. It has a high strength and stability and so it is suitable for the "supporters" and platforms on the main display. Although it chips very easily, it can be sanded/ veneer can be stuck in to cover it up and solve this problem.
- Brass rods: These were used to make removable joints for the display. It is easy to machine and has a low friction property and so it is a suitable material to use. It is also resistant to corrosion which ensures that the pastries being displayed won't get contaminated.
- Aluminium poles: These are light weight and strong enough to support the platforms on the display. Moreover, it is non corrosive and non toxic therefore it is suitable for the display.

SIZES:
-Rods: ø 8mm and Length: 40mm
-Fittings: ø 13mm and Length: 30mm and 10mm

TOLERANCES:
ø= ±0.05mm
Length= ±0.5mm
Dimension= ±2mm

MANUFACTURING PROCESSES+MACHINERY+ TOOLS + EQUIPMENTS

- WOOD:
  Cutting: CNC router
  Filing: Hand file
  Drilling: Pillar Drill, Hand drill
  Sanding: Belt Sander, Glass paper
  Adhesives: PVA glue
  Finishes: Wax
  Others: Chisel, mallet, hammer, clamps, 8mm brass pointy parts.
- BRASS:
  Machine: Centre lathe
  Finish: Wet and dry paper and Brasso
- FITTING BRASS INTO WOOD
  Mallet, hammer, clamps, machine vice
- ALUMINU POLES
  Cutting: Tube cutter
  Filing: Handiburr
  Finishes: Wet and dry paper, Brasso

HEALTH AND SAFETY PRECAUTIONS

- When usingtheCNC,ensurethatthe wood is clamped down tightly.
- Always ensure that brass is securely in the chuck before starting it.
- Always remove Chuck Wrench from Chuck immediately after use.
- Neverput hands near the rotating brass.
- Avoid touching brass after it has just been turned to avoid getting burns/ wear gloves.
- Always clamp piece down when drilling, and drill in pilot holes.
- Always wear appropriate PPE equipment when using any tools/ machines.

ROTATINGPLATFORM

MATERIALS USED

- 10mm and 15mm Plaswood: Waterproof and strong and so it is suitable for the rotating platform as water may be spilt onto it from the insulating foam component. It is also sustainable as it is made out of recycled plastic and can be recycled again at its end of life.

3mm Acrylic: Resistant to sunlight, has good impact strength and is a better conductor than wood and so therefore it is suitable for the lid. It can also be easily cleaned.

Blue foam with HIPS plastic: Good insulator and can be made into a mould for vacuum forming. HIPS plastic can be vacuum formed and so it is suited for making the insulating part.

Mild steel: Has high strength, is easy to work with and finishes well.

- Brass: Easy to work with, resistant to corrosion and high strength.

SIZES:
-Plaswood: Ring with ø= 220- 240mm
-Acrylic: Printed out to be a circular platform with a ø= 240mm
-Blue foam and HIPS plastic after vacuum formed ø=200mm and Height= 35mm.

TOLERANCES:
Dimensions= ±0.5-2mm

MANUFACTURING PROCESSES+MACHINERY+ TOOLS + EQUIPMENTS

- PLASWOOD:
  Cutting: CNC router
  Drilling: Pillar Drill
  Sanding: Belt Sander, Glass paper
  Adhesives: Solvent cement, Epoxy Resin
  Finishes: Self finishing
  Others: Fretsaw
- ACRYLIC
  Cutting: Laser cutter
  Adhesive: dichloromethane
- BLUE FOAM
  Cutting: Hot wire foam cutter, Wood lathe
  Shaping: Wood lathe
  Sanding: Belt sander, Glass paper
- HIPS PLASTIC
  Former: Vacuum forming
  Cutting: Circularsaw
  Sanding: Belt sander, Glass paper

HEALTH AND SAFETY PRECAUTIONS

- Alwaysclamp piece down whendrilling/ filing/ cutting using saw.
- Use solvent cement in a well ventilated area as it produces toxic fumes.
- Wear gloves when using solvent cement and if it comes into contact with the skin, rinse off immediately.
- On the vacuum former, keeps hands away from the heater and frames to avoid getting burned.
- Remove tool rest on the wood lathe before using glass paper to sand it (while it is still rotating).
- Do not sand small or handheld items.

BOX

MATERIALS USED

- 10mm Plywood– It is available in the size that was large enough for the top and bottom of the box and so it can just be trimmed down to the desired size.
- 20mm Pinewood (planed down to 15mm)- It resists swelling and shrinking, has an attractive grain pattern, is easy to work with and finishes well.
- 5mm foam board– It has a width that allows the depth of the layers to be easily adjusted (the amount being stacked/ cut). It can be cut easily using a cutting knife and can also be glued using PVA glue. This made it really easy to work, which saved me time. Its softness would absorb the impact if the box is dropped/ banged into something and so therefore it would protect the display effectively.

TOLERANCES:
Box construction= ±0.5– 1mm
Foam board= ±2mm

SIZES:
-Plywood: 850x550
-Pinewood: 820x75mm ,850x20mm 550x75mm, 550x20mm 550x115mm 820x520mm
-Foam board:

TOLERANCES:
ø= ±0.05mm Length: ±0.5mm

HEALTH AND SAFETY PRECAUTIONS

- For hand drills, always ensure that drill bit it securely in the chuck.
- Refrain from touching drill bit straight after use. (It may still be hot and cause burns)

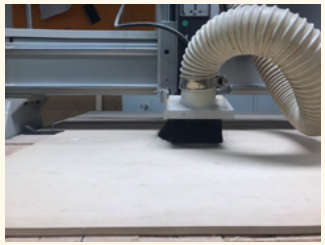
MANUFACTURING PROCESSES + MACHINERY+ TOOLS + EQUIPMENTS

- PLYWOOD
  Cutting: Circular saw
  Drilling: Hand drill
  Sanding: Glass paper
  Adhesives: PVA
  Finishes: Wax
- PINEWOOD
  Machine: Circular saw
  Drilling: Handdrill
  Sanding: Glass paper
- CONSTRUCTING:
  Screw driver
- FOAM BOARD
  Cutting: Circular saw, Cutting knife
  Adhesive: PVA glue

PPE (PERSONAL PROTECTIVE EQUIPMENT)

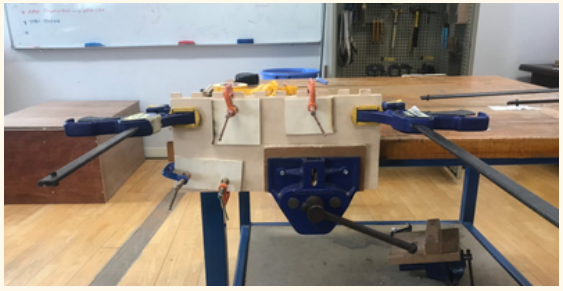
- Apron: Secures lanyard and protects clothing
- Safety glasses: prevents dust/ sharp/ flying pieces from flying into eye while using machines.
- Gloves: Prevents contact of skin with corrosive material.
- Hygienicmasks: To prevent inhalation of dust.
- Protective shoes: Prevent injuries from falling objects.

MANUFACTURING EVIDENCE (1)



The wooden parts were printing using the CNC router. The edges were chipped off and so the wooden parts had to be sanded down using glass paper, from coarse to fine grain. The surfaces were also smoothened down.

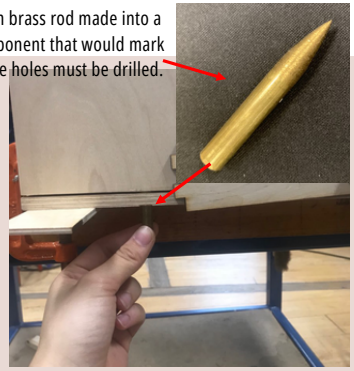
The wooden components for the "supporters" were then glued and clamped together using PVA glue.



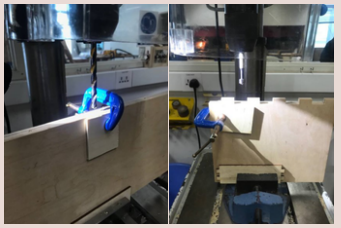
The finger joints were filed down until the platform and the "supporters" were able to fit together nicely.

The sides were then sanded to ensure that they were flushed. This was especially important for the underside to ensure that the wooden part would stand up vertically.

8mm brass rod made into a component that would mark where holes must be drilled.



Points to drill were marked on the wooden components, where 8mm brass rods with a point was made to indicate the position of where fittings must be drilled so that they would match and the holes were drilled in, (ø= 8mm for rods and ø= 13mm for fittings, both for the depth of 30mm)



Ø8mm= drill bit
Ø13mm=forstner bit

Sides of wood were clamped to prevent the component from separating,

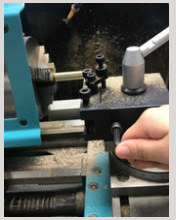
PROBLEM AND SOLUTION: When I was drilling the holes for where the aluminium poles would fit in, the forstner bit chipped the wood a lot. As a result, I quickly made a jig; I drilled a hole through scrap wood then clamped it onto the wooden piece.

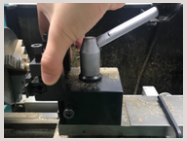
Another problem was found as the tip of the forstner bit was longer than 5mm and so it pierced through the to the other side when the hole was made. To cover this up, a 8mm hole was drilled, and a dowel was fitted through and it was sanded.

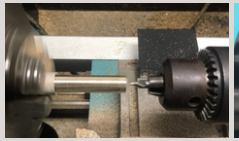
Some parts of the wood, especially at the fingers got chipped when the holes were drilled and so a chisel was used to remove the chipped part and a small veneer was glued on.

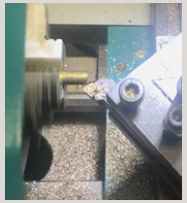
The centre lathe was used for making the brass fittings and rods.

One end was also chamfered so that they can be guided into the holes.



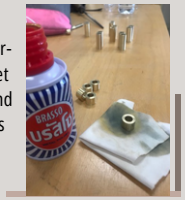






One end was chamfered so that it can be guided into the wooden components.

They were finished using different grades of wet and dry paper and then Brasso was used to polish them.



MANUFACTURING EVIDENCE + MODIFICATIONS(2)

Thebrassrodswerethenfittedinto the wooden components.

One side of the clamp was underneath the table and the other side was on the rod. This ensured that the rid would be clamped down vertically. Side of wood was clamed to prevent them from splitting.

PROBLEM AND SOLUTION: It was really difficult to insert the brass fittings in with the clamps and an alternative method was used- so a mallet and then a hammer was used instead where a piece of wood was used to prevent the hammer from damaging the end of the brass fittings.

The length of the aluminium poles were marked out and then cut using a "tube cutter".

The ends were then smoothened and the jagged parts removed by the "handiburr".

It was then finished with wet and dry paper then polished with Brasso.

The foam layers were marked out and then cut out using a cutting knife and stacked together, from the bottom with the components inside, to ensure that the thickness of each big layer is correct

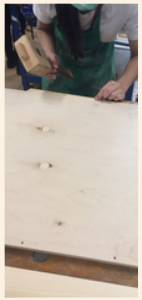
They were then stuck together using PVA glue.

PROBLEM + SOLUTION: It was hard and inaccurate to use the cutting knife to cut out circles for the rotating platforms and so the shape was changed into an octagon.

Parts where the screws would be were marked out and then drilled using a hand drill.

The pinewood side parts were then glued and clamped to the top/bottom plywood.

The holes were countersunk and screws were screwed in.



The rods are locked into the wood by small brass pegs. For each rod, a 3mm hole was drilled in and then a 2.5mm to a deeper depth so that the peg can be locked in. Brass is soft enough and was already and so I was able to just drill through the wood and rod at the same time. The peg was cut to the desired length by pliers and covered with epoxy resin. It was then hammered into the wood through the rod.

PROBLEM: The sizes of the part attaching the wheels to the wood was too for the lid of the box, and so therefore the wheels couldn't be directly screwed onto the sides.

As a result, another plank of pinewood was cut out and its screwed to the end of the box.

This would also allow the box to be durable because the wheels won't be trying toopen the lid all the time.

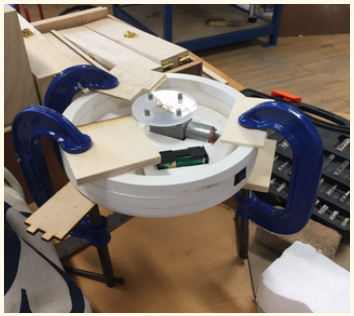
Thehinge,locks,handles were then screwed in.

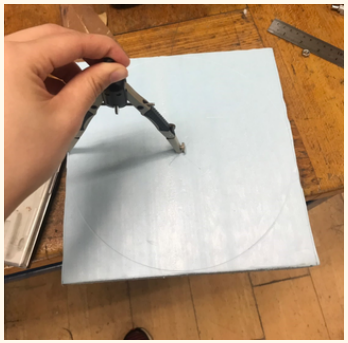
Straps were attached.

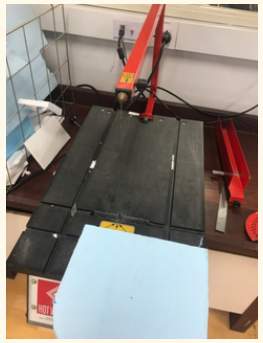
MANUFACTURING EVIDENCE (3)

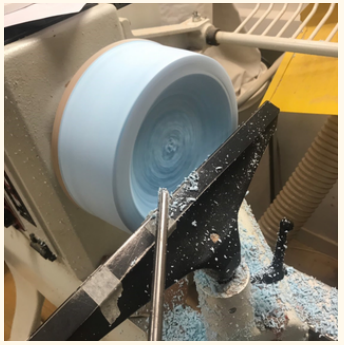
The Plaswood was glued and clamped together with solvent cement alongside the switch (epoxy resin was used to glue the switch with the Plaswood).

