SUSPENDED INSTALLATION – AN INTRODUCTION

ARTIST STUDY – SEON GHI BAHK

My journey with suspended installation first began when I came across one of Bahk's installations on the internet. Seon Ghi Bahk is an artist from Seoul, most recognised for his installations of suspended charcoal. He suspends pieces of charcoal using nylon threads to form architectural structures, as well as a range of different 3D shapes.

Source: http://www.thisiscolossal.com/2014/06/an-aggregation-seon-ghi-bahk/

Bahk originally used stones as the primary material for his installations, however, soon, the accumulated weight of the stones were too heavy for the supporting structure. He then found a substitute, which is charcoal, that could still express his theme of the complex relationship between nature and humanity. "Bahk suggests "nature" can be incorrectly viewed as simply a backdrop or tool used in the creation of civilisation" (Jobson, 2014). This idea reflects in his artwork as the entire architectural structures (perhaps symbolising progression of humanity), are all made entirely out of charcoal (representing mother nature).

Source: http://www.artnet.com/artists/seon-ghi-bahk/an-aggregate-drop-1107-a-vngzzoxc5ni0SlweGeTi5g2

WHY I WANTED TO INVESTIGATE HOW BAHK MAKES HIS INSTALLATIONS

The whole concept of fitting individual pieces together to form a shape of an object excites me, as it portrays the relationship between collectivism and individualism perfectly (the theme I was exploring at the time).

As the charcoal pieces come in different shapes and sizes, they could symbolise each and every one of us as individuals – with different appearances and perhaps personality – yet, the colour and the substance that makes up the charcoal could suggest that we are not that different after all – we all have something in common.

My initial idea was to suspend pieces of charcoal to form the shape of a stair; as one can either travel up or down the stairs, the suspended installation could provoke a conversation within my audiences of whether collectivism taking us forward or dragging us back (down the stairs).

As Bahk's idea of suspending charcoal is purely original, the only way I could find out how he managed to suspend pieces of charcoal with nylon threads is by testing it out myself. To my surprise, charcoal is relatively light, however, very brittle and rather hard to work with. This is my first attempt, where In the photos below, I was investigating the different ways I could suspend charcoal using nylon threads by utilizing different knots and tying techniques.

EXPERIMENTATION (WITH CHARCOAL, TINY PIECES OF BRICKS AND WINE CORKS)

First approach: tying the thread around the charcoal.
Second approach: drilling a hole through the charcoal and tying a knot underneath to suspend the piece.

Later on, I also experimented with suspending tiny pieces of bricks (gluing them, as opposed to tying them on). The collective weight of the tiny pieces of bricks, however, proved to be too heavy for the cardboard support.

Throughout the next few days, I continued my search for the **ideal material** to suspend, as I didn't believe that charcoal or bricks were the materials I would like to work with. After a week or so, I stumbled across a number of wine corks. With my friends Taanthip and Katya, I started exploring this material. Initially, we wanted to drill holes in to suspend the pieces, but due to the elasticity of the corks, we soon found out that we can just simply clip the pieces of corks on the nylon strings without any adhesives or knots. Following the discovery, we created our first-ever suspended installation (see image on the right). Unlike Bahk's way of suspending objects (directly hanging down from the ceiling), we decided to create an acrylic box with nylon strings extended from the top to the bottom, as the small pieces of corks were too light to hold the nylon strings in place (they would often tangle up).

Photograph taken by me
VIDEO OF FINAL WORK HERE

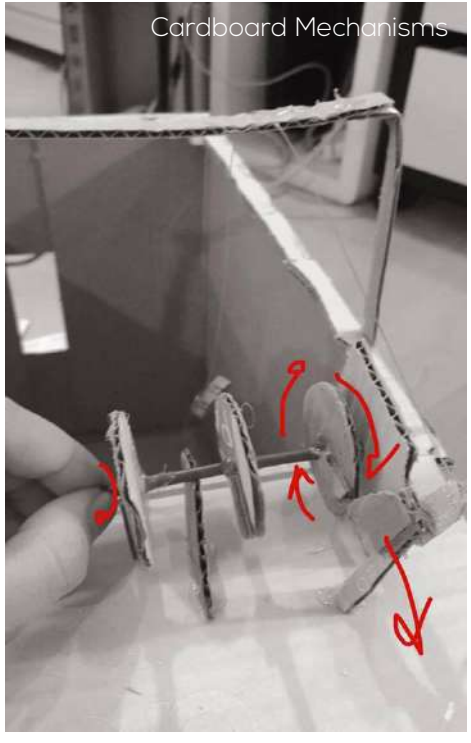
REFLECTION & EVALUATION

In my opinion, I prefer Bahk's method of suspending the objects in air (rather than attaching the strings to both ends) as his method is much more efficient. However, with this small model, it was inevitable that we had to do it our way, as the nylon strings were too coiled up and the tiny pieces of corks were not heavy enough to straighten the nylon threads.

