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Graduate Show

BA (Hons) Product Design

Edinburgh College of Art



Pods

Encouraging
food growth in
expanding city
landscape

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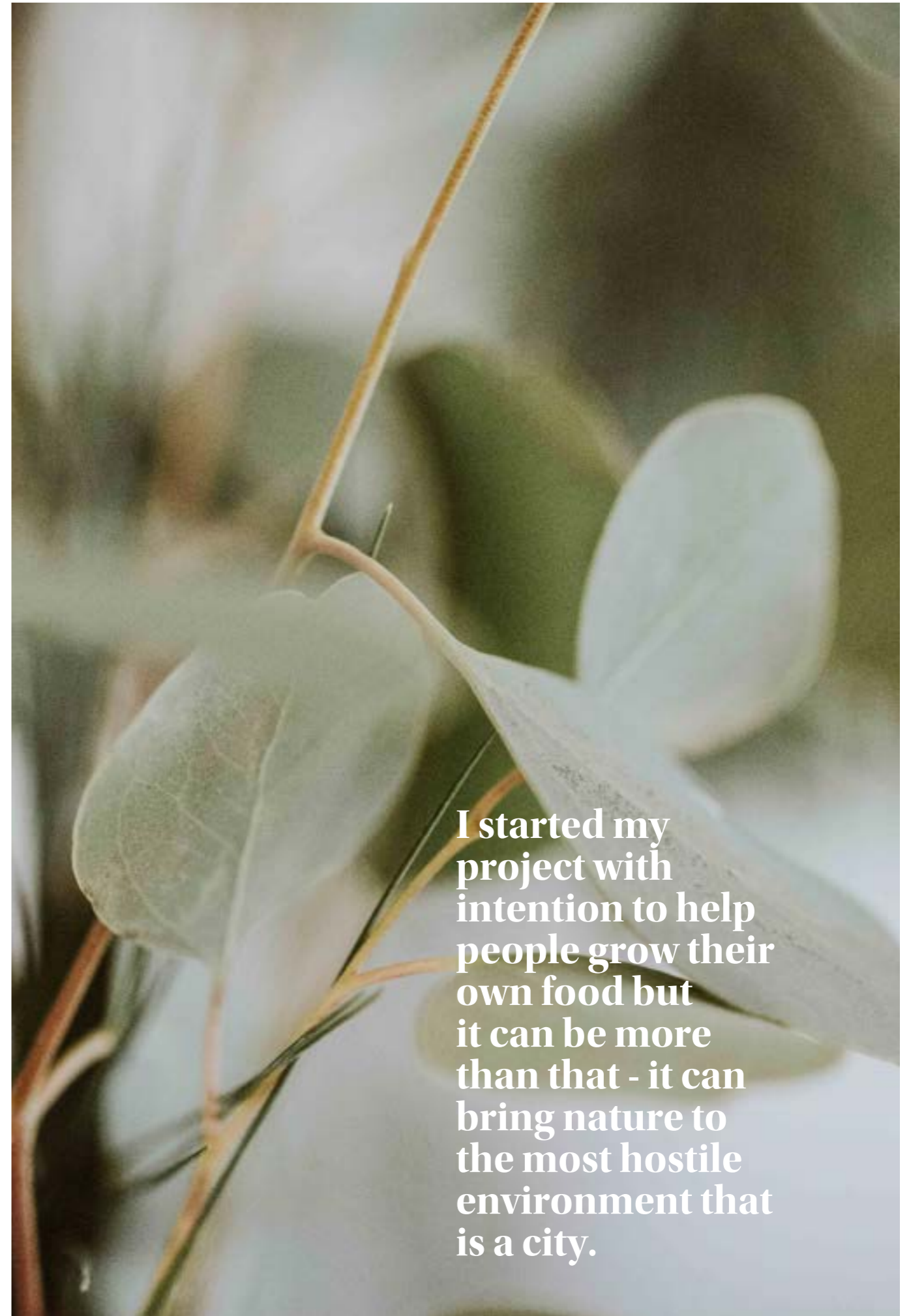
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what

“Almost one in 20 British households said one of their family members went a whole day without eating in the past month, because they couldn’t afford or get access to food. In April 2022, 13.8 per cent of households experienced moderate or severe food insecurity, a five percentage point increase on January 2022, according to analysis by the Food Foundation.”