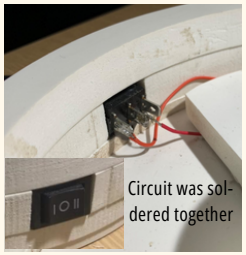
The part supporting the internal components were stuck onto the Plaswood using epoxy resin.





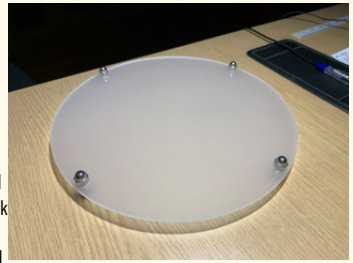






Circuit was soldered together

The brass component was tapped and screws were screwed in to lock the acrylic part into the brass. A horizontal screw was also screwed in through the sides and this allowed it to lock onto the rotating part of the motor.



Threaded rods were cut out and file to the correct length and used for assembling the lid.

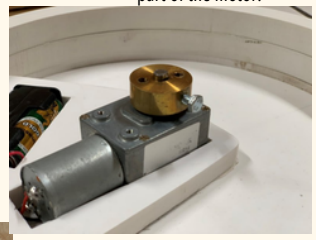
The insulating foam was made on the wood lathe, using the wood lathe chisels.

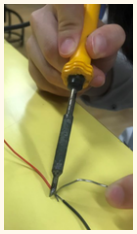
The diameter was turned down, the slump was made and it was cut out.

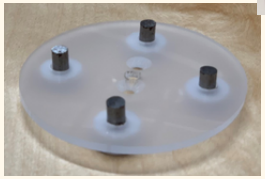
Holes were then drilled so that it can be vacuum formed.

The mild steel was cut out using a hack saw and then filed down and polished using Brasso. It was then stuck into the acrylic components using epoxy resin.

The acrylic parts were glued together using dichloromethane.





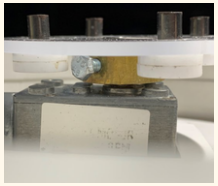


Holes were drilled underneath the top platform. As it was difficult to fit the rods in, the holes were enlarged by a countersink bit.

The HIPS plastic on the sides were then trimmed and the insulating platform was placed on to the top layer of the rotating platform.

However, while it was vacuum forming, one side burst and so it had to be sanded.

The acrylic part was screwed into the brass component



TESTING OUT THE PRODUCT (DISPLAY)

Totestout the product, thebox was wheeled out and the display was assembled. Some of the components of her display such as the trays were set up with mine, alongside the other parts of her old display. (As my display was aimed to only present a part of her overall display). Ice was put into the rotating platform to test out how cool the acrylic platform can get and to see whether it would effectively cool the tarts. At the end of the day, the pastries were removed and the display was packed back into the box.

CUSTOMERS COMMENT

"Each platform shows a certain pastry and so that pastries really stand out– I can choose what I want really easily"

"I think this rotating platform is really good at attracting attention because it is moving. If everything was still then we might've walked through it like every other store but this rotating platform really made it stand out from the rest."

"The first thing is saw is the rotating platform. Last time I came to the event, I didn't see it but now that it's here, it really captivated my attention as I could tell that this display was unique and is unlike any other displays around here."

"It was very easy to look at the different pastries on each level, as the platforms really highlight them"

"The shape of the platform is really cool and unique, a creative way to build up layers"

"The colour is really nice because it contrasts with the darker coloured table cloth."

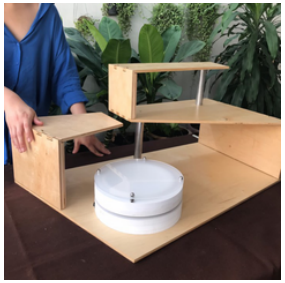
"Its quite open and this allows it to not look too packed which is good"

PORTABILITY

"In terms of transportation, if we actually compare the display with the old components we need to take around with us, I feel like they're the same weight and around the same size and so we can displace it with this new display. Also as the different parts of the display are removable, we can take them apart and stack them onto each other to save even more space.

I also really like the box that comes with the display and allows it to be flat-packed, but I think it's a bit too big- as I have to also carry my box (storing the other components on the table), and the boxes containing my pastries, therefore carrying another box might be difficult. However, it would be very good for when there is someone else helping me as it would be easier for us to separate the things to carry, as the box can be wheeled along.

Another thing that I really love is that it can be taken apart in a very short periodoftimeandcanbeconstructed very easily, without the use of any external equipment. However, it might be difficult to construct without knowing the pieces and so having a small label on each of the platform alongside the manual might be useful"



KHUN NAN'S COMMENTS ON THE FUNCTIONS OF THE DISPLAY

LAYERS

"This new display made my pastries look a lot more attractive due to the layers– the pastries can now be arranged in a way that is more eye catching and in a way that would allow the customers to see the pastries more easily. My old display was very flat and so when pastries were displayed, nothing stood out. Moreover, other booths near us would stack their things up so they were taller than us, blocking the customers view of our pastries from the sides completely. This display solved that problem, and now customers will notice our booth more.

The height of the display is really good as it isn't too tall and so it would allow me to interact with the customers easily. It is also at peoples eye level when they're walking through the booths and so it is what customers see first; it would be telling customers to come look at the store. This is really good for me when I want to advertise my products."

ROTATING PLATFORM

The rotating platform gave the tarts a "point of interest" as its motion would cause it to be looked at by the customers. Also, I can put the "highlight of the week" on this rotating platform because I think it really attracts attention.

I really like how the ice packs can be put underneath the rotating platform, because we always set up our booth outdoors and the heat is always intense. Our tarts are very sensitive and so when met with the heat in Bangkok, the icings would melt very quickly. This is because we do not add any preservatives or anything like that, that might prevent them from melting and so therefore we need this coolness from the ice to allow the tarts to last longer.

However, it isn't very stable and so the tarts on the platform must be balanced or else it might be tilted.

THEME

I also think that it goes really well with my current display due to them being the same tone. My black trays can be used to cause a contrast in colours and I just think that it goes really well with the display. This is really good because we won't have to buy anything new as it is adaptable. Moreover, the sizes of the platform and the variety of platforms would allow my pastries to be presented in different ways, and so I can be very flexible."

MORE PHOTOS OF PRODUCT IN USE

TESTING OUT THE PRODUCT (BOX)




ERGONOMICS OF THE BOX

Thegap between thehandle andthe wood is large enough for the user to hold it comfortably, by a variety of user groups. This is beneficial for if someone else is helping the client carry her things because this means that they are more than likely to be able to also carry/ wheel the box around comfortably.

When the box is held horizontally, the length of the box isn't too long and so it can be held above the ground without the user having to always tense their muscles and bend their elbows as this may cause muscle fatigue for the user due to the weight of the box. This also ensures that the box wouldn't get damaged as it is being carried around as it wouldn't constantly hit the floor.

The height of the box when being wheeled is also at a comfortable height, where the elbows can be slightly bent to ensure that the users' arms aren't too stiff and straight/ too bent. Furthermore, the photo on the right shows how the box can be lowered down easily, with the wheels supporting the weight of the box and helping the box move away form the users body with ease. However, with the box being lowered onto the ground all the time, some supporters/ protectors might be added so that the box won't get damaged in the long term. The photo on the very right shows how the distance in between the two handles are close enough for the user to change orientation of the box easily. These two handles are also beneficial for when the box must be carried up and into a car, as it can just be carried like a suitcase. These two handles would help distribute the weight of the box, allowing the user to lift it up more easily.



TESTING OUT THE PRODUCT

SETTING UP OF DISPLAY

This shows step-by-step process of the display being set up. I personally think that the setting up of the display can be easily mastered after only a few tries due to all of the components being different and so they won't get mixed up. Moreover, sizes of the finger joints of the different edges are different and so it is really obvious if a component isn't slotted into the correct place because it can't be fitted in. Therefore, if we follow the fact that a "supporter" must always be underneath a "platform" and that brass rods must fit into the brass fittings (alongside the knowledge of the general form and shape of the display), then users should be able to assemble the product without the help of a manual after a couple of tries and they should also be able to assemble it faster too due to it being quite simple.

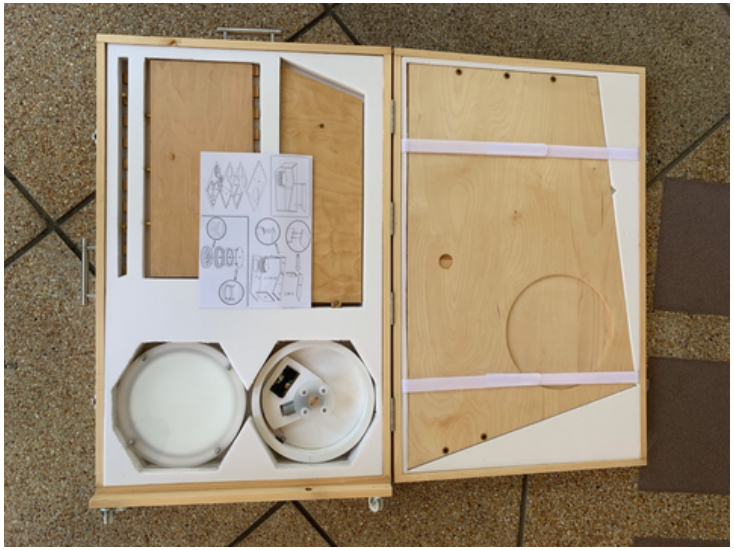
It was quite hard for the base to be removed because it is quite heavy and although a triangle has been cut out on the foam layers so that there aren't any spaces where our fingers can be slotted underneath it so that it can be taken out. Therefore, the lid must be lifted before the base can come off. This may be a problem because the lid and the base is quite heavy and so though it is achievable, it may not be as practical for the client.

"I honestly think I would enjoy setting this up and putting it away at the farmers market because it is quite satisfying to fit in the components together. It is also very easy to put the parts together as I can just slot everything into place. The thing I like is that the joints feel very secure once they are in place– because it is a combination of two joints and so I feel like it is very strong. It also wouldn't take me a long time to assemble this– probably the same or even shorter than the time I spend to set up the previous one, and so I really like it."

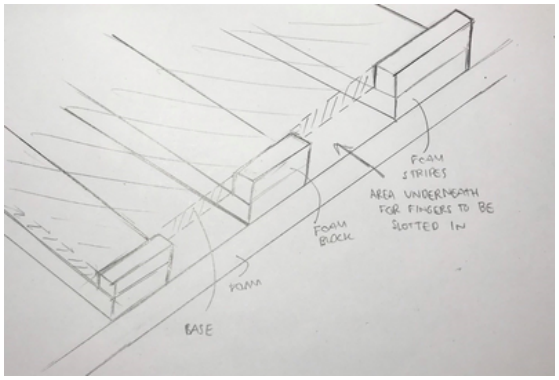
The times of assembly by me, the client and a randomly selected user is shown in the box below. The reason for why a randomly selected user was chose to assemble it too is explained on page 44. The specifications specified that the client should be able to construct it within the time she takes to construct her old display: 6.0 minutes. Many attempts were recorded to check the simplicity of the display– if it is simple, then users should be able to assemble it in a faster time the second round.

USER	1ST ATTEMPT	2ND ATTEMPT	SUCCESS?
ME	2.7 mins	2.5 mins	YES
USER 1 (CLIENT)	4.5 mins	3.0 mins	YES
USER 2 (RANDOMLY SELECTED USER)	6.0mins	5.0 mins	YES

EVALUATION OF COMPONENTS INSIDE BOX



The sizes of the different slots were marked out by the outlines of the finishes components and then adding 2-3mm to the sides (depending on its shape). This allowed the components to be fitted and removed from their slots quite easily as it is not a tight fit (however, it isn't too lose that the components would move around once being moved around either) and so all of the components are able to fit in well in their slots. The gaps in between the finger joints allow all of the components to be removed from their slots easily by the user. For components without finger joints such as the platforms, the brass rods would allow them to be removed easily.



However, as mentioned in the previous page, it is difficult for the base to be removed from the lid without having to lift the lid up and so therefore, to solve this problem, this sketch on the right can be applied to the design –one of the layers would be changed into strips and blocks can be used to lock the base in place– these blocks can be made out of foam which are from the scraps formed by cutting out the inner parts of the other foam components. These blocks and the strips would allow there to be space in between the bottom foam and the bottom of the base so that the user's fingers can be slotted in, to lift the base up and off its layer. However, the material of the blocks may need to be considered again if this design was to be executed due to its strength of it and the strength of PVA glue, sticking the boards together. This is because the base is quite heavy and so the blocks may come off if it is constantly being pushed at by the base.

The arrangement of the different layers can be seen below.

"All of the pieces can be put in and taken out from its holes easily because they fit not too tightly. There is also a gap in between the wood and the foam on both sides of the parts and so I can easily put in fingers in there to remove the wood.

A difficulty I found when pulling out the parts was that I sometimes forget that there are rods poking down and so I nearly damaged the foam many times from pulling the piece out and causing the rod to push against the foam quite hard.

The foam layers are also really light and so I can easily remove each layer after I have taken out the parts on that layer.

However, I think it might be easier if the parts were arranged so that they are in order of which one to assemble first etc./ parts around the same area can be grouped together so that the pieces on each layer can be taken out and assembled immediately."

EVALUATION OF DISPLAY AGAIST SPECS.