FLIGHT – A SUSPENDED KINETIC WAVE SCULPTURE

RESEARCH AND DEVELOPMENT

After discovering the kinetic wave installation by Reuben Margolin, I was enraptured by the idea of incorporating movements within suspended sculptures. In many ways, my journey with this project resembles the movement of the waves. There were highs and lows, excitement and disappointments whilst I was putting my heart and soul into investigating and making this project.



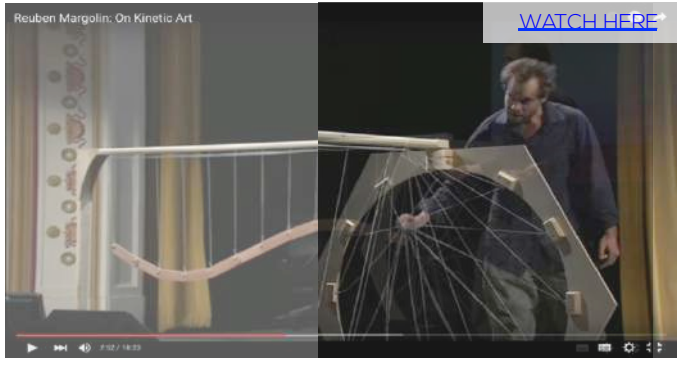
This photo (left) depicts the 'testing-process' following my investigation on the mechanical system Reuben Margolin utilized: a camshaft assembled with an array of pulleys, levers (which the strings are attached to), the blocks screwed onto the pulleys to move the levers thus the strings, as well as an electric motor.

As you can see, it is fairly complicated, and seemingly impossible to make. It took the artist, I later found out, 7 months to complete (alongside his team). Just as I was closer to making the artwork, I was pushed further aback. This was another "down" that I faced whilst making this project.

Discouraged for a day or two, I began searching for my own solutions to the problem. *There must be an easier way of making this mechanism!* I told myself.

My research led me to a video of Reuben Margolin talking about Kinetic Art. I saw the fundamental principle behind his complex system, and started, by using this fundamental knowledge, designing my own way of creating these harmonious movements.

As a product design enthusiast, I've always believed that the Maths and the Sciences are never separate with the Arts. I am, also, for as long as I can remember, fascinated by how things work, as well as movements. I believe that the function of my artwork should be to remind the world that the Arts and Sciences are interconnected.
Reuben Margolin, a Harvard graduate, created this piece of artwork from observing Nature: the natural world, but also the nature of our lives. When I saw this piece, I saw harmony, and the interconnectedness of our experiences. This piece is more than just some dowels moving up and down in accordance to the other pieces to form a blanket of sine waves, it's a symbol of infinite possibilities of when the arts and the sciences combine. This beginning was an exciting one for me. Yes, it was daunting when I realised how complex the mechanical system was, how inexperienced I am, how none of the people around me knew how to make this system, and how little resources I had to figure how the whole system of the sine wave blanket was constructed. Luckily, I found a video of Reuben Margolin briefly explaining the principles behind his mechanical system.



FLIGHT – A SUSPENDED KINETIC WAVE SCULPTURE

THE MAKING PROCESS

A "high" in my project strikes again when my Mum suggested a material lying in the wooden bucket in the corner of my room. "Why don't you use corks rather than the heavy dowels the artist used?" Immediately, I knew that she was right. It was a material I was familiar with, as I have explored it for my first-ever suspended-in-air installation.

Not only is the material physically ideal for this installation, the corks are also symbolic, as (1) the collection of corks came from all around the world, different cities, etc. (2) it is symbolic of my Father's love for me, as these corks are his only collection of anything. He just gave them to me when I kindly asked.

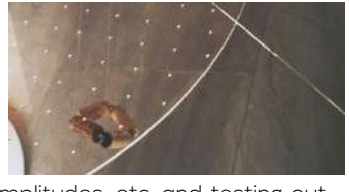
Following the discovery of the materials I will be using (wine corks, nylon strings, closed hooks and acrylic), I was faced with another set of problems. The size and dimensions of the installation.

The dimensions kept on getting refined, as each time I visited the Design Technology machinery lab where the school's laser-cutter is located, the technician gave me different maximum dimensions the laser-cutter could cut for acrylic pieces. When one dimension changes, a series of other dimensions would need to change, therefore this process lasted a little over two weeks.