Barber, H. (2022, June 1). Britain is one shock away from a food crisis, experts warn. The Telegraph. <https://www.telegraph.co.uk/global-health/terror-and-security/britain-one-shock-away-food-crisis-experts-warn/>

brief



I started my project with intention to help people grow their own food but it can be more than that - it can bring nature to the most hostile environment that is a city.

why

With climate change, and growing human population as well as other world wide events like pandemic interfering with food production and distribution I decided to use it as a focus for my final year product design project.

Growing urban populations as well as personal experiences have led me to use city landscape as setting for my brief. With lots of opportunities within urban environment being squandered I saw this as a perfect chance to try and tackle a problem that is more future oriented but can be identified right now and acted upon before it escalates.

I conducted an extensive secondary research into this problem and the take outs were mostly gravitating around limitations in urban spaces available for urbanites to grow their own produce.

Initial primary research has shown interest in gardening and a need for more spaces within cities to be available for communities to utilise for produce growing. Some answers from my research indicated that even wild flowers could make a huge difference in changing the micro-climate of the city inviting more life in forms of pollinating insects.

This led me to reach out to a local community garden located at the Meadows to conduct more primary research as well as looking into more information about community gardens and their implications on societies as well as environment.



“But with one in eight households in Britain having no access to a private or shared garden during the coronavirus (COVID-19) lockdown, and food scarcity on the rise, getting into gardens and learning how to grow food should be accessible to all.”

Arboine, N. (2021, May 21). The rise and rise of community gardening in the UK. House & Garden.
<https://www.houseandgarden.co.uk/article/community-gardening>



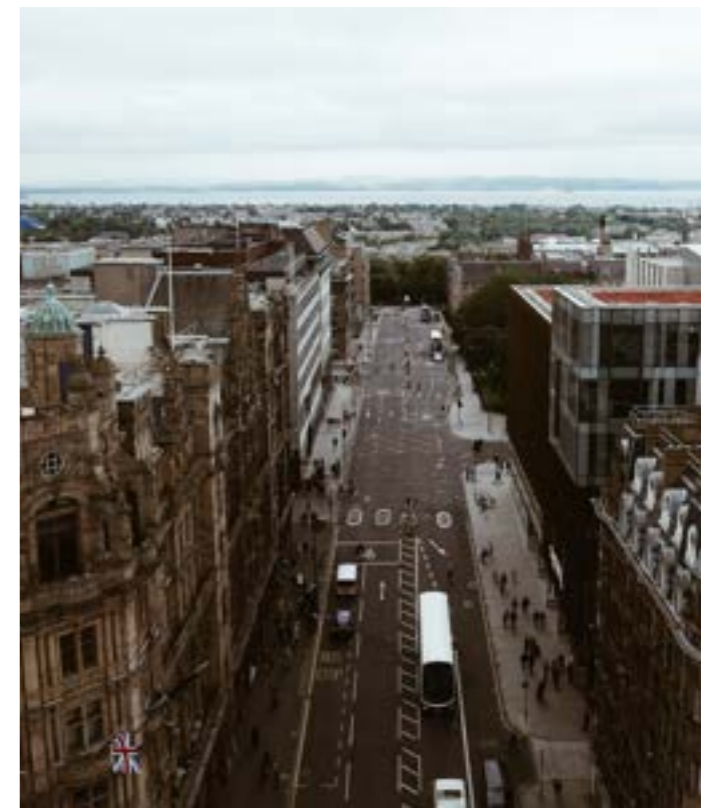
People have limited access to places where they can grow their own food, socio-political events impact food imports and climate change affect the crops. Using Edinburgh as space and example for my project I found out that there are few regeneration projects being in motion, however none of them focus on food production but rather existing parks and green spaces with emphasis on net zero.

Communal gardens were my place to conduct primary research as they are relatively easy to access and there are few in the city centre alone. I found out that they are not as effective as a food production source due to the size as well as limitations imposed by the council (restricted space, valuing aesthetics over functionality, limited funding) as well as several other problems that are not directly caused by but are affecting the performance of the gardens.

where

setting

“By 2050, nearly 70% of the global population will live in urban areas, putting to the test the capacity of cities to accommodate them.”



How urban entrepreneurs can help build sustainable cities. (2022, October 31). UNCTAD. <https://unctad.org/news/how-urban-entrepreneurs-can-help-build-sustainable-cities>

setting

how

Through my primary and secondary research I managed to pinpoint key issues regarding city gardening. The lack of spaces, incentives and difficulty of assembly led me to explore various possibilities that I tested through prototypes. Since I'm working within city centre landscape I wanted to utilise the spaces available. I started with creating a portable glasshouse. The concept worked well but there are limitations to it as it still requires a certain amount of space that are not available in the centre of the city. I also wanted to implement the communal aspect by making the glasshouse assembly an activity that can be shared with other people.

I shifted my focus to guerilla gardening (telephone booths, window displays, bus shelters, lampposts). I explored alternatives to soil that could hold its shape and be used in those spaces as well as a light, portable planter that could be stuck to various surfaces without damaging them. The idea also had aspects of re-usability.

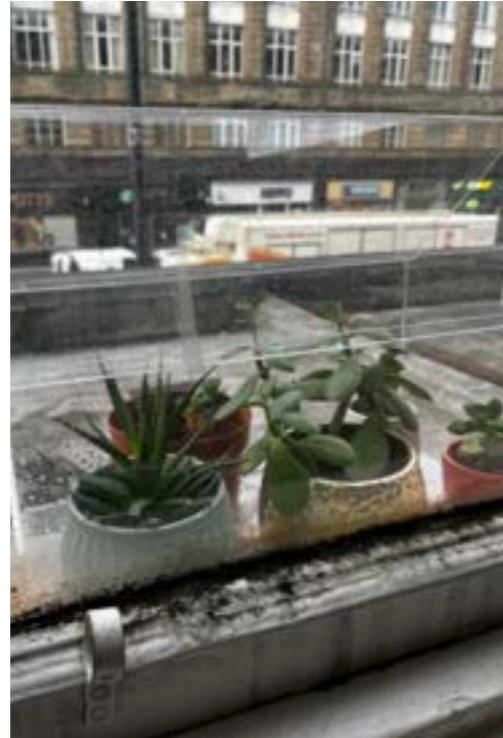
process



I was also concerned about making new product out of wood. Using new timber is not ideal as it cuts down trees which seems a bit ironic. It would also have to be treated to make it weather proof. For glass parts I would have to consider alternatives due to weight. I'd rather not use any plastics - more research needs to be made in that field. Perhaps shellac covered paper like in Eliza Hague's project.

I created 2 prototypes: first one is a type of germination tray (3D printed) but I wanted to make it flexible so it can adapt to various surfaces - it did not work well as it was too rigid. Second prototype was dodecahedron (laser cut), I wanted to use it as a holder for various plants so I tried to design it to be lightweight by making it a net, it also allows the light to go through. The shape allows it to be joined with other pots to create larger installations.

process



Another concept I explored was about utilising window spaces as there is a lot of tenement flats in city centre. I wanted something that could be installed in the window gaps without much effort. I decided to explore the properties of a tension rod. First iteration included a small glasshouse that slides onto a rectangle profiled tension rod.

In second iteration I tried to find an

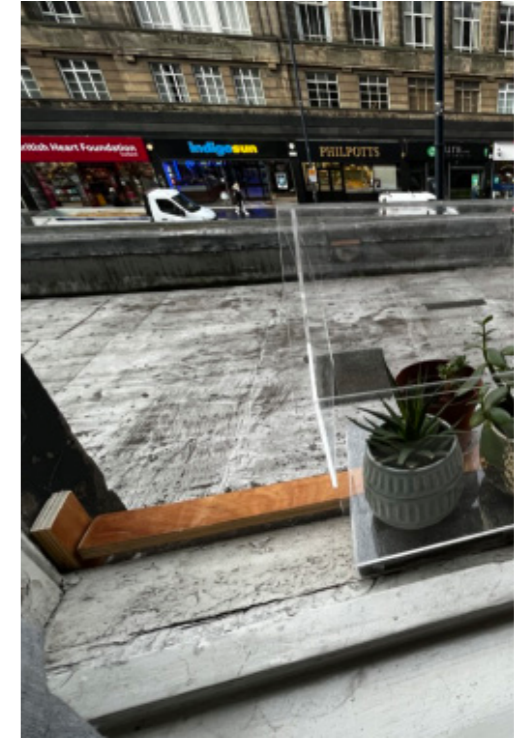
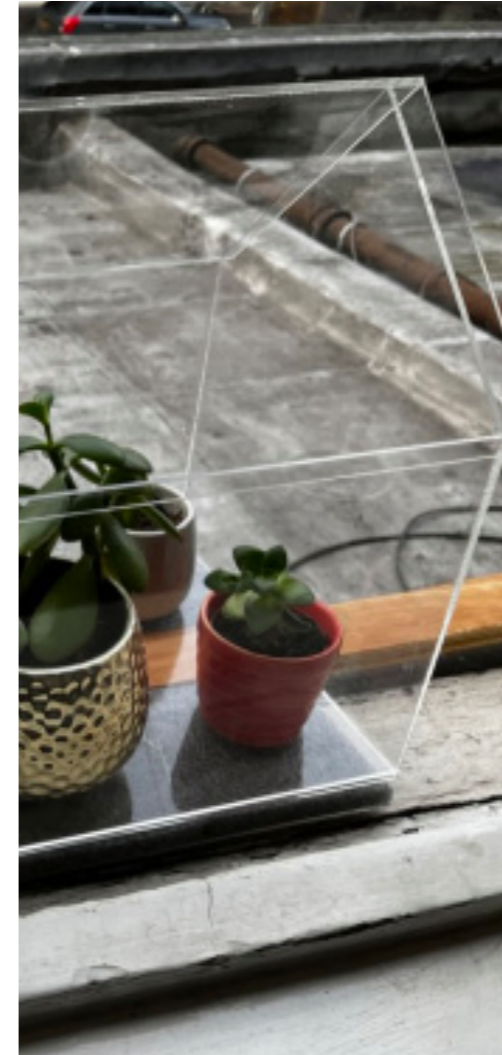
Third iteration incorporated the element of adjustability.

I researched the most common window sizes and calculated the optimal size for each segment of the new tension rod. This one (circle based profile) cannot be used with housing as it needs to be perfectly aligned (which can be difficult when using screws based joining).

alternative to the glasshouse. I used 2 tension rods that housed an acrylic mounting board. The clear material allows the pass of light and thin design is safer to use. The pots can be installed using wire or string in any way user might see fit. This design allows the user to utilise their own pots.

I then tried to see how the round tension rod can be utilised to support plants. I decided to use fabric for that one. I hung it between the rods to create space for plants. It requires at least 2 rods and uses a lot of window space that will also obstruct light so that might not be the best solution.

process



I've built a simple tension rod out of wood and placed my glasshouse on it. The bottom of it sits tightly and is supported on one side making it stable. I was able to open and close the window without any issues. I had to make sure that the heavier pots would sit on the inner side of the glasshouse so it wouldn't topple.

This version was made out of wooden pole, cut to sizes and joined with m10 insert nuts and dowel screws. The concept works well, however, I made it partially by hand which means it's not perfectly symmetrical - some pieces are a bit off. It also means that I can't use them along with the mounting board as the housing wouldn't align.



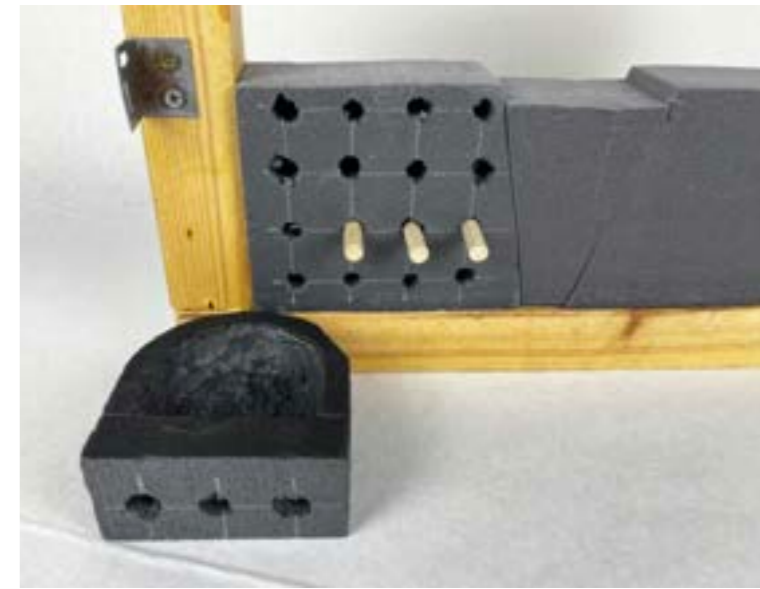
process

The prototypes I made are exploring how I can adapt something to specific spaces (window gaps, telephone booths etc.), however I would like my project to be universal to make the most of the spaces available which also include public spaces such as pavements, squares etc. as well as community gardens from which my product can be moved further into the city.

The tension rods work well in window spaces but can't be used in open spaces. My guerilla gardening prototypes could work in both but they're not big enough to support bigger plants. I think a combination of all my findings could be the answer: a non invasive fixing (tension rods), modular design and adaptability may create a product that could be universally used in limited spaces of Edinburgh city centre.

I decided to use all my findings and create a system of modular bricks that can be free standing or fixed in window gap spaces using wedging to secure them. The bricks could be easily installed without any tools, taken apart if needs be and moved to different location.

Material wise I strongly consider mycelium as it's a natural material that can grow into desired shapes. For that I contacted local mushroom farms to use their post use mycelium. Through this I'm reusing a material that already has been used previously (mushroom farms use agricultural and food waste as a substrate).



I made few quick prototypes to test the wedges. All of them work well, however, the one with a key brick in the middle provides the most stability. The idea is to hold them stable in place but can still be removed if needs be. I then created an iteration to test a concept of modularity with attachable components (the planting pots). It seems to be working

really well but more tests need to be concluded. I need to test the way they can be stacked on top of each other if used in a free standing mode. I think I will also need few special bricks (corner ones) and pots as well as additional connectors (bolts).



After researching the reasons why people are not growing their own food I concluded that foraging might be a solution. It's free, seasonal and local. But how city dwellers can benefit from it? I made a foragers planter to encourage and educate people about safe foraging. I decided to abandon that idea however in favour of fas - a movable planter designed for the use in the city