PURPOSE AND FUNCTION

From testing out the display with my client's products on, the pastries were successfully displayed in a more effective way, where the levels and the various platforms successfully highlighted the pastries that were put on it. The way the client was able to adapt her display components was an effective way to make the pastries stand out more but this meant that she would still have to carry some extra components with her which would add to the weight. Though there was an area for the samplings to be placed, the client decided that the area was a bit too small and it was a waste of space to just put samplings there. Therefore, the area was used for displaying other pastries. It is quite difficult for the client to access the pastries which are at the very front of the display because she'll have to reach and this might cause some of the displayed pastries to fall, but these pastries can be accessed very easily from the front when she is packing and setting up. The display can be disassembled and this ensures that it can be cleaned easily and transported around as a flat-pack in a box. The tarts section can be rotated by a motor and this was one of the most successful parts of the display because its motion was really effective in attracting attention. Tarts can also be cooled by the icepacks below the lid in the insulating foam but it was discovered that the insulation wasn't enough for the ice to last for a very long time as it melted before the tarts.

QUALITATIVE TESTING: The display was set up with the pastries on it, alongside the other parts of her display. The client was really satisfied with how the outcome and all the comments received by the customers were positive and said that the display really attracted their attention and also made it easier to choose the pastry they want.

AESTHETICS

The display was made out of plywood and so the main colour was light brown. After being set with the other parts of the client's display, it looked like one big display. The design was quite simple and plain, with a unique shape, ensuring that the attention of the customers would be mainly on the pastries being displayed. This worked quite well as the display allowed the pastries to be seen clearly and both the pastries and the display complemented each other.

QUALITATIVE TESTING: The customers commented on how the display really attracted their attention because it was different from the other stores. They also liked the shape of the display.

HEALTH AND SAFETY

The base of the display is large and stable enough to ensure that the display won't fall over. A combination of two joints were used; the finger joint and dowel joint. This ensures the stability and security of the joints. All edges of the display can be touched without causing injuries and so it is safe for the user. Though the previous specification stated that food on displayed should be covered, it is no longer vital as the food being displayed aren't going to be consumed by anyone. Finally, the client was happy with the hygiene of the finishes and glues.

QUALITATIVE TESTING: Only one prototype was made and most of the components were made manually.

SIZE AND WEIGHT

Thedisplay can be turned into a flat-pack and stored in a box. The box has wheels attached and handles and so it can be wheeled around by the client easily. This also means that the client won't have to carry any heavy components because she can simply take out the bits and pieces and then assemble it on the table. Though the size of the display and the platforms worked when it was being tested by the client with the pastries on it, the box was quite long (850mm) and so it was hard to be transported around with the other components that the client has to bring for the other parts of the display. It was also quite difficult for her to put the box into her car as she had to lift it up. To improve, the shape of the box might be changed and the components stacked differently, with the larger piece– the base– foldable.
QUALITATIVE TESTING: The client was able to easily lift up and place the pieces of the display onto the table. However, it was difficult for her to lift up the box to be put into the car.
QUANTITATIVE TESTING: The weight of the empty box and the box with everything inside is 9kg and 17kg respectively. The weight of the largest part (base) is 2kg. Though the box is too heavy, the handles would help distribute the weight.

MATERIALS AND SCHEME

Main material used was plywood and it fits in well with the other parts of the client's display due to them being the same colour. Aluminium tubes were used for the poles– it is really light and is strong enough to support the platform and so it was suitably used. White Plaswood was used for the rotating platform, with frosted acrylic used for the lid. As a result, the display was focused on light colours, that is towards warm tones such as brown.

QUALITATIVE TESTING: The display goes well with the other parts of the clients display, due to the colours being the same tone. Some of her components were even able to be placed on my display to add effects to the presentation of the products and so it was successful in this aspect.

COSTS

Most of the display was made out of materials which are available in the workshop– 10mm plywood, plaswood, blue foam, HIPS plastic, Foam boards, Pinewood, 15mm brass rods etc. and so only some components had to be bought, such as the motor, the switch, the wheels, hinges, handles, 8mm brass rods and so overall, the product costed less than 1000 baht (£25).
QUANTITATIVE TESTING: Overall display costed 712 baht. (£17.24)

QUALITY

All wooden surfaces were finished off with different grades of glass paper and then wax. All metal components were finished off with different grades of wet and dry paper and then polished with Brasso. The parts were able to join together nicely and accurately, and so it can be removed and fitted in easily. Plywood was however chipped at some places on the display and so the quality wasn't the best that it could've been. To improve, a different type of wood should be used- possibly pinewood as it also fitted the client's criteria.
QUALITATIVE TESTING: The client was satisfied with the quality of the final product.

DURABILITY

The fingers at the end of the wooden component works with the brass joints to stabilize and increase the durability of the joint and the main material used; plywood is a very durable material. However, they would still wear out over time due to their requirement to be constantly assembled and disassembled. The platforms are supported by the aluminium poles which are placed into the holes in the wood to further stabilize the platforms. However, the component on the left hand side is quite unstable due to the lack of these poles and the joints on the bottom between the supporter and the base isn't joined with fingers and so it is already more loose than when it was just manufactured. Therefore, this part is not as durable as the other parts of the display. All the components can be packed into the foam layers and this might contribute to its durability in the long term as the likeliness of it being damaged during transportation is very small as foam protects it. Although the foam can be easily dented (especially by the brass rods at the end of the platforms) and so its quality may not be that good, it won't affect how the parts inside are secured and protected therefore it would be able to perform its function for a long period of time.

Qualitative testing: The right part of the display can be assembled and disassembled many times without its quality decreasing and so it is durable. However, the part on the left got unstable and so it is not as durable. The clients' pastries were also put onto the platform successfully where it the platforms were strong enough to not get distorted.

ENVIRONMENTAL IMPACTS

The display was manufactured in a way that would reduce the most amount of waste, and save material, through following the methods of eliminating waste that was mentioned in the final design development; such as the arrangement of pieces when they're being printed out etc. and main material used was wood. However, a lot of foam was used in for the inner part of the box to store the display and a lot of waste was produced from cutting the insides out, and so this part was made very carefully to reduce the amount of mistakes and waste.

ERGONOMICS

The client was able to easily move her pastries around the main display and the aluminium poles were of a diameter that can be easily gripped. However, the foam in the display was quite difficult to remove when it had water inside (without removing the platform) because the gap in between the foam and the sides were too small. When the parts of the display were stored in the foam layers, they were easy to take out apart from the base which is on the lid because the lid had to be tilted every time to make it come out.

INSTRUCTIONS

A manual was provided alongside the display and the client successfully assembled the product within a short period of time (first attempt= 4.5 minutes and second attempt= 3.0 minutes). The she also commented on how she wouldn't have been able to assemble it this fast with the help of the manual as it told her exactly where each piece is located within in the box and where and what it must be fitted with. As the client as able to successfully assemble the display with the help of the manual, the manual was a success. However, to further improve this, numbers might be added to it so that someone other than the client is able to use it effectively too.

QUANTITATIVE TESTING: Client assembled the product in 4.5 and 3.0 minutes, and a randomly selected user managed to assemble in 6.0 and 5.0 minutes. Therefore it was a success.

ANALYSIS AND EVALUATION OF MANUAL

The aim of this manual is to make inform the client/ anyone else who has to set up my display about the different components and also how it should be assembled.

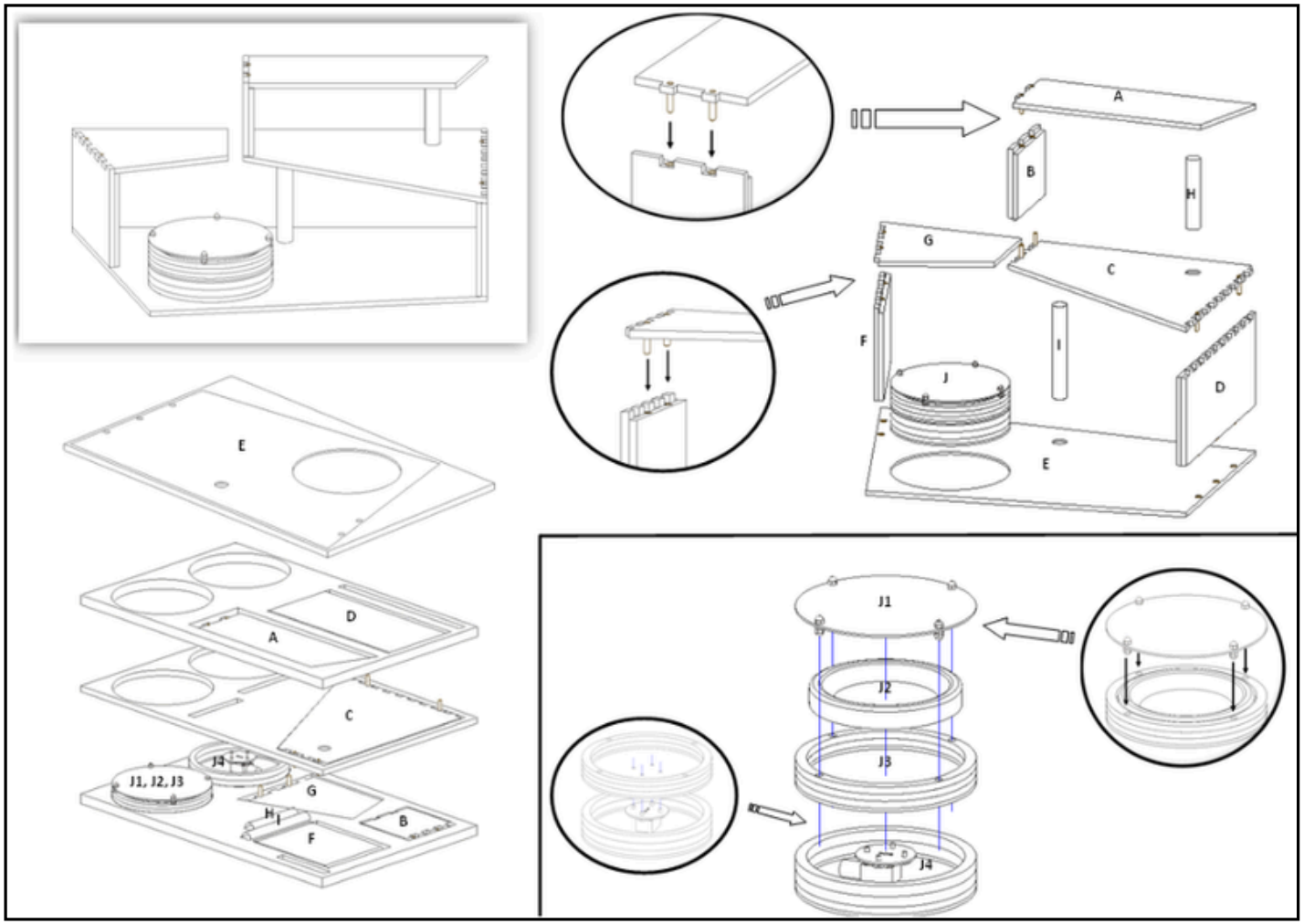
It contains the front view of the whole display on the top left. This is here to give the user an idea of what the assembled product should look like.

The exploded view of the display on the top right would show the different components on the display, though the rotating platform was made into just one component for simplicity. The part in the circle shows how the brass rods should be inserted into the fittings. This wasn't shown in every single joint in the display because the method of joining is the same. The lower circled image is there with the intention of informing the user that for the "supporting" components (where two pieces of wood are glued in together), the fingers must be on the outside to allow the rods to be fitted into the fittings.

The lower left exploded diagram of the layers in the box is there to inform the user of where the different components can be found inside the box (from looking at the labels). This would allow the user to know which component is which and where it can be found so that they would be able to locate it quickly.

The exploded view of the rotating platform is on the lower right. This is separated from the other components because it has its own "complexity" which may confuse the user. The circled images show where the cap nuts should be fitted in and also where the pegs should go through, on the right and left of the platform respectively.

"This was really useful for when I was assembling the platform as if I wasn't given this then I would've been really confused since the very first layer. With my pre knowledge about the display and this manual, it was quite easy to construct the display because I already had a rough idea of where each component should be put and so after being able to locate the components from this manual and seeing the exploded view to confirm where the parts should be put, I was able to assemble it."



The client also commented on how it might be difficult for someone whom has never seen the display before (like if someone else was going to set up her store) to assemble the pieces because they might be indecisive about which parts to assemble first which would result in time wasted. She also mentioned that anyone who has assembled it once should be able to assemble it a second time with a much faster speed because it is relative.

In response to the clients comment, I asked someone else that doesn't know about the display to try assembling it with the help of a manual (the randomly selected user from the table on page 41).They commented on how the manual really helped because they were informed of the relationships between each component and all of the diagrams aided them. They also agreed with the client about how they would be able to assemble it much faster the second time round because the components aren't complicated.

To improve this manual, I might name the components with numbers instead of letters where the base might be number one and component "D" is 2 etc. where it would slowly build up the display. Components such as the aluminium poles and rotating platform might be named as letters so that when the user sees something that is labeled as a letter they would know that they should look more a part that isn't made out of plywood.

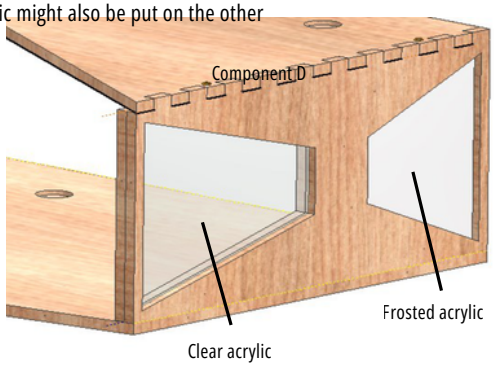
IMPROVEMENTS

PROBLEMS

BLOCKEDPASTRIES:

When walking form the right, the pastries being displayed on the lowest platform of the display can't be seen due to component "D" blocking it– this is bad for when the display is placed on the very right of the table. This gives the display both an advantage and a disadvantage. The advantage is that the customers would be able to focus on the pastries which are on the upper layers of the display instead– and if there were pastries displayed on the right hand side of the display, then the customers would be able to focus on those first before walking in and looking at everything. This is because if the products being displayed are interesting, then they might want to see more– causing them to walk closer to the store. This then means that they can be persuaded to sample the products and then maybe buy something. However, a disadvantage of this is that the product would be blocked and so therefore not all products are being displayed in an efficient way.