In the mean time, I began attaching two closed hooks to each cork until I had a total of 423+ corks.

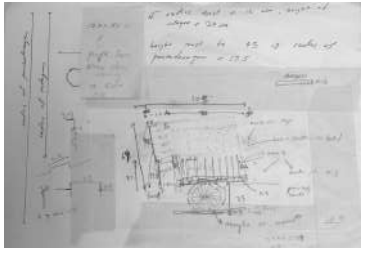
Attaching closed hooks with the recycled wine corks.

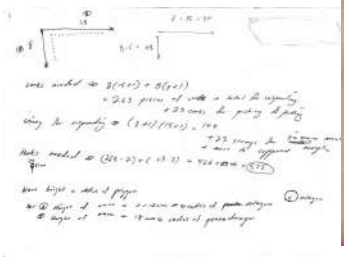
Stretching out the nylon strings so that they don't coil up!



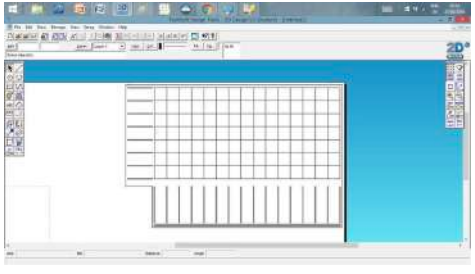
Calculating the amplitudes, etc. and testing out the different kinetic theories!

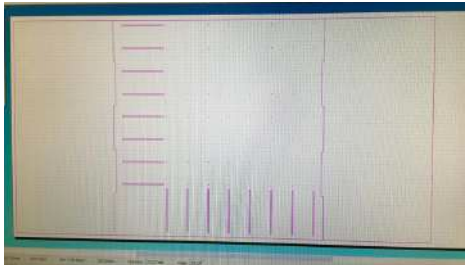
CALCULATIONS AND NAPKIN SKETCHES OF POTENTIAL DESIGN





DRAWING PROCESS OF THE ACRYLIC STRUCTURE (FOR THE LASER CUTTER)



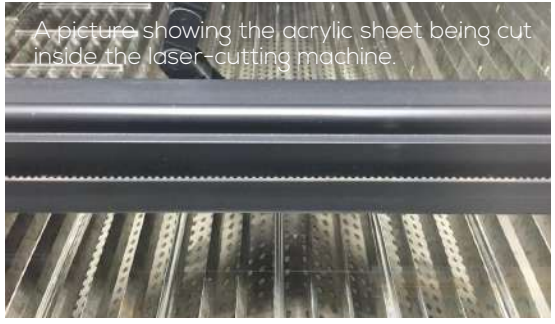


WEAVING IT ALL TOGETHER

A problem I ran into in this stage is that the school's workshop ran out of transparent acrylic, so I decided to work with glossy, black 3mm acrylic. I later found out that the thickness of the acrylic was not ideal, as it would not provide the installation with much stability. Therefore, I decided to use this as an initial testing model.

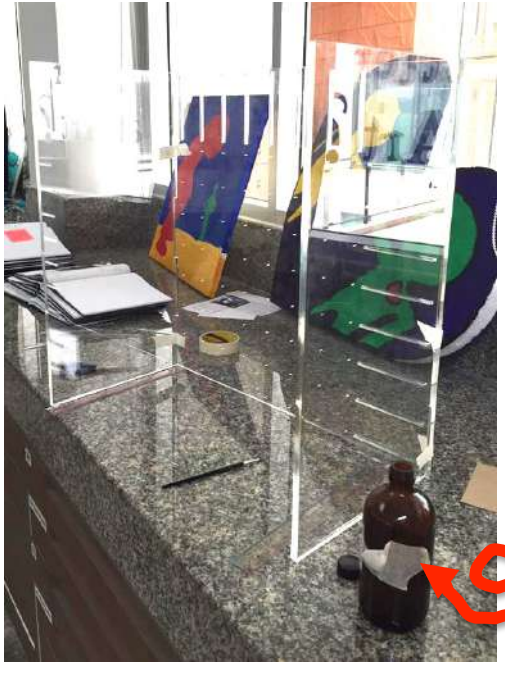
Whilst waiting for the acrylic pieces to finish laser cutting, I started weaving the corks together into a blanket by connecting the closed hooks with transparent nylon strings.

FLIGHT – A SUSPENDED KINETIC WAVE SCULPTURE



Finally, the transparent acrylic arrived to school. I decided to use the 10mm acrylic for my project, a little more than three times the thickness of the black acrylic I used.

Freshly cut octagon unit circles!

