re-Materialize

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Final Realisation Portfolio
Card 7055
2319055 - MA Interior Design

Fig.1 *Front view of the pavilion (2024)*

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INTRODUCTION

01

Experimental

Experimenting and creating new materials out of waste.

Re-materialize

Educational

Promoting and Educating people about this new material through a pavilion.

The project is divided in two parts for the purpose of clarification. The making of material is the primary purpose and converting the material into a pavilion is the secondary purpose. The pavilion is a medium through which the material is promoted among people.

ABSTRACT

In the contemporary pursuit of technological advancement, fast fashion, and social media prominence, there is an escalating demand for the best of everything. This relentless quest often leads to the overutilization and wastage of natural resources, culminating in significant landfill deposits and increased CO2 emissions. Recognizing this environmental challenge, the design and interior industry has been progressively shifting towards sustainable practices.

This thesis project aims to contribute to the sustainability movement by exploring the optimal utilization of waste materials in interior design. The research delves into the principles of the Circular Economy, investigating how material waste can be repurposed effectively. It focuses on the abundant availability and properties of waste materials, aiming to create new materials that can be recycled multiple times until they are fully degraded.

The project specifically targets the creation of new materials from waste paper and sawdust. In the UK, paper waste constitutes approximately 20% of the total waste, translating to around 5 million tonnes annually ending up in landfills. Paper, which can be easily crushed and recycled, and sawdust, a by-product of wood-working processes, both contribute to pollution when improperly discarded. By combining paper mache, sawdust, and acacia gum—a natural bio-binder—this project proposes a novel material suitable for practical applications in interior spaces, such as walls, ceilings, and countertops.

HOW CAN WE INCORPORATE SUSTAINABLE MATERIALS FOR OUR BUILT ENVIRONMENTS TO MAKE IT SAFE TO LIVE AS WELL AS MAKE IT AFFORDABLE AND EASILY ACCESSIBLE TO EVERYONE?

HOW DO WE PROMOTE THESE MATERIALS AND CREATE AWARENESS AMONG THE PUBLIC, ARCHITECTS AND DESIGNERS?

OBJECTIVES

1

To investigate various waste materials that end up in landfills and cause CO_2 emissions.

2

To analyse case studies of similar type and take meaningful insights from it.

3

To create new and sustainable materials out of waste keeping paper as the base and making additions to it.

4

To inquire about the properties of these waste materials and ensure the load bearing capacity and tensile strength is of a high level.

5

To educate architects, designers and people of this new material through a public pavilion.

6

To ensure that the pavilion is easy to assemble as well as dismantle.

RESEARCH

02

WHAT IS WASTE?

Fig.2 *Symposium on sustainable packaging: protecting products and the planet (2021)*

Waste/Rubbish is a waste material that is unwanted or unusable. It is anything we longer want or need - from unwanted items, such as broken toys, electrical items, empty packaging or clothing that you have outgrown or no longer wear. The list just goes on.

Humans are creating more and more waste and it is having a devastating effect on the environment. If waste isn't reduced, reused or recycled, it is taken to landfills where it contributes to air pollution, water and soil contamination and ultimately climate change. Landfills should be considered as a last resort, and finding ways to reduce our waste and recycling more should be important to everyone. (What is rubbish and how does it affect our environment?, s.d.)

Over two billion metric tons of unsustainable, human-generated waste are thrown away globally every year, entering our environment and polluting every ecosystem around the world. If we continue practicing waste management strategies as we do today, the total waste generation for 2050 is projected to be around 3.78 billion metric tons, representing a 1.66 billion metric ton increase in waste since 2020. In other words, we are creating more trash than ever!
The most common type of landfill, accounting for 31% globally, is an 'open' system. These landfill systems allow different types of waste, such as microplastics and toxic chemicals, to leak out of the trash and into the soil, groundwater, and nearby waterways. These open landfill sites also allow greenhouse gasses, like carbon dioxide and methane, to be released directly into the atmosphere. Researchers have discovered that 20% of the total methane emissions from human-related sources are produced from open waste landfill sites. (How our trash impacts the environment, 2024)

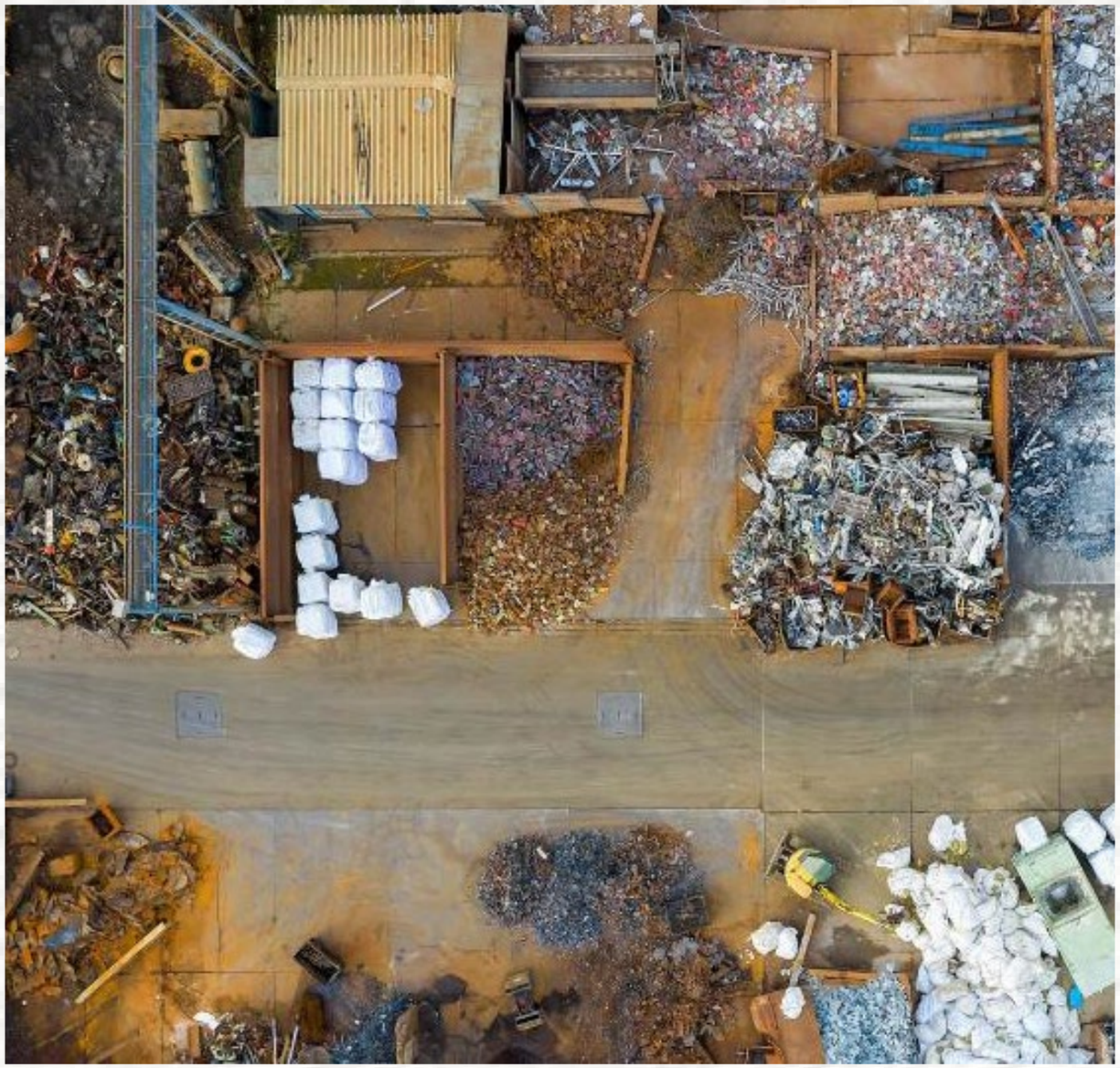


Fig. 3 *What actually happens to rubbish in the UK?* (2023)

Humans have been disposing waste in the same way for thousands of years; burying leftovers in the ground or creating a designated area for rubbish. Ancient rubbish tips are known as ‘middens’ and their shards of pottery and tools are a source of fascination for archaeologists.
Modern scrapheaps, or ‘landfills’, contain the relics of our consumer society: electrical equipment, rotting food, paper, cardboard, wood, plastic and building materials. Like our ancestors, we still throw our rubbish into a hole in the ground (‘landfilling’) or pile it up (‘landraising’) (Frith, 2022)

The UK generates a large amount of waste every year, with households alone accounting to over 26 million tonnes of rubbish annually. To manage this waste, local councils collect waste from individual households and dispose off the rubbish into landfills weekly or fortnightly. Landfills are often the destination for non-recyclable waste, with over 70% ending up in landfills in the UK. We should all be concerned about what happens to the waste in landfills because the process is a major source of pollution and global warming. It produces toxin, leachate, greenhouse gases which pollute our planet. These greenhouse gases have negative impacts on the health of people who lives near these landfills. Methane is the biggest component of landfill gas; followed by carbon dioxide, benzene, ethyl benzene etc. People living close to landfills often face health problems like headache, itchy eyes and fatigue. (Alfie, 2024)

LANDFILLS IN UK

Landfills have systems in place that prevent or slow down biodegradation and decomposition. As a result, it can take anything from a couple of weeks to millions of years for waste to decompose in landfills.

- Paper: 2 - 6 weeks
- Food waste: 6 months to 2 years
- Plastic bag: 10 - 100 years
- Aluminum cans: 80 - 200 years
- Disposable nappies: 450 years
- Plastic bottles: 450 years
- Glass: upto one million years. (Frith, 2024)

Proper waste management is critical to protecting the environment and public health, and one key component is waste processing at treatment facilties. These facilities are designed to separate, treat and dispose of different types of waste materials in a safe and environmentally responsible manner.
Recycling is a key component of waste processing at a treatment facility. Recycling conserves natural resources and reduces the amount of waste that ends up in the landfill. At the treatment facilities, recyclable materials are sorted and processed into new materials; for examples; plastic bottles can be recycled into new plastic bottles or other products. (Alfie, 2024)

Fig. 4 *Cardboard recycling Norwich - quick collections* (2023)

THE DIFFERENCE BETWEEN

LINEAR AND CIRCULAR ECONOMY

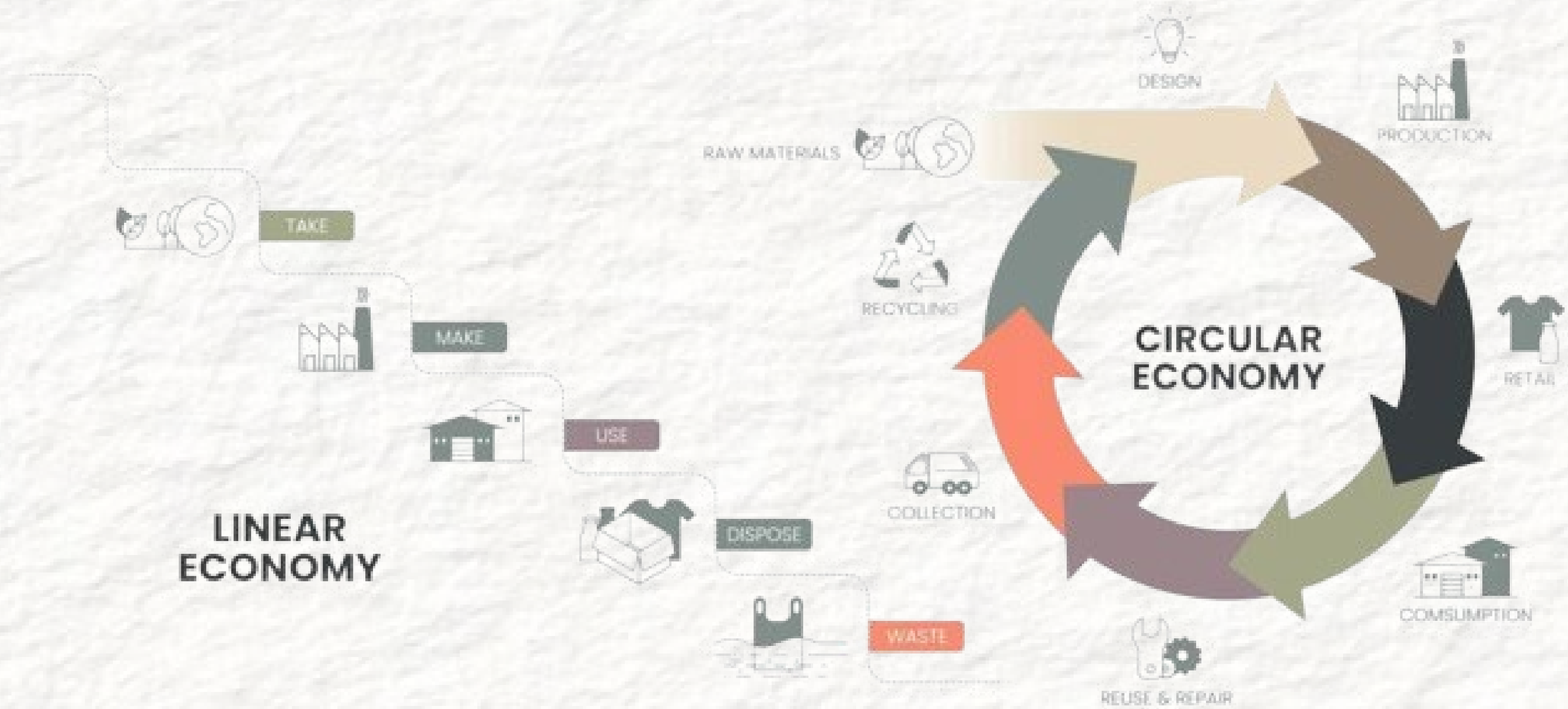


Fig. 5 *The Shift From Linear To Circular Economy Is The Road To Sustainable Digitalization* (2022)

LINEAR ECONOMY

In a linear economy, we use raw materials that are processed and thrown away after use. The cycle in a linear economy, therefore, is open-ended. All materials of input, processing, or output are left to fo “out” of the cycle since the loop isn’t closed.
The linear economy follows the traditional “take-make-dispose” step-by-step plan. When industries use raw materials to create a product, they discard them after using them through and through. That means the value is created in a linear economic system by producing and selling as many prodcuts as possible. (Lrea, C. M. J. P. C., 2022)

CIRCULAR ECONOMY

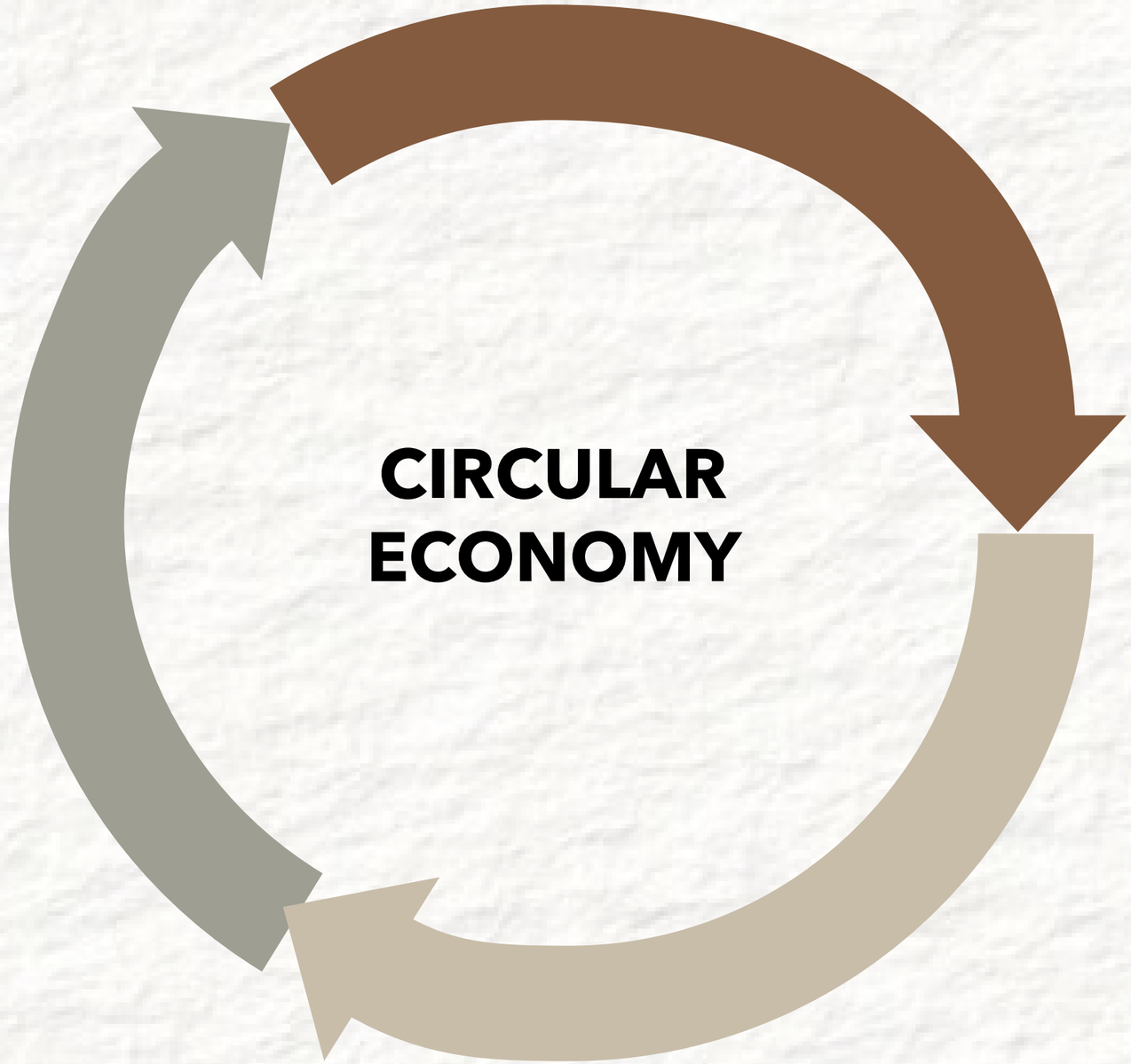
A circular economy theory, in essence, is about closing the cycle so that all materials used in input or processing remain within the circle. Essentially, a circular economy differs from a linear economy in a way that value is created or maintained.
A circular economy uses the 3R approach: Reduce; Reuse and Recycle. In such a system, value is created by focusing on preservation. The resources are minimized or reduced. The reuse of parts and products is maximized, and the raw materials are reused to a higher standard. (Lrea, C. M. J. P. C., 2022)

	Linear	**Circular**
Step Plan	Take-make-dispose	Reduce-reuse-recycle
Focus	Eco-efficiency	Eco-effectivity
System boundaries	Short term, from purchase to sales	Long term, multiples life cycles
Reuse	Downcycling	Upcycling, cascading and high grade recycling
Business Model	Focuses on products	Focuses on services

(Knight, 2021)

Eliminate Waste & Pollution

Our economy works in a take-make-waste system. We take raw materials from the Earth, we make products from them, and eventually we throw them away as waste. Much of this waste ends up in landfills or incinerators and is lost. This system can not work in the long term because the resources on our planet are finite. (Eliminate waste and pollution, s.d.)



Circulate Products & Materials

The circular economy is to circulate products and materials at their highest value. This means keeping materials in use, either as a product or, when that can no longer be used, as components or raw materials. This way, nothing becomes waste and the intrinsic value of products and materials are retained. (Circulate products and materials, s.d.)

Regenerate Nature

By moving from a take-make-waste linear economy to a circular economy, we support natural processes and leave more room for nature to thrive. (Regenerate nature, s.d.)

The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling exisiting materials and products as long as possible. In short, it implies reducing waste to a minimum. (s.n., 2023)
When a product reaches the end of its life, its materials are kept within the economy wherever possible thanks to recycling. These can be productively used again and again, thereby creating further value. Moving towards a circular economy could deliver benefits including reduced pressure on the environment; enhanced raw materials supply security; and increased competitiveness etc. (Circular economy: definition, importance and benefits, 2023)

The economy uses materials which are either extracted domestically or imported. These materials are processed to provide energy. Materials can either be consumed rapidly or kept longer in material stocks. Once short-lived products are discarded and material stocks are demolished, they become waste and maybe recycled. After energy use, materials leave the economy as emissions and waste.

Municipal waste and its various fractions are generally landfilled, incinerated (burnt), recycled (paper,glass or metal) or composted. Some waste management options are preferable to other. For instance, recycling and composting are generally preferred over incineration. Landfilling is the least preferred option. (Circular economy: definition, importance and benefits, 2023)

Benefits:

1. A circular economy path could halve carbon dioxide emissions by 2030.
2. Reduction in primary material consumption by 32% by 2030.
3. Higher land productivity, less waste in the food value chain, and the return of nutrients to the soil will enhance the value of land and soil as assets.
4. For FMCGs, there is a material cost-saving potential upto USD 700 billion globally.
5. Higher scope of innovation by replacing linear products by circular ones. (The circular economy in detail, s.d.)

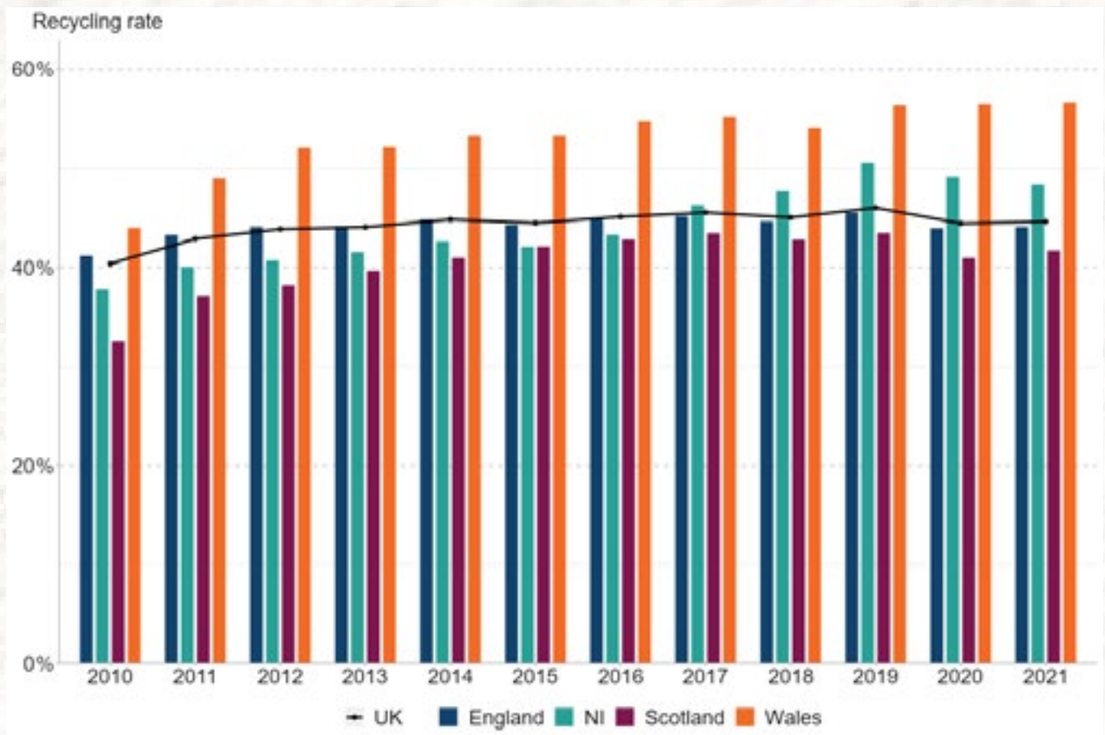


Fig. 6 *Recycling rate from Waste from Households, UK and country split, 2010–2021* (2023)

CONTRIBUTING TOWARDS THE INTERIOR INDUSTRY

GROWTH IN INDUSTRY

Interior design is a profession where the job of an interior designer is not just to beautify the built environments but to also make it functional for the users. The industry is growing at a rapid pace, where every second person now wants to get their homes designed by a professional designer. This is due to the surge in the development of new real estate projects which is leading to people investing in them. The industry revenue is estimated to increase at a compound annual rate of 0.4% over the five years through 22-23. People renovate their homes just after they buy them and the government support for the housing market is instrumental in pushing up interior design services. (Interior Design Activities in the UK - industry Market research report, 2024)

Another crucial reason for the growth of the interior industry is social media. Everyone now wants to make their homes, restaurants and offices “instagrammable”; which means pretty looking for the social media world so as to garner thousands of likes and comments on their posts. Social media is also a major reason for flourishing interior design businesses. One can sell their services through showcasing their work on various platforms and make a successful business.