Some adjustments might be made to component D, where clear acrylic might be put in between the two plywood that has been stuck together so that customers can see through it. Frosted acrylic might also be put on the other end because the back area of the display is for the client to store her things, such as the money and this being seen through the display may give the customers a bad impression of the store.



UNUSED SPACE

There are some unused spaces on the lowest level of the display, underneath the platforms. This is because products can't be displayed there due to it being at the back. Though the client has put some of her stuff in here, adding something here to separate the display and the area at the back might be beneficial, to give the client more privacy as well incase she wants to place money here. Another idea is that a small component that can be slid out can be added. This area is under the platform and so looking at it from the back can be quite difficult.

With the tongs being put on the display, the customers might be given the impression that they would be getting the pastries which are on display therefore they may think of it not being hygienic due to them not being covered. Therefore, this area should be blocked from view of the customers.

SOCIAL, MORAL, ETHICAL AND ENVIRONMENTAL IMPACT

The product was designed and manufactured in a way where the user's safety was considered all the time– are the joints strong enough, is the user exposed to any risks while using it, are all the chipped parts sanded etc..

Though the design of the product was aimed at the client and her wants and values were highly considered, anyone who wants to display their products can also use the display and so the product was also aimed at the general public.

The product can be easily recycled at its end of life due to its ability to be disassembled, though the brass fittings and rods would have to be removed. These can however be easily located by looking at the manual, by finding where the joints are. Plywood is also a durable and resistant material, therefore it can be reused and recycled easily.

In the manufacturing of the product, the methods of eliminating waste that was spoken about in the development was used to eliminate waste as much as possible.

BOX: As the client has commented on how the box is really heavy and is too long, causing it to be difficult to be lifted up. The shape of the box could be changed to be more cubic. This would also allow the wheels to be able to support the box too and the client would also be able to remove the contents of the box without having to bend down as much and also wouldn't have to find a large area to put the box down to be opened. However, the size of the box is still limited by the components– though the base can be made so that it can be folded, the second platform (platform "C") is still quite big and it if it was made to be foldable then it might be unattractive.

Design Classics - Lamps

Task - 1

Design Classics are those products that have a timeless harmony and have become famous in the history of design. Many design classics come from the beginning of the twentieth century: styles, shapes and intuitions that made an era important and marked the whole century, they continue to inspire contemporary design.

Your task is to research two of these classics; several examples are given on this page. You will need to produce two A4 pages which gives a brief outline of the product, a picture and perhaps some comment on the designer and your own opinion, why is it a 'design classic'? Do you like it?

Bestlite 1930

Tizio Lamp 1972

The Anglepoise task light 1932

Simon Karkov 1969

Starck Ara lamp 1989

Need more?

www.antiquelamps.net/history.html

Miss K Table Lamp Philippe Starck

Design and technology – Task 2

Name a famous designer, either past or present and critically analyse and describe in detail a sample of their work

You should use sketches in your answer to identify key features and explain how specific features contribute to the success of identified product.

Your arguments must be relevant and well structured.

TIPS:

Key feature analysis:

original / appropriate use of materials and technologies
originality of form / aesthetics / colour

Success of product in terms of:

being trend setting e.g. mini car, iPod
improved product function e.g. Dyson cleaners
longevity of sales e.g. Mini car

Answer this question belowand on the next side only

Design Classics

Mini Cooper

The **Mini** is a small economy car that was made by the British Motor Corporation (BMC) and its successors from 1959 until 2000. The original is considered a British icon of the 1960s, and its space-saving front-wheel drive layout — allowing 80% of the area of the car's floorpan to be used for passengers and luggage — influenced a generation of car makers. The vehicle is in some ways considered the British equivalent to its German contemporary the Volkswagen Beetle, which enjoyed similar popularity in North America. In 1999 the Mini was voted the second most influential car of the 20th century, behind the Ford Model T.

The team that designed the Mini was remarkably small: as well as Issigonis, there was Jack Daniels (who had worked with him on the Morris Minor), Chris Kingham (who had been with him at Alvis), two engineering students and four draughtsmen. Together, by October 1957, they had designed and built the original prototype, which was affectionately named "The Orange Box" because of its colour.

Designed by Alec Issigonis; 1957

Design Classics

British Red Telephone Box

The **red telephone box**, atelephonekioskforapublictelephone designed by Sir Giles GilbertScott,is a familiar sighton the streets of the United Kingdom, Malta, Bermuda and Gibraltar, and despite a reduction in their numbers in recent years, red boxes can still be seen in many places and in current or former British colonies around the world. The colour red was chosen to make them easy to spot.

The first standard public telephone kiosk introduced by the United Kingdom Post Office was produced in concrete in 1920 and was designated K1 (Kiosk No.1). This design was not of the same family as the familiar red telephone boxes. Very few remarkable examples remain. One shining example is located in Trinity market in Kingston-upon-Hull where it is still in use today.

The red telephone box was the result of a competition in 1924 to design a kiosk that would be acceptable to the London Metropolitan Boroughs which had hitherto resisted the Post Office's effort to erect K1 kiosks on their streets. The boxes were the same idea as the police boxes.

Designed by Sir Giles Gilbert Scott; 1924

Design Classics

Earl R. Dean's original 1915 concept drawing of the contour Coca-Cola bottle

The prototype never made itto production since its middle diameter was larger than its base, making it unstable on conveyor belts.

CocaColaBottle

TheequallyfamousCoca-Colabottle,calledthe "contour bottle" within the company, butknown to some as the"hobble skirt" bottle, was created by bottle designer Earl R. Dean. In 1915, the Coca-Cola Company launched a competition among its bottle suppliers to create a new bottle for their beverage that would distinguish it from other beverage bottles, "a bottle which a person could recognize even if they felt it in the dark, and so shaped that, even if broken, a person could tell at a glance what it was."

Dean was inspired by a picture of the gourd-shaped cocoa pod in the Encyclopædia Britannica. He made a rough sketch of the pod and transformed the shape of the pod into a bottle. The bottle design was patented in November 1915.

The prototype never made it to production since its middle diameter was larger than its base, making it unstable on conveyor belts. Dean resolved this issue by decreasing the bottle's middle diameter.

Today, the contour Coca-Cola bottle is one of the most recognized packages on the planet..."even in the dark!".

Designed by Earl R Dean; 1915

Design Classics

London Underground Tube Map

What is now a single network of lines controlled by a single organisation began as a collection of independent underground railway companies that constructed lines in the 19th and early 20th centuries. These companies published route maps of their own services but did not, generally, co-operate in advertising their services collectively. Early maps were based on standard geographic city mapsindicating the directions of lines and locations of station, overlaid on geographic features and main roads.

The first combined map was published in 1908 by theUnderground Electric Railways Company of London(UERL) in conjunction with four other underground railway companies using the "Underground" brand as part of a common advertising initiative.

The first diagrammatic map of London's rapid transit network was designed byHarry Beckin 1931.Beck was a London Underground employee who realised that because the railway ran mostly underground, the physical locations of the stations were irrelevant to the traveller wanting to know how to get to one station from another — only thetopologyof the railway mattered.

Today, the Tube map bears the legend, "This diagram is an evolution of the original design conceived in 1931 by Harry Beck" in the lower right-hand corner.

Designed by Harry Beck; 1931

Design Classics

Angle Poise Lamp

Carwardine was a car designer and was, at the time he invented the Anglepoise lamp, a freelance design consultant specialising invehicle suspensionsystems. While developing new concepts for vehicle suspensions, he created a mechanism which he recognised had applications in other fields. He particularly saw its benefits for a task lamp. Despite many claims to the contrary, his concept had nothing whatsoever to do with mimicking the actions of the human arm. The joints and spring tension allow the lamp to be moved into a wide range of positions which it will maintain without being clamped.

Carwardine applied for a patent, number 404,615, for a lamp design using the mechanism on 4 July 1932, and manufactured the lamp himself in the workshops of his own company, Cardine Accessories, inBath, England. He soon found the interest and demand so great that he needed a major expansion or partner and, on 22 February 1934, entered into a licensing agreement with the Terry Spring Company in Redditch, England. Terry's manufactured and marketed the lamp, while Carwardine continued to develop the concept, producing a number of other versions and applications (for example, for supporting microphones). The original four-spring design was made for working environments, such as workshops and doctors' and dentists' surgeries, but he also designed a three-spring version for use in the home (patentedon10February1934,patentnumber433,617).

Designed by George Carwardine; 1932

Design Classics

iPod

iPod is a line of portable media players created and marketed by Apple Inc.. The product line-up consists of the hard drive-based iPod classic, the touchscreen iPod touch, the compact iPod nano and the ultra-compact iPod shuffle. iPod classic models store media on an internal hard drive, while all other models use flash memory (the discontinued iPod mini used a Microdrive miniature hard drive). As with many other digital music players, iPods can serve as external data storage devices. Storage capacity varies by model, ranging from 2GB for the iPod shuffle to 160GB for the iPod classic. The iPod line was announced by Apple on October 23, 2001, and released on November 10, 2001.

All of the models have been redesigned multiple times since their introduction. The most recent iPod redesigns were introduced on September 1, 2010. Apple's iTunes software can be used to transfer music to the devices from computers using certain versions of Apple Macintosh and Microsoft Windows operating systems. For users who choose not to use iTunes or whose computers cannot run iTunes, several open source alternatives are available for the iPod.

Design Classics

Volkswagen Beetle

The**Volkswagen Beetle**, officially called the**VolkswagenType1**(or informallythe**Volkswagen Bug**), is aneconomy carproduced by the German auto makerVolkswagen(VW) from 1938 until 2003. With over 21million manufacturedin anair-cooled,rear-engined, rear-wheel drive configuration, the Beetle is the longest-running and most-manufactured car of a single designplatformanywhere in the world.

In 1933,Adolf Hitlergave the order toFerdinand Porscheto develop a*Volkswagen*(literally, "people's car" in German, pronounced[ˈfɔlksvaːgən]). The epithet*Volks*-literally, "people's-" had been previously applied to other Nazi sponsored consumer goods such as the*Volksempfänger*("people's radio"). Hitler required a basic vehicle capable of transporting two adults and three children at 100km/h (62mph). The "People's Car" would be available to citizens of the*Third Reich*through a savings scheme, or*Sparkarte*(savings booklet),at 990*Reichsmark*, about the price of a small motorcycle (an average income being around 32RM a week).

Designed by Ferdinand Porsche; 1933

Design Classics

Volkswagen Split Screen Van

The**Volkswagen Type 2**, known officially as the**Transporter**or**Kombi**(campers, short for Kombinationskraftwagen) and informally as the**Bus**(US) or**Camper**(UK), is apanel vanintroduced in 1950 by GermanautomakerVolkswagenas its secondcar model– following and initially deriving from Volkswagen's first model, theType 1 (Beetle), it was given the factory designation Type 2.

The concept for the Type 2 is credited to Dutch Volkswagen importerBen Pon. (It has similarities in concept to the 1920sRumpler Tropfenwagenand 1930sDymaxion carbyBuckminster Fuller, neither of which reached production.) Pon visitedWolfsburgin 1946, intending to purchase Type 1s for import to Holland, where he saw an improvised parts-mover and realized something better was possible using the stock Type 1 pan.He first sketched the van in a doodle dated April 23, 1947,proposing a payload of 690kg (1,500lb) and placing the driver at the very front. Production would have to wait, however, as the factory was at capacity producing the Type 1.

Designed by Ben Pon; 1947

Design Classics

E Type Jaguar

From the sleek XK120 two-seater and Mark 1 saloon to the sexy E-Type sportscar, JAGUAR designed and built many of the best-loved British cars of the mid-20th century. The flair of its dynamic founder William Lyons made the Jaguar marque synonymous with seductively designed and sharply priced cars.
When Jaguar Cars prepared to unveil its new sports car at the 1961 Geneva Motor Show, the founder, Sir William Lyons (1901-1985), insisted that an early production model was driven there all the way from the Coventry factory. The new E-Type only just got to Geneva in time. The suspense ensured that Jaguar's sexy new sports car was a media sensation even before it was unveiled.

The E-Type was typical. With the promise of a top speed of 150mph (with a fair wind) and a price tag of £2,097 for a roadster – half the price of an Aston Martin – Jaguar billed it as Britain's affordable answer to a flashy Italian Ferrari.

The Series 1 was introduced, initially for export only, in March 1961. The domestic market launch came four months later in July 1961.

On its release Enzo Ferrari called it "The most beautiful car ever made".

Designed by Jaguar; 1961

Design Classics

Concorde

One of the best-loved engineering design projects of the20thcentury,CONCORDE (1976-2003) is a rare example of successful internationalcollaboration.Its Anglo-Frenchdesignersproduced theworld'sfirst supersoniccommercialpassenger aircraft which at its fastest flew from New York to London in less than three hours.

When the British government established the Supersonic Transport Aircraft Committee in 1956 to explore the possibility of developing the world's first passenger aircraft able to fly faster than the speed of sound, it could take as long as eighteen hours for a commercial jet to fly from London to New York.