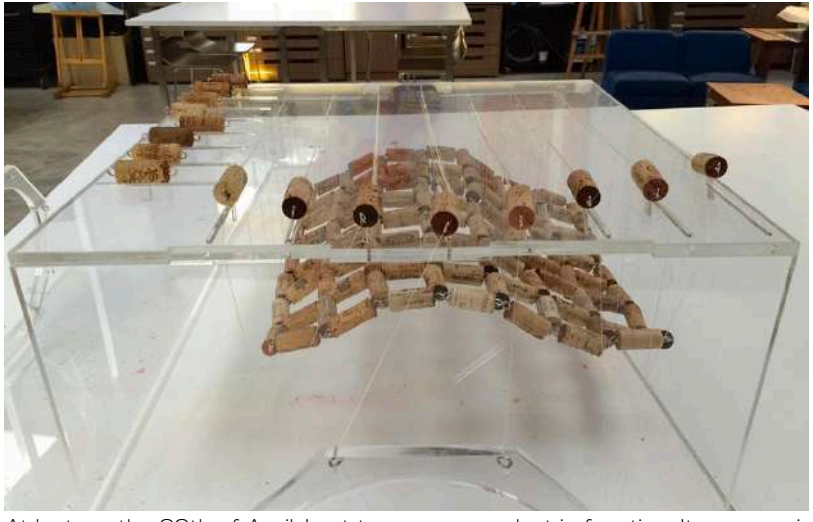


Connecting the four edges first...

Assembling the pieces using methylene chloride (an acrylic adhesive).

FLIGHT – A SUSPENDED KINETIC WAVE SCULPTURE

The only impossible journey is the one you never begin." – Anthony Robbins



At last, on the 26th of April, I got to see my product in function. It was magical to see that all the hard work put in turned into something functional. All the pieces were at work, making some impressive waves!

Watch the Youtube videos here! https://www.lisalo.info/flight/ (UNRESOLVED WORK)

Critical Evaluation

As I watched the audiences interact with my interactive kinetic wave sculpture during the mock exhibition, I witnessed both the positives and not-so-good aspects of my design.

What went well: The structure is made out of clear acrylic, which meant that the audiences can gather around the installation and observe it from different sides and angles (this was what happened during the pre-exhibition). The 10mm acrylic chosen is also very durable and stable.

Even better if: I had applied more adhesive to the sliding pieces on top to secure the acrylic slotted within (one slid off towards the end of the mock exhibition).
Many suggested that I can consider adding an electric motor to my kinetic wave sculpture. I am currently in the process of adding one!

Reflection

What was the hardest part about making your piece?
Perseverance. Not giving up when people have no idea what you're trying to make thus lacking support. When explaining to them what I'm trying to achieve – a simple mechanism incorporating hydraulics to create a sinusoid plane using components such as nylon strings, closed hooks, wine corks and 10mm acrylic pieces as support– no one knew what I was making. At times during the process, even I questioned myself whether the installation would function... But all these challenges and fall backs made the piece even more worthwhile.
If I knew exactly how it was going to turn out at the very beginning, my relationship with this piece would be different.
If you approached me during arts last December, and asked me what I was making, I would've said "some sort of art installation incorporating a mechanism built using two camshafts made out of dozens of pulleys and a motor!" But then, I would've then gone silent and begin to think about where/how to get those mechanical pieces. In the evenings and at night, that would've been the thing that consumed my thoughts. I was constantly brainstorming ways to approach this problem.

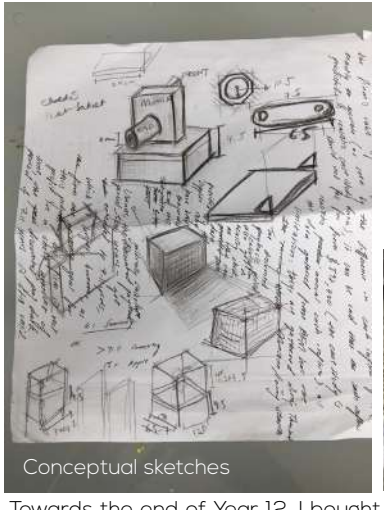
Life is a journey. It has its ups and downs. But if you persevere through the downs, the ups will follow.

FLIGHT – A SUSPENDED KINETIC WAVE SCULPTURE

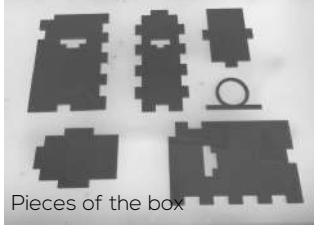
PRE-EXHIBