Design and Manufacture (Higher)

Design task – Slam City Skates

Candidate 6

H Design and Manufacture
DESIGN TASK
RESEARCH PRO FORMA 1

SQA

NAME

NOTES TO CANDIDATES

Before you start the research you should have read the instructions for candidates and be familiar with:

- the brief
- the skills which you have to demonstrate
- the type of evidence you have to provide

You should speak to your assessor if you are not familiar with the areas above.

The company has produced a partially completed specification (on Research Sheet 2) which you are required to complete.

You must:

- Identify a retail environment in which the display stand will be used
- Identify the items which the display stand will be required to hold
- Identify additional issues required for the specification
- Carry out primary and secondary research

The retail environment in which the display stand will be used is a London skateboard shop called "Slam City Skates".

The display stand I am designing will have to include the same colour scheme in order to work well with the shop its in.

Black is used on the doors and windows as an accent colour

Wood is used throughout the shop as part of it's aesthetic

Walls of the shop are mostly white

White walls work well as the bold colours come from the skateboards that are hung on them

Secondary Research — Survey

I created a survey and visited a skateboard shop in Glasgow to gather more information to use in my design.

How many skateboards would you like a stand to hold?

"I would say a good amount would be around 10 skateboards"

What part of the skateboard do you think should be shown when on the display?

"I think the bottom of the skateboard shown should be shown, because that's where the brand and designs are shown, and you don't want to be only able to see just grip tapes."

Do you think there be anything else displayed on the stand other than just skateboards?

"I think that it would be best for the stand to focus on the skateboards, rather than having other items which could take away from the attention of the boards."

What do you think would be the best way for the skateboards to be displayed?

"The skateboards would probably be best displayed on their sides with the bottom shown, as that's the most decorative part which brings colour to our shop's aesthetics compared to the white walls."

H Design and Manufacture

DESIGN TASK

RESEARCH PRO FORMA 2

SQA

NAME

Primary Research — Weight of skateboard taken from Amazon

Additional Information

Item Weight	10.5 Kg
Shipping Weight	3 Kg
Delivery Destinations	Visit the Delivery Destinations Help page to see where this item can be delivered Find out more about our Delivery Rates and Returns Policy
Item model number	Falcon 4 - 7.5 Inch

Secondary Research — Measurements I have taken from a skateboard

Length — 785mm

Skateboard Width — 193mm

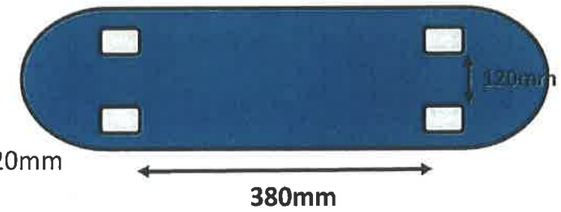
Skateboard Wheels — 50mm

Distance between sets of wheels — 120mm

Distance between wheels - 380mm

Skateboard thickness — 5mm

Top of deck to bottom of wheel — 97mm



Branding

The skateboards that I will be displaying will be made by Vans. This is a good brand of skateboard to display as it is a very popular and well known brand which will help gain more attention to the skateboards.

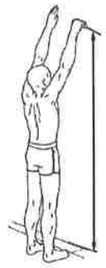
The logo and a lot branding of the Vans company is also black and white, which is appropriate for the skateboards as it will work well with the aesthetics of the 'Slam City Skates' shops.

Anthropometrics — Secondary Research

Vertical grip reach

5th Percentile (Women) - *180.83cm*

5th Percentile (Men) - *195.84cm*



Eye height standing

5th Percentile (Women) - *141.52cm*

5th Percentile (Men) - *152.82cm*

I have used the 5th percentile sizes as this means that the majority of people will be able to reach the top of the stand, rather than only the tallest people.

SPECIFICATION

Your specification should detail the issues appropriate to the design brief.

The specification for the display unit is as follows:

1 Function

1.1 It must take up no more than 800 x 800mm in floor space.

1.2 It must display skateboards in more than one way.

1.3 Any parts that move must use a standard component to secure it. (see brief for details).

1.4 It must be able to be used the floor of Slam City Skates.

1.5 It must be portable enough for the shop employees to move it.

1.6 The bottom of the skateboard must be shown when in the stand.

1.7 It must hold 10 skateboards on one stand.

1.8 It must be able to hold the weight of skateboards that weigh 10.5kg

1.9 It must be able to hold skateboards with the average dimensions (see research for specifics)

2 Aesthetics

2.1 It must feature colours which will work well with the white, black and light wood aesthetics of the chosen environment.

2.2 Must communicate the 'Vans' brand through the "Off the wall" logo

3 Ergonomics

3.1 The stand should be a suitable height for the 5th percentile of people to be able to reach the top of it. *(Women) - 180.83cm (Men) - 195.84cm*

Ideas

⊗ = 'Vans' Logo

① Wouldn't work very well as it is top heavy and could tip.

Wheel shape cut into stand to allow entire board to slide in

② Standard component

③

④ Support from the back creates support

Double-sided allows for more skateboards to be displayed

Plastic, moulded shape so that it can be moved easily

⑤ Simple cuts cheap to manufacture

Could be rotational moulded to make it hollow and therefore lightweight and easy to move.

Mirrored on other side

⑥ Creates support as the base is wide

⑦ Standard Component

Made of plastic so that the shape can be moulded

Rotational moulded so that it is hollow and lighter to move.

Creates problem as base isn't showing and only grip tape is visible.

⑧ Standard Component

Could create problems if it becomes too tall for customers or employees to reach.

Metal rod for strength

Could fold up to be moved

Wide base creates support and makes the stand stable

⑨ Only fits 3 skateboards

Manages to show grip tape and bottom

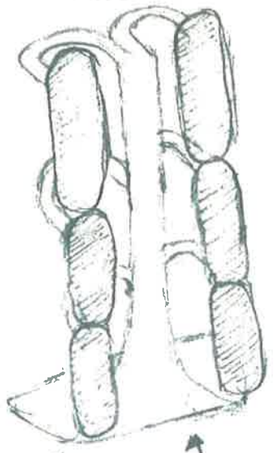
Experimenting turning it upside-down.

⑩ Could easily fold up for transportation

Only shows grip tape

Ideas Cont.d

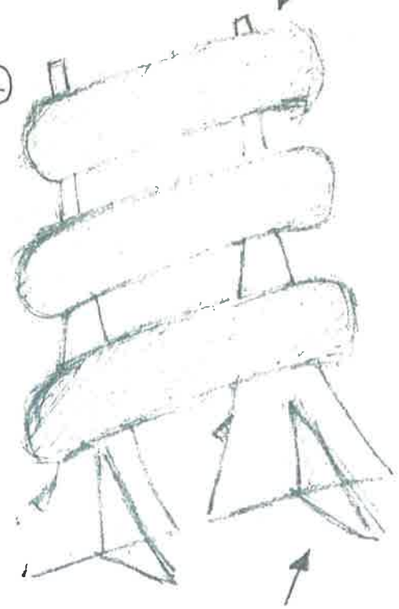
(11)



plastic so that it can be moulded into the shape

Mainly shows grip tape, not the base

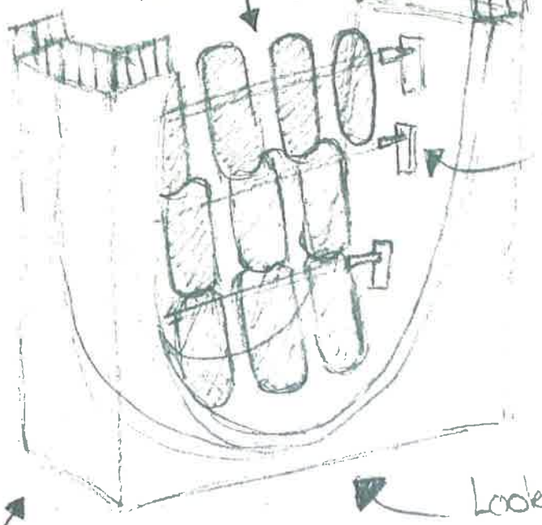
(12)



Made of wood

Easily slots into shape for assembly and taking apart to move it

(13)



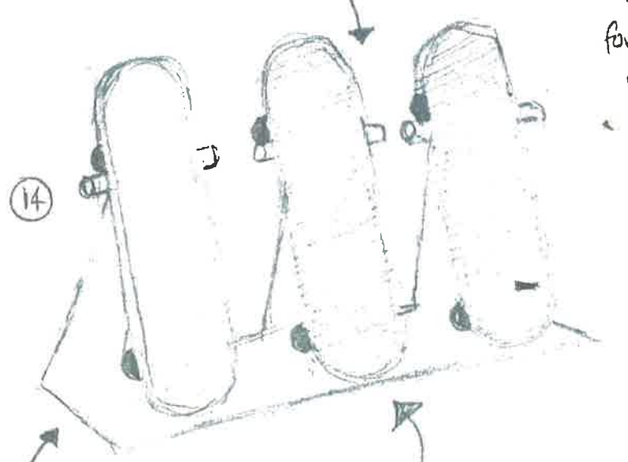
Would be hard to reach top boards without standing on display

Standard Component

Looks like a skatepark half pipe, links to product

May be too difficult for staff to move around shop

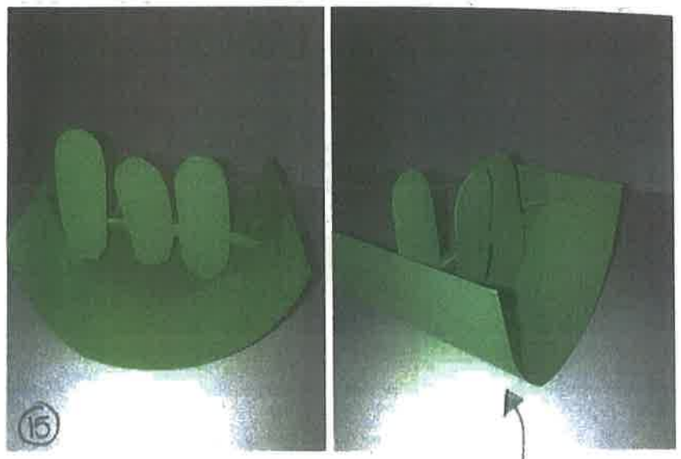
(14)



Moulded plastic to get the required single shape and comes in bright colours to attract attention

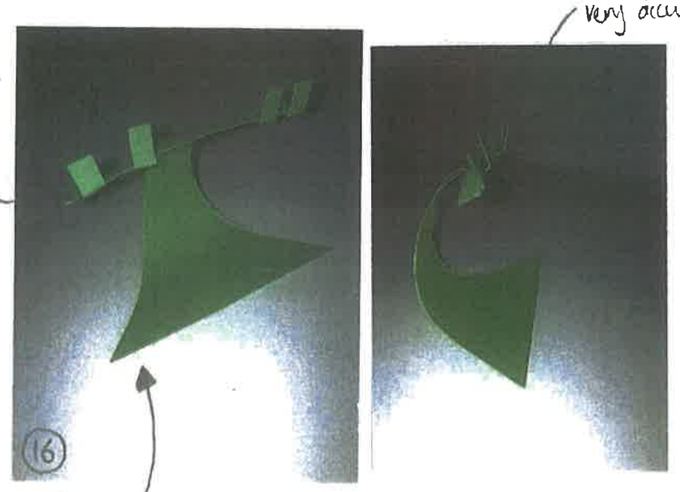
Could be a problem if only plain grip tape is displayed.

(15)



Relates to shape of a half pipe

(16)



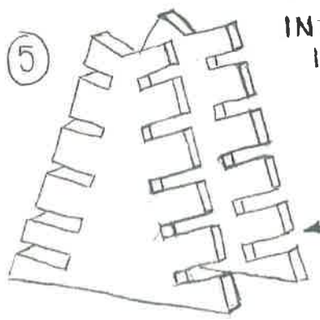
Would have to balance out weights very accurate

Skateboards have on

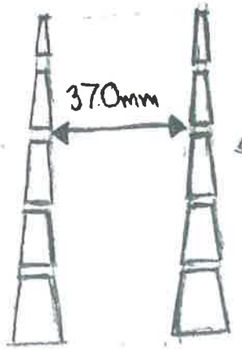
Shape may be too difficult to manufacture

Development of Ideas

⑤ INITIAL IDEA

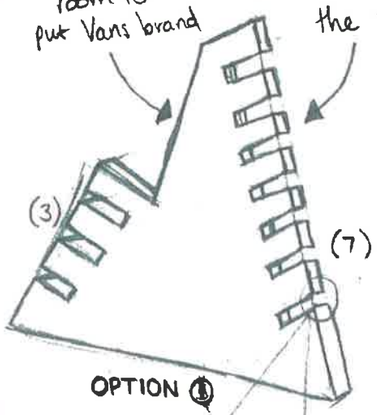


Holds 10 skateboards, meets spec

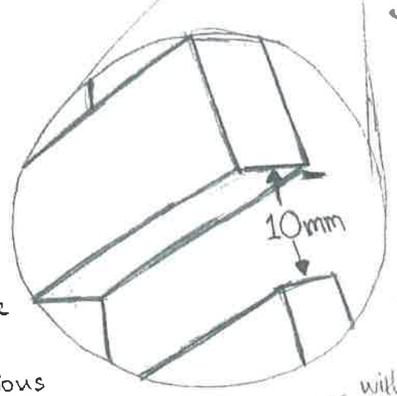


room to put Vans brand

Could make the slots uneven



OPTION ①



• I noticed a dip in the board and wasn't sure if 10mm would be enough so I made a card model with various sized slots.

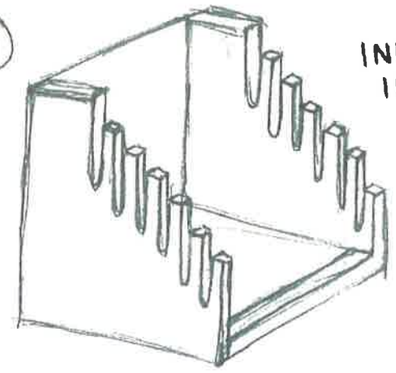
• 20mm will be the best option as it fits the thickness of the board in with enough room for a bit of movement and to not get stuck.

OPTION ②

OPTION ③

OPTION ④

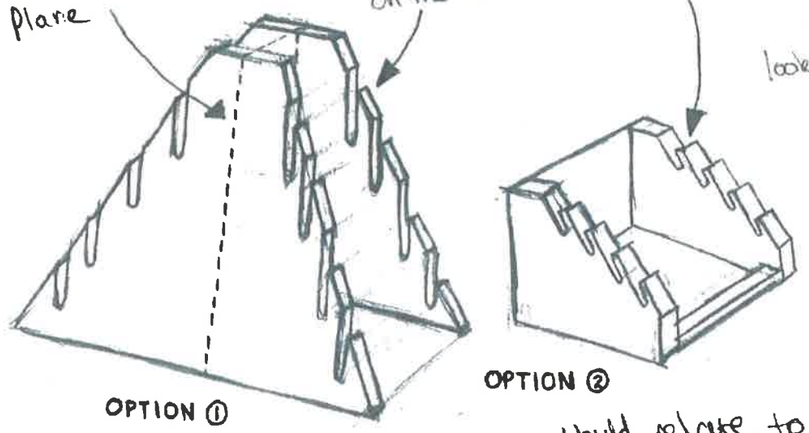
③ INITIAL IDEA



Mirror Plane

Could mirror on the other side

Slots at an angle would allow the bottom of the board to be shown and meet spec

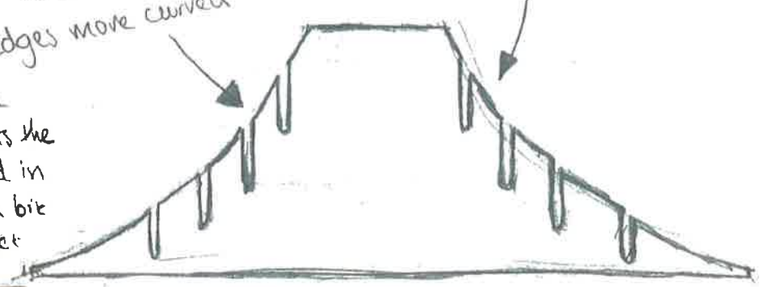


OPTION ①

OPTION ②

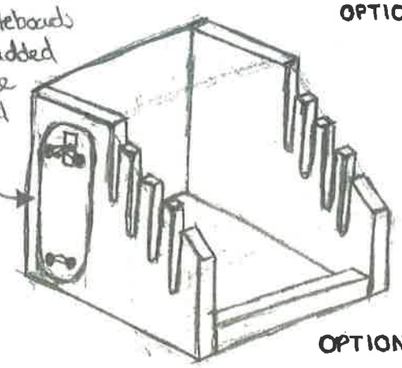
Would relate to skateboard ramp

Could make edges more curved



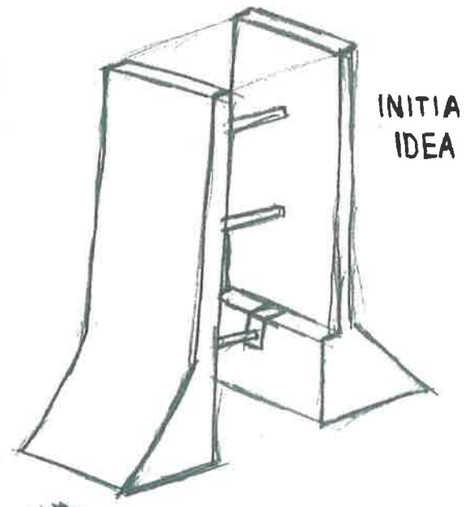
OPTION ③

Extra skateboards could be added on the side using standard component



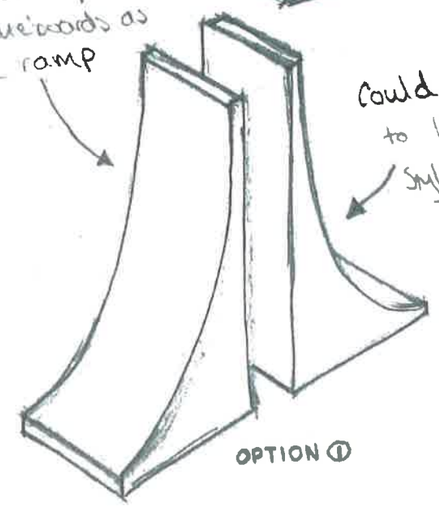
OPTION ④

⑧ INITIAL IDEA



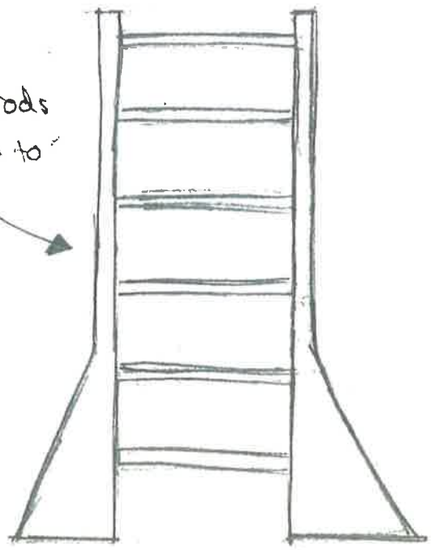
relates to product of skateboards as looks like ramp

Could be redesigned to look more stylish and less rigid.

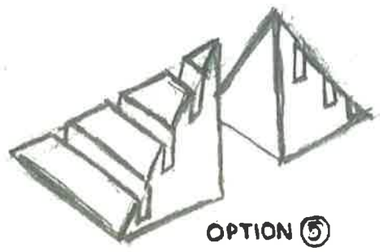


OPTION ①

More steel rods Could be added to allow more skateboards to be held



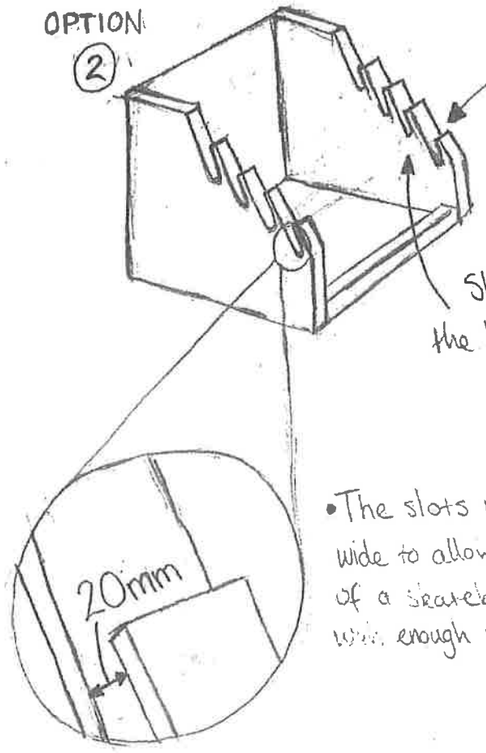
OPTION ②



OPTION ⑤

Further Development of Idea 3

OPTION ②

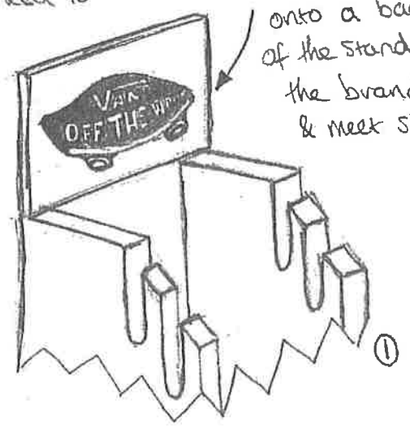


Only holds 4 skateboards so far. 6 more need to be held.

Slanted gaps allow the bottom of the board to be shown

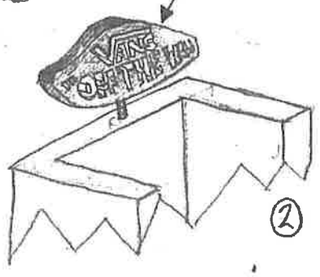
- The slots will be 20mm wide to allow the thickness of a skateboard to fit in with enough room to not get stuck.

10 x 20mm gap = 200mm



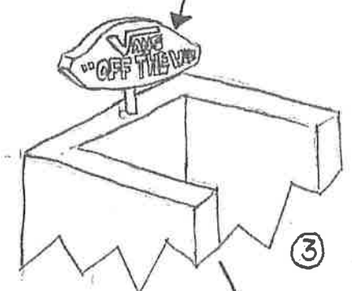
"Vans" Logo could be painted onto a backboard of the stand to make the brand clear & meet spec.

①



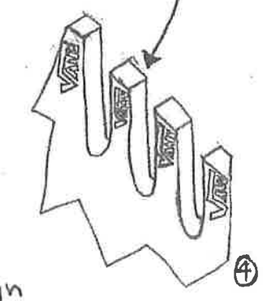
Lasercut

②



Rotational Moulded

③

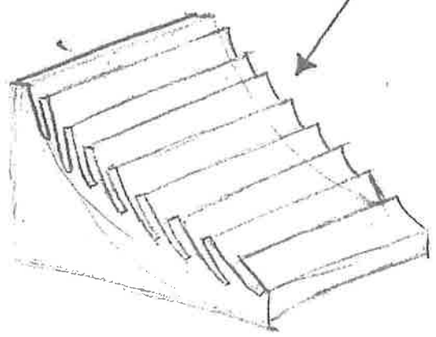


Engraved down the side

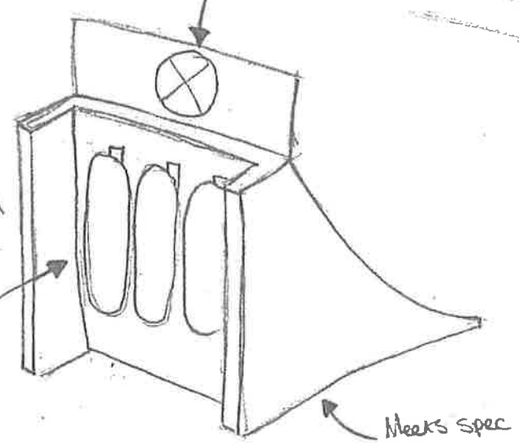
④

I will go with the plastic rotational moulded sign as it is more interesting to look at compared to the backboard and would be lighter compared to the laser cut sign as it would be hollow. This would mean it would meet the spec as it would make the stand more portable.

Make stand curved to relate to skateboard ramp

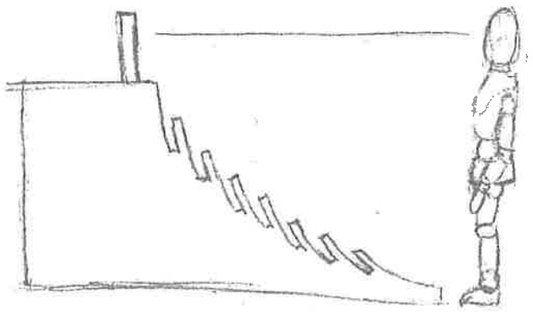


Vans Logo

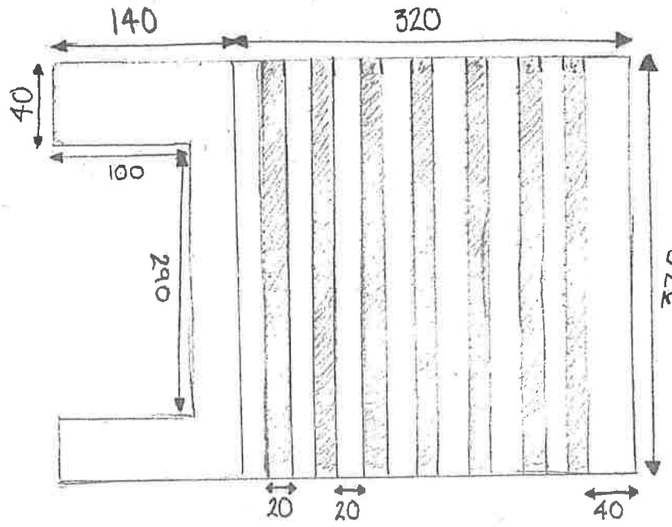


Extra Skateboard added on the back

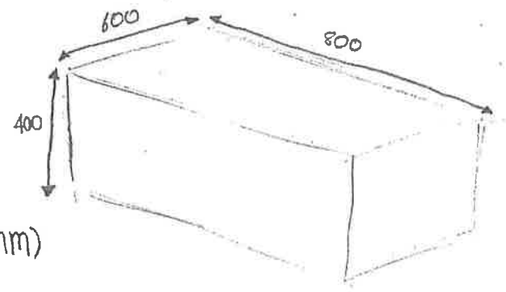
Meets spec as it allows 10 boards to be held and also uses standard component part at the same time.



- To make the backboard at eye level to the 5th percentile of Males, it would have to be 1530 mm tall and therefore not meet the spec.

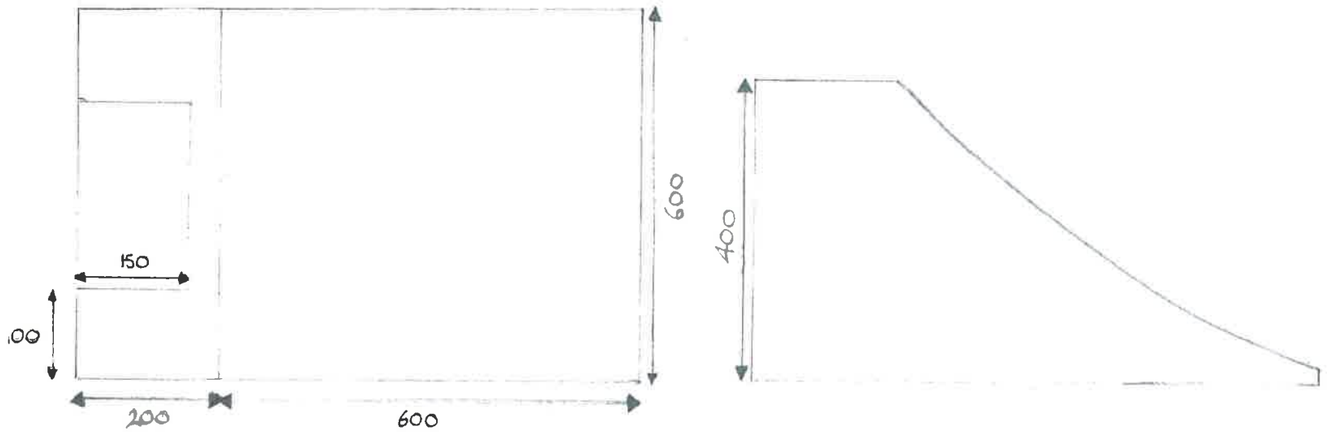


- When testing the size of the stand using these dimensions, it turned out to be too small compared to the average user, so the sizes will be increased.



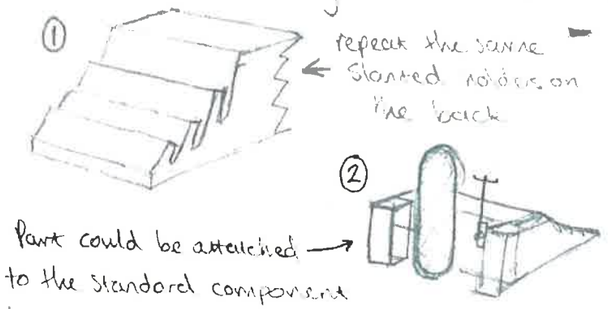
Development of dimensions

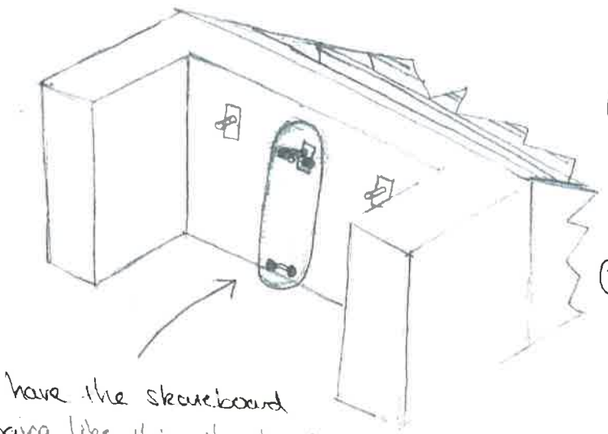
(MM)



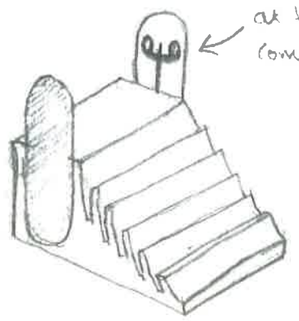
- As there are only 7 slots on the ramp, I will use the standard component to allow 3 more skateboards to be held on the back of the stand, allowing the design to meet two more spec points.

Alternative ways to hang 3 more skateboards.





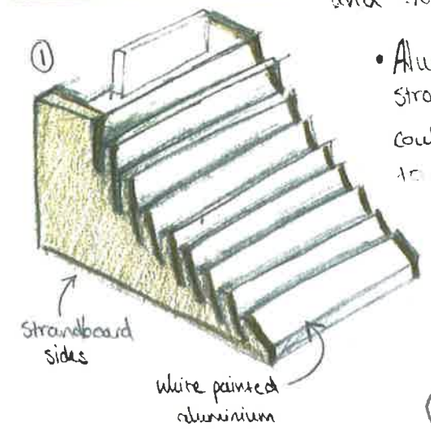
To have the skateboard hanging like this, the height of the entire stand will have to increase as the average length of a skateboard is 750 mm, whereas the stand is 400 mm tall.

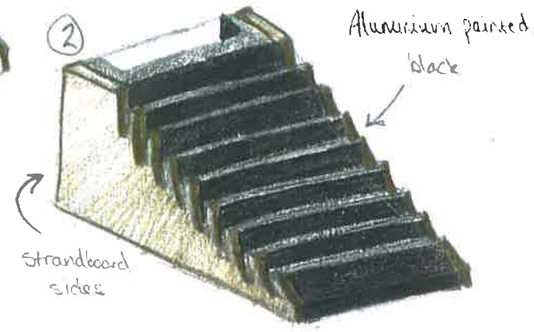


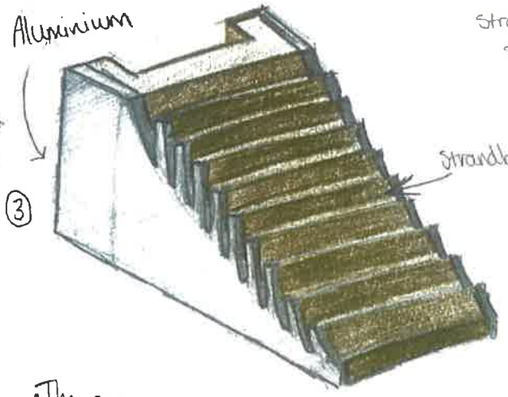
- None of these options are good enough to use in the design so I will increase the height of the stand in order the skateboards to stand on the back.

Materials

- I will use strandboard to make the skateboard stand, as it will work with the black, white and light wood aesthetic of the shop.
- Strandboard would also be appropriate as it is commonly used for skateboard ramps and would link it to the product.
- Aluminium could also be used as it is strong while also being lightweight, which could allow the stand to be easily moved to meet the spec.

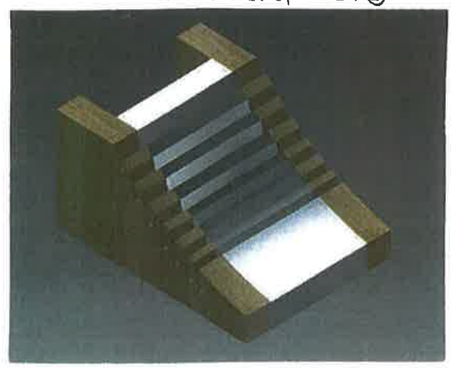


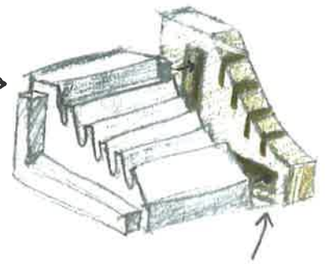




- The spec requires the stand to hold 10 x 10.5kg boards (105kg). The aluminium should be able to support that weight easily.

CAD Model of Idea ①





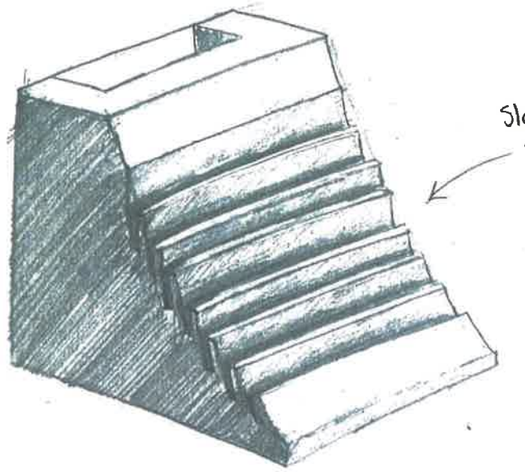
aluminium body would be hollow to remain as light as possible

aluminium middle section could slot into the strandboard to attach them together

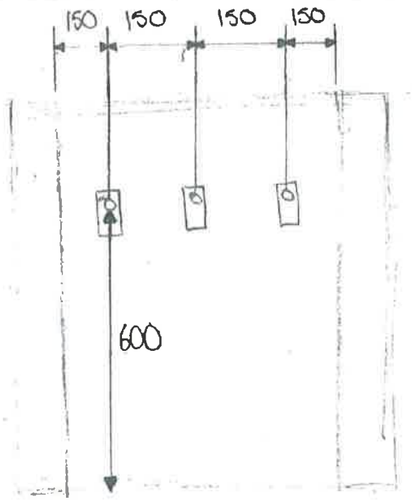
Development

- To allow 3 more skateboards to be held by the stand, I will have to increase the height of it in order to hold 785 mm tall skateboards.

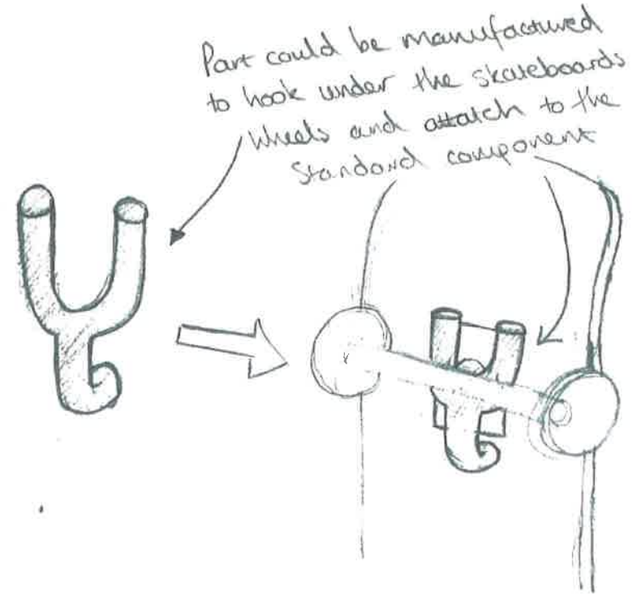
The stand will double its original height, from 400mm to 800mm.

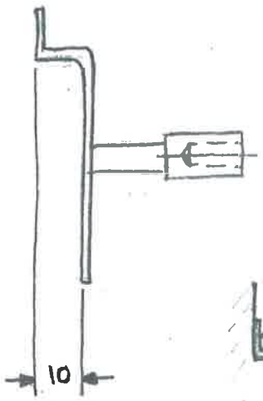


Slope is now much steeper than before

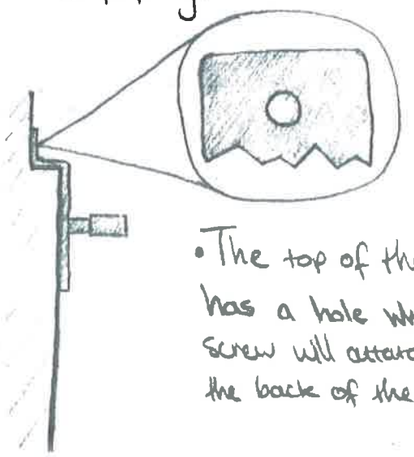


- Next to an average male or female, the new 800mm stand will only go to about the top of their legs, meaning that there will be no problem with the majority of users reaching the highest point of it





- As the standard component has a 10 mm bend at the top, I will have to make the shape of the back wall come 10mm out in order to attatch it properly.



- The top of the components has a hole where a 5mm screw will attatch it to the back of the stand.

1:15 Card model stand & skateboards

1:15 Ergonome next to models

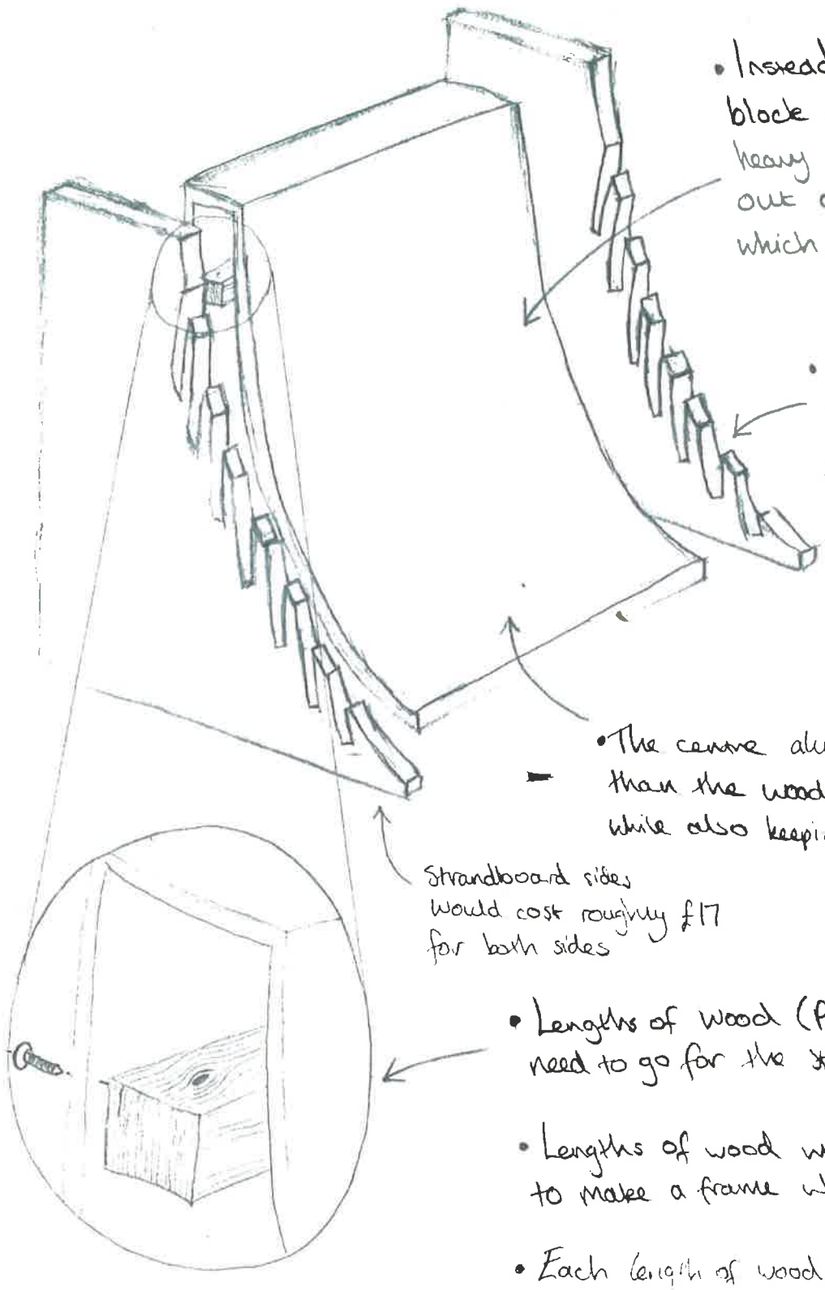
NEW

OLD

Old Vs. New side by side

Development

- Now that I am looking at the manufacture of the design, I have come into some issues and will have to change the design in places but keep the same function and aesthetics



Would cost roughly £17

- Instead of having a large, solid block of aluminium which would be heavy and expensive, I will make the centre out of 5mm thick aluminium sheet which is bent into shape.

- I will also make the wooden sides 25mm thick instead of 100mm, as this will make it lighter, easier to manufacture and allows more length to be added onto the main stainless steel part, allowing more room for the skateboards

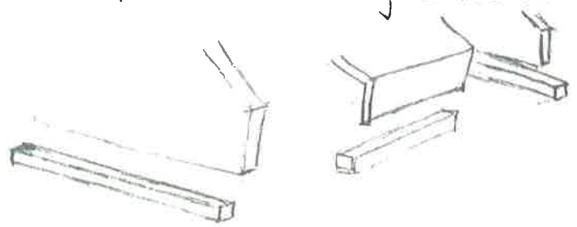
- The centre aluminium part will be lower down than the wooden sides, to allow room for the skateboards while also keeping the ramp shape in the design

Strandboard sides
Would cost roughly £17 for both sides

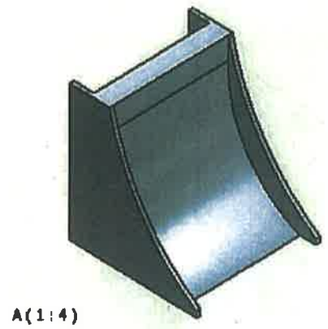
- Lengths of wood (Pine) would be put behind where the screws need to go for the standard component to hold the screws

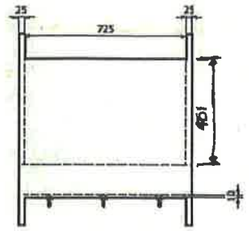
- Lengths of wood would also be put along the bottom of the stand to make a frame which would provide support and stability to the stand.

- Each length of wood would be roughly £4 each



Dimensioned Orthographic of stand





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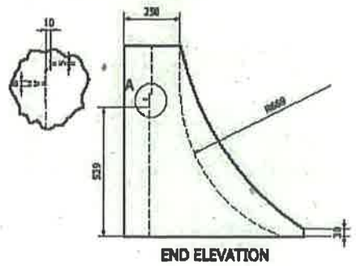
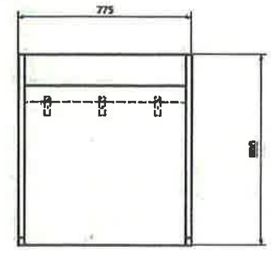
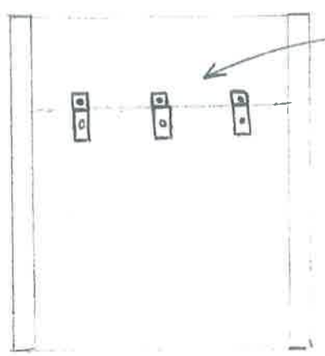






A screw will be drilled into each standard component to attatch it to the stand

H Design and Manufacture

DESIGN TASK

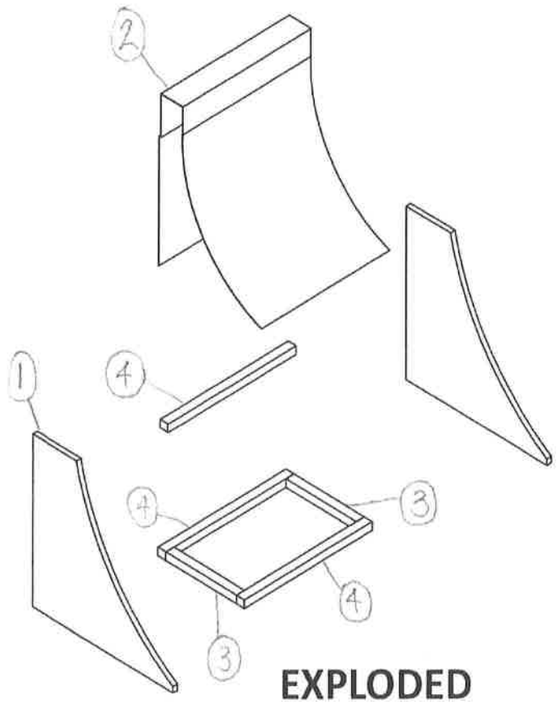
PLANNING FOR MANUFACTURE PRO FORMA

SQA

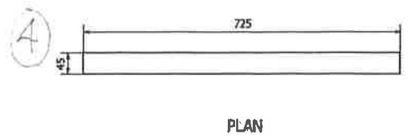
NAME

COMPONENT PART TABLE

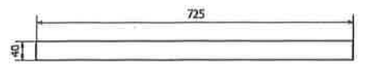
PART	QUANTITY	MATERIAL	PROCESS
Ramp	1	Aluminium sheet	Folding, drilling
Sides	2	Wood	Plane to 25mm, cut to length, drill holes for screws, CNC routeing
Standard Com-ponent	3	Chrome plated mild steel	No process required
Front frames	2	Wood	Plane to 25mm, cut to length, drill holes for screws
Side frames	2	Wood	Plane to 25mm, cut to length, drill holes for screws
Top wooden panel	1	Wood	Plane to 25mm, cut to length, drill holes for screws



EXPLODED



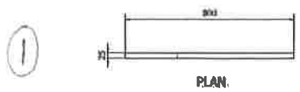
PLAN



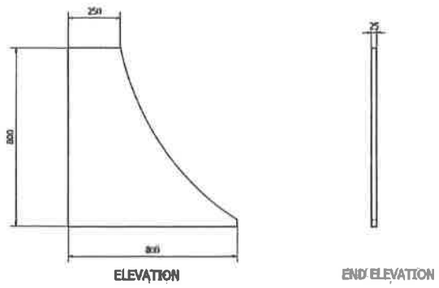
ELEVATION

END ELEVATION

PANEL 1



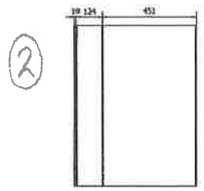
PLAN



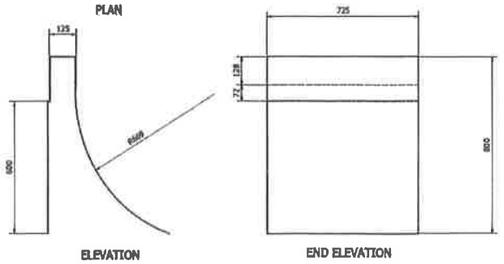
ELEVATION

END ELEVATION

SIDES



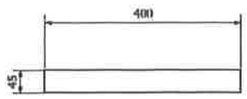
PLAN



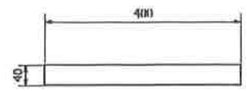
ELEVATION

END ELEVATION

MAIN PART



PLAN



ELEVATION

END ELEVATION

PANEL 2

H Design and Manufacture

DESIGN TASK

PRACTICAL MODELLING PRO FORMA

SQA

NAME	

Add photographic evidence of the practical modelling skills you used during the development of your proposal.

Photographs must be clear enough to show your skills.