Fig. 7 *Interior Design Market 2022 - 2028* (2022)

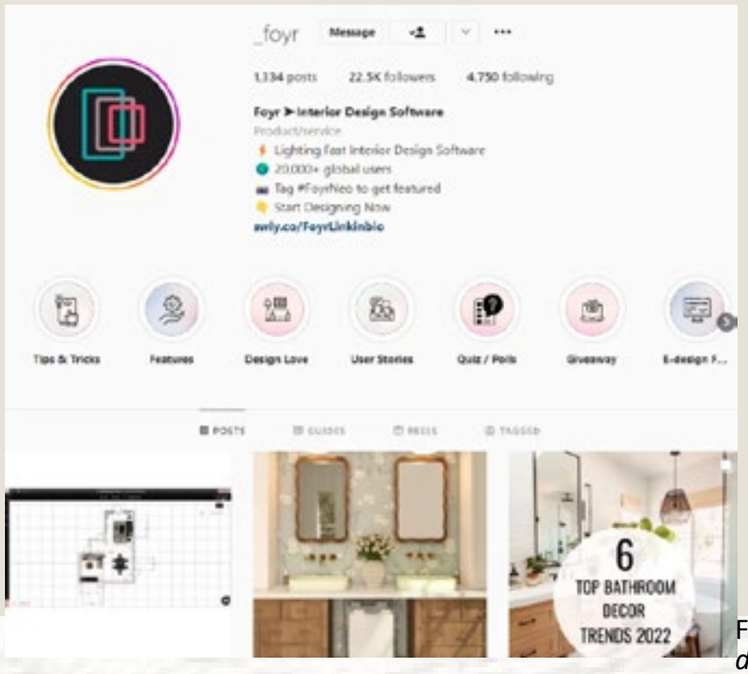


Fig. 8 *15 ways to build an interior design brand on Instagram (2022)*

WASTE IN INDUSTRY

Due to this soaring growth, the materials used in designing the built environments is also increasing and so is the wastage of these materials. The UK generates around 200 million tonnes of waste each year, 59% of which accounts for the construction industry including interior fittings and fixtures. This is a vast proportion and not a lot of people are aware about the waste management in the interiors industry. The total carbon emissions from manufacturing, processing, installing and transportation of interior design elements can cause carbon emissions equal to that of an entire building. (Designers vs. Climate change: 15 best tips to combat climate, 2022) change

Fig. 9 *Addressing waste in commercial interior design.* (2024)

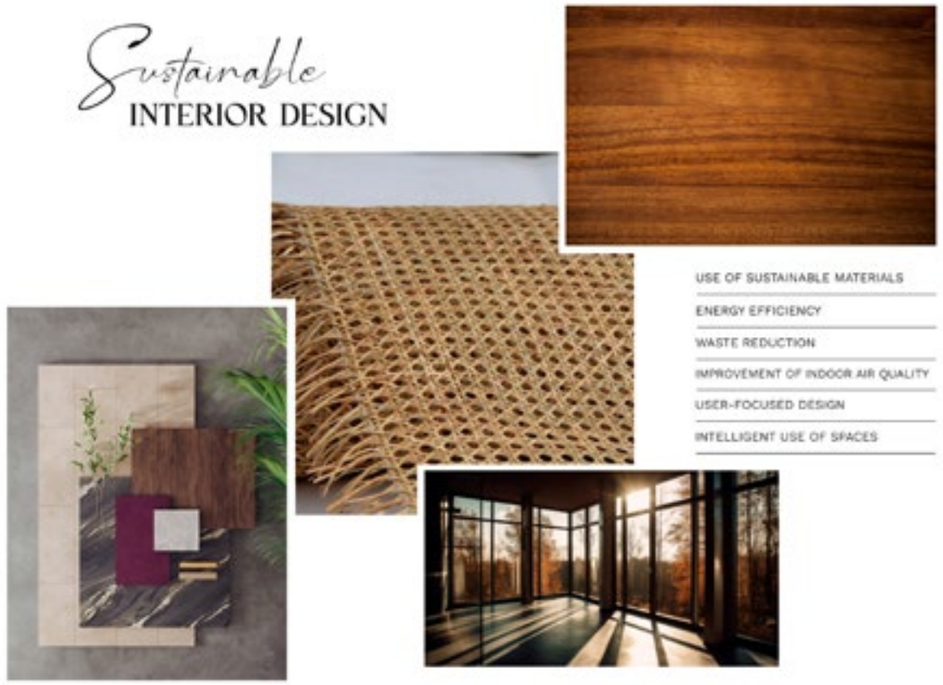


Fig. 10 *Sustainable interior design: how to create ecologically conscious spaces.* (2023)

Sustainability is a concept that has now been talked about by designers but not all designers or architects are adapting the principles of sustainability in their projects. Building a project completely sustainably is not a very feasible option for designers as well as users but taking small steps also makes a huge impact. For example: revamping old furniture and converting it into another piece of furniture or use of solar panels to ensure less energy consumption thereby effectively decreasing the carbon footprint.

IMPACT OF HEALTHY ENVIRONMENTS

A person spends maximum amount of time in built environments and it is our responsibility as designers to make sure that these environments are healthy to live in. Recent statistics suggest that if someone lives until they are 80, around 72 of those years will be spent inside buildings. This makes sense if we bear in mind that, when not at home, humans are working, learning or engaging in fun activities mostly in enclosed, built settings. (Zancanella, A. 2022)

Contemplating current events, however, this number is expected to grow. In an increasing chaotic and uncertain world, marked by the ongoing effects of climate change and the global pandemic, the desire to stay indoors in a protected, controlled and peaceful environment is stronger than ever. (Zancanella, A. 2022)

Designers face an important challenge: to create comfortable, productive, and healthy interiors with well regulated parameters, considering factors like indoor air quality, daylighting and biophilic features from the initial stages of design.
Of course, this involves choosing materials sensitively and accordingly, whether it be avoiding certain health-harming components or by integrating non-toxic products that soothe and promote wellness. (Zancanella, A. 2022)

This project is also a contribution towards the ways of adapting sustainability in our projects by the optimum use of waste materials. This project uses simple ways of breaking and remaking waste materials and molding it into a new sustainable material that can be used as an alternative to the building materials such as concrete, limestone, cement that cause high emissions of CO_2.

Fig. 11 *What Materials Can Promote Health in Interior Architecture?* (s.d.)

WHAT IS SUSTAINABILITY IN INTERIOR DESIGN?

Sustainability in design is defined as assimilating objects and materials characterized by principles of verifiable economics and ecological sustainability into the interior design process. It's the practice of creating environmentally responsible and aesthetically pleasing spaces. This approach considers the entire lifecycle of items to minimize negative environmental impact. (Anna, 2023)

WHY IS SUSTAINABLE INTERIOR DESIGN IMPORTANT?

Such an approach exhibits an ethical devotion to preserving the environment.
Additionally, solving environmental issues minimally saves time, effort and cost, limiting the earth's aftermath. It satisfies customers while creating a healthy method of environmental interior design, ensuring efficiency. (Anna, 2023)

WHAT IS THE DIFFERENCE BETWEEN GREEN DESIGN & SUSTAINABLE DESIGN?

Green design focuses on reducing the impact of electricity, home appliances and cement buildings. It enables an energy efficient infrastructure, and its primary goal is to reduce the impact on earth, making sustainability in interior design of great influence and importance.
Sustainable design is more concerned with the building itself, using recycled viable materials; the goal is to produce a functional, long-lasting construction. (Anna, 2023)

5 R's OF SUSTAINABLE DESIGN

REDUCE

Reduce the use of harmful, wasteful, and non-recyclable products. Always try to use the minimum amount required to avoid unnecessary waste. (Dorset. A, 2021)

REFUSE

Learning to refuse items can take some practice to get into, but incorporating this step into your home is the most effective way to minimise waste. (Dorset. A, 2021)

REUSE

Single-use plastics have created a "throw-away" culture of using materials once and then throwing them away. (Dorset. A, 2021)

RECYCLE

Recycling is the most environmentally friendly waste disposal method. If your home doesn't already, start collecting cardboard, paper products and organics. (Dorset. A, 2021)

REPURPOSE

For every item that can't be refused, reduced, or reused, try repurposing it. Interior designers commonly refer to this method as upcycling. (Dorset. A, 2021)

The purpose of eco designs is to establish a collective awareness of the need for sustainability in interior design. Reclaiming materials typically built for singular use in a modern technique - a cutting-edge trend to refurbish furniture and appliances to meet living demans. Generating energy-efficient equipment aids in greenhouse emissions. Using natural light and solar energy promotes lessened consumption, and simple things like color choice eliminate depending on artificial light. Moreover, working with recyclable materials that impose an imminent threat on natural resources can diminish carbon footprints and radio emissions, thus, reducing the consequences of the industrial revolution. Luckily, such solutions are available by managing and extracting different products and materials; thus, healthy spaces are within reach and obtainable. (Anna, 2023)

Fig. 12 *Sustainable materials every interior designer needs to know.* (2023)

HOW TO IMPLEMENT SUSTAINABILITY IN INTERIOR DESIGN?

Fig. 13 *Light as a design statement: Inspiring ways to manage natural lighting.*(2024)

Choosing sustainable materials in Interior design.

1. Bamboo is a long lasting and enduring type of wood. It is durable, adaptable to heat, and withstands swelling and shrinking.
2. Natural stones: Incorporating nature gives a welcoming vibe to your home> Rustic can be new to introduce to your designs. Granite, slate, and sandstones offer a variety of colors and shapes that make the perfect choice for wall cladding, fire places etc.
3. Recycled Aluminum gives a new meaning to a healthy indoor environment. By minimizing pollution, carbon emissions, mining scars, and saving electricity, it is a unique decision to design a bold lighting fixture. It can also used to build staircases and railings. (Anna, 2023)

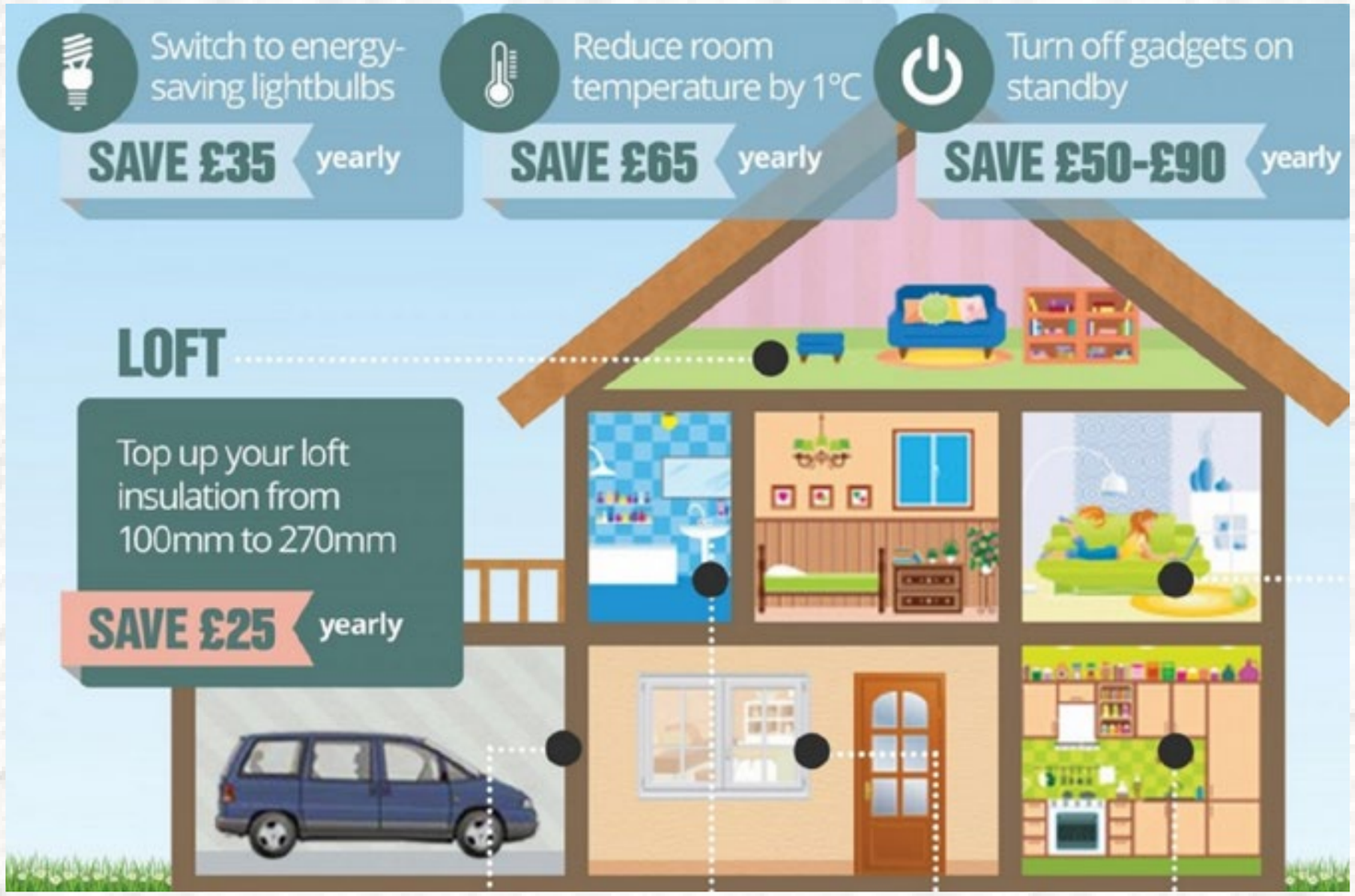


Fig. 14 *Best Electricity Saving Ideas from the Best Interior Design Company in Kolkata*. (2020)

ENERGY EFFICIENCY IN INTERIOR DESIGN

Living in an energy-efficient house reduces the cost of utility bills. By incorporating energy-efficient lighting, appliances and HVAC systems and maximizing natural light, interior designers can significantly reduce energy usage for their clients:

- Replace current lights with energy-efficient ones, like LED or CFL light bulbs.
- Consider the orientation of the building and utilize solar design techniques to reduce energy consumption. Sometimes, rearranging the furniture could do the job.
- Stack heavy libraries to act as a thermal barrier when positioned against walls.
- Check around windows for air leaks, doors, and electrical outlets, and use caulk or weather stripping to seal them.
- Add insulation to the walls, attic, and flooring to reduce heat loss in the winter and heat gain in the summer. (Anna, 2023)

03

MATERIAL STUDY

PAPER

Fig. 15 *Paper Mache* (2024)

Paper is a popular material used in our daily domestic and working lives even as we move to a more digital world. We still produce and use more than 414 million tonnes of paper every year. This includes everything from printing and writing paper to envelopes, toilet paper, and paperboard.
There are many benefits of paper as it's from a renewable resourse, is sustainable and can be recycled several times. Almost all paper comes from trees, so planting new ones helps contribute to a circular economy. However responsible recycling and disposal of paper waste is essential for this to happen. Unfortunately, not all waste paper is recycled and discarded properly, for which we need to come up with ways in which we can maximise the recycling of paper. (Paper waste facts and statistics, 2024)

FACTS

- Produced mechanically or chemically processing cellulose fibres from wood or rags.
- Consumption of paper has risen to 400%.
- Paper waste accounts for upto 40% of total waste produced in the US. (Wikipedia contributors 2024

SAWDUST

Fig. 16 *Sawdust* (2024)

Sawdust or wood shaving is a relatively abundant and inexpensive lignocellulosic compound, which is provided by mother nature. It is a waste of industry and agriculture, that is found in large quantities and has disposal problems. Nowadays, waste management (like sawdust) and research on converting it to different compounds for special applications and goals have been receiving tremendous attention. (Mallakpour, S., Sirous, F. and Hussain, C. M. 2021)

FACTS

- Sawdust is a by-product or waste product of wood working operations like sawing, sanding, miling etc.
- Wood flour is finely pulverized wood which is also the main ingredient in wood composite building products such as decks or roofs.
- Wood flour can cause dust explosions if not disposed properly. (Wikipedia contributors 2024

ACACIA GLUE

Fig. 17 *Acacia Glue* (2024)

Acacia gum, commonly called gum arabic, is derived from certain kinds of acacia trees: Senegalia senegal and Vachellia seyal. Sap is extracted from acacia trees by cutting incisions in their bark that allow the liquid to seep out. After that, the sap turns into gum. (Ali, 2024)

USES:

- Acacia gum is used for tabletting, coating and texturing pills, capsules and tablets in food supplements and pharmaceutical products.
- Acacia gum is a safe and natural stabilizer and thickener in cosmetics.
- Acacia gum is a natural emulsifier, a mouthfeel improver, a stabilizer and a fiber. (Alland & Robert, s.d.)

FACTS

- Dink is also known as edible gum or Acacia gum.
- Its binding properties make it vastly popular in the textile, cosmetics industry.
- It is tasteless, odorless, nutritious and edible and is a fabulous natural thickener and emulsifier. (Viola, 2022)

WOOD WASTE

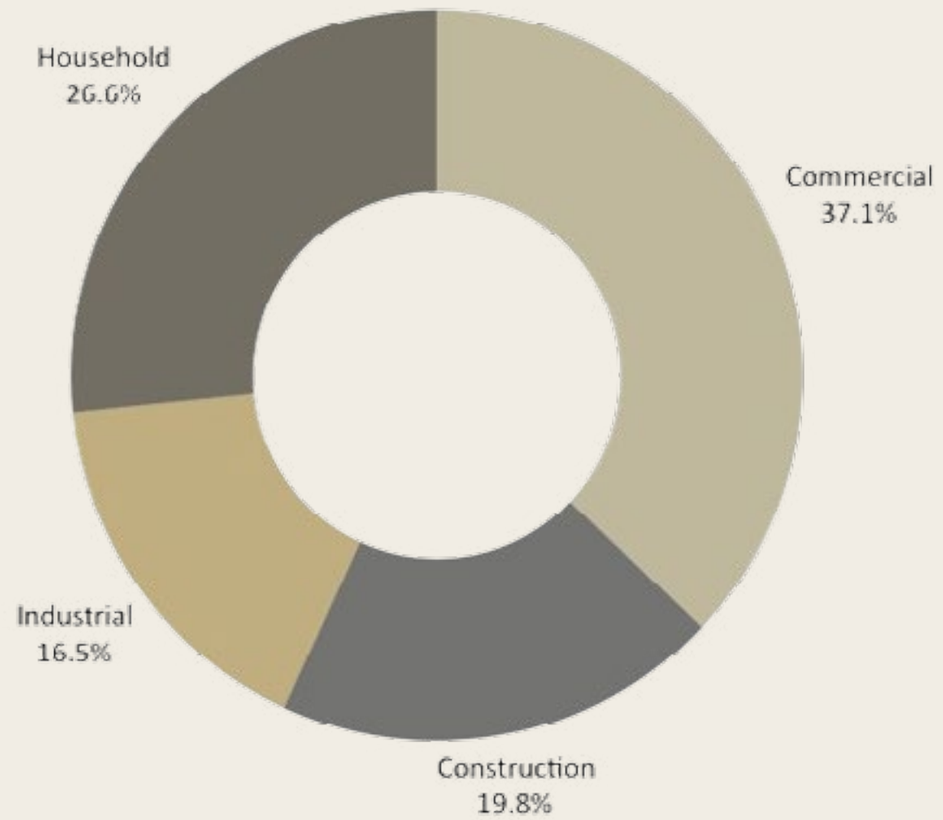
The overall size of the wood waste market in the UK is estimated to be around **4,500,000 tonnes** (Wood recycling facts and statistics, 2024)

Only **15%** of waste wood is recycled across the world. (Wood recycling facts and statistics, 2024)

Exports with imports netted off increased by **21% to 130,000 tonnes** (Wood recycling facts and statistics, 2024)

The amount of waste wood used for animal bedding, other recycling, is around **322,000 tonnes**

(Wood recycling facts and statistics, 2024)



PAPER WASTE

Paper is a very versatile material and is used for multiple purposes. Where on one side we have seen paper being one of the most important material; on the other side we see over-utilisation of this material. This results in high proportion of wastage. And while there has been an increase in recycling of paper, it is still one of the most over-utilised material.
On the right side are some of the facts and statistics to describe the quantity of paper that is used and how much is thrown away.

The average family in the UK throws out the equivalent of **six trees worth of paper** every year. (Paper waste facts and statistics, 2024)

4 million tonnes of junk mail go to landfill annually. (Paper waste facts and statistics, 2024)

Around **20%** of of all UK waste is paper. (Paper waste facts and statistics, 2024)

Around **10%** of paper discarded daily is toilet paper. (Paper waste facts and statistics, 2024)

About **£60,000** is spent on photocopying by schools (Paper waste facts and statistics, 2024)

42 million tons of toiler paper are used globally each year. (Paper waste facts and statistics, 2024)

04

PROCESS

Fig. 18-21 *Steps to follow to make paper mache* (2024)

Fig. 19

Fig. 20

Fig. 21

Steps to follow to make paper mache:

1. Soak waste paper in water for atleast 24 hours

2. Put the paper in the churner to make small pieces of paper

3 & 4. Drain excess water out of paper.

INITIAL PROCESS

Fig. 22 *Paper* (2024)

Fig. 23 *Sawdust* (2024)

Fig. 24 *Wheat flour* (2024)

EXPERIMENTATION

Fig. 25 *PAPER + SAWDUST + WHEAT FLOUR* (2024)

Fig. 26 *PAPER + WET SAND + WHEAT FLOUR* (2024)

Fig. 27 *PAPER + EGG SHELLS + WHEAT FLOUR* (2024)

Fig. 28 *PAPER + MOULD BREAD + WHEAT FLOUR* (2024)

Fig. 29 *PAPER + EGG SHELLS + EDIBLE GLUE* (2024)

Fig. 30 *Cutting the Sapyrus block* (2024)

I went ahead with the paper and sawdust block and conducted some tests on it to understand its strength and water resistance.

I tried cutting the paper block with a wood cutting machine to analyse whether the block acquires any cracks or breaks.

Fig. 31 *Sapyrus block between clamps (2024)*

Second test was conducted to understand the block's strength.

I put the Sapyrus block between the clamps and applied maximum amount of pressure till it could no longer go further.

TEST METHODS

Fig. 32 *Soaking the block in water (2024)*

The block was submerged in water to observe if it dissolves completely. After a few hours, a few pieces of paper had begun to separate from the block.
A week later the piece had completely dissolved in water. This shows that the block is strong enough to not easily dissolve in water.