It was to take nearly twenty years for the committee's work to culminate inthefirstcommercial flightof a supersonic aircraft, but the subsequent performance of that jet, Concorde, exceeded even the most optimistic expectations. Routinely flying faster than twice the speed of sound, Concorde sported a take-off speed of 250 mph (400 kmph) and a cruising speed of 1,350 mph (2,160 kmph) at an altitude of up to 60,000 feet, twice the height of Mount Everest. At its fastest on 7 February 1996, Concorde flew from New York to London in just 2 hours, 52 minutes and 59 seconds, less than a sixth of the time that the same journey would have taken by air in 1956.

Hailed for its beauty as well as its speed, Concorde seemed to belong less to the modern world than to the future. During 27 years of commercial service from 1976 to 2003, it became one of the best-loved engineering design projects of the 20th century. An exemplar of technological excellence, Concorde struck such a strong emotional chord with the public that children cheered whenever they spotted it in the sky.

Designed by British Aircraft Aviation & Aerospatiale; 1969

Design Classics

Fender Stratocaster

The Fender Stratocaster, designed by Leo Fender, George Fullerton, and Freddie Tavares in 1954, it has been manufactured continuously by the Fender Musical Instruments Corporation to the present. It is a double-cutaway guitar, with an extended top horn for balance. Along with the Les Paul, it is the most popular electric guitar. Although "Stratocaster" and "Strat" are trademark terms belonging to the Fender, the term "Strat" is often applied to any guitar with the same general features as the original regardless of manufacturer.

Originally the Stratocaster was offered in a 2-color sunburst finish on a solid, deeply contoured ash body, a 21-fret one-piece maple neck with black dot inlays and Kluson tuning heads. In 1956 Fender began issuing solid Stratocasters with alder bodies. In 1960 the available custom colors were standardized, many of which were automobile lacquer colors from Dupont available at an additional 5% cost. The unique single-ply, 8-screw hole white pickguard allowed all electronic components——except the recessed jack plate——to be attached to it for easy assembly. Despite subsequent Stratocaster models (including copies) vintage Fender models are highly valued by collectors for their investment potential and players who prefer the timbre of older models.

Among the genres the Stratocaster has been used for—besides Country, the genre Leo Fender intended it to be for—it has played a large role in rock, pop, soul, rhythm and blues as well as blues and jazz.

Designed by Leo Fender; 1954

Design Classics

Polaroid Camera

The **instant camera** is a type of camera that generates a developed film image. The most popular types to use self-developing film were formerly made by Polaroid Corporation.

The invention of modern instant cameras is generally credited to American scientist Edwin Land, who unveiled the first commercial instant camera, the Land Camera, in 1948, a year after unveiling instant film in New York City. The earliest instant camera, which consisted of a camera and portable darkroom in a single compartment, was invented in 1923 by Samuel Shlafrock.

In February 2008, Polaroid announced it would discontinue production of film, shut down three factories and lay off 450 workers. Sales of chemical film by all makers have dropped by at least 25% per year in the first decade of the 21st century, and the decline is likely to accelerate. Fujifilm is now the only remaining supplier of instant film in the United States. However, in October 2009, Polaroid announced it would bring back its classic instant film cameras, after announcing the year before that production was to be stopped.

Designed by Edwin Land; 1948

Design Classics

Bakelite Telephone

Bakelite is an early plastic. It is a thermosetting phenol formaldehyde resin, formed from an elimination reactionofphenolwithformaldehyde. It was developed in 1907 byBelgianchemistLeo Baekeland.

Dr. Baekeland had originally set out to find a replacement forshellac(made from the excretion of lac beetles). Chemists had begun to recognize that many natural resins and fibres were polymers, and Baekeland investigated the reactions of phenol and formaldehyde. He first produced a soluble phenol-formaldehyde shellac called "Novolak" that never became a market success, then turned to developing a binder forasbestoswhich, at that time, was moulded with rubber. By controlling the pressure and temperature applied tophenolandformaldehyde, he found in 1905 he could produce his dreamed-of hard mouldable material (the world's first synthetic plastic): bakelite.He announced his invention at a meeting of theAmerican Chemical Societyon February 5, 1909.

In the early 20th Century, it was found in myriad applications includingsaxophonemouthpieces,whistles,cameras,solid-body electric guitars,telephonehousings and handsets, earlymachine guns, pistol grips, and appliance casings. The thermosetting phenolic resin was at one point considered for the manufacture ofcoins, due to a shortage of traditional material. In 1943, Bakelite and other non-metal materials were tested for usage as apennyin the US before theMintsettled onzinc coated steel.

The rotary dial was invented byAlmon Brown Strowgerin 1891. There were numerous competing inventions, and 26 patents of dials, push-buttons, and similar mechanisms for signalling were issued prior to 1891.

Rotary Dial Designed by Almon Brown Strowger; 1891

Design Classics

AlessiWhistlingKettle

Alessi is a kitchenutensilcompany fromItaly. They design everyday items fromplasticandstainless steel. Foundedin1921toproducecraftedproductsinmetalforeatinganddrinking,by GiovanniAlessi.

It was designed in 1985. It became one of the greatest icons of modern design ever since. It comes with iconic bird-shaped whistle, that has made it recognisable among other stove top kettles. It fits the range of Alessi products, designed by Michael Graves. Alessi Bird Whistle Kettle suits any kitchen, beginning with simple and ending with the most modern designs. The kettle is suitable for all types of hobs. It's capacity is suitable for every day needs of an average user. Both bird-shaped whistle and lid are replaceable. The metal handle is covered with a polyamide protective coating remains cool after boiling and assures comfortable grip. Polished stainless steel makes it stain resistant and very easy to clean. If you're looking for a kettle that not only does what it's meant to do but also plays a vital decorative role in your kitchen, this kettle is made for you. It comes with three colour trims: cream/ivory, black and blue, so that it can fit

any kitchen colour scheme.

Designed by Michael Graves; 1985

Design Classics

Red Blue Chair

The Red Blue Chair is a chair designed in 1917 byGerrit Rietveld. It represents one of the first explorations by theDe Stijlart movement in three dimensions. The original chair was constructed of unstained beech wood and was not painted until the early 1920s.Fellow member of De Stijl and architect,Bart van der Leck, saw his original model and suggested that he add bright colours.He built the new model of thinner wood and painted it entirely black with areas of primary colours attributed to De Stijl movement. The effect of this colour scheme made the chair seem to almost disappear against the black walls and floor of theSchröder housewhere it was placed.The areas of colour appeared to float, giving it an almost transparent structure.

The Museum of Modern Art, which houses the chair in its permanent collection, a gift fromPhilip Johnson, states that the red, blue and yellow colours were added around 1923.The chair also resides at the High Museum of Art, Atlanta. It features severalRietveld joints.

The Red and Blue Chair was reported to be on loan to theDelft University of TechnologyFaculty of Architecture as part of an exhibition. On May 13, 2008,a firedestroyed the entire building, but the Red and Blue Chair was saved by fire fighters.

Designed by Gerrit Rietveld; 1917

Design Classics

Barcelona Chair

The **Barcelona chair** wasexclusivelydesignedfortheGerman Pavilion, that country's entryfortheInternationalExposition of1929, which was hosted byBarcelona,Spain. The design resulted from collaboration between the famousBauhausarchitectLudwig Mies van der Roheand his longtime partner and companion, architect and designerLilly Reich, whose contributions have only recently been acknowledged.An icon ofmodernism, the chair's design was inspired by the campaign and folding chairs of ancient times.

The frame was initially designed to be bolted together, but was redesigned in 1950 using stainless steel, which allowed the frame to be formed by a seamless piece of metal, giving it a smoother appearance. Bovine leather replaced the ivory-coloured pigskin which was used for the original pieces.

The functional design and elements of it that were patented by Mies in Germany, Spain and the United States in the 1930s have since expired. The Barcelona chair was manufactured in the US and Europe in limited production from the 1930s to the 1950s.

Designed by Ludwig Mies van der Rohe; 1929

Design Classics

W W Stool

As one of the most dynamic furniture designers of the 1980s and 1990s, Philippe Starck (1949-) developed dozens of chairs to be put into volume production by different manufacturers, yet he also executed experimental projects by designing conceptual pieces. Starck described them as “surrealist or Dada objects” intended to liberate the user “from the humdrum reality of everyday life". Among them was the W.W. stool, which was originally designed by Starck as part of a fantasy workspace for the German film director Wim Wenders and named after him. The only object in the room to go into production, this stool seems to ignore all functional constraints by barely providing a surface to be sat on.

Designed by Philippe Starck; 1990

Design Classics

Dyson DC07 Vacuum Cleaner

Dyson Ltdis aBritishtechnology company, founded in 1992 bySir James Dyson, which designs and manufactures vacuum cleaners, hand dryers,bladeless fansandheaters.

In 1974 Dyson bought a Hoover Junior vacuum cleaner. The Hoover became clogged quickly and lost suction over time. Frustrated, James emptied the bag to try to restore the suction but this had no effect. On opening the bag to investigate, he noticed a layer of dust inside, clogging the fine material mesh and preventing the machine working properly. The machine only worked well with a fresh bag, it lost suction over time. He resolved to develop a better vacuum cleaner that worked more efficiently.

During a visit to a local sawmill, Dyson noticed how the sawdust was removed from the air by large industrial cyclones.He hypothesised the same principle might work, on a smaller scale, in a vacuum cleaner. He removed the bag from the Hoover Junior and fitted it with a cardboard cyclone. On cleaning the room with it, he found it picked up more than his bag machine. This was the first vacuum cleaner without a bag.

Dyson developed 5,127 prototype designs between 1979 and 1984. The first prototype vacuum cleaner, a red and blue machine brought James little success, as he struggled to find a licensee for his machine in the UK and America. Manufacturing companies like Hoover didn't want to license the design, probably because the vacuum bag market was worth $500m so the Dyson was a threat to their profits.

Designed by James Dyson; 1984

Design Classics

MokaExpress

The**moka pot**, also known as**caffettiera**("coffee maker" inItalian language),**macchinetta del caffè**(literally "small coffee machine" in Italian language) or "Italian coffee pot", is a stove topcoffee makerwhich produces coffee by passing hot water pressurized by steam through ground coffee. It was first patented by inventor Luigi De Ponti forAlfonso Bialettiin 1933.*Bialetti Industrie*continues to produce the same model under the name "Moka Express".

The moka pot is most commonly used inEurope, but also inLatin Americancountries. It has become an iconic design, displayed in modern industrial art museums such as theMuseum of Modern Art, theCooper–Hewitt, National Design Museum, theDesign Museum,and theLondon Science Museum. Moka pots come in different sizes, from one to eighteen 50 ml cups.The original design and many current models are made from aluminium with bakelite handles.

Designed by Luigi De Ponti ; 1933

Design Classics

Ford Model T

Designed by Childe Harold Wills; 1908 The **Ford Model T** (known as the **Tin Lizzie**) was produced by Henry Ford's Ford Motor Companyfrom September 1908 to October 1927.It is generally regarded as the first affordableautomobile, the car that opened travel to the commonmiddle-classAmerican; some of this was because of Ford's innovations, includingassembly lineproduction instead of individual hand crafting.The Ford Model T was named the world's most influentialcar of the 20th centuryin an international poll.

The Model T set 1908 as the historic year that the automobile became popular. The first production Model T was produced on August 12, 1908 and left the factory on September27, 1908, at thePiquette PlantinDetroit, Michigan. On May26, 1927, Henry Ford watched the 15millionth Model T Ford roll off the assembly line at his factory inHighland Park, Michigan.

There were several cars produced or prototyped by Henry Ford from the founding of the company in 1903 until the Model T came along. Although he started with theModel A, there were not 19 production models (A through T); some were only prototypes.
Henry Ford said of the vehicle:

"Iwill build a car for the greatmultitude.Itwillbelargeenough for the family, but small enough for the individual to run and care for. It will be constructed of the best materials, by the best men to be hired, after the simplest designs that modern engineering can devise. But it will be so low in price that no man making a good salary will be unable to own one– and enjoy with his family the blessing of hours of pleasure in God's great open spaces."

Designed by Childe Harold Wills ; 1933

Design Classics

SwissArmyKnife

The **Swiss Army knife** (French: *Couteau suisse*, German: *Schweizer Offiziersmesser* "Swiss officer's knife", Italian: *Coltellino svizzero*) is a brand of pocketknife or multi-tool manufactured by Victorinox AG and Wenger SA. The term "SwissArmyknife" was coined by US soldiers after World War II due to the difficulty they had in pronouncing the German name.

The Swiss Army knife generally has a blade as well as various tools, such as screwdrivers and can openers. These attachments are stowed inside the handle of the knife through a pivot point mechanism. The handle is usually red, and features a Victorinox or Wenger "cross" logo or, for military issue knives, the coat of arms of Switzerland.

Originating in Ibach, Switzerland, the Swiss Army knife was first produced in 1891 after the company Karl Elsener, which later became Victorinox, won the contract to produce the Swiss Army's *Modell 1890* knife from the previous German manufacturer. In 1893 the Swiss cutlery company Paul Boéchat & Cie, which later became Wenger, received its first contract from the Swiss military to produce model 1890 knives; the two companies split the contract for provision of the knives from 1908 until Victorinox acquired Wenger in 2005.

The design of the knife and its flexibility have both led to recognition worldwide.

Design Classics

Citroen2CV

The **Citroën 2CV** (French: *“deuxchevaux”i.e.“deuxchevaux-vapeur[fiscaux]”*, literally “two tax horsepower”) was an economy car produced by the French car manufacturer Citroën between 1948 and 1990. It was technologically advanced and innovative, but with uncompromisingly utilitarian unconventional looks, and deceptively simple Bauhaus inspired bodywork, that belied the sheer quality of its underlying engineering. It was designed to move the French peasantry on from horses and carts. It is considered one of Citroën's most iconic cars. In 1953 *Autocar* in a technical review of the car wrote of "the extraordinary ingenuity of this design, which is undoubtedly the most original since the Model T Ford". It was described by CAR magazine journalist and author LJK Setright as "the most intelligent application of minimalism ever to succeed as a car".
It was designed for low cost, simplicity of use, versatility, reliability, and off-road driving. For this it had a light, easily serviceable engine, extremely soft long travel suspension (with height adjustment by lengthening/shortening of tie rods), high ground clearance, and for oversized loads a car-wide canvas sunroof, which (until 1955) also covered the boot.

During a production run of 42 years between 1948 and 1990, 3,872,583 2CVs were produced, plus 1,246,306Fourgonnettes (small 2CV delivery vans),

CITROËN

Design Classics

Routemaster Bus

The **AEC Routemaster** is a double-decker bus builtbyAssociated Equipment Company (AEC) in 1954 (in production from 1958) until 1968. Front-engined buses generally with rear platforms, a small number were produced with doors and/or front entrances. Introduced by London Transport in 1956, the Routemaster saw continuous service in London until 2005, and remains on two heritage routes in central London.

The Routemaster was developed by AEC in partnership with London Transport, the customer for nearly all new Routemasters, although small numbers were also delivered to the airline British European Airways (BEA) and the Northern General Transport Company. 2,876 Routemasters were built, with approximately 1,000 still in existence.

A pioneering design, the Routemaster outlasted several of its replacement types in London, survived the privatisation of the former London Transport bus operators and was used by other operators around the UK. In modern UK public transport bus operation, the old- fashioned features of the standard Routemaster were both praised and criticised. The open platform, while exposed to the elements, allowed boarding and alighting away from stops; and the presence of a conductor allowed minimal boarding time and optimal security, but with greater labour costs.

The Routemaster became one of London's most famous symbols, with much tourist paraphernalia continuing to bear Routemaster imagery, and with examples still in existence around the world. Despite the retirement of the original version, the Routemaster has retained iconic status, and in the late 2000s work began on an updated version, which entered service in February 2012.

Design Classics

Harley Davidson Motorbike

Harley-Davidson Inc (formerly HDI), oftenabbreviated **H-D**or **Harley**, is an American motorcycle manufacturer. Founded in Milwaukee, Wisconsin, during the first decade of the 20th century, it was one of two major American motorcycle manufacturers to survive the Great Depression. Harley-Davidson also survived a period of poor quality control and competition from Japanese manufacturers.

In 1901, William S. Harley, age 22, drew up plans for a small engine with a displacement of 7.07 cubic inches (116 cc) and four-inch (102 mm) flywheels. The engine was designed for use in a regular pedal-bicycle frame. Over the next two years, Harley and his childhood friend Arthur Davidson labored on their motor-bicycle using the northside Milwaukee machine shop at the home of their friend, Henry Melk. It was finished in 1903 with the help of Arthur's brother, Walter Davidson. Upon completion, the boys found their power-cycle unable to conquer Milwaukee's modest hills without pedal assistance. Will Harley and the Davidsons quickly wrote off their first motor-bicycle as a valuable learning experiment.

Work immediately began on a new and improved second-generation machine. This first "real" Harley-Davidson motorcycle had a bigger engine of 24.74 cubic inches (405 cc) with 9.75 inches (25 cm) flywheels weighing 28 lb (13 kg). The machine's advanced loop-frame pattern was similar to the 1903 Milwaukee Merkel motorcycle (designed by Joseph Merkel, later of Flying Merkel fame). The bigger engine and loop-frame design took it out of the motorized-bicycle category and would help define what a modern motorcycle should contain in the years to come. The boys also received help with their bigger engine from outboard motor pioneer Ole Evinrude, who was then building gas engines of his own design for automotive use on Milwaukee's Lake Street.

Designed by William S. Harley & Arthur Davidson; 1903

Design Classics

Vespa

Most scooter enthusiasts know the story of Piaggio developing the Vespa after World War II as a means of affordable transportation to aid in the re-construction of war torn Italy. The industrial history of the Piaggio Company actually began sixty years earlier in 1884 when they started making interiors, cabinets and fine woodwork for luxury liners and other sailing ships.

Twenty years later the building of the Italian railroad was becoming a booming industry.

The Piaggio Company diversified from woodworking to metal work. In 1908, they started producing a variety of railway cars and streetcars. Detailed, of course, with the same luxury interiors they had designed and produced for ships.

In 1924, they branched out even further, adding an aeronautical division to their company. It was located in Pontedera. To aid the efforts of World War I they produced entire aircraft including engines.

It was during that time that Enrico Piaggio and aeronautical engineer Corradino D'Ascanio, the two men who would later be responsible for developing the Vespa motor scooter, joined the company. Piaggio was in the forefront of airplane and engine development with many technical achievements to their credit. Did you know that D'Ascanio, that the man who designed the first Vespa, designed the first successful hovering helicopter in 1930?

Designedby
Corradino D'Ascinio;
1945

Such innovations ended during WW II when the Pontedera factory was demolished by allied bombing. Recovery from this devastation was the driving force that led to the invention of the Vespa!

The first prototype MP5 (Moto Piaggio 5), developed in 1945, became known as the Paperino (Donald Duck). The design did not pass muster with Enrico Piaggio. He directed D"Ascanio to design a innovative vehicle for transportation based on aeronautical concepts. The resulting MP6 was labeled by Enrico as the Vespa because it looked to him like a wasp (vespa in Italian).The aerodynamics and monocoque (integrated) body were straight from airplane design. The front suspension was designed after the trailing link rear wheel of an airplane's landing gear. The wheels were mounted on one side of the fork and engine to make it easier to change flat tires. The gears where shifted by twisting the grip where the clutch was located. All of these design innovations were firsts in the field of two-wheel

transportation.

That design led to a new direction for the Piaggio Company in 1946, and to the mass production Vespa scooters. It is a design and mechanical icon that has captured the imagination of people around the world for fifty-seven years!

Design Classics

CadillacCoupede Ville

The name "De Ville" is from the Frenchde la ville or de ville meaning"of the town". In French coach building parlance, a coupé de ville, from the French couper (to cut) and ville (town or city), refers to a town car that is "cut" by a division between the passenger and driver compartments.
The first Cadillac "Coupe de Ville" was shown during the 1949 Autorama. It was built on a Cadillac Sixty Special chassis and featured a dummy air-scoop, chrome trim around front wheel openings, and a one-piece windshield and rear glass. The interior was black and trimmed in gray leather, including the headliner, to match the roof color. It was equipped with a telephone in the glove compartment, a vanity case and a secretarial pad in the rear armrest, power windows and highly decorative chrome interior trim. The prototype "Coupe de Ville" was used by GM President Charles E. Wilson until 1957 when he presented it to his secretary. At some time during this period it acquired a dark Vicodec roof. The prototype "Coupe de Ville" was still in use as of 1976.

Cadillac

The Cadillac Series 62 Coupe de Ville was introduced late in the 1949 model year.[3][4] Along with the Buick Roadmaster Riviera, and the Oldsmobile 98 Holiday, it was among the first pillarless hardtop coupes ever produced.[3][4] At $3,496 it was only a dollar less than the Series 62 convertible, and like the convertible, it came with power windows standard. It was luxuriously trimmed, with leather upholstery and chrome 'bows' in the headliner to simulate the ribs of a convertible top.[3][4] In its first year the Series 62 Coupe de Ville only sold 2,150 units.[3][4] But 1950 sales more than doubled to 4507, and in 1951 sales more than doubled again to 10,241 exceeding the sales for the Series 62 Club Coupe that year.[3][4] Also, in 1951, Coupe de Ville chrome script appeared on the rear roof pillar for the first time, to further distinguish it from the Series 62 Club Coupe.[3][4]

Design Classics

Porsche 356

The **Porsche 356** was the company's first productionautomobile.It wasalightweight and nimble-handling rear-engine rear-wheel-drive 2-door sports car available in hardtop coupe and open configurations. It is estimated approximately half of the total production of 76,000 356s still survive.

Prior to World War II Porsche designed and built three Type 64 cars for a 1939 Berlin to Rome race that was cancelled. In 1948 the mid-engine, tubular chassis 356 prototype called "No. 1" was completed. This led to some debate as to the "first" Porsche automobile, but the 356 is considered by Porsche to be its first production model.[1][2]

Designed by Ferdinand Porsche; 1948

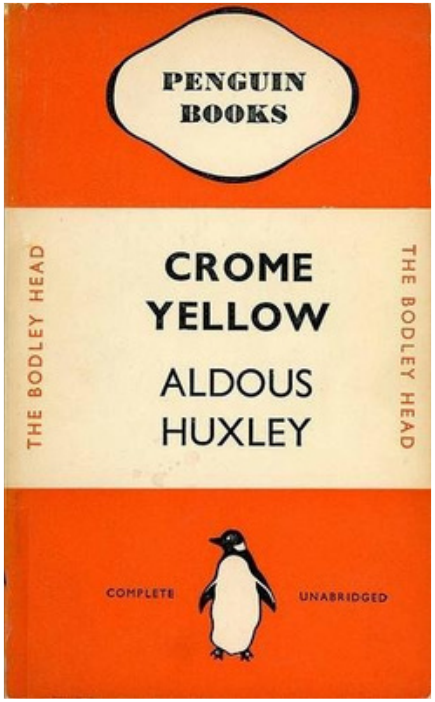
The 356 was created by Ferdinand Porsche, founder of the company. Like its cousin, the Volkswagen Beetle (which Ferdinand Porsche Senior had designed), the 356 was a four- cylinder, air-cooled, rear-engine, rear-wheel-drive car utilizing unitized pan and body construction. While the 356's body was an original design by Porsche employee Erwin Komenda, its mechanicals (including engine, suspension and chassis) were derived from the Volkswagen. The first 356 was road certified in Austria on June 8, 1948, and used many Volkswagen parts for manufacturing economy. Quickly though, Porsche re-engineered and refined the car with a focus on performance. By the late '50s many fewer parts were shared between Volkswagen and Porsche. The early 356 automobile bodies produced at Gmünd were handcrafted in aluminum, but when production moved to Zuffenhausen, Germany in 1950, models produced there were steel-bodied.

Increasing success with its racing and road cars brought Porsche orders for over 10,000 units in 1964, and by the time 356 production ended in 1965 approximately 76,000 had been produced.

Design Classics

Penguin Book Covers

Penguin Books is a publisher foundedin 1935by Sir Allen Lane. Penguin revolutionised publishing in the 1930s through its high quality, inexpensive paperbacks, sold through Woolworths and other high street stores for sixpence. Penguin's success demonstrated that large audiences existed for serious books. Penguin also had a significant impact on public debate in Britain, through its books on politics, the arts, and science. Penguin Books is now the flagship imprint of the worldwide Penguin Group and is owned by Pearson PLC.



From the outset, design was essential to the success of the Penguin brand. Eschewing the illustrated gaudiness of other paperback publishers, Penguin opted for the simple appearance of three horizontal bands, the upper and lower of which were colour coded according to which series the title belonged to; this is sometimes referred to as the horizontal grid. In the central white panel, the author and title were printed in Gill Sans and in the upper band was a cartouche with the legend "Penguin Books". The initial design was created by the then twenty-one-year-old office junior Edward Young, who also drew the first version of the Penguin logo. Series such as Penguin Specials and The Penguin Shakespeare had individual designs (by 1937 only S1 and B1-B18 had been published).

The colour schemes included: orange and white for general fiction, green and white for crime fiction, cerise and white for travel and adventure, dark blue and white for biographies, yellow and white for miscellaneous, red and white for drama; and the rarer purple and white for essays and belles lettres and grey and white for world affairs. Lane actively resisted the introduction of cover images for several years. Some recent publications of literature from that time have duplicated the original look.

From 1937 and on, the headquarters of Penguin Books was at Harmondsworth north of London and so it remained until the 1990s when a merge with Viking involved the head office moving into London (27 Wrights Lane, W8 5TZ).

Designed by Edward Young

Design Classics

Juicy Saliff

Not all squeezers are meant to actually squeeze. Perhaps the most famous example of this is the Juicy Salif, designed byPhilippe Starckin 1990. It is considered an icon ofindustrial designthat has been displayed in New York'sMuseum of Modern Art. It is manufactured by Italian kitchenware companyAlessi. Its diameter is 14cm, height 29cm, and it is made from cast and polishedaluminium. As the founder of the company Alberto Alessi recalls "I received a napkin from Starck, on it among some incomprehensible marks (tomato sauce, in all likelihood) there were some sketches. Sketches of squid. They started on the left, and as they worked their way over to the right, they took on the unmistakable shape of what was to become the juicy salif. While eating a dish of squid and squeezing a lemon over it, Starck drew on the napkin his famous lemon squeezer."

For the tenth anniversary of its launch, 10,000 were individually numbered andgold plated. There hasalsobeen agrey/black(Anthracite) coloured versionof which 47,000 un-numbered exampleswereproduced between 1991 and 2004. Both now are collectors items, though an urban legendperpetuates that the anthracite version is rarer than the gold plated version.

The gold plated version was described as an ornament because the citric acid in a lemon discolors and erodes the gold plating. Starck even said his squeezer was, "not meant to squeeze lemons" but "to start conversations".

Designed by Philippe Starck; 1990

Design Classics

DigforVictoryPosters

Designed by Henri Kay Henrion

Henri Kay Henrion(1914–1990), was aGermangraphic designer.

Afte leaving school he went to Paris, and worked in textile designsweatshopbefore studying with poster designerPaul Colin. In 1936 he moved instead toEngland, to work in poster design. He designed a Modern Architectural Research (MARS) Group of architects. DuringSecond World Warhe wasinternedas an alien but subsequently worked for theMinistry of Informationdesigning posters for campaigns likeDig for Victory, Aid the Wounded, and Grow More Food.

After the war he becameart directorat Contact Books and also designed two of the pavilions for theFestival of Britain. Subsequently he worked in the then emerging field ofcorporate identity- ensuring that a company's visual identity is consistent throughout every medium it uses to communicate with the public. His clients includedBritish European Airways,KLM, TheNational Theatre, and thePost Office

Henrion lectured at theRoyal College of Artfrom 1955 to 1965 and was head of Visual Communication at theLondon College of Printingfrom 1976 to 1976. Henrion was a member of theArtists' International Association, the Society of Industrial Artists and Designers (later theChartered Society of Designers), and theCouncil of Industrial Design; in 1952 he became one of the earliest members ofAlliance Graphique Internationale, in which designers from all over the world could meet and share ideas.

He was elected a Royal Designer for Industry in 1959, and was appointedMBEin 1951,OBEin 1985.

Design Classics

Ekco AD 65 Radio

Wells Coates was a Canadian trained architect who came to London in the early 1920's and became one of the pioneers for British Modernism.

He designed important buildings in the new architectural style and it was inevitable that he would attract the attention of manufacturers like E.K. Cole who wanted to modernize their industry. Wells's wireless Receiving Set AD 65 was the result of a design competition held in 1932 by Eric K. Cole to produce the ideal plastic radio. Wells Coates' winning design was produced, with variations, from 1934 until 1946 and became a best seller for the company. It was a radical departure from traditional forms and materials of radio cabinet construction. The AD 65 had a distinctive circular cabinet of moulded brown Bakelite made to fit a circular speaker. The shape was reiterated in the controls and arc of the channel display and gave the radio an entirely novel form that also reduced the tooling costs. A less expensive and more popular 'walnut look' version of the AD 65 was also available.

Designed by Wells Coates; 1932

Design Classics

Candlestick Telephone GPO 150

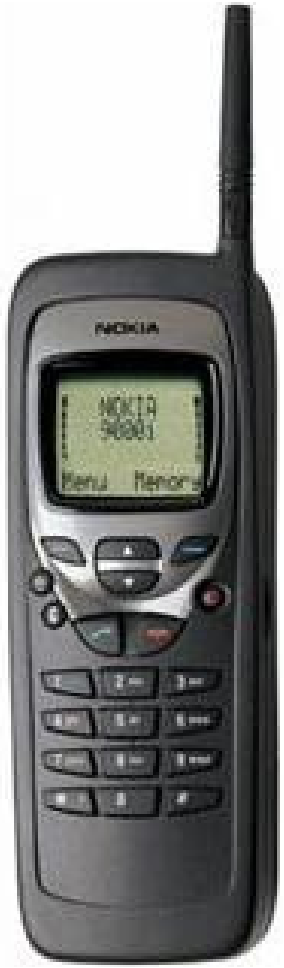
The candlestick telephone was one of the most common designs in the early decades of the twentieth century and became the international standard table telephone.

One development which had a lasting impact on telephone design was the evolution of plastics. Telephone manufacturers looked for a material from which telephone components could be made easily and cheaply. In the 1920's improvements in chemical engineering and moulding techniques made Bakelite, from which the 150 is made. The major disadvantage of the candlestick was the fact that the mouthpiece was fixed onto the base, forcing the user either to crouch near to the telephone or hold both parts, one in each hand. Improvements in transmitter design, through electronic amplification, did not come until the late 1920's after research by engineers commissioned by the American Bell Company.

Initially calls could only be made through the operator but the introduction of the dial, for which space was made on the base, enabled the caller t make connections automatically. The shape proved extremely popular and lasted for many years. It is still marketed as a reproduction piece.

Design Classics

Nokia 9000 Communicator



The Finnish Nokia company has developed the latest range of personal telephone communications, which represent an important step towards miniaturization.

The Nokia 9000 Communicator allows the user to carry around a whole series of facilities. It combines digital voice, data services and personal organiser functions into a pocket-sized and easy to use unit. The communicator features an impressive list of applications, including telephone, fax, e-mail, internet browser, personal organiser, messaging terminal, calendar and calculator. It has an infra-red PC and printer connection and has an eight megabyte memory.

Designed by Nokia in-house design team; 1996

Design Classics

Brionvega RR126 Stereo Hi-Fi

Designed by Achille and Pier Castiglioni; 1965 - 66

Originally radio manufacturers, Brionvega went on to produce televisions and hi-fi equipment. They employed a series of well known Italian designers to transform their products.

The Castiglionis' radical concept in stereo was a unit that fitted with the dominant style of the mid-1960's; its bold forms and colours lending a dynamic image to the product. The RR126 Stereo is a free-standing mobile unit which has speakers that can be stacked up on top to form a box, or folded out into a horizontal arrangement.

Design Classics

Brionvega Algol Television

Designed by
Marco Zanuso & Richard Sapper;
1964

The **Brionvega Algol TV** is a design classic designed by**Richard Sapper**and**Marco Zanus**o in the 1960s has has proved to be one of Brionvega‘s more successful products. The company was founded in Milan in 1945 by**Giuseppe Brion**and specialized in manufacturing televisions.**Brion’s**televisions used cutting-edge technology and advanced manufacturing techniques. Many of Brionvega’s products have become collector’s items and are often exhibited in design museums around the world. Part of the permanent collection at the Museum of Modern Art (MoMA) in New York.

Design Classics

Sony Walkman

Sony chairman Akio Morita is said to have conceived this portable stereophonic cassette player whilst playing tennis, imagining a lightweight , easy-to-carry device for listening to music at any time. The Sony Walkman represents key changes in the 1970's and 1980's consumer markets. One of the first personalized products, both fashion accessory and functional object, the concept used existing technologies in an innovative and revolutionary way with new styling. With about fifty million sales, the Walkman has seen many versions, such as the model shown here. It continues to evolve in line with social and fashion trends and the need for individual customization.

Designed by Sony Design Centre; 1978

Design Classics

Sinclair ZX81 Computer

The **ZX81** was ahome computerproducedbySinclairResearchandmanufacturedinScotlandbyTimex Corporation. It was launched in the United Kingdom in March 1981 asthe successor to Sinclair'sZX80and was designed to be a low-cost introduction to home computing for the general public. It was hugely successful and more than 1.5 million units were sold before it was eventually discontinued. The ZX81 found commercial success in many other countries, notably the United States, where Timex manufactured and distributed it under licence. Timex later produced its own versions of the ZX81 for the US market – theTimex Sinclair 1000andTimex Sinclair 1500. Unauthorisedclones of the ZX81were produced in a number of countries.

The ZX81 was designed to be small, simple, and above all cheap, using as few components as possible to keep the cost down. Video output was to a television set rather than a dedicated monitor. Programs and data were loaded and saved ontoaudio tape cassettes. It had only four silicon chips on board and a mere 1kB of memory. The machine had no moving parts – not even a power switch – and used a touch-sensitivemembrane keyboardfor manual input. The ZX81's limitations prompted the emergence of a flourishing market in third-party peripherals to improve its capabilities. Such limitations, however, achieved Sinclair's objective of keeping the cost of the machine as low as possible. Its distinctive design won awards in the UK and abroad.

Designed by Sinclair Research; 1981

Design Classics

TS 502 Radio

Designed by
Marco Zanuso & Richard Sapper;
1964

Brionvega was established as a radio manufacturer in 1945 and began producing television sets in the early 1960's. The design team of Marco Zanuso and his Bavarian-born design partner Richard Sapper worked regularly with Brionvega, as did Mario Bellini and Achille Castiglioni, other stars in the Italian design firmament. When closed, the TS 502 forms an anonymous box that conceals the function. It is a natural partner to the ST/201 television set, also designed by Zanuso and Sapper for Brionvega.

Design Classics

Beogram4000 Turntable

In 1944 Bang and Olufsen launched the revolutionaryGrand Prix 44 RG,acompact cabinet incorporating a record player and a radio. In 1968 the Danish designer, Jakob Jensen, was placed in charge of Bang and Olufsen's hi-fi design programme. His vision for the company was simplicity and elegance – timeless products notable for their logicality and technical precision. Jensen's anonymous and discreet styling for Bang and Olufsen has come to define the aesthetics of high quality contemporary sound systems. Using state of the art technology with its precision components and electronic tangential arm., the Beogram was a rare example of a product from a European electronics company capable of holding its own in an industry dominated by the new Japanese companies. Bang and Olufsen continue to produce audio-visual equipment to high professional standards for the domestic market.

Designed by Jakob Jensen; 1973

Design Classics

Sony PortableTV80301

The post war US occupationofJapanhadtremendousinfluenceonthecountry's reconstruction. New Japaneseindustries concentrated oncapital-intensive goodssuchas radios,TV's and cars. One of the best known company's to represent this economic recovery was the Sony Corporation. In the 1950's Sony bought the manufacturing rights to a new American invention, the transistor, and in 1955 produced its first radio. This was followed in 1959 by the first solid state television receiver with a 46 centimetre screen and weighed 6 kilograms.

Sony's product development has been guided by technological innovation, supreme quality control and sound business management. It played a major role in establishing the profile the Japanese electronics industry that would dominate global markets. Unlike Western companies, Japanese companies have tended to use in-house anonymous design teams for product development rather than outside designers. The Sony team is responsible for all aspects of the company's products and their corporate identity, expressed through packaging and promotion.

Designed by Sony Design Centre; 1959

Design Classics

Kodak Brownie 127

The Kodak Company was founded in 1881 by George Eastman Kodak. His products pioneered the simplification of photography, as suggested by Kodak's advertising slogan; "You press the button, we do the rest". Kodak is the worlds largest photographic organisation. It designed and manufactured hundreds of cameras during the last century. This post war model has the rounded contours that were popular in Walter Darwin Teague's series of popular cameras designed in the 1930's, the best known of which was the Bantam special of 1936. This made it appear old-fashioned even when it was new. Several million were nonetheless sold.

Designed by Kodak; 1959

Design Classics

MarilynSofa

MarilynSofa was designed by **Studio 65** in 1970. The chair was named after Mae West and,assuch, can be seen as an early example of Redesign. With its anti-establishment connotations, Surrealism was highly influential to the 1960s and 1970s Anti-Design movement. Inspiration for this quintessential Pop design may also have come from Andy Warhol's collection of silk screens.

Designed by Studio 65; 1970

Design Classics

Olympus Trip 35

The Olympus Trip 35 was designed in 1968 and was in continuous production until 1988, selling over ten million units and making it one of the most successful cameras of the twentieth century. Tha camera was designed as a 35mm version of the Olympus range and combined high quality technical performance with a more affordable price. Aesthetically, the camera broke new ground, by wrapping the light meter cells ingeniously around the lens. It was simple and easy to use, compact in size so that it was easy to carry. Olympus has continued its commitment to innovation. One of its more recent cameras, the 1993 Olympus Zoom, with distinctive sculptural contours, was the lightest 35mm camera on the market at that time.

Designed by Olympus Design Team; 1968

Design Classics

IBM Typewriter 72

Design in 1963, IBM's golf ball typewriter revolutionised the 1960's office. For the first time a single machine offered interchangeable typefaces, carbon ribbon, electric drive, a small footprint and a weight of only 14 kilograms. Its success was due to a nickel-plated plastic type, positioned by a mechanism so that each stroke tilted and rotated to bring the required character to the front, before striking it against the ribbon and moving it on a space. Later variants gave an even greater quality of print. The international Business Machine Corporation (IBM) operated a clearly defined design policy in the 1950s under the new direction of Eliot Noyes. With an eye on the work of Italian rivals Olivetti, in particular products designed by Nizzoli, the 1972 represented not only a technical breakthrough but the expression of sophisticated sculptural form.

Designed by Eliot Noyes; 1963

Design Classics

AppleiMac

Designed by Jonathon Ive; 1996

In 1999, Apple took the world of product design by storm with the iMac, which is now recognised to be one of the most important products at the end of the century. It has redefined the way computers are perceived, coming in a range of fashionable colours and using a sexy aesthetic far removed from previous computer styling.

The design team is headed by Jonathon Ives, a British designer based in California. Ives is also a vice the president of the corporation, reinforcing importance of the place of design within the company. The success of the i-Mac has been overwhelming, the reaction to it has been so pervasive from its sales figures to the number of websites that are dedicated to the product. Ives's objective was to try and create a computer that was functional and at the same time fun and easy to use. It fits neatly into both the home and office environment, enriching the experience of the user. A detailed approach to every aspect of the product, from materials to the marketing, had made the i-Mac a turning point in accessible design and technology.

Design Classics

Sinclair C5

The **Sinclair Research C5** is a battery electric vehicle inventedbySirCliveSinclairand launched by Sinclair Vehicles Ltd in the United Kingdom on 10 January 1985. The vehicle is a battery-assisted tricycle steered by a handlebar beneath the driver's knees. Poweredoperation is possible making it unnecessary for the driver to pedal. Its topspeedof15 miles perhour(24 km/h), is the fastest allowed in the UK without a driving licence. It sold for £399 plus £29 for delivery.

It became an object of media and popular ridicule during 1980s Britain and was a commercial disaster, selling only around 17,000 units, although according to Sinclair, it was "the best selling electric vehicle“ until November 2011 when the Nissan Leaf had sold over 20,000 units.

Designed by Sir Clive Sinclair; 1985

Sir Clive Sinclair started to think about electric vehicles as a teenager, and it was an idea he toyed with for decades. In the early 1970s Sinclair Radionics was working on the project. Sinclair had Chris Curry work on the electric motor. However, the company focus shifted to calculators and no further work was done on vehicles until the late 1970s. Development began again in 1979 and progressed erratically until, in 1983, it became apparent new legislation would alter the market and make it possible to sell a vehicle closely resembling development efforts.