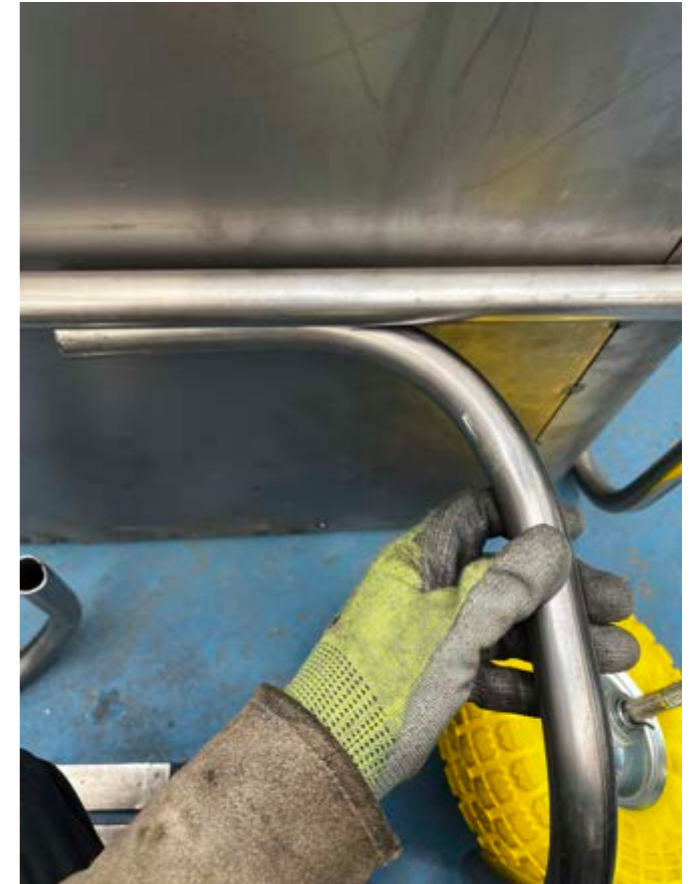


I started by building a frame from 25mm steel pipe that had to be cut into smaller pieces, due to limitations of tube bender each part cannot be bent more than in 2 places, it also does not have a compass to indicate the angle so they are not precisely 90 degrees like I wanted (just approximately) and due to the size even slight mistake results in uneven result; I thought that I had enough time to make a prototype but due to the time limitations and opening hours of the workshop I had to make the prototype into a final product which resulted in changes during production;

Originally I envisioned a basket at the front but I changed my concept after the frame was done so I had to cut it and re-weld it; Next I cut the sheet metal - it comes in 3 parts as the sheet comes in 2m x 1m sheets - not long enough to make it out of one piece; the pieces were cut on a guillotine and then the corners rounded using angle grinder, as I changed the design during production I had to cut holes for the handles using the same method; in different circumstances I would plasma cut those pieces for a nicer and even finish;

process

Then I welded the sheet to frame using arc welding, created the files in Fusion 360 for plasma cutter for the bottom part, as the design changed and I must've made a mistake in calculations, the bottom bit was too small my approx. 30 mm on the sides, I made a decision not to waste the material and added extra pipe at the bottom for support. The bottom piece was then bent on the roller and welded to the rest, the half circle at the back was plasma cut and bent on the roller as well. For the wheel I cut a piece of pipe that fits through the wheel and drilled 2 holes on each side, then using a steel rod and a torch I bent it to "R" shaped pin to secure the wheel, using 2 M16 hex bolts I cut the top bits off, deburred them to create a chamfer and welded it to the pipe.



To secure the wheel I used 2x25 mm pipes and bent them on tube bender, I wasn't sure how I want them secured, I considered cutting the pipe and weld it so it would create a whole piece with the frame but after speaking to the technician I decided to weld them under the tube - in hindsight that might have been a mistake as the whole thing seems to bend way more than I would like, doing it the way I planned would give the frame more structural integrity. Before welding I had to figure out the transition between the pipes and the axle, to do that I decided to flatten the end of the pipe, plasma cut the bits in which the axle will sit and weld it together, wheel then was secured using 4x M16 hex nuts; For the bee hotel I went for a simple design, base was plasma cut out of 3mm steel sheet and weld to a steel pipe, the hotel itself is an untreated piece of pine wood that I drilled using various drill bits (sizes from 5-10 mm), to protect it from the elements I encased it in a 1mm steel sheet that I bent on sheet metal brake and spot welded it around the hotel, the whole thing was then welded to the stand using a plasma cut 3mm thick circle for stability.

process

Fàs

Fàs is a system of modular street furniture that allow city dwellers to enjoy their very own piece of land where there is none to be found in the ever expanding concrete jungle. Utilising the flat, paved areas this movable planter gives the freedom to be incorporated into ever-changing city landscape.

product



Designed for everyone who yearns for a garden of their own but lacks the accessibility to green spaces where they can hone or learn their gardening skills. It's character lets everyone to use it weather its a community of neighbours are an individual. The mobility grants the freedom of taking your garden with you to a new place, change it's location in case of roadworks or simply follow the sun for maximum benefits for the plants. Inspired by Nordic style of home decor with a twist of mid-century and Bauhaus this truly unique planter can be a part of everyone's home even if it rests in front of your tenement building.

product





Portfolio

June 2023

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