Fig. 33 *Expanded Sapyrus block* (2024)

This made the piece of block to expand but it did not completely disintegrate into smaller pieces as can be seen in the image.

The block formed a few cracks on only one side whereas the other side remained unaffected.

TEST RESULTS

SAMPLES

Fig. 34-37 *6 varied samples of Sapyrus blocks* (2024)

Fig. 35

The name of the material is Sapyrus and it is an amalgamation of sawdust and papyrus (greek name of paper) Sawdust + Papyrus = Sapyrus

After the initial process of creating the sample and testing the material's strength, I moved on to create six different samples of varied proportions of paper, sawdust and edible glue. The upper 3 are higher in proportion of paper whereas the lower 3 are higher in proportion of sawdust. This was done to understand which material holds excessive strength and can keep the block binded together.

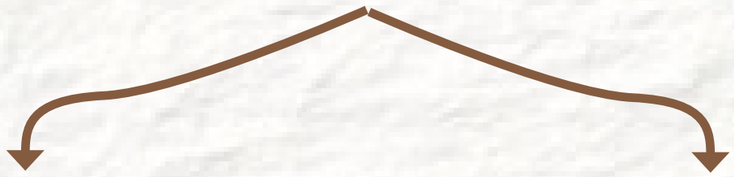
Fig. 36

Fig. 37

RECIPE

In order to prepare the required Sapyrus block, a few simple steps need to be followed with a few ingredients that are easily available at your home.

TWO WAYS OF MAKING PAPER MACHE



FIRST WAY

STEP 01: Take a considerable amount of paper waste, preferably paper that has not been treated by any chemical coating.

STEP 02: Soak the paper for 24 hours in a tub or any container. This makes the paper softer and easy to crush.

STEP 03: Next day, drain excessive water and grind the paper in a grinder or mixer.

SECOND WAY

STEP 01: Take a considerable amount of paper waste, preferably paper that has not been treated by any chemical coating.

STEP 02: Tear the paper into smaller pieces.

STEP 03: Keep adding smaller amounts of water till the pieces are completely soaked.

STEPS TO FOLLOW TO MAKE SAPYRUS

After a few tests, it was clear that the 80% + 10% + 10% combination worked well. To make this block the steps are as follows:

80% of Paper =

x 16 (32g) approx

10% of Sawdust =

x 2 (15g) approx

10% of Edible Glue =

x 2 (42g) approx

COSTING

One of the main objectives behind creating a sustainable material is to make sure that costing is as minimal as possible. Since, the materials are all waste products, sourcing them would not be a hassle as they are easily available at one's home or nearby stores.

Materials	Average cost per 100g	Cost of making one block
Paper	Free	Free
Sawdust	£0.70 - 100g	£0.20
Edible Glue	£3.40 - 100g	£1.5
Total	£4.10	£1.70

Fig. 38 *Application - Flooring* (2024)

Fig. 39 *Application - Wall panels* (2024)

Fig. 40 *Application - Table top* (2024)

The Sapyrus is made in such a way that it can be used for multiple purposes. Paper being the base material makes it easier to mold into different shapes and forms. And technology like 3D printing makes it a material that is versatile for different kinds of applications.

APPLICATION

JOINERIES

The joinery needs to be of such a design that two or more paper blocks can get interlocked easily. The joinery mold needs to have cutting on all four sides so that the blocks sit and lock perfectly into each other in order to make a 3-dimensional object such as the pavilion. The blocks have a cavity in the center for natural light to enter the pavilion.

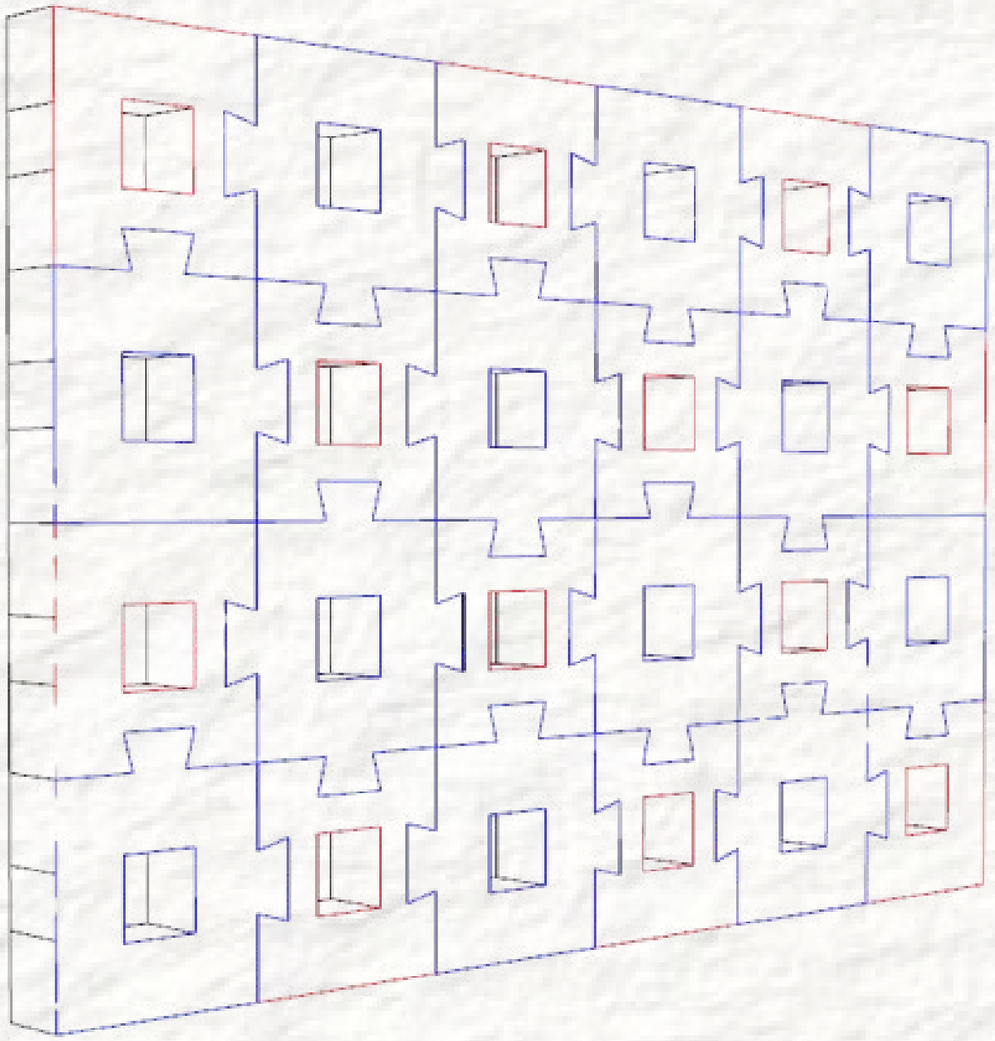


Fig. 41-42 *Block joinery* (2024)

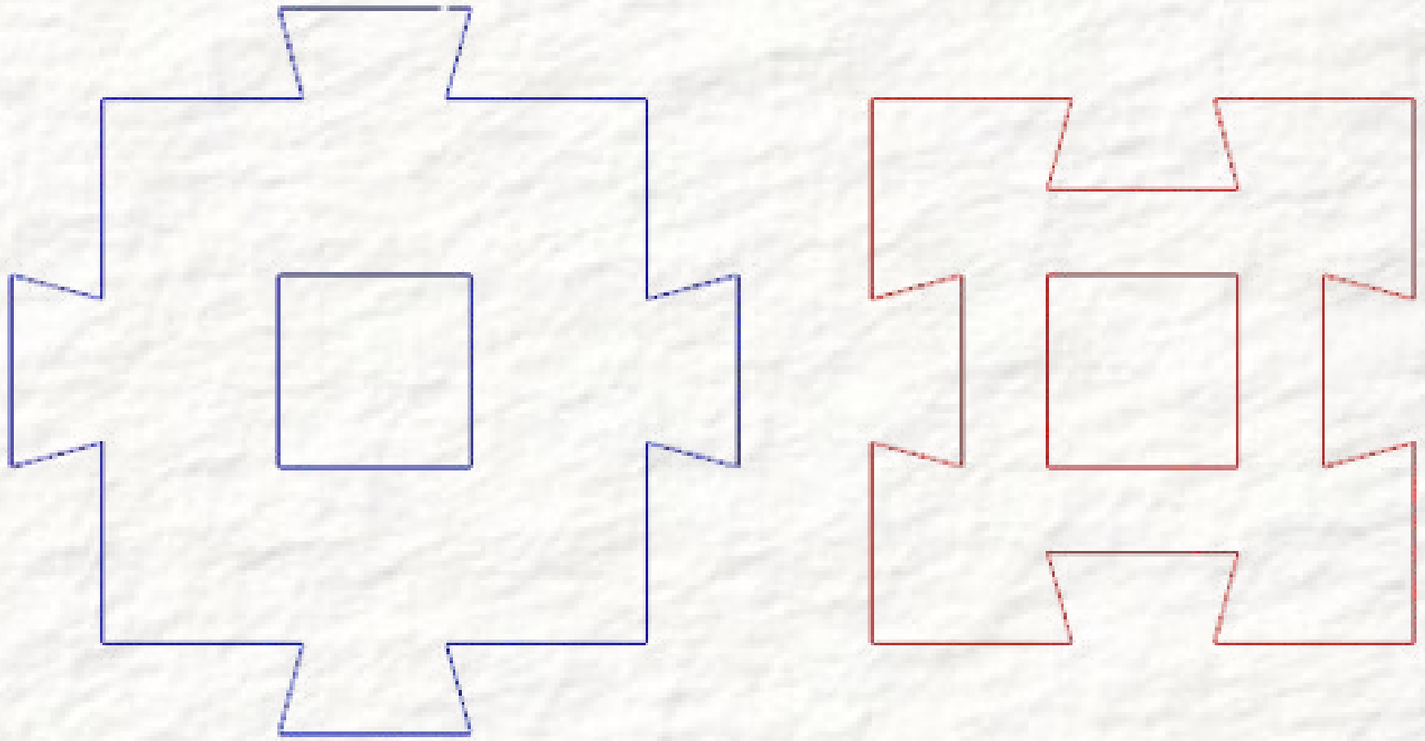


Fig. 42

WHAT DID NOT WORK WELL?

To ensure the puzzle-like joints were sturdy and easy to connect, the adjoints needed to be thicker to prevent breaking and facilitate smoother assembly.

However, despite increasing the thickness, the blocks still failed to interconnect due to the nature of the material.

Therefore, I decided to proceed with the rectangular blocks in their original form and created cavities at various angles to enable their connection.

Fig. 43 *First sample of joinery mold* (2024)

Fig. 44-45 *Joinery prototypes* (2024)

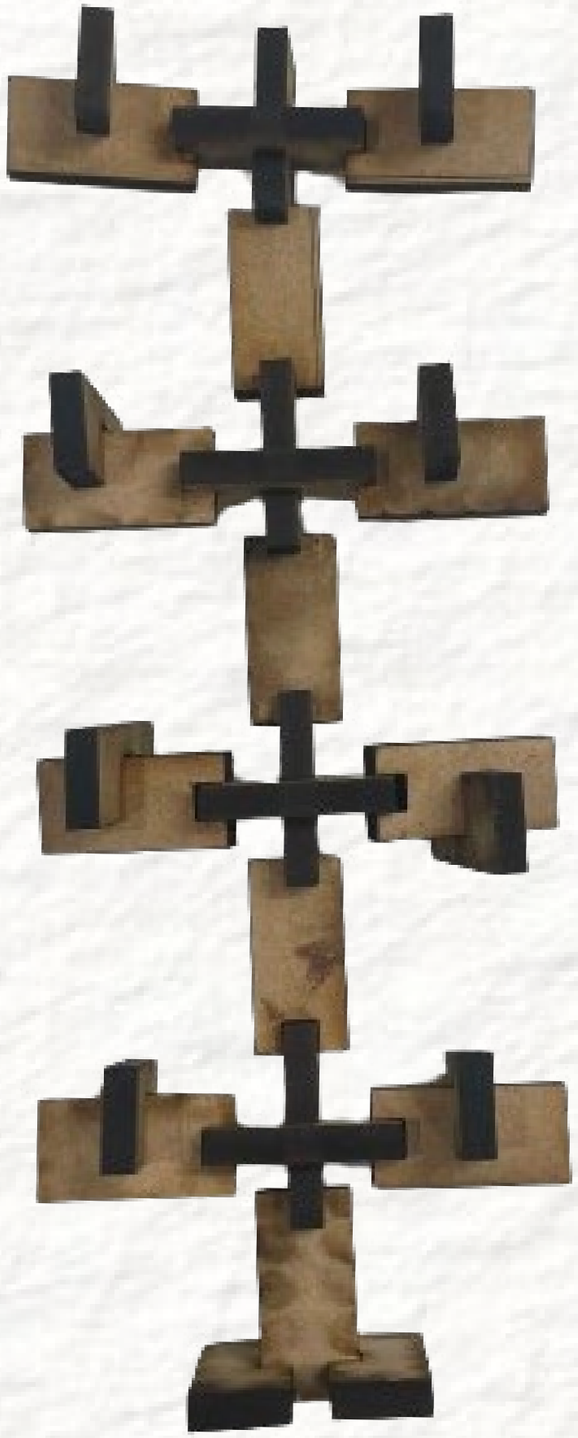


Fig. 45

Fig. 46-53 *Various iterations of Joineries* (2024)

Fig. 47

Fig. 48

Fig. 49

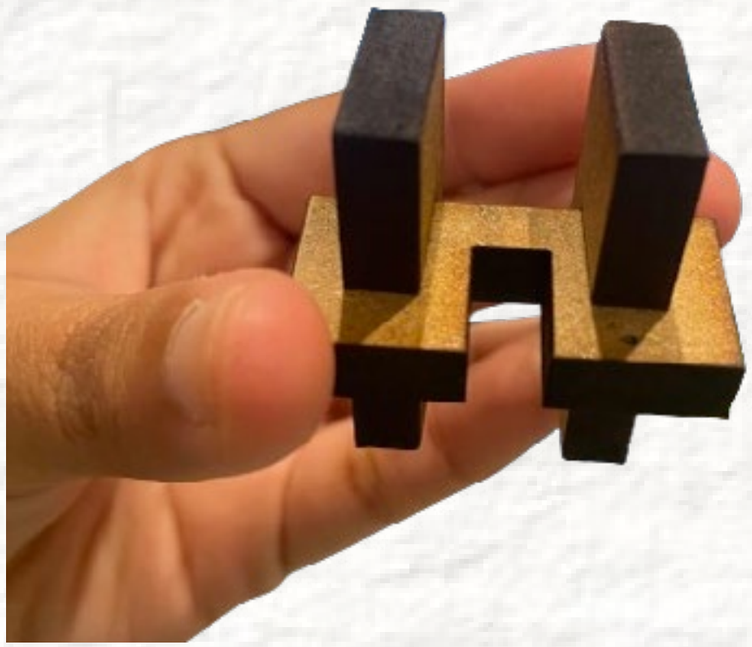


Fig. 50

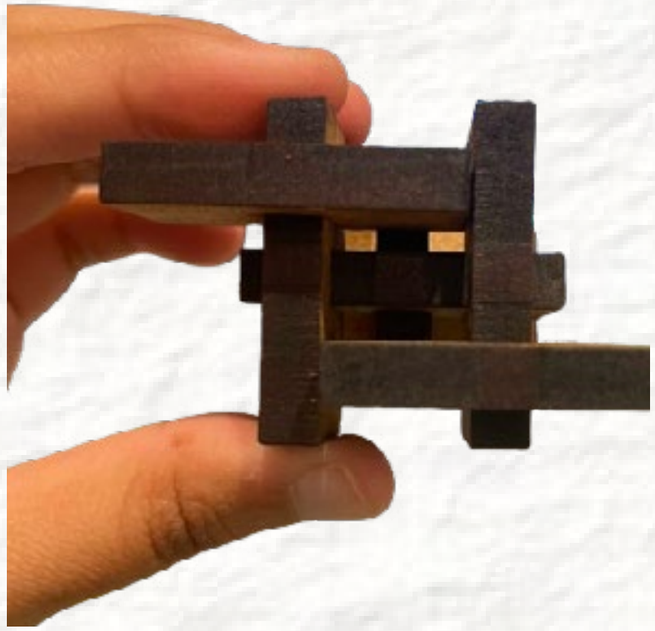


Fig. 51

Fig. 52

Fig. 53

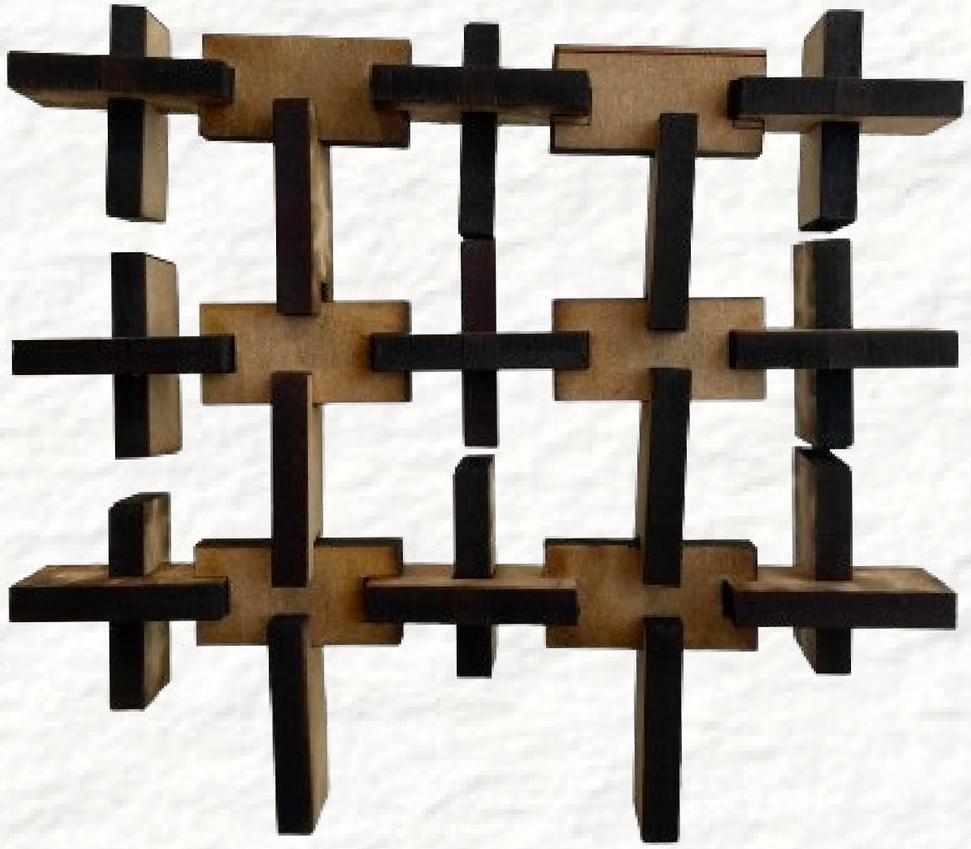


Fig. 54-57 *Prototypes with angled joineries* (2024)

As the project progressed positively, I started understanding the scope of it. Since, I took the rectangular block in its origin form, I could have converted the block into a linear set connecting them at 90 degrees. But in order to make it more challenging, I decided to create a curvature out of this rigid piece of block.
The image on the right show a linear as well as a curved structure.

All in Scale - 1:10

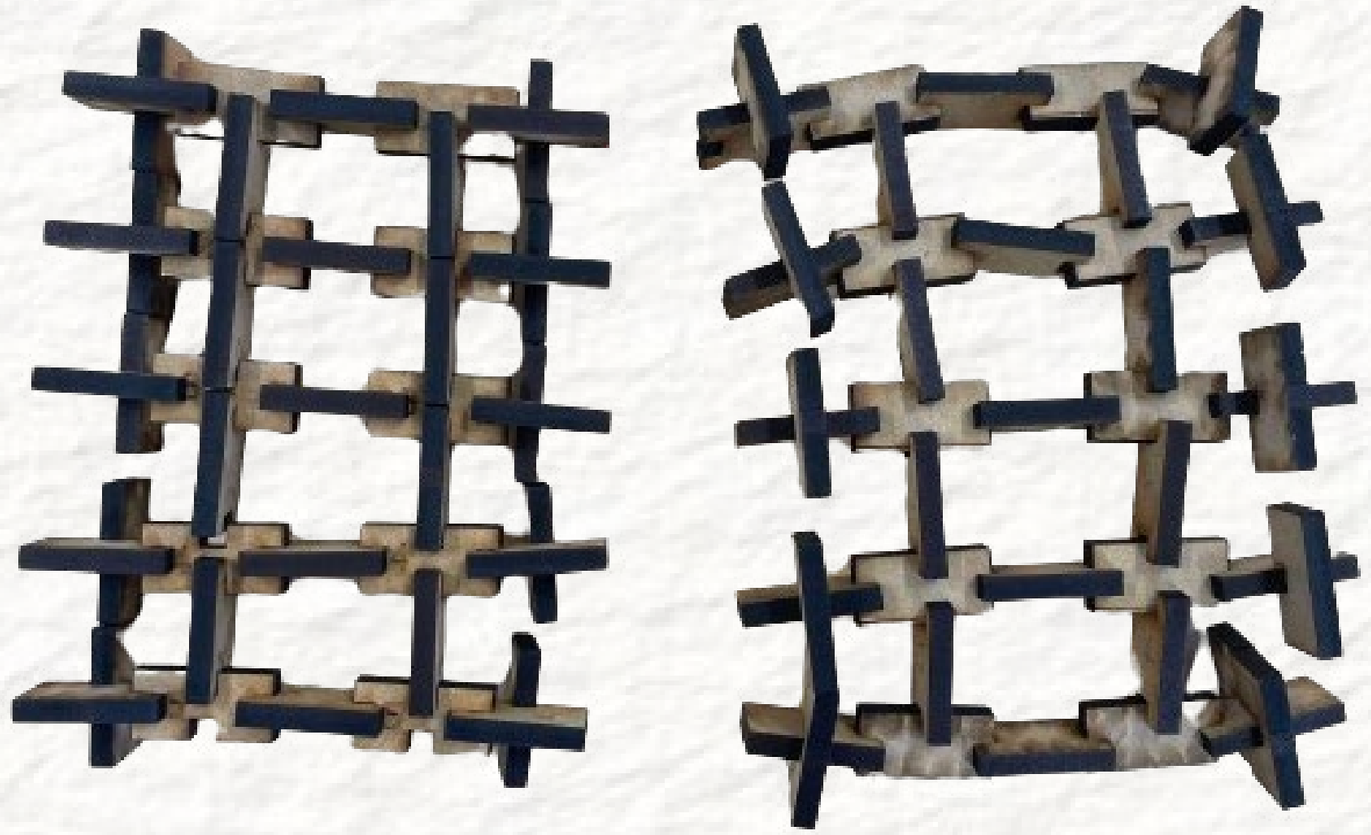


Fig. 55

With the above experimentation, the first set of angles pieces were created to make a prototype.

Fig. 56

Fig. 57

All in Scale - 1:10

INSTRUCTION MANUAL

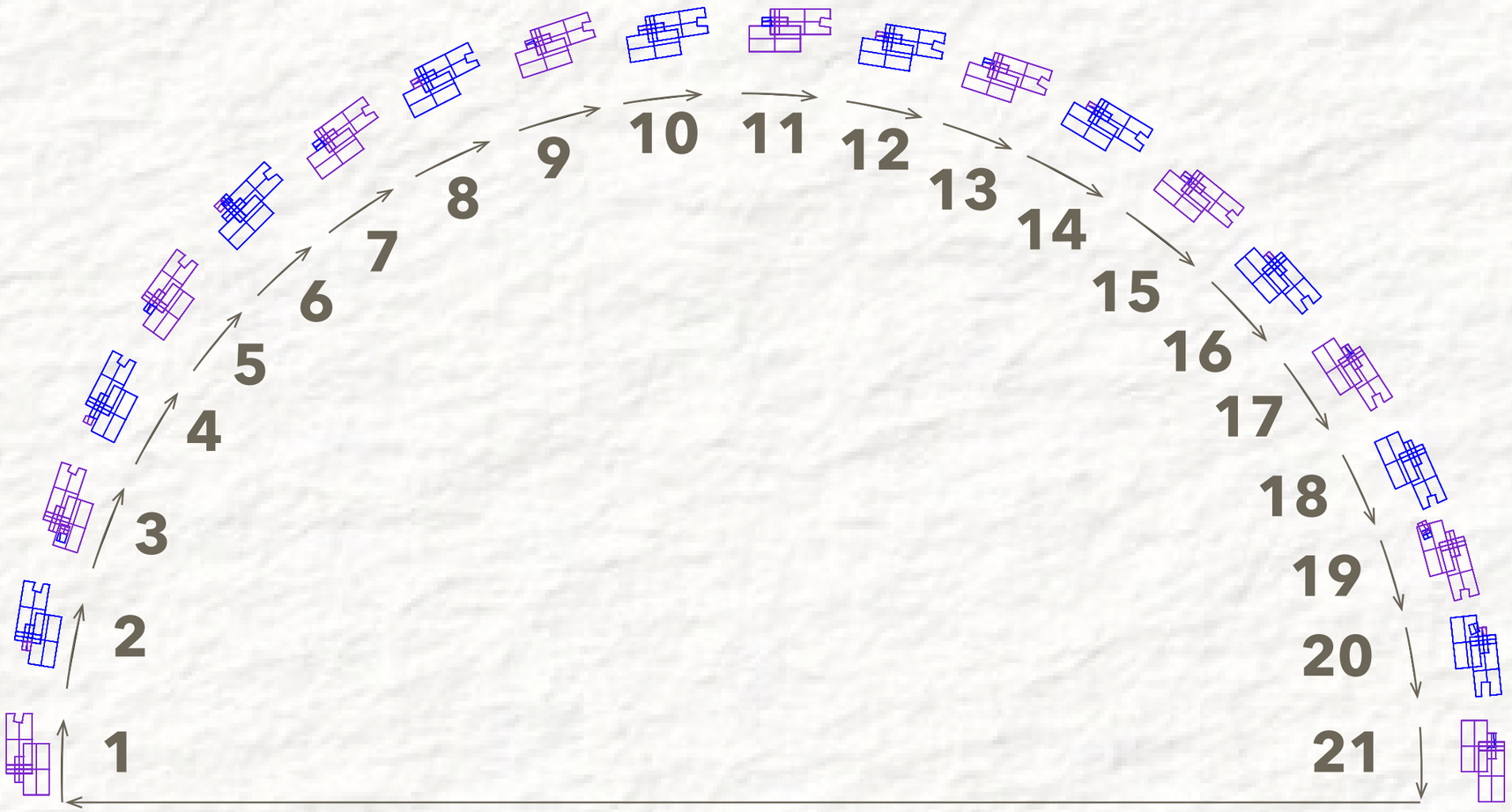


Fig. 58 *Instruction manual* (2024)

In order to create a curved structure, blocks have to be cut in different angles. Each set has two connector pieces that is cut at a different angle in order to form the required curvature. Rest other pieces in each set connect at 90 degrees.

1	0°
2	9°
3	18°
4	27°
5	36°
6	45°
7	54°
8	63°
9	72°
10	81°
11	90°
12	9°
13	18°
14	31°
15	39°
16	48°
17	57°
18	66°
19	75°
20	84°
21	0°

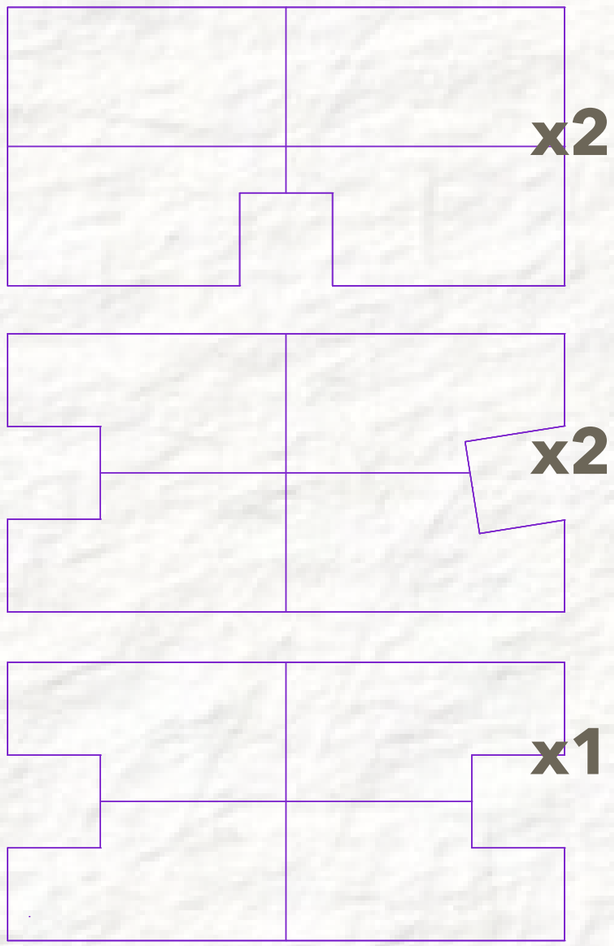


Fig. 59 *Set of 9 Blocks* (2024)

Each set has 9 blocks; 2 connector pieces cut at a different angle each and 7 that conect 90 degrees.

Size of each block

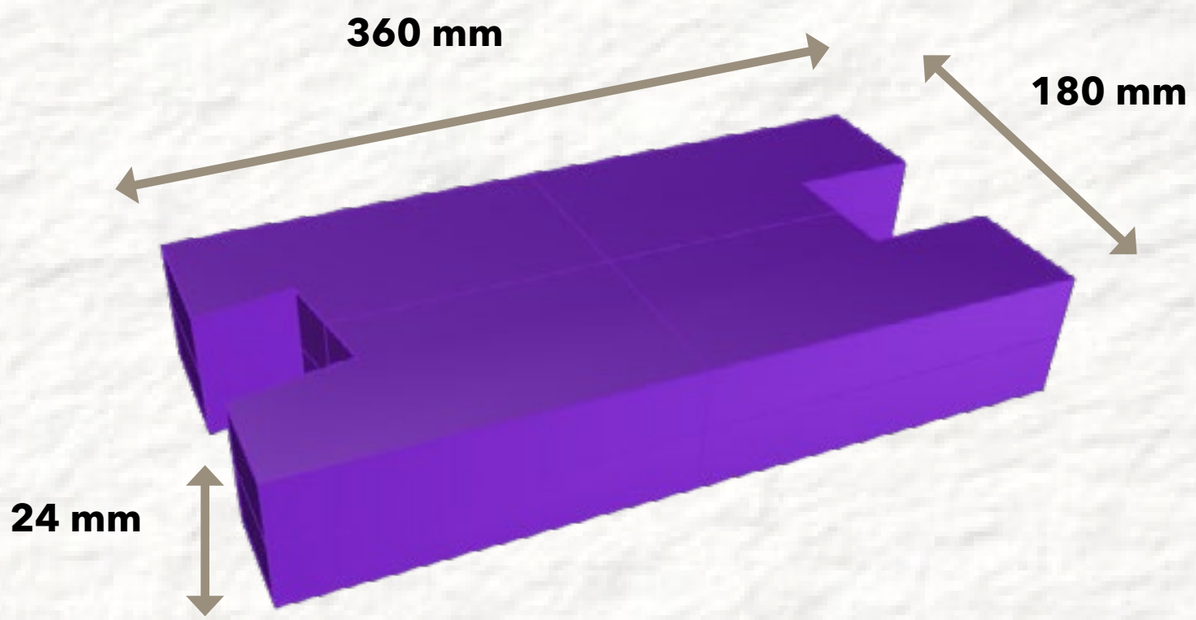


Fig. 60 *Block with dimensions* (2024)

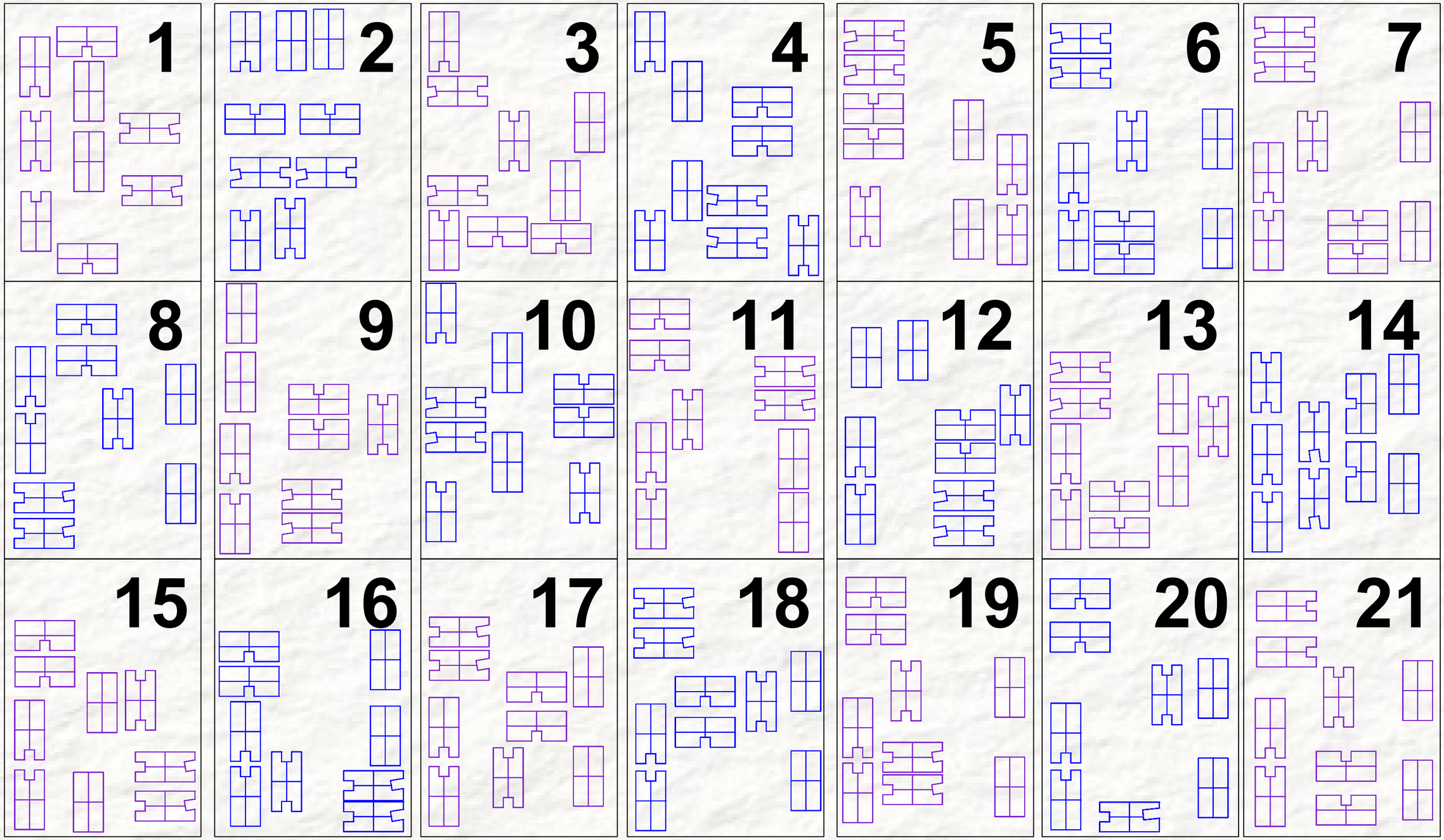


Fig. 61 *Set of blocks arranged according to their numbers for clear understanding.* (2024)

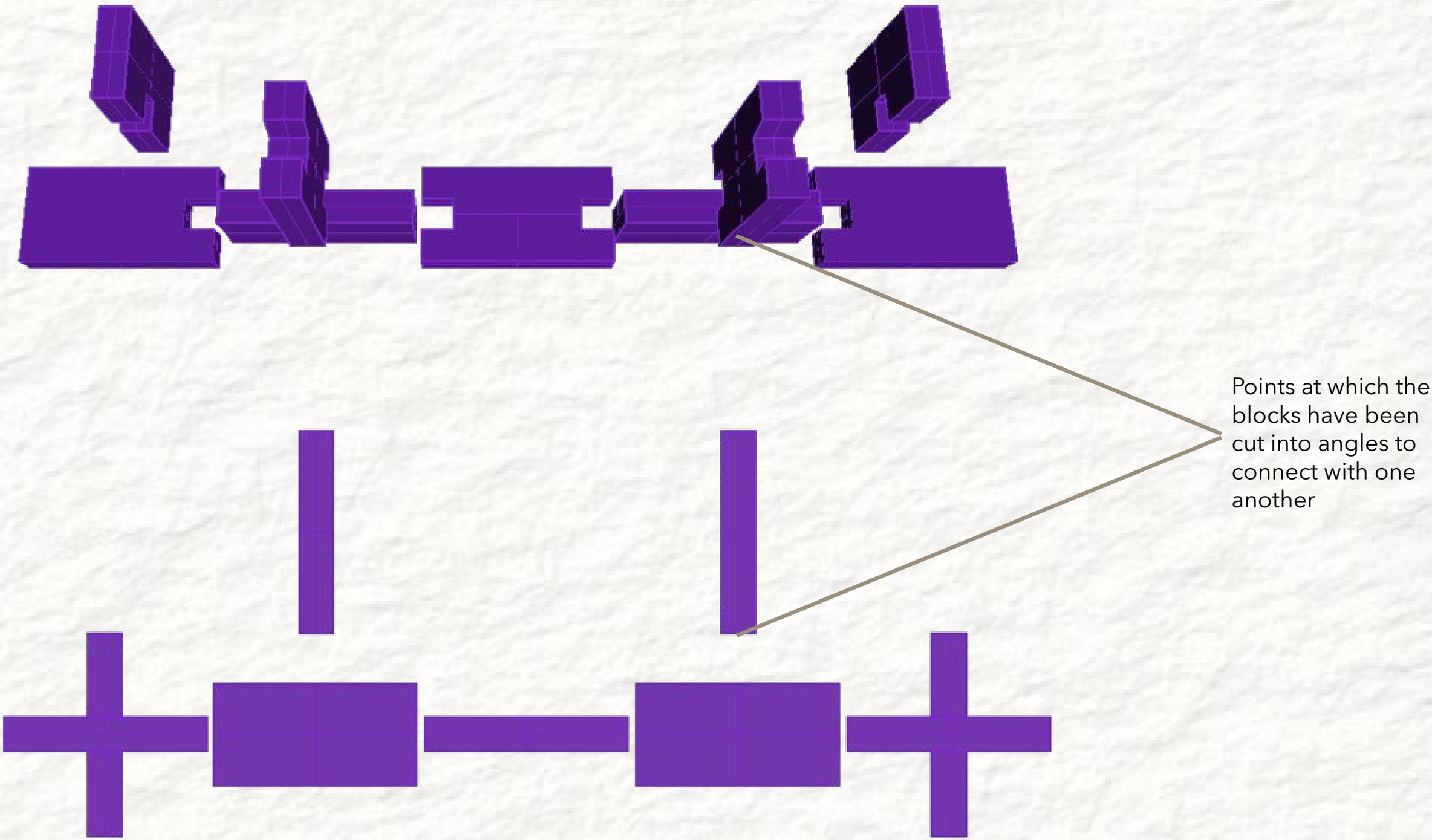


Fig. 62 *Exploded views of block sets.* (2024)

ASSEMBLY

Fig. 63-64 *Assembly of pavilion prototype.* (2024)

Fig. 64

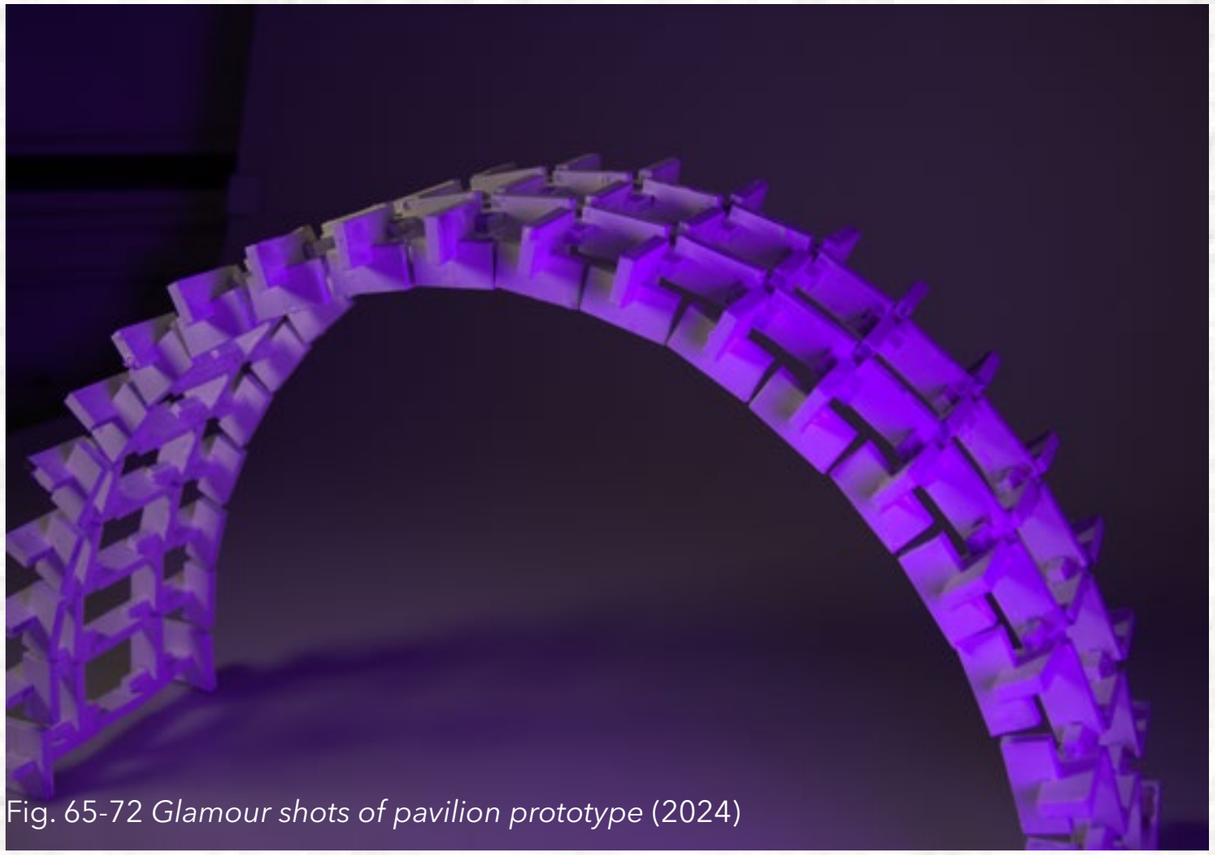


Fig. 65-72 *Glamour shots of pavilion prototype* (2024)

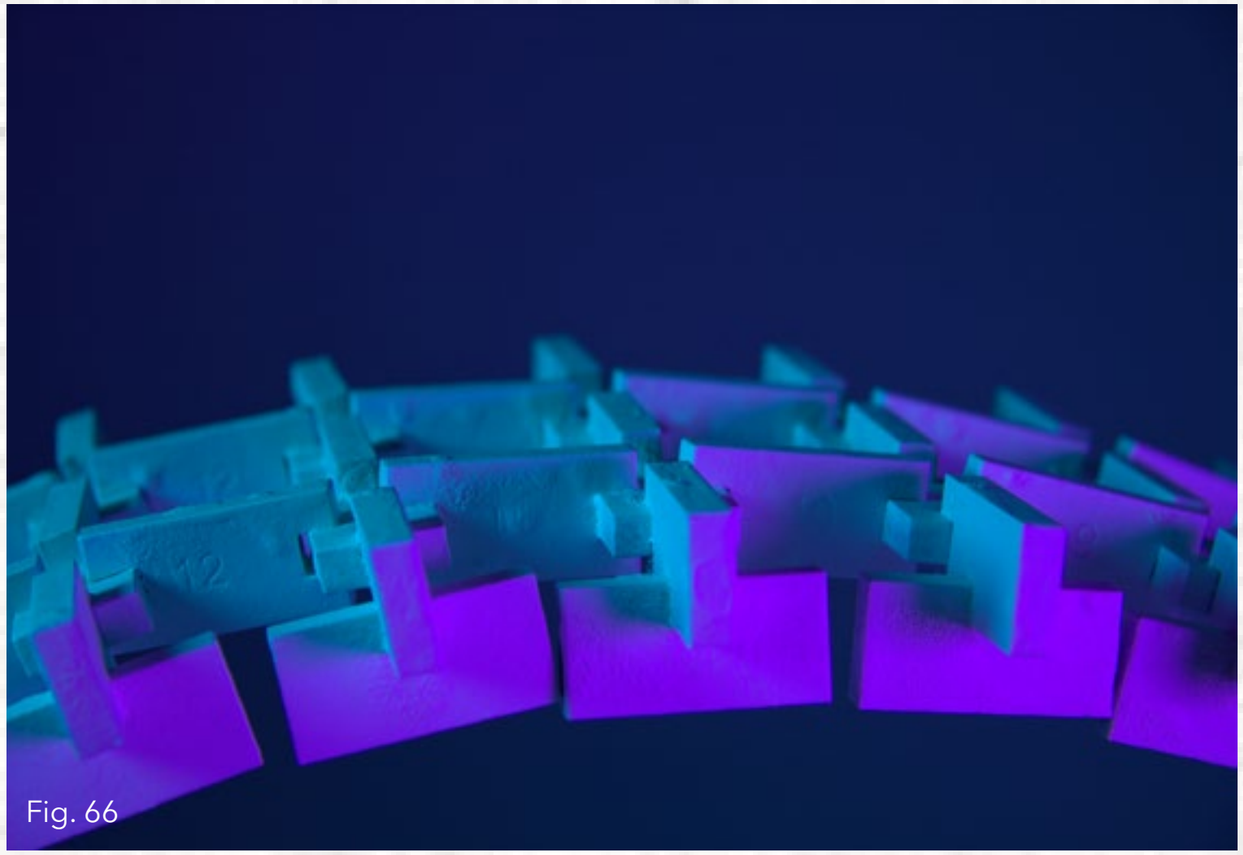
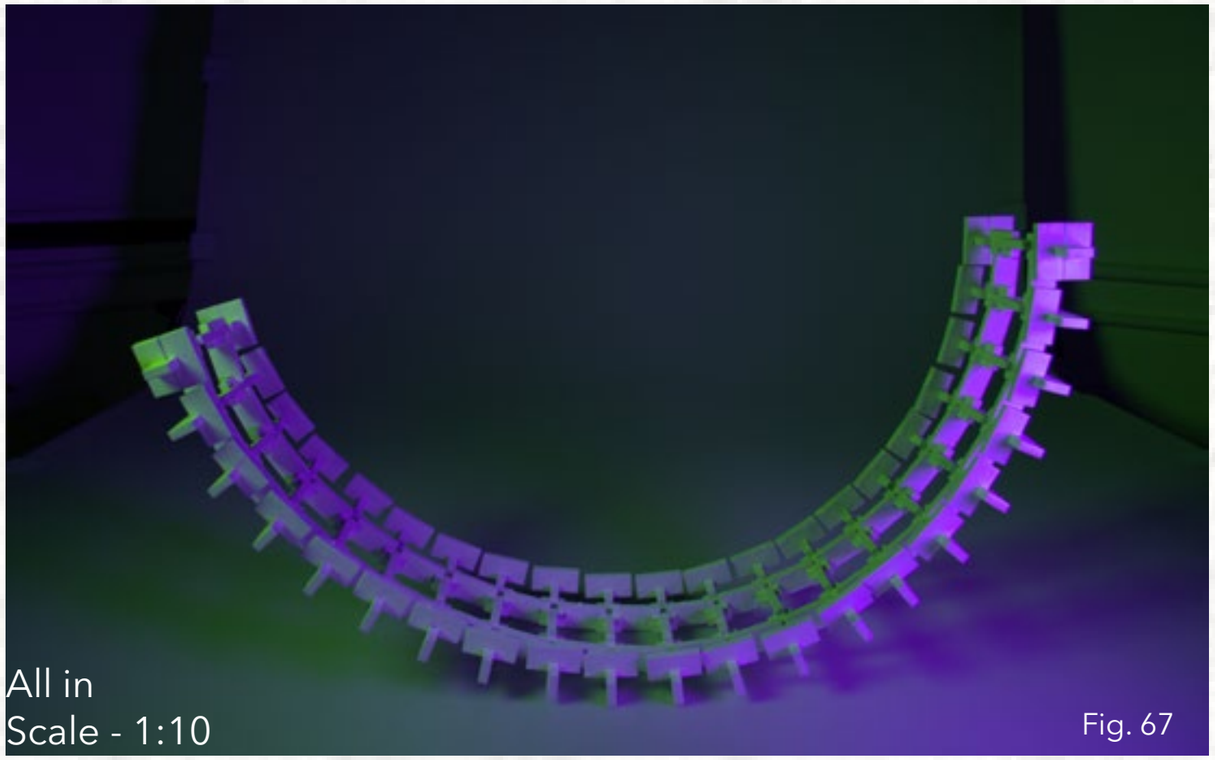


Fig. 66



All in
Scale - 1:10

Fig. 67

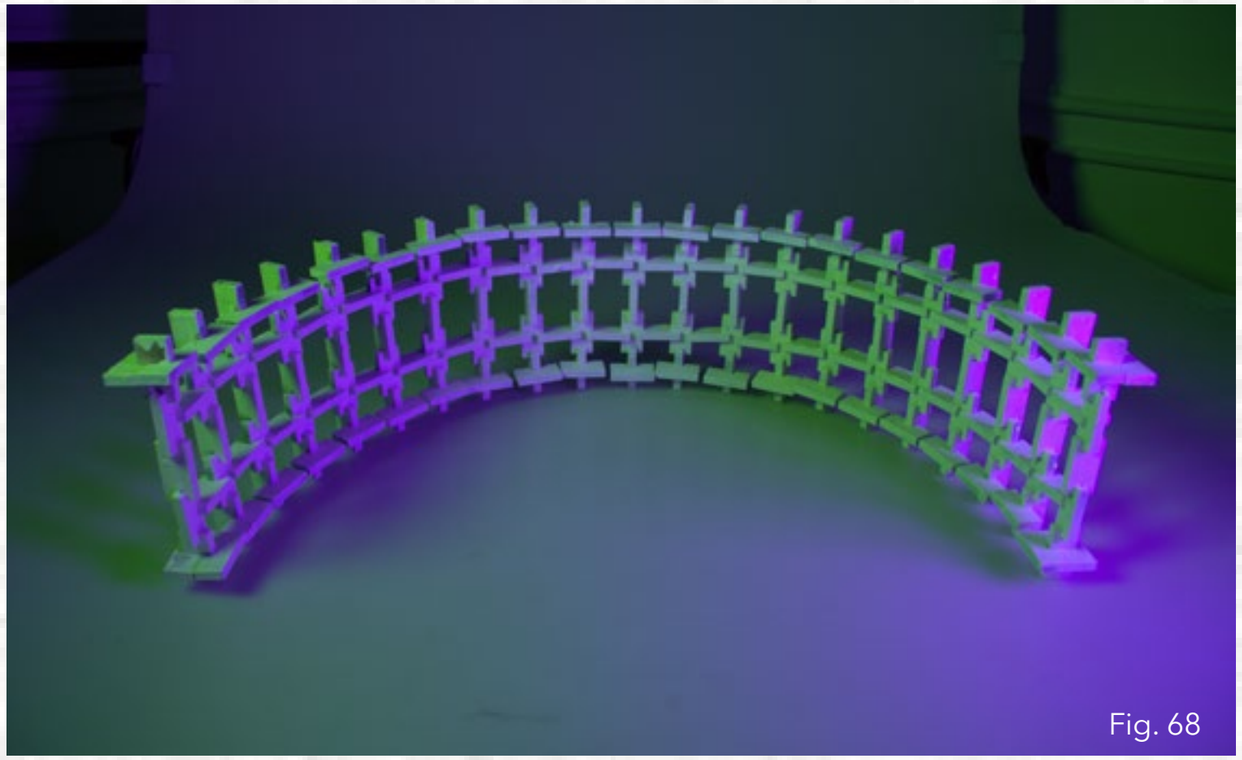


Fig. 68

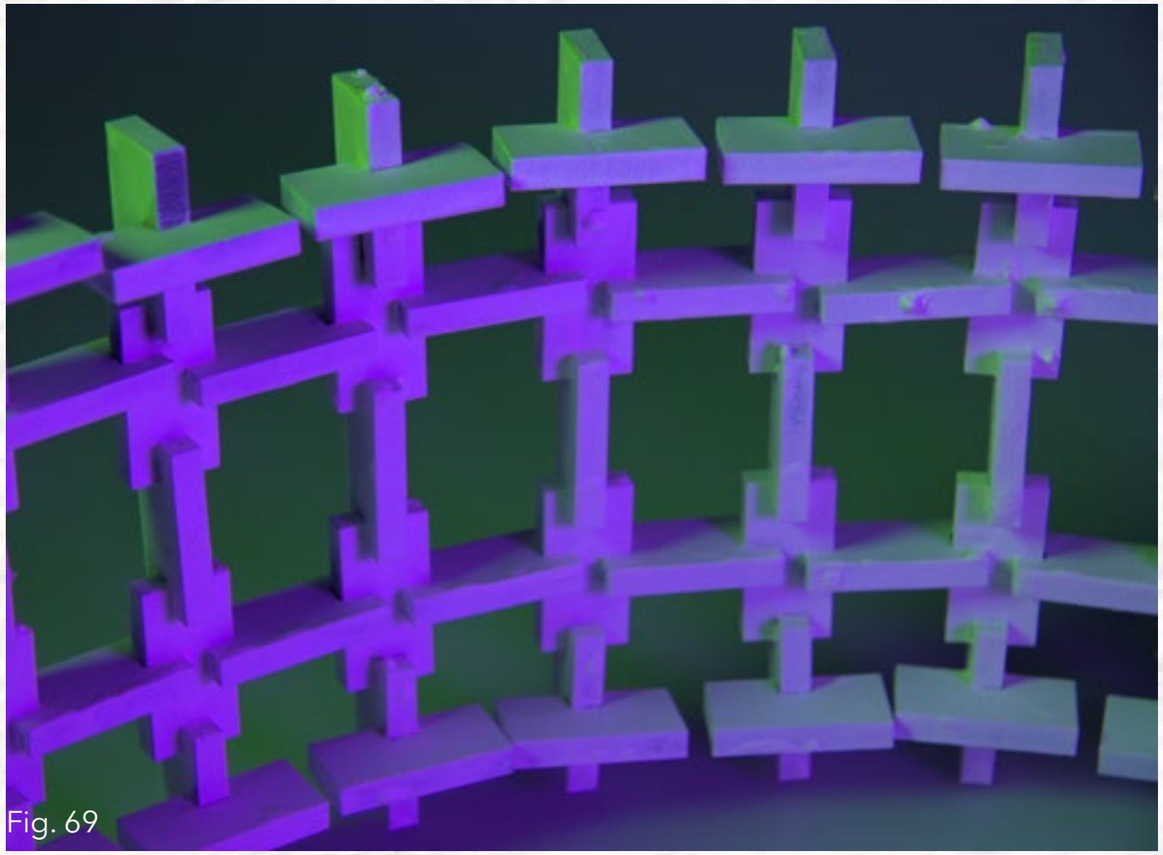


Fig. 69

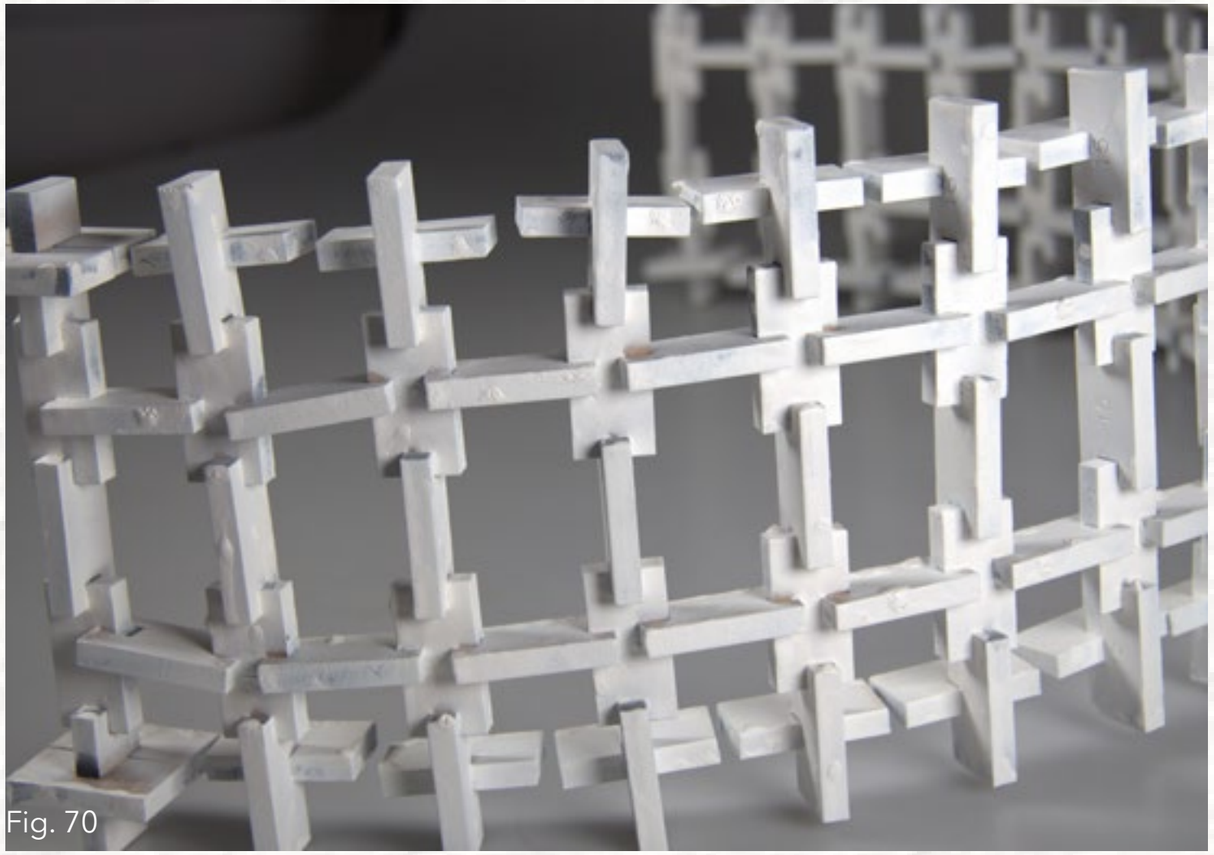


Fig. 70

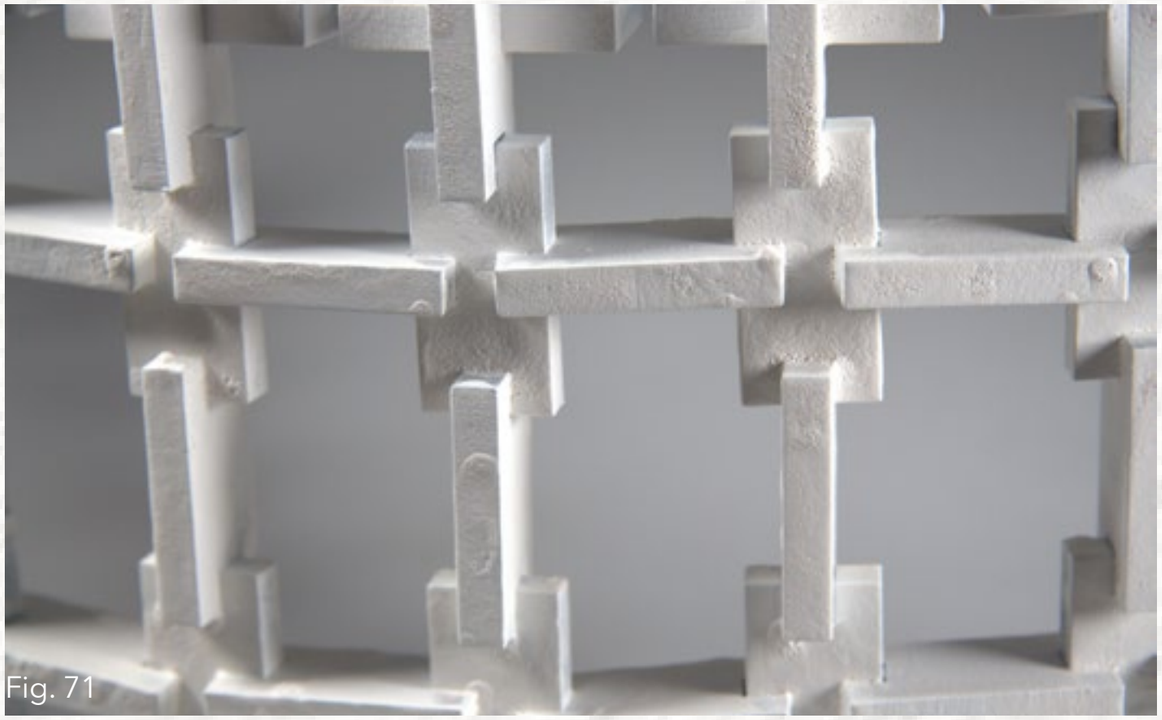


Fig. 71

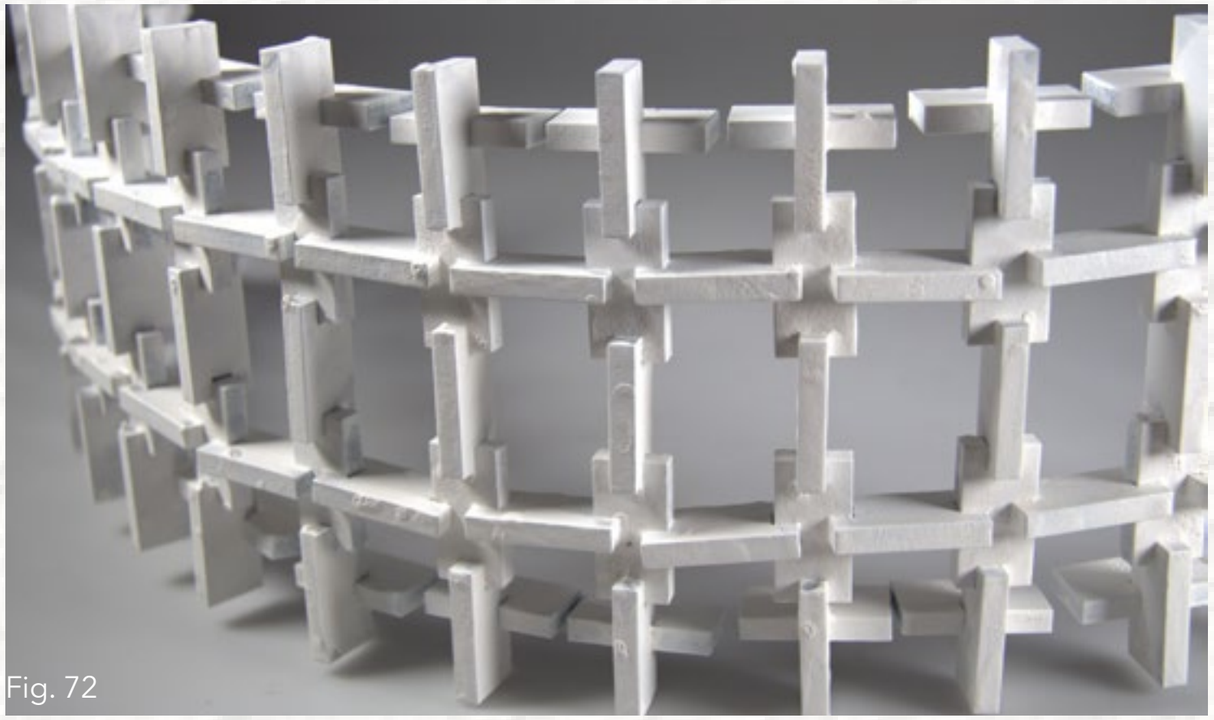


Fig. 72

DIMENSIONS

The changes in dimensions are not so drastic whenever the form of the pavilion changes. The range of sizes are:

L: 10,000 mm - 15,000 mm
B: 9,000 mm - 15000 mm
H (pavilion): 3,000 mm - 3,500 mm
H (total): 5,500 mm - 6,500 mm

Fig. 73 *Section view of pavilion* (2024)

WHY A CANOPY IS REQUIRED?

As we know that Sapyrus is made of paper and paper is neither water-proof nor fire-proof. I investigated into different ways of how to make Sapyrus water and fire-proof but all options were pointing me towards applying a layer of chemical coating. Chemical coating will make the material “un-recyclable” thereby going against the principles of circular economy. There are no natural coatings yet innovated.
Keeping in mind the weather of UK, where one can experience sudden rains at any point of the day, I needed something to protect the material, something that was light-weight, portable as well as easy to assemble.

Therefore, the idea of having a canopy over the pavilion worked well. Most canopies are made of vinyl that is water-proof and resistant to harsh weather.

VARIOUS ITERATIONS

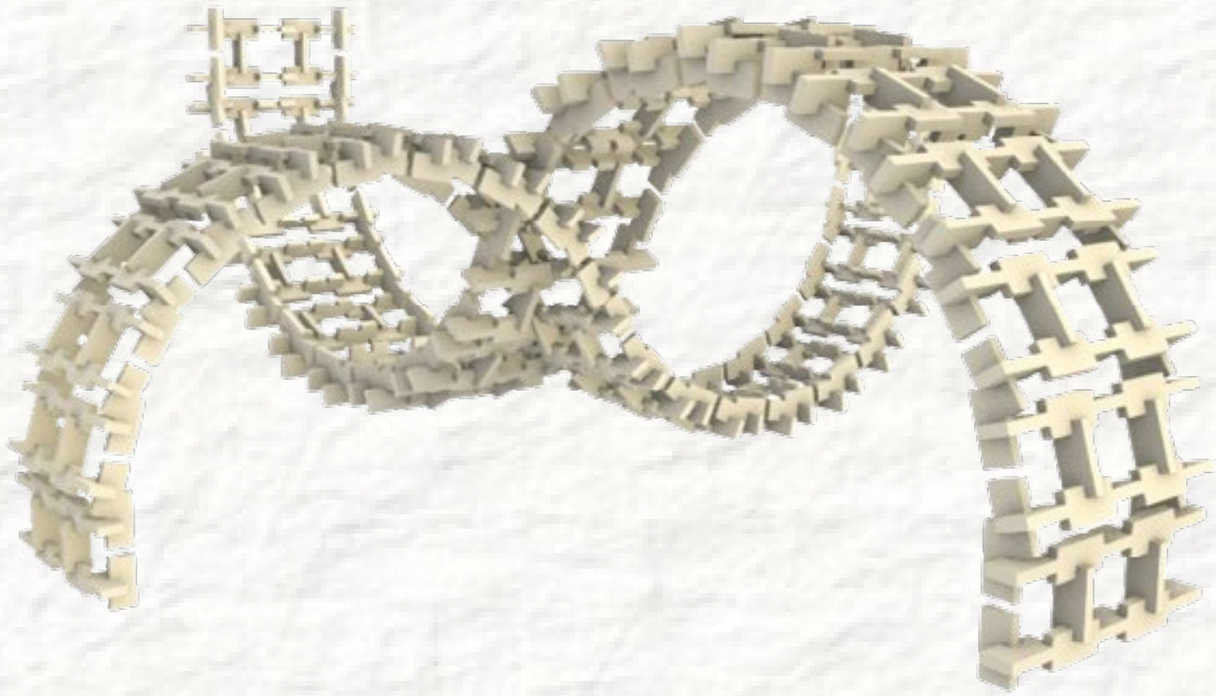


Fig. 74-77 *Various form iterations of thr pavilion.* (2024)

The versatility of the curvatures led to creating various unique iterations.

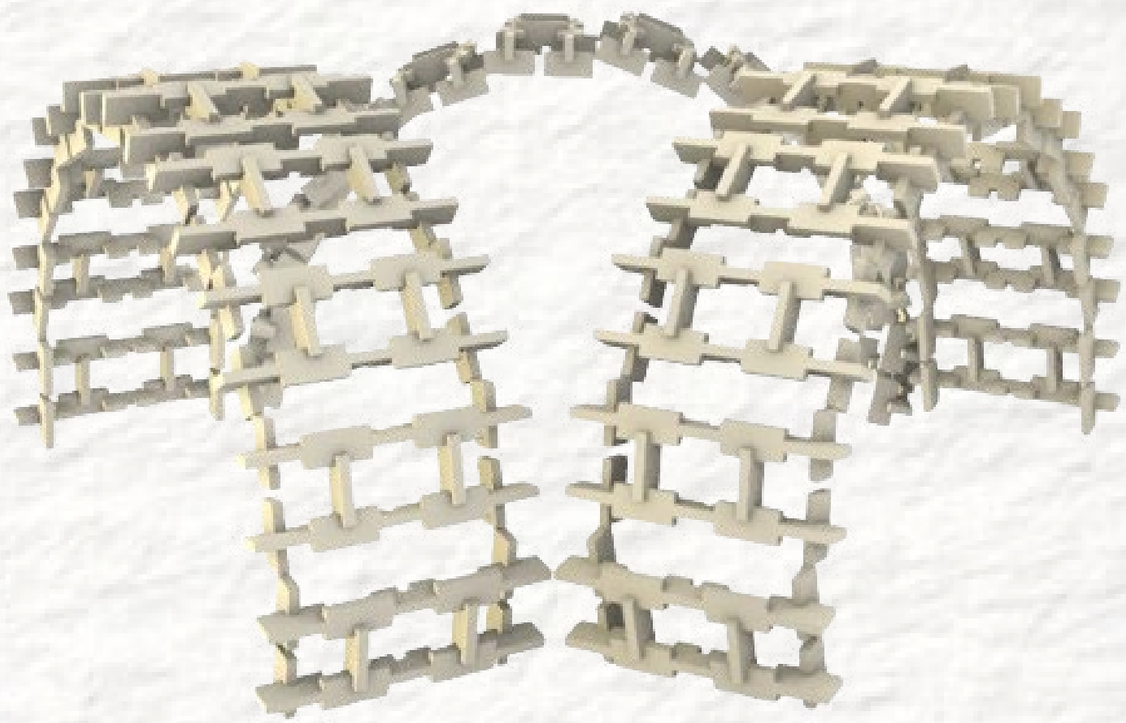


Fig. 75

The curvatures could also be flipped to its sides to create enclosed spaces which can be used as sitting areas, reading area, cafe etc.

Fig. 76

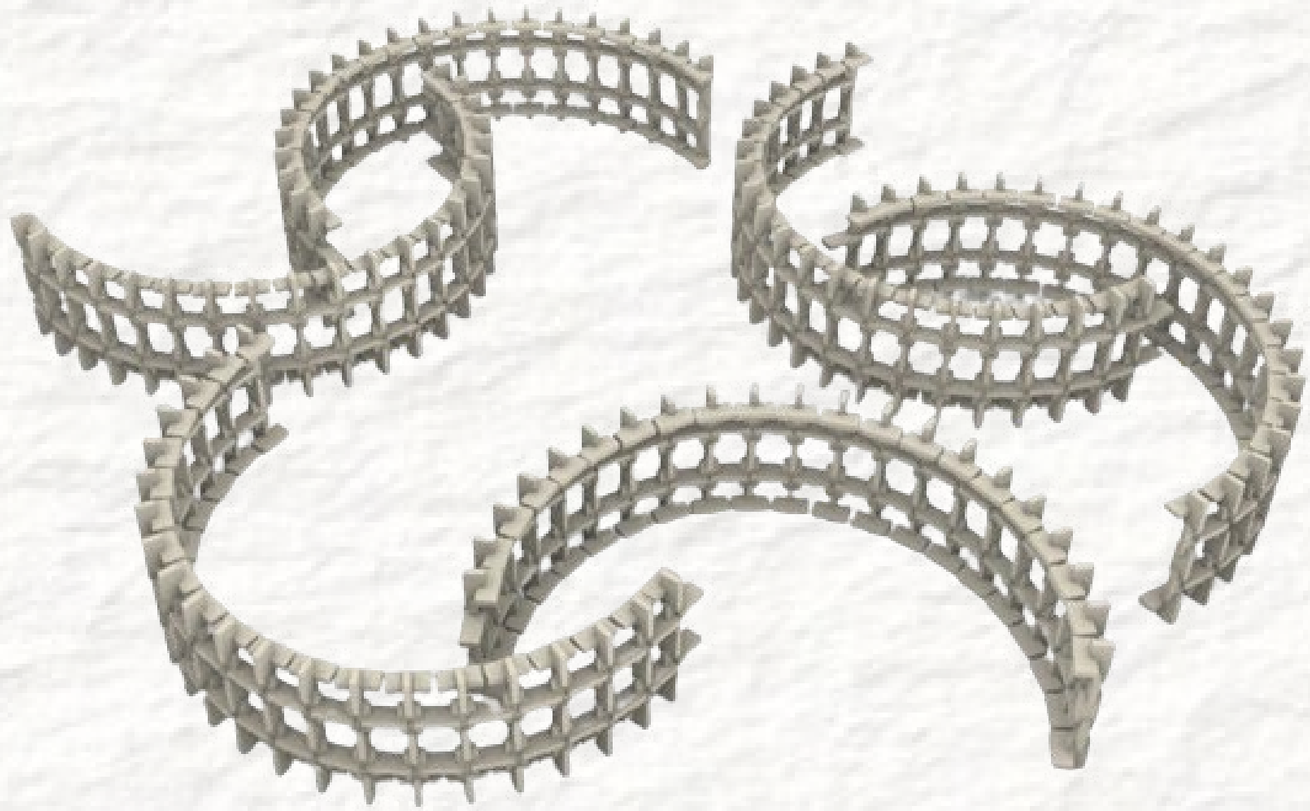


Fig. 77

TRANSPORTATION

Fig. 78 *Packaging for easy transportation.* (2024)

Each curvature has 21 sets and each set has 9 pieces which makes it 189 pieces per curvature.

The total number of pieces:

189 x 6 = 1134 pieces

For easy assembly and transportation, pieces can be arranged in section boxes with the number of each set labelled correctly.

Once the exhibition gets over, the curved structures can be easily dismantled and arranged in the boxes.

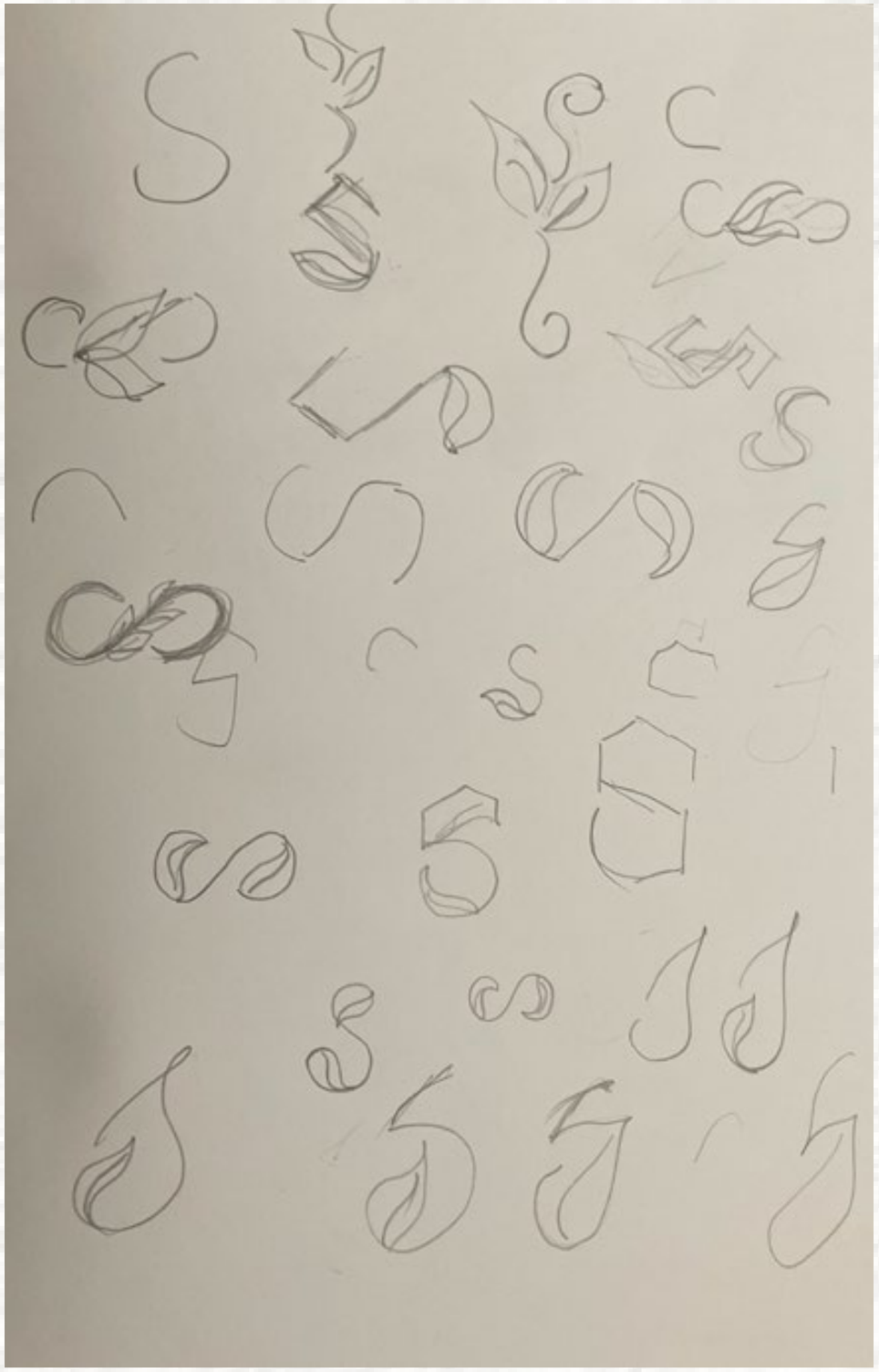


Fig. 79 *Quick ideation sketches for logo.* (2024)

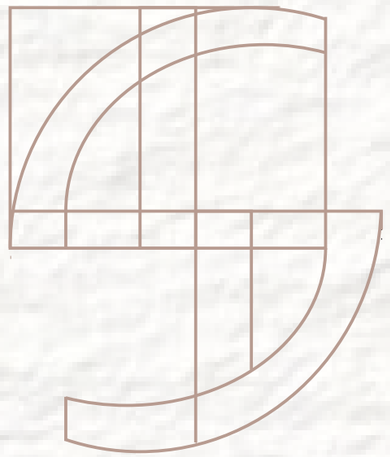


Fig. 80-84 *Various options for logo.* (2024)

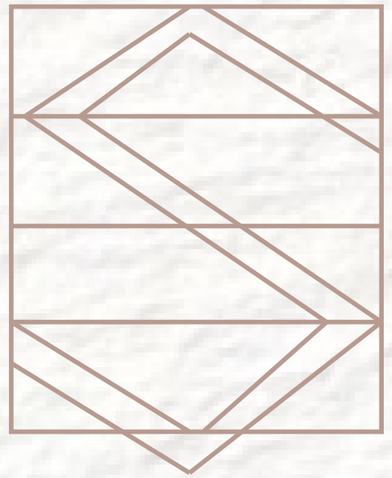


Fig. 81

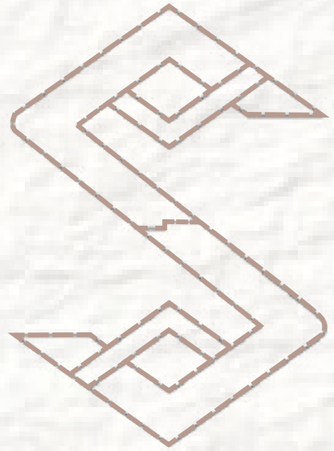


Fig. 82

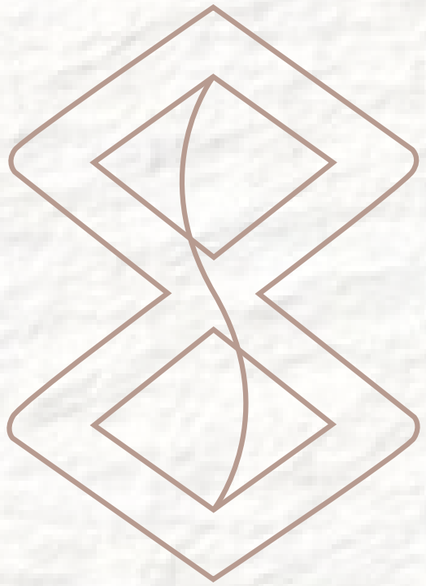


Fig. 83

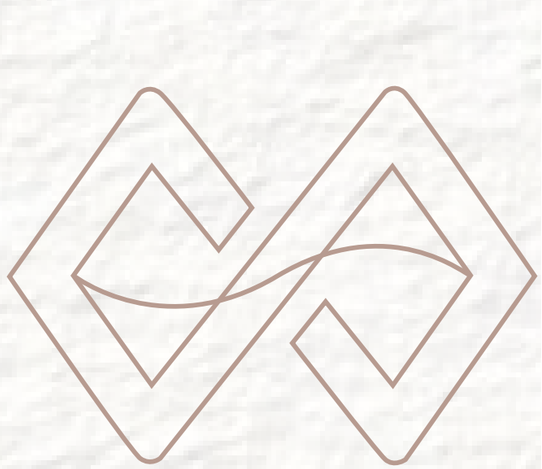
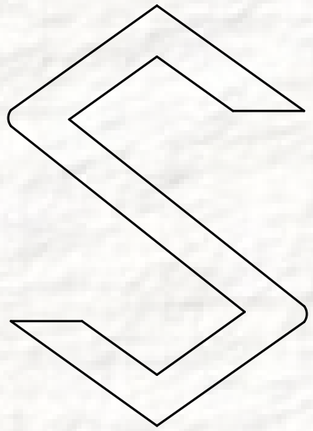


Fig. 84

FINAL LOGO

SYMBOL OF CIRCULAR ECONOMY

+



INITIALS OF SAPYRUS

+

LEAF SYMBOLISING NATURE AND SUSTAINABILITY

Fig. 85 *Final logo* (2024)

Fig. 86-88 *Final packaging* (2024)

The packaging is made of cardboard keeping sustainability in mind. A personal note is written on the back that gives a gist of the product.

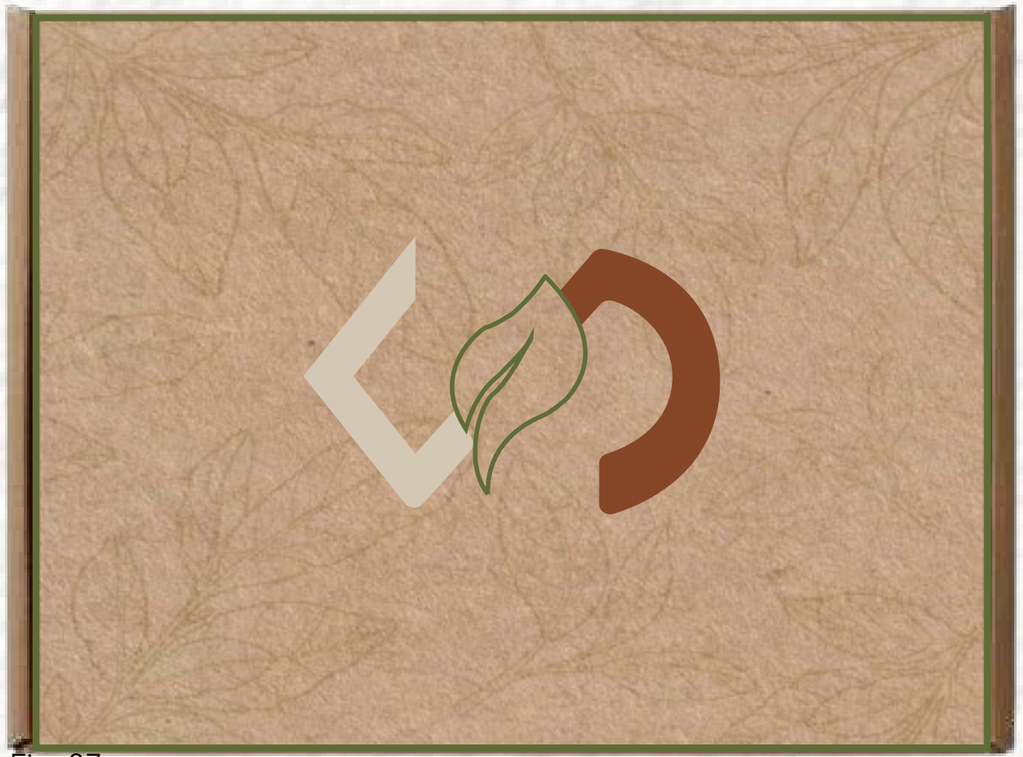


Fig. 87

Sapyrus (a blend of sawdust and papyrus) has been created by Smruti Patel through a process of experimentation and exploration into creating a new material out of waste. This process continues to give a new perspective to sustainable material research and the different iterations that can be formed from recycling of composite materials. This project also creates awareness and educates people about the usage of these materials in interior spaces. It is an ongoing process of re-forming and development to make it more adaptable to different environmental usages and functions.

Fig. 88

SOURCES

05

CASE STUDY - I

Fig. 89-91 *From recycled paper to functional furniture (2016)*

Paperscapes: From Recycled paper to Functional furniture

Montreal based creative studio Dear Human has come up with a way to return recycled paper into functional furniture, lighting and tiles in a creative explanation called Paperscapes. (Yang, V. 2016)

Fig. 90

Fig. 91

The studio prides itself on being able to take a second look at everyday objects in order to uncover its hidden potential and transform the potential into something tangible.
Using recycled paper from a local industry waste site, the studio manipulates paper into a clay-like material, which they use to create stools, side tables, large dome lights and tiles. (Yang, V. 2016)

CASE STUDY - II

Fig. 92 *Shigeru Ban created the Paper Log House at the Glass House* (2024)

Shigeru Ban's Paper Log House

"The Paper Log House continues this ethos of experimentation and innovation, turning Ban's creative energy toward the solution of urgent social problems with recyclable and easily available materials."

- Tom Ravenscroft

Fig. 93 *The pavilion is the latest structure on the site* (2024)

- Japanese architect Shigeru Ban has created a pavilion from paper tubes, wood and milk creates to mark the 75th anniversary of US architect Philip Johnson's Glass House in Connecticut, USA.
- The Paper Log House was created to contrast the original house, which has entirely glass walls set within a charcoal-coloured steel frame.
- The structure was constructed with walls made from 15 paper tubes, which sit within a frame made from plywood on a foundation made of 39 milk crates.
- Ban is known for his work with cardboard and has designed a series of structures in response to natural disasters for over 30 years.
- The Paper Log House model was also used as temporary shelters in Europe to house Ukrainians fleeing from the Russian invasion. (Ravenscroft, 2024)

Fig. 94 *The pavilion was made from paper tubes, wood and milk crates* (2024)

Fig. 95 *Its structure contrasts the original house* (2024)

KEY INSIGHTS

- Creation of the Paper Log House exemplifies innovation in using unconventional materials like paper tubess, wood and milk crates.
- Highlights the role of architecture in addressing urgent social problems, particularly in providing shelter during crises.
- The adaptibility of Ban's Paper Log House model, used in various global contexts such as post-earthquake Morocco and Turkey, illustrates the global impact of innovative design solutions.

CASE STUDY - III

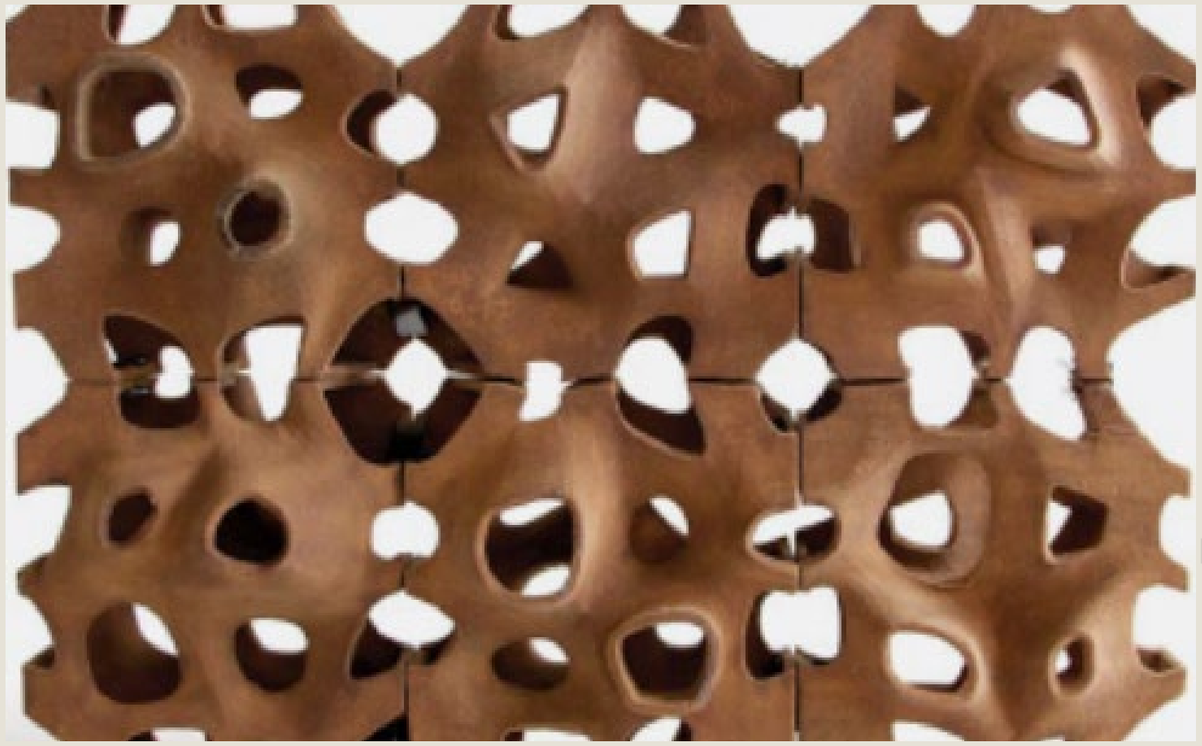


Fig. 96-99 *Sawdust objects-Printing Architecture: Innovative Recipes for 3D Printing. (2018)*

3D Printing with Sawdust and Newsprint

"In recent years, we have witnessed an unparalled explosion of creative expression and experimentation with 3D printing - not only as a practical tool but increasingly as a medium in its own right."

-Dries Verbruggen

- Upcycling of sawdust needs equal parts of sawdust and polymers.
- Whereas, this 3D printed product uses 85% recycled wood and cellulose particles.
- The remaning 15% is composed of powder-based glues activated by water.
- Only after the product is 3D printed, a polymer coating is applied for a rich texture and surface in addtion to its strength. (Rael, R. and Fratello, V. S, 2018)

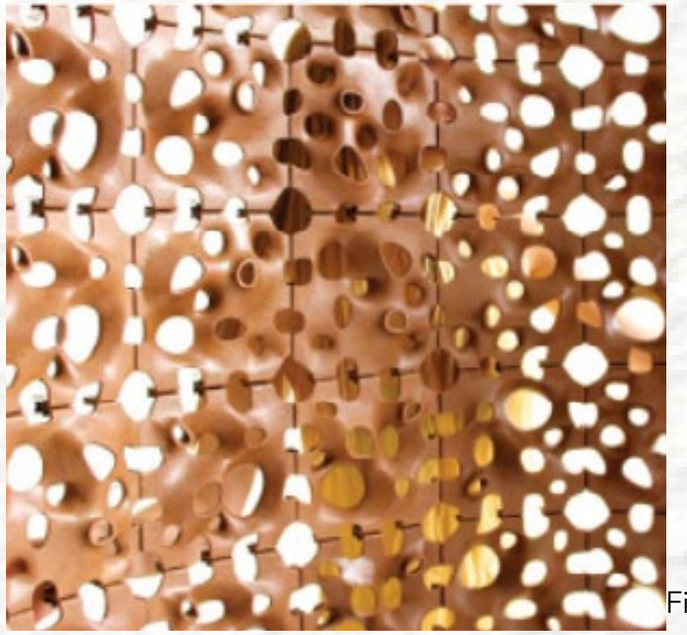


Fig. 97

- Sawdust screen is made of pulvarised walnut shells and sawdust.
- Individual 3D wood components are affixed together to form a dimensional enclosure and surface.
- Its porous pattern is inspired by the vessels found in a microscopic analysis of the anatomy of hardwoods.
- When viewed from the end grain, these vessels demonstrate the porosity of wood. (Rael, R. and Fratello, V. S, 2018)

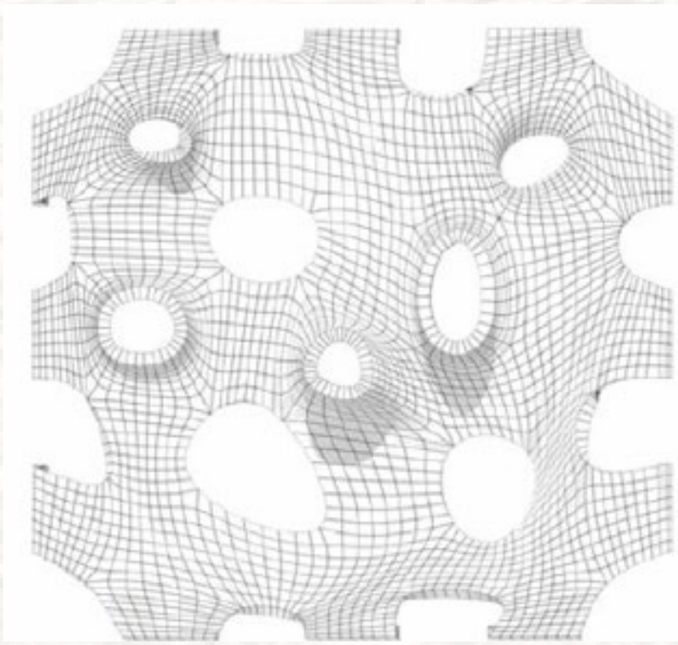


Fig. 98

- For 3D printing, the newspaper is shredded, mixed with water, dried and ground up into fine powder mixture like paper mache.
- The final product has a velvety, granular appearance and is soft to touch. (Rael, R. and Fratello, V. S, 2018)

Fig. 99

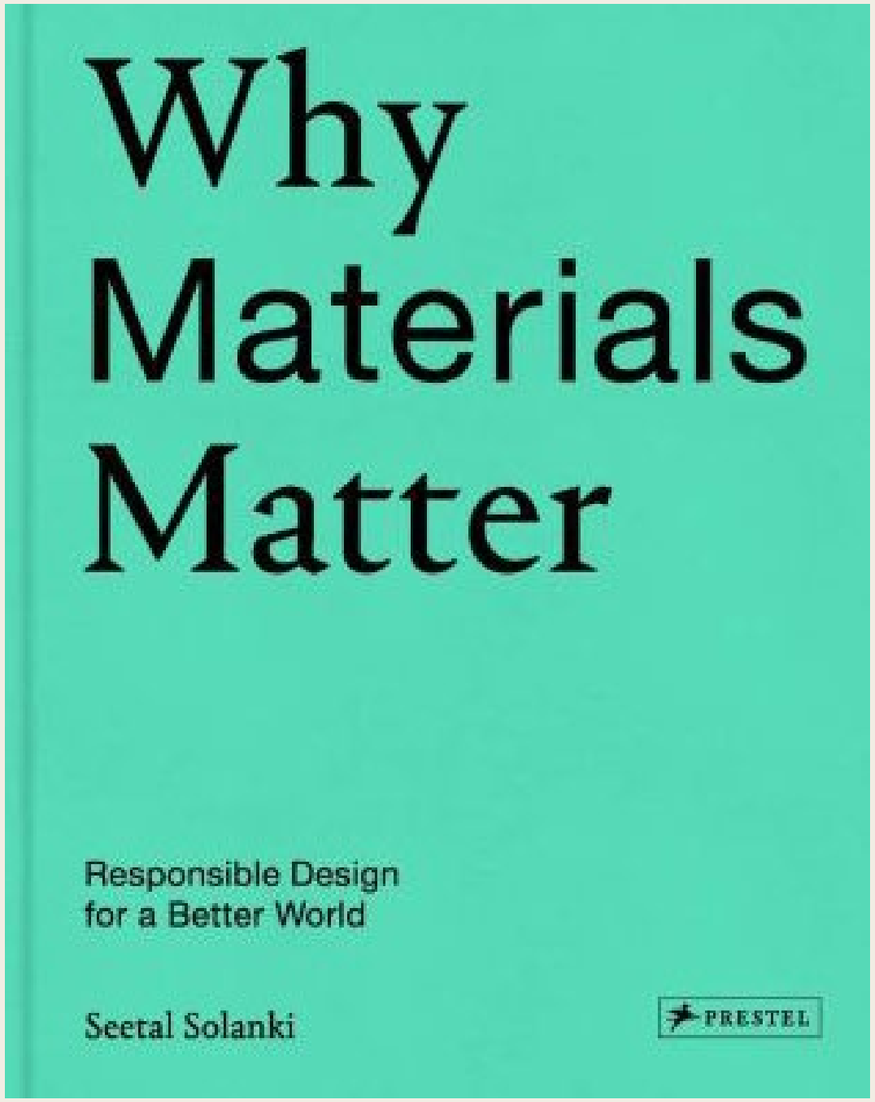


Fig. 100 *Why Materials Matter: Responsible Design for a Better World*. (2018)

Learnings:

- Central theme: The book explores the significance of living in a material world and how materials from the past and present influence our futures
- Focus on issues and solutions: It addresses various human challenges and discusses potential solutions related to materials.

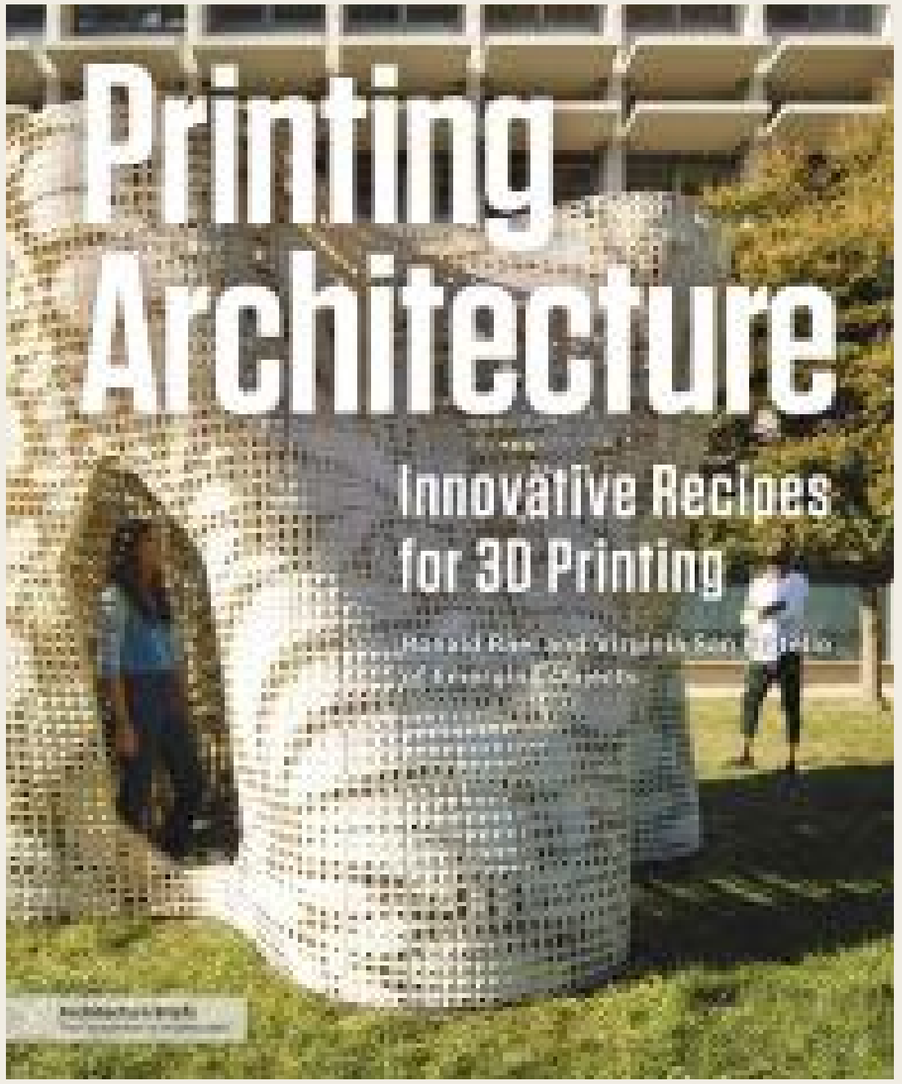


Fig. 101 *Printing Architecture: Innovative Recipes for 3D Printing*. (2018)

Learnings:

- Diverse materials: The materials used for printing include sawdust, clay, cement, rubber, salt and coffee grounds
- Educational approach: Insightful case studies, illustrations and guidance on the development and qualities of powder-based materials.

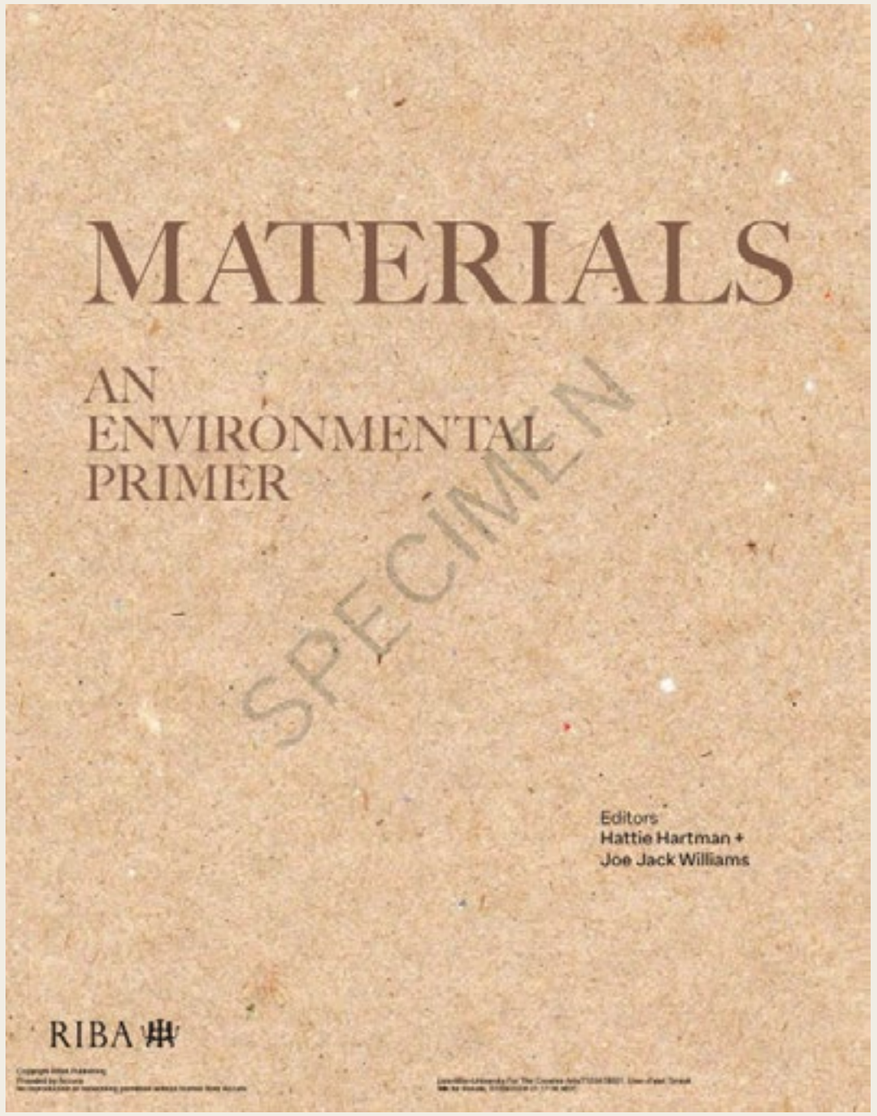


Fig. 102 *Materials - An Environmental Primer* (2024)

Learnings:

- Talks about various materials and their varied characteristics. “Every material has benefits and constraints. Throughout the following chapters, these pros and cons are explained, with a focus on how to best use each material to its advantage. Building design is not a linear process, and it is through an iterative and collaborative process of refinement that each material finds its place”.

Fig. 103 *The New Pavilions* (2016)

Learnings:

- Versatile structures: Pavilions serve various functions such as tents, bandstands, displays and spaces for social interaction.
- Experimentation: They provide designers to experiment with different aspects of design.
- Prototyping: Pavilions can be prototypes for larger buildings or purely artistic creations.

PAVILION DESIGN

06

WHAT IS A PAVILION?

A Pavilion is a flexible architectural open space that invites people to come in and spend time in it.

It could be temporary or permanent and might even change its form and function. (What is a Pavilion? (2015)

Fig. 104 *Pavilion Let's Play!/Dream* (2022)

6 USES OF A PAVILION

1. SHELTER

Some pavilions are ambitious, in terms of concept and the expression of this is in its built form, others appear to be more modest, solely providing shelter for passers-by. (Jodidio, 2016: 9)

2. LEARN

Pavilions designed at MIT and in Stuttgart do seem to generate forms that are not related to any building known to date, but which are profoundly connected to nature, whose efficiency can provide many useful lessons in architecture. (Jodidio, 2016: 9)

3. EXHIBIT

Pavilions have long been used for exhibtion purposes, vaunting the merits of the specific products or works of art within public spaces. (Jodidio, 2016: 12)

4. GATHER

London's Serpentine Gallery has long called on figures including Zaha Hadid, Frank O. Gehry, Alvaro Siza and Rem Koolhaas to conceive its summer pavilions, which it uses for various cultural events amongst other things. (Jodidio, 2016: 11)

5. LIVE/WORK/PLAY

A pavilion need not be a temporary structure. Indeed there are many good examples that have been built to function as offices or as spaces in which to live or play. (Jodidio, 2016: 13)

6. LOOK/LISTEN

The challenge of providing acoustics within an outdoor space or making a structure that is just as noteworthy as the views it has been built to highlight have been deftly surmounted by famous pavilions. (Jodidio, 2016: 16)

WHY A PAVILION & NOT AN ART INSTALLATION?

An art installation is a temporary space that is crafted specially to showcase an art form. It is a medium through which artists express their skills and talent. It engages people on multiple levels by activating the senses to experience it. Once the purpose is served, the installation is transported to a different destination for another setup.

A pavilion, on the other hand, is used for multiple purposes such as shelter, seating, meeting point, cafe, theatre or for lectures, events, exhibitions and much more.
The space can be used for community engagement and this pavilion also serves the same purpose.
The pavilion is inspired from the symbol of circular economy and hence will be a representation of the principles of circular economy.

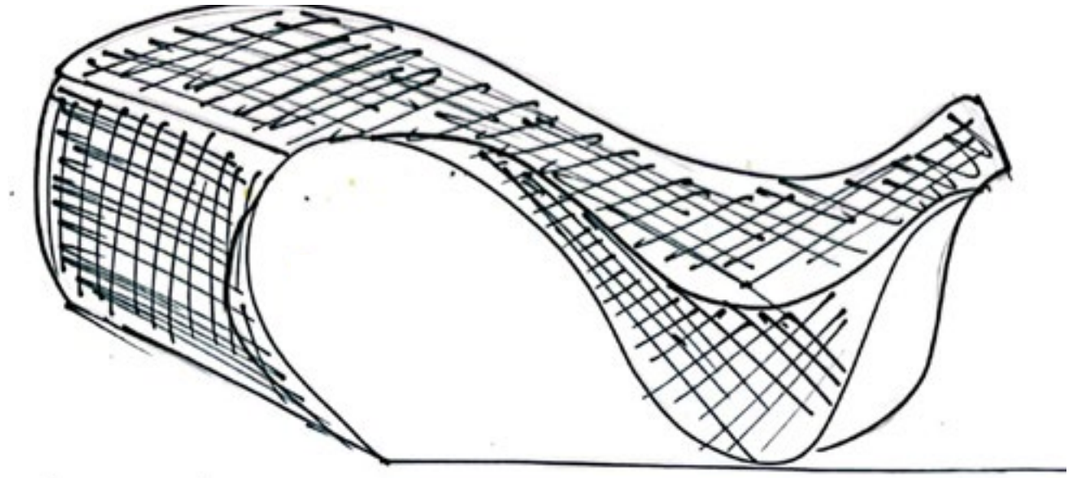


Fig. 105-108 *Pavilion sketches for quick ideation (2024)*

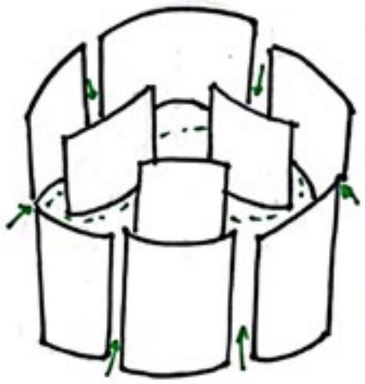


Fig. 106

Fig. 107

Fig. 108

SERPENTINE PAVILION

Serpentine's annual architectureal commission showcases new temporary buildings by international architects. Each summer, Serpentine invites an internationally renowned architect to create their first built structure in England. The Pavilion commission has become an international site for architectural experimentation and has presented projects by some of the world's greates architects. (Serpentine - Our History, s.d.)

Serpentine displays contemporary art across two sites in Kensington Gardens. Serpentine South and Serpentine North are a short distance apart, on either side of the Serpentine Bridge.
Each site hosts about thress exhibitions per year. The exhibitions show art, design, architecture, performance, and community projects. It functions as a cafe, meeting place and venue for live events throughout summer. (Serpentine - History of the Pavilion, s.d.)

Fig. 109 *Our History (s.d.)*

Fig. 110 *Archipelagic Void, designed by Minsuk Cho, Mass Studies © Mass Studies* (2024)

Fig. 111 *Serpentine Pavilion* (s.d.)

Fig. 112 *Bjarke Ingels completes Serpentine Gallery Pavilion that is "both solid box and blob"* (2016)

Fig. 113 *Serpentine Pavilion 2023 in London* (2023)

SERPENTINE PAVILION: A SOURCE OF INSPIRATION

The Serpentine Pavilion is a source of inspiration for many. The gallery hosts international architects year after year and every year the city gets to see a marvellous pavilion that is unique in its design, architecture, material, color, form and shape. What is also amazing, is to see a community of people that gather to experience the mammoth. These public art of works foster a sense of community and belongingness among people and evokes multiple emotions.

For me, designing a pavilion was not just exciting but also very challenging. The Serpentine pavilion gave me a sense of validation when I started working on the process. Having only designed interior spaces, designing a pavilion of a certain scale was not something I had planned of. Trying my hand at designing a pavilion made me acknowledge the importance of the role that people play in the design process.

SITE ANALYSIS

Initial thought...

Before developing the final design for the pavilion, I had thought of basing it at a site for context purpose. The chosen site was Folkestone, a town in Kent, known for its beaches and buzzing art culture. It has also got a huge community that gathers occassionally not just for festivals but also for social causes.

Fig. 114-115 *Kingsnorth Gardens, Folkestone (s.d.)*

Fig. 115

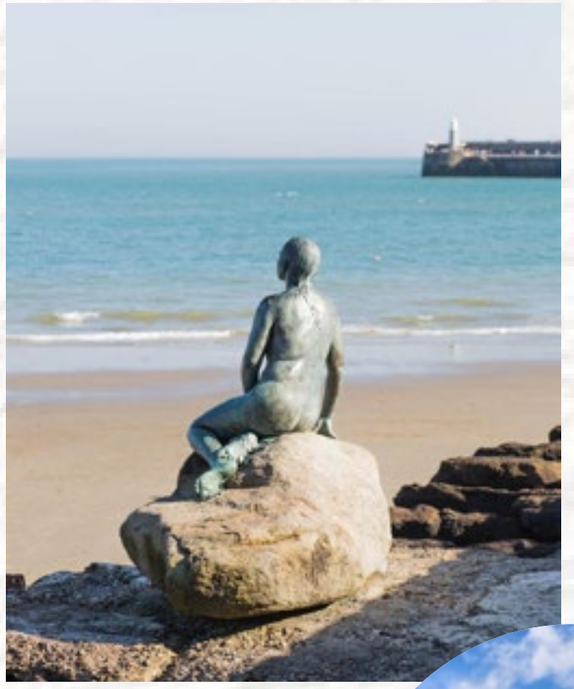


Fig. 116 *Folkestone: what to see, eat and do in Kent's buzziest seaside town (2019)*

The New Folkestone Society exists to foster an awareness of the local environment and amenities and to encourage their conservation and enhancement. It is a non-political organisation with membership open to everyone who shares the desire to make Folkestone a more attractive town in which to live and work. (About - New Folkestone Society, 2022)

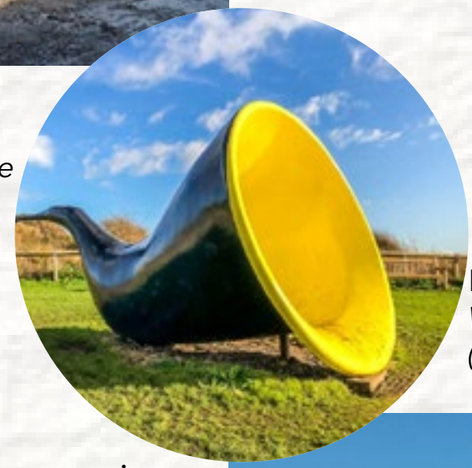


Fig. 117 *Walking the Warren in Folkestone. (2022)*

- Harbour arm events (live music, food trucks etc.)
- Multiple gardens
- Sense of community
- An established market place
- Exisitng inclusive public art installations
- Art galleries
- Antique furniture stores
- Pubs and bars to enjoy nightlife
- Festive Market place all year round (About - New Folkestone Society, 2022)

Fig. 118 *Spring sunshine on the Lighthouse Champagne Bar on the Harbour Arm, in Folkestone, Kent, UK. (s.d.)*

Final thought...

Having a site helps a designer make better design choices, for example; they help in space planning, ensure accurate measurements as well as overall execution of a project. Hence, having a site context is extremely essential.

However...

The pavilion design (keeping the same material) has various different iterations in terms of its form. Basing these iterations in the same site was restricting the pavilion to a particular size. It also restricts the pavilion to a certain group or community of people. Instead, the idea of building each pavilion type in a different site will help the pavilion reach a larger audience; thereby, generating awareness and knowledge to a greater extent.

Some examples of sites would be the Business Design Center in London, Hyde park or Serpentine Galleries in Kensington Gardens for an outdoor setting.

Fig. 119 *Business Design Centre, Gallery Hall & Atrium (s.d.)*

Fig. 120 *The Serpentine Gallery (s.d.)*

3D MODEL

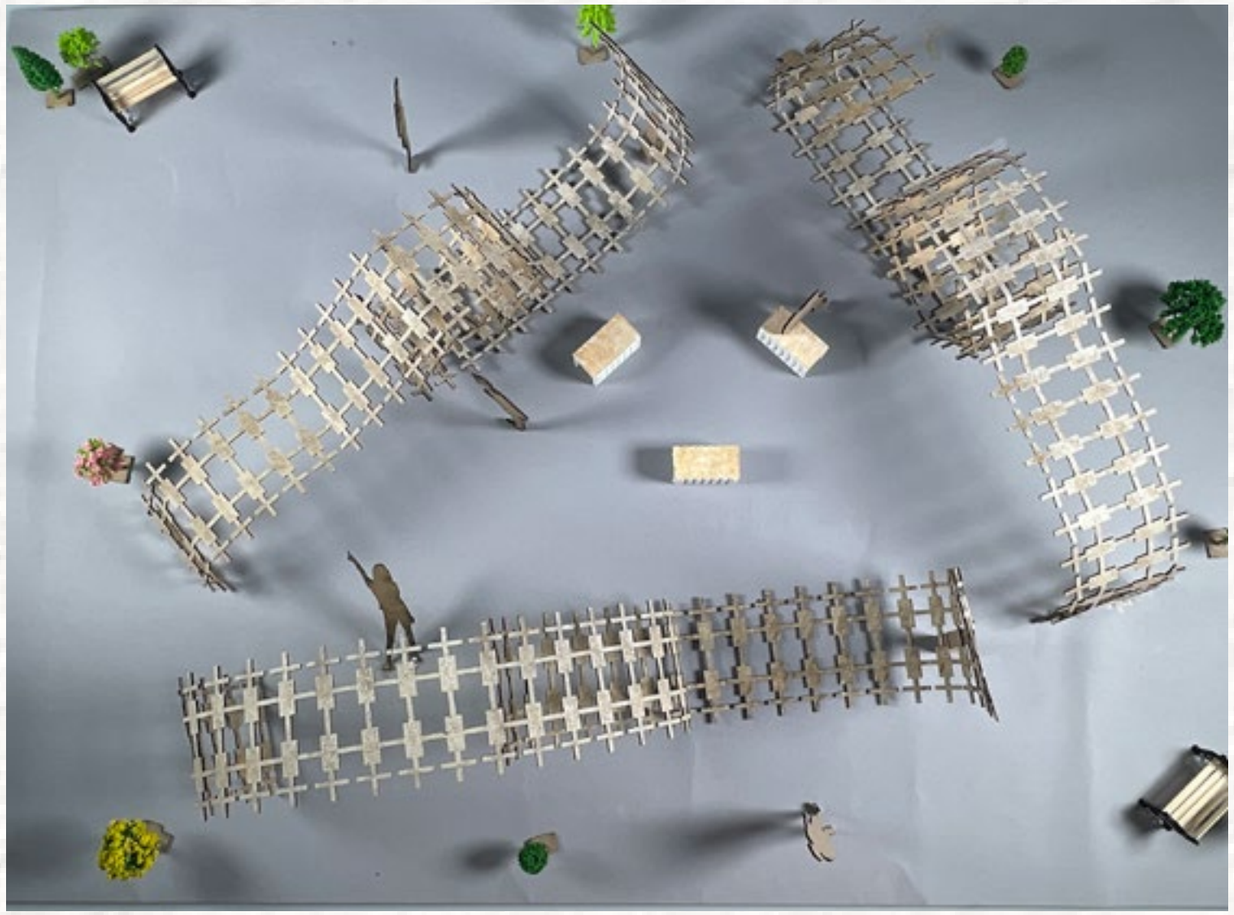


Fig. 121-122 *Scaled down physical models of pavilion (2024)*

All in
Scale - 1:20

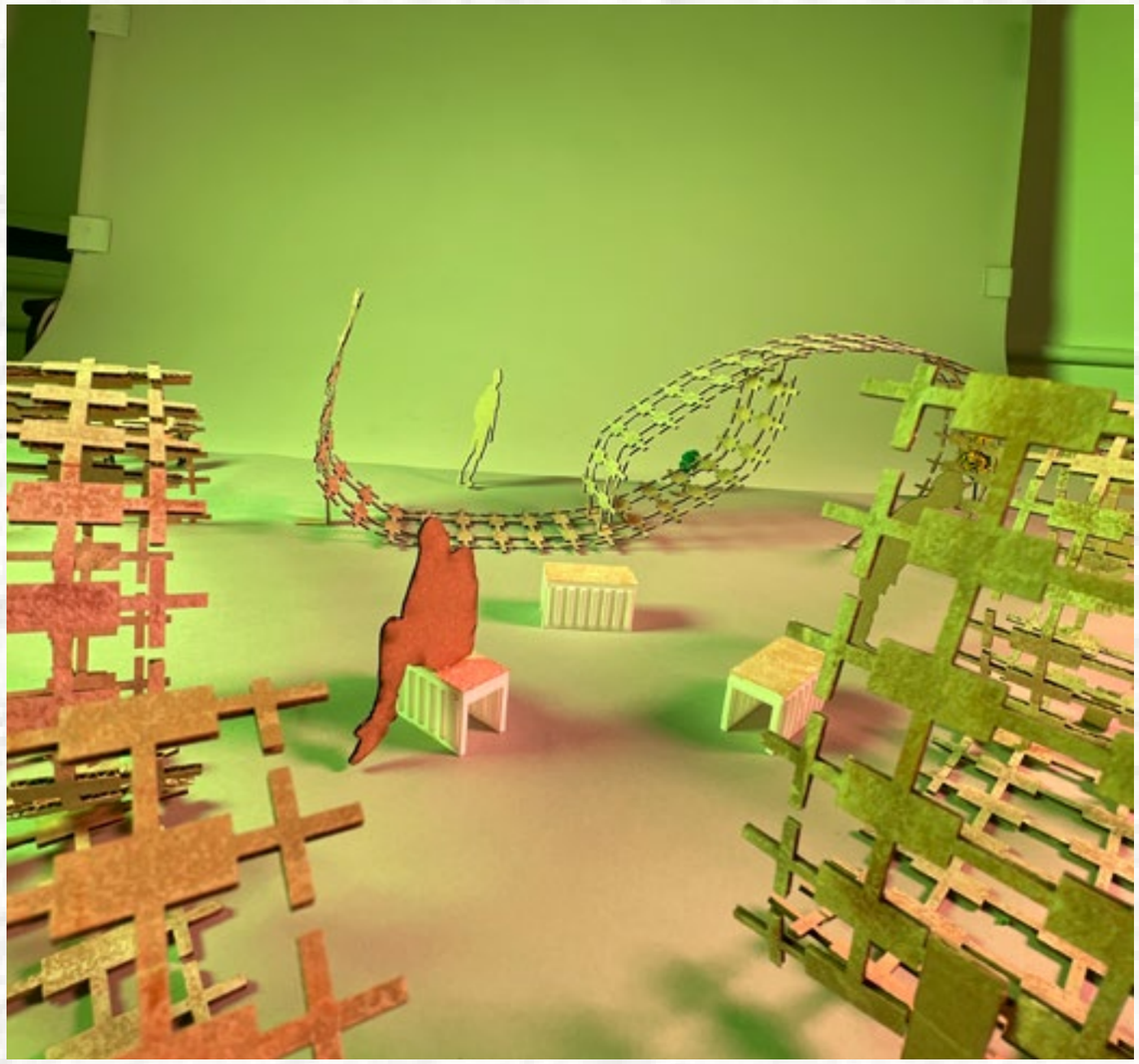


Fig. 122

3D RENDERS

Fig. 123-126 3D Renders of Pavilion (2024)

Fig. 124

Fig. 125

https://ucreative-my.sharepoint.com/:f:/g/personal/2319055_students_ucreative_ac_uk/Ele7YOQb-5ZJhM7fpD7aMlUBJAmwE_ImyH-QuZFkycXzPPw?e=NRy4l8

CLICK ON THE URL/SCAN QR CODE TO WATCH WALKTHROUGH AND PROCESS VIDEOS

Fig. 126

“AN ACCIDENTAL DISCOVERY“

As a final touch to the Sapyrus blocks, I decided to add a layer of texture in order to enhance the look and feel of the material. For which, I added some pumpkin and flax seeds while preparing the paper-sawdust-glue mixture, without realising that these seeds will eventually start germinating and grow into a plant.

Within just a couple of days, the plant had grown to an inch with their strong and sturdy roots tangled into one another towards the back of the block.

Fig. 127-130 *Plant growing in Sapyrus (2024)*

Fig. 128

Fig. 129

Fig. 130

This “accidental discovery” made me realise that the sustainable material I have created had the scope to convert into a material that could be used as green walls, that it had the potential far beyond than being just a wall panel. It adds a new turning point in the design process slowly entering into Biophilic design.

It would be interesting to understand how these individual materials, namely paper and sawdust come together and provide the nutrients that are required to grow a plant. The requirement of soil would reduce thereby reducing the pressure on the depleting natural resources of the earth.

WAY FORWARD

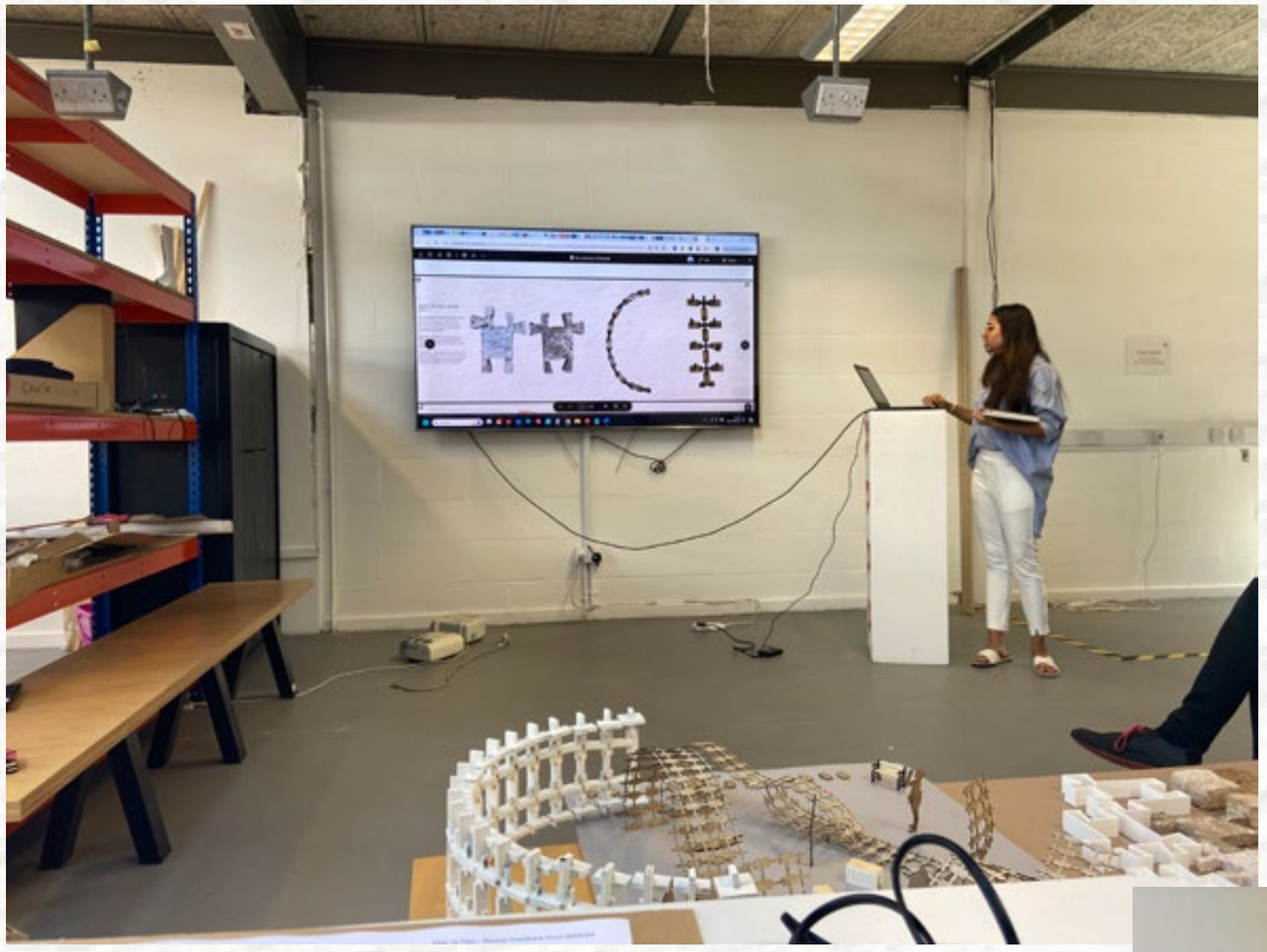


Fig. 131-132 *Final Presentation (2024)*

Fig. 132

FINAL PRESENTATION

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Fig. 2 *Symposium on sustainable packaging: protecting products and the planet* (2021) At: https://council.science/events/sustainable-packaging/ (Accessed 20/08/2024)

Fig. 3 Alfie (2024) *What actually happens to rubbish in the UK?*. At: https://www.wastemanaged.co.uk/our-news/other/what-actually-happens-to-rubbish-in-the-uk/ (Accessed 20/05/2024)

Fig. 4 *Cardboard recycling Norwich - quick collections* (2023) At: https://www.plasticexpert.co.uk/cardboard-recycling/cardboard-recycling-norwich/ (Accessed 20/05/2024).

Fig. 5 *The Shift From Linear To Circular Economy Is The Road To Sustainable Digitalization* (2022) At: https://www.linkedin.com/pulse/shift-from-linear-circular-economy-road-sustainable-caroline/ (Accessed 20/08/2024).

Fig. 6 *Recycling rate from Waste from Households, UK and country split, 2010–2021* (2023) At: https://www.gov.uk/government/statistics/uk-waste-data/uk-statistics-on-waste (Accessed 20/08/2024).

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Fig. 8 *15 ways to build an interior design brand on Instagram* (2022) At: https://foyr.com/learn/how-to build-interior-design-brand-on-instagram/ (Accessed 20/05/2024)

Fig. 9 WDC Creative (2024) *Addressing waste in commercial interior design*. At: https://www.wdc-creative.com/post/addressing-waste-in-commercial-interior-design (Accessed 20/05/2024)

Fig. 10 de Luce, A. (2023) *Sustainable interior design: how to create ecologically conscious spaces.* At: https://www.almadeluce.com/blog/sustainable-interior-design-how-to-create-ecologically-consciousspaces/ (Accessed 20/05/2024)

Fig. 11 What Materials Can Promote Health in Interior Architecture? (s.d.) At: https://www.archdaily.com/989880/what-materials-can-promote-health-in-interior-architecture/63375 1bc4dba6e525dde6ff1what-materials-can-promote-health-in-interior-architecture-photo (Accessed 20/05/2024).

Fig. 12 Hunter, I. S. (2023) Sustainable materials every interior designer needs to know. At: https://interiorstylehunter.com/sustainable-materials-every-interior-designer-needs-to-know/ (Accessed 20/05/2024).

Fig. 13 Montjoy, V. (2024) Light as a design statement: Inspiring ways to manage natural lighting. At: https://www.archdaily.com/975929/light-as-a-design-statement-inspiring-ways-to-manage-natural-lighting (Accessed 20/05/2024).

Fig. 14 Interiors, S. (2020) Best Electricity Saving Ideas from the Best Interior Design Company in Kolkata. At: https://www.spectruminteriors.co.in/best-electricity-saving-ideas-from-the-best-interior-design-company-in-kolkata/ (Accessed 20/05/2024).

Fig. 15 Patel, S. (2024) *Paper mache* [Photograph, portrait] In possesion of the author: Canterbury

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Fig. 92 Ravenscroft, T (2024) *Shigeru Ban created the Paper Log House at the Glass House*. At: https://www.dezeen.com/2024/04/17/shigeru-ban-paper-log-house-philip-johnsons-glass-house/ (Accessed 20/08/2024).

Fig. 93 Ravenscroft, T (2024) *The pavilion is the latest structure on the site*. At: https://www.dezeen.com/2024/04/17/shigeru-ban-paper-log-house-philip-johnsons-glass-house/ (Accessed 20/08/2024).

Fig. 94 Ravenscroft, T (2024) *The pavilion was made from paper tubes, wood and milk crates*. At: https://www.dezeen.com/2024/04/17/shigeru-ban-paper-log-house-philip-johnsons-glass-house/ (Accessed 20/08/2024).

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Fig. 96-99 Rael, R. and Fratello, V. S. (2018) *Printing Architecture: Innovative Recipes for 3D Printing*. At: https://play.google.com/store/books/details?id=SoNaDwAAQBAJ (Accessed 20/05/2024)

Fig. 100 Rael, R. and Fratello, V. S. (2018) *Printing Architecture: Innovative Recipes for 3D Printing*. At: https://ucreative.summon.serialssolutions.com/search?s.q=printing+architecture#!/search/document?pn=1&ho=t&include.ft.matches=f&l=en&q=printing%20architecture&id=FETCHMERGED-ucreative_catalog_6648522 (Accessed 20/05/2024)

Fig. 101 Solanki, S. (2018) *Why Materials Matter: Responsible Design for a Better World.* At: https://ucreative.summon.serialssolutions.com/search?s.q=printing+architecture#!/search/document?pn=1&ho=t&include.ft.matches=f&l=en&q=why%20materials%20matter&id=FETCHMERGED-ucreative_catalog_6733872 (Accessed 20/08/2024)

Fig. 102 Williams, H. H. J. (2024) *Materials - An Environmental Primer.* (Accessed 20/08/2024)

Fig. 103 Jodidio, P. (2016) *The New Pavilions* At: https://ucreative.summon.serialssolutions.com/search?s.q=printing+architecture#!/search/document?pn=1&ho=t&include.ft.matches=f&l=en&q=the%20new%20pavilions&id=FETCHMERGED-ucreative_catalog_5024382 (Accessed 20/08/2024)

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Fig. 109 *Our History (s.d.).* At: https://www.serpentinegalleries.org/our-history/ (Accessed 20/08/2024)

Fig. 110 *Archipelagic Void, designed by Minsuk Cho, Mass Studies © Mass Studies* (2024) At: https://secretldn.com/serpentine-pavilion-play-area-archipelagic-void/ (Accessed 20/08/2024)

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Fig. 113 *Serpentine Pavilion 2023 in London*. (2023) At: https://arquitecturaviva.com/works/pabellon-de-la-serpentine-2023 (Accessed 20/08/2024)

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Fig. 116 Alexander, E. (2019) *Folkestone: what to see, eat and do in Kent's buzziest seaside town*. At: https://www.harpersbazaar.com/uk/travel/a27583394/why-folkestone-is-kents-most-underestimated-seaside-town/ (Accessed 21/05/2024).

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Fig. 118 Alamy Limited (s.d.) *Spring sunshine on the Lighthouse Champagne Bar on the Harbour Arm, in Folkestone, Kent, UK*. At: https://www.alamy.com/spring-sunshine-on-the-lighthouse-champagne-bar-on-the-harbour-arm-in-folkestone-kent-uk-image425569562.html (Accessed 21/05/2024)

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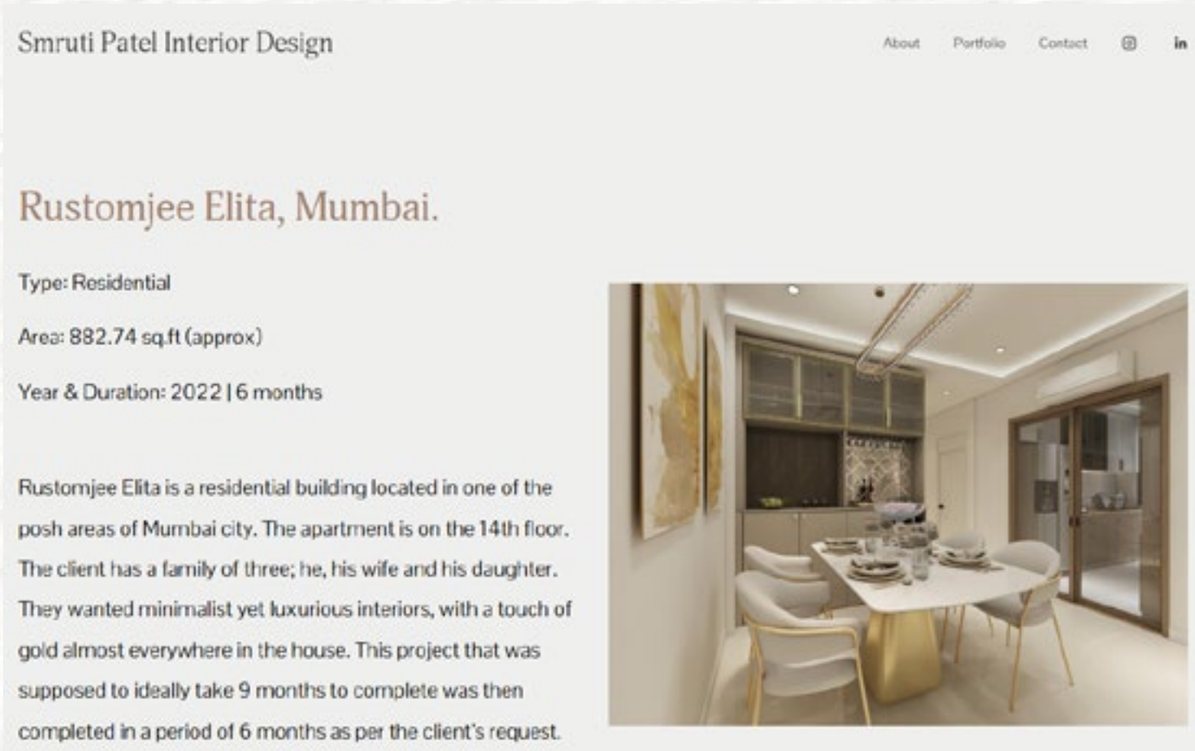
JOB DOCUMENTATION

I have my CV updated to date. I will make changes to the CV according to each job description. Whereas, my portfolio is still work in progress. At the moment, I am working on developing my portfolio website. I will also make a protfolio of just selected works.

The link to my Portfolio Website

https://azalea-silver-tcaf.squarespace.com/config/



SMRUTI **PATEL**

Interior Designer

+44 - 7774604857

smrutipatel.uk23@gmail.com

Canterbury, England, UK

PROFESSIONAL SUMMARY

Innovative and detail-oriented Interior designer with a keen interest in material research, residential, commercial and hospitality interiors along with designing bespoke furniture. One year of work experience in the design industry, wherein I acquired skills like design thinking, design strategies and completed a 60 sq.m residential space in 6 months. Currently, studying Master's in Interior design from UCA with a focus on sustainable and material design.

EDUCATION

University for the Creative Arts
Master of Arts in Interior Design
2023 – Present

ISDI School of Design & Innovation
Undergraduate Diploma in Interior Design
2017 – 2021

University of Mumbai
Bachelor of Arts in Sociology
2017 – 2020

SKILLS

- AutoCAD
- Rhino
- Sketchup
- V-ray
- Adobe Indesign
- Adobe Illustrator
- Adobe Photoshop
- Adobe Premiere Pro
- MS Suite
- Revit
- Material Selection
- Organisational skills
- Design thinking
- Communication
- Time management
- Space Planning
- Problem solving
- Attention to detail
- Team work & Collaboration

CERTIFICATIONS

- UCA University Ambassador
  Jan 2024 - Present
- President of Canterbury Dance Club
  Feb 2024 - Present
- Wacom Design Competition
  Sept 2020 - Nov 2020
- Within Studio Design Competition
  July 2020 - Aug 2020

PROFESSIONAL EXPERIENCE

Design Intern
Wood Arcade | Feb 2023 - Apr 2023

- Assisted senior designers in all stages of interior design projects, including concept development, space planning, and material selection, gaining hands-on experience in the design process.
- Conducted research on industry trends, materials, and suppliers, providing valuable insights to support design decision-making and project development.
- Participated in client meetings and site visits, observing client interactions and project presentations, and assisting in gathering project requirements and specifications.

Interior Designer
Curious Canvas | Sept 2021 - Sept 2022

- Spearheaded multiple interior design projects simultaneously, from concept development and space planning to furniture selection and styling, delivering projects on time and within budget.
- Expedited a key project deadline by 3 months to support the client request of an earlier move-in, and saved the company months of resources in the process.
- Drove negotiations with materials vendors, allowing clients to get better quality materials within their budgets.
- Managed cross-country communications between the India and China teams to ensure timely completion of furniture creations by the China team and installations by the India team.
- Curated the interior styling of a 2 BHK residential apartment within the client budget.

Interior Designer
Freelance Project | July 2021 - Sept 2021

- Developed thorough 2D and 3D drawings.
- Coordinated with suppliers and manufacturers to source high-quality materials within budget constraints.
- Conducted site visits and inspections to ensure materials were used correctly and met quality standards.