As time went on, the Sinclair Research C5 development cost gradually increased. In March 1983, Sinclair sold some of his shares in Sinclair Research Ltd and raised £12 million to finance vehicle development. In May a new company, Sinclair Vehicles Ltd, was formed out of Sinclair Research and a development contract entered with Lotus to take the C5 design to production. At the same time, the Hoover Company at Merthyr Tydfil contracted to manufacture the C5. This, together with the fact that the motors were made by Polymotor in Italy, started the urban myth that the C5 was powered by a washing machine motor. In 1984, Sinclair Vehicles Ltd set up head office at the University of Warwick Science Park.

Design Classics

Bicycle of the Future

In 1946, London's Victoria and Albert Museum reopened after the war withadesign exhibition – "Britain Can Make It". Attracting thousands of visitors, one of its most successful features was Designs of the Future, a stand which included a futuristic kitchen, an air conditioned bed and Ben Bowden's Bicycle of the Future.

Until the historian Paul Clarke researched his career, little was known of Bowden. Trained as an engineer, in the 1930s he was chief body engineer for Rootes, the British car manufacturer. After the war he turned his attention to bicycles, the design of which had remained almost unchanged since the turn of the century. Bowden's bicycle abandoned tubular steel in favour of a hollow frame made from alloy, a technique that soon became the industry standard for mopeds and scooters. It was intended to be electrically assisted with a rechargeable battery shaft drive rather than a chain drive. When the bicycle was shown to the public in 1946 its new technology and radical shape – according to Bowden, inspired by the bows of the great ocean liner, the Queen Mary – created a sensation.

Bowden's bicycle was never put into production. He moved to the USA in the 1950s and in the following decade he produced small quantities of his design, renamed the Spacelander. The bike quickly became something of legend, avidly sought by specialist collectors.

Designed by Ben Bowden; 1946

Design Classics

Eames Lounge Chair and Ottoman 670

Widely acknowledgedasoneofthemostimportantandinfluentialdesignsofthe20thCentury,theEamesLounge Chair and Ottoman effortlesslyooze status,style and laid-back comfort. Correctly titled the Eames Lounge (671) and Ottoman (672), this ultra-stylish and exceptionally comfortable furniture set was introduced to a rapturous reception in 1956 after undergoing years of design and development by Charles and Ray Eames. It has been in production ever since by Hermann Miller with whom the Eameses closely collaborated. Indeed, a truly enduring testament to its iconic stature.

The New York Museum of Modern Art sealed reputation of the Eames LoungeChair & Ottoman as the most iconic of all modern chair sets by installing them as part of the museums permanent collection. The pair have also been on permanent display for decades at the Art Institute of Chicago.

The Eames Lounge Chair (Eames Lounger) made its debut public appearance on the Arlene Francis ‘Home’ show aired on the NBC network in 1956. Since then it has continued to feature on both television and film, gracing the apartment of Frazier Crane in the popular sitcom Frazier and starring in numerous films and commercials.

Designed by Charles and Ray Eames; 1956

Design Classics

Chaise Longue

During the mid to late 1920s, some of the mosttalentedEuropeanarchitects,includingMarcel Breuer and Ludwig Mies van der Rohe,producedchairdesignsintubularsteelandleatherthatremainsomeoftheclassicpieces oftwentieth century furniture.

Perhaps the greatest and most enduring piece of Modernist furniture produced at this time is the chaise longue designed in 1928 by a previously little-known French designer called Charlotte Perriand. When she approached the prominent architect Le Corbusier with her portfolio, she was told that “we don’t sew cushions here!”. Her desire to make her mark within the masculine world of architecture was rewarded when she was eventually employed by Le Corbusier to design items of furniture for the villas he was building.

The feet of the chair mimic the profile of an aeroplane wing and establish the piece as an icon of the “machine age”.

Perriands’ designs were first manufactured by Thonet and later by the Swiss company Embru.

Thechaise longue remainsin production today in a modified form by Cassina.

Designed by Le Corbusier, Pierre Jeanneret & Charlotte Perriand; 1928

Design Classics

Hill House Chair

Charles Rennie Mackintosh(1868 – 1928) was a Scottish architect, designer, watercolourist and artist. He was a designer in theArts and Crafts movementand also the main representative ofArt Nouveauin the United Kingdom. He had a considerable influence on European design. He was born inGlasgowand he died in London.

The narrow Hill House Chair was meant by Charles Rennie Mackintosh to be a decoration, and not a functional piece of furniture. Mackintosh designed Hill House for the publisher Walter Blackie between 1902 and 1904, the chair still resides at Hill House in Helensburgh, Scotland. The Hill House Chair is constructed of ashwood. Black or a walnut finish is available. The seat is leather or fabric. Mackintosh was also a skilled interior designer, painter and decorator who was renown for his inventive interpretation of Art Nouveau. His "Spook School" did not gain immediate notoriety due to his unconformity to the standards of French and Belgium Art Nouveau. Slowly Mackintosh gained appreciation by the populous throughout Europe, as well as his contemporaries of Art Nouveau whom he thought were excessive in their decorative style. His participation in such landmark events such as the 1902 exhibit of Modern Decorative Arts in Turin and the 1931 Exhibition of the Vienna Secession School solidified his place in the history of design.

Designed by Charles Rennie Mackintosh;
1902

Design Classics

Super Lamp

Designed by Martine Bedin; 1981

Martine Bedin's (b.1957) formed part of the Italian design group ‘Memphis’. Bedin’s contributions to Memphis were primarily in the area of lighting and graphic design. Born and raised in Bordeaux (where she was a friend of Memphis colleague Nathalie du Pasquier), Bedin moved to Florence in 1978 to study architecture with Adolfo Natalini of Superstudio. In 1979 she contributed an installation entitled La Casa Decorata to the Milan Furniture fair, and she met Ettore Sottsass Jr. the following year, leading to an invitation to join Memphis; she also introduced du Pasquier to the group. Among Bedin's contributions to Memphis in its first year (1981) was this iconic Super lamp. This version is the initial prototype and was shown at the first Memphis exhibition at the gallery, Arc 74 in 1981.

Design Classics

Lazy FishCorkscrew

Corkscrew design is similar to that of the mousetrap. For hundreds of years, man has wracked his brain in search of easier and more humane ways of getting the job done. On more than one occasion, pain and heartache have resulted from the end product, which is one of the reasons why people love the Lazy Fish Corkscrew. It is a pleasure to use, but it also looks good

The origins of the Lazy Fish go back to 1888, when the lever mechanism was patented as the 'lazy tong'. However, it was not until the 1920s that it was incorporated into a corkscrew design, but manufacturing costs at the time meant it was not a viable commercial proposition until it was rediscovered recently by those clever people at Bacchanal, the producers of the famous La Cafetiere.

It requires none of the pulling and shoving needed in the application of so many of its inferior brethren. Admittedly, you do have to turn the device to twist the screw into the cork, but the modicum of effort is more than amply rewarded with what follows. To extract the cork you gently pull the tail of the fish and, pleasure of pleasures, the cork comes sliding out.

However, sheer practicality alone is not the marque of great design. The Lazy Fish looks good and its aesthetic features are all practical features. The jaws of the head open to direct the screw into the right position. The eye is a rivet to stop the user pushing the screw too far into the cork. The body is formed by the ingenious collection of levers. The tail is the handle.

Design Classics

Ron Arad Chair

Born in Israel, Ron Arad moved to London in 1973, studiedatthe Architectural Association and in 1981 opened a furniture shop in Covent Garden. Called “One Off”, the showroom became a significant part of the new British design wave of the 1980’s and established Arad as Britain’s most creative designer-maker.

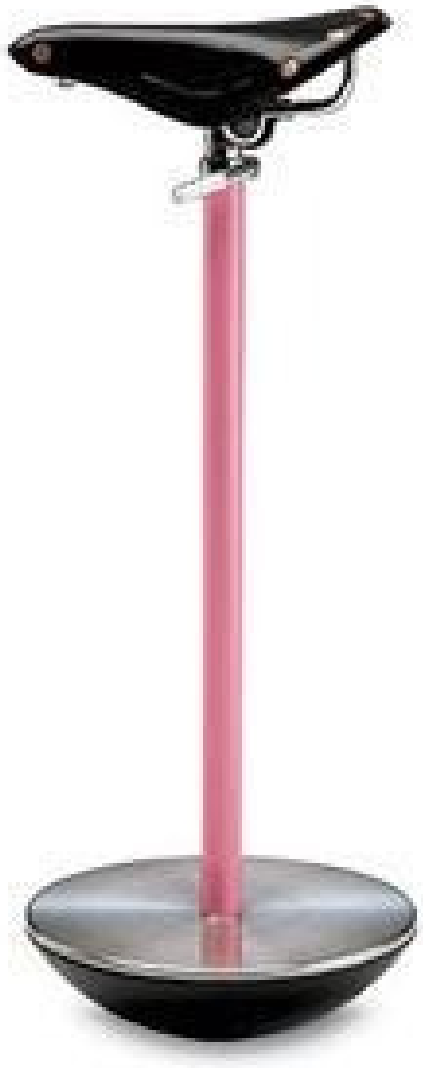
Designed by Ron Arad; 1986-93

His early work used industrial materials and recycled parts, notable the famous rover chair, which placed the car seat into a tubular steel frame. His showroom attracted many other designers with whom he collaborated or whose work he sold, including glass furniture by Danny Lane and metal furniture by Tom Dixon. Arad was therefore at the centre of new and exciting developments in London.

Always an inventive maker, Arad worked extensively in his metal workshop, welding large pieces together to make installations and furniture. Here Arad has reduced the traditional armchair to simple folded forms which challenge the conventional idea of comfort and use. Unlike many of his contemporaries in the 1980s, Arad made the significant jump into the international arena. His work was profiled in many leading museums, including the Pompidou Centre in Paris, and his annual exhibitions at the Milan Furniture Fair attracted a great deal of favourable attention. Leading and Italian manufacturers, including Driade, Vitra Poltonova, have commissioned him to design furniture for limited production.

Design Classics

Sella



Without a doubt, Sella is one of the great icons of Italian design from the 20th century. The stool's design was coined by the brothers Castiglioni, Achille and Pier Giacomo that created it in 1957. In its time the chair was evaluated radical, which is why it only entered the serial production in 1983 by the Italian premium manufacturer Zanotta.

Its elegance does nearly appear bizarre regarding its seat that is a traditional racing bicycle seat. Placed on a pink lacquered steel rod and ending in a robust cast-iron foot, a composition appears that magically forms a harmonious and noble object.

Sella is considered an extreme design of the creative team together with the Mezzadro stool that has a tractor seat as sitting area. With Sella, the Castiglioni brothers prove their sense for converting everyday objects into original designs.
Thereby the stool stands typically for the whole Zanotta collection that displays the Italian design from the 20th century, and all of it until today.

Designed by Achille Castiglioni; 1957

Design Classics

Joe Chair

The "Joe" Chair was designed by Italian architects and is still produced from the original moulds. Named for the famed New York Yankees centerfielder Joe DiMaggio, "Joe" was suggested by a client's off-hand remark that a chair "should fit like a glove." The "Joe" Chair is now considered a cult classic.

Exquisitely crafted in luxurious leather, the "Joe" Chair has a metal frame that is padded with preformed expanded polyurethane foam and circles the bases on 4 rolling casters. The size of a Loveseat or Big Chair, it seats 2 adults or 3 children, measuring approximately 69" wide x 43" deep x 35" high.

The Baltimore Orioles have them sitting in their corporate offices. Some Major League Baseball team owners and officers have them in their private offices. This is the ultimate luxury and yes, baseball aficionados, you too can watch your beloved baseball team in the comfort of a chair shaped like a baseball glove . . . in YOUR den . . . in YOUR home . . . in YOUR office.

Designed by Jonhatan De Pas, Danato D'Urbino and Paolo Lomazzi; 1970

Design Classics

DrMartens Boots

Dr. Martensis a traditional Britishfootwearbrand, which alsomakesarangeofaccessories– shoe care products, clothing, luggage, etc. In addition to Dr. Martens, they are known as**Doctor Martens**,**Doc Martens**,**Docs**or**DMs**. The footwear is distinct because of its unique air-cushionedsole(dubbed*BouncingSoles*) upper shape,weltedconstruction and yellow stitching. They are one of the most popular and well-known footwear brands in the world, and are iconic to the fashion industry.

Klaus Märtens was a doctor in theGerman armyduringWorld War II. While on leave in 1945, he injured his ankle whileskiingin theBavarian Alps. He found that his standard-issue armyboots were too uncomfortable on his injured foot. While recuperating, he designed improvements to the boots, with softleatherand air-padded soles made of tyres. When the war ended and some Germans looted valuables from their own cities, Märtens took leather from acobbler's shop. With that leather he made himself a pair of boots with air-cushioned soles.

Märtens did not have much success selling his hoes until he met up with an olduniversityfriend, Dr. Herbert Funck, inMunichin 1947. Funck was intrigued by the new shoe design, and the two went into business that year in Seeshaupt, Germany, using discardedrubberfromLuftwaffeairfields. The comfortable and durable soles were a big hit with housewives, with 80% of sales in the first decade going to women over the age of 40.

Sales had grown so much by 1952 that they opened a factory in Munich. In 1959, the company had grown large enough that Märtens and Funck looked at marketing the footwear internationally. Almost immediately,Britishshoe manufacturer R. Griggs Group Ltd. boughtpatentrights to manufacture the shoes in the United Kingdom.Griggsanglicizedthe name, slightly re-shaped the heel to make them fit better, added the trademark yellow stitching, and trademarked the soles as AirWair.

Designed by Klaus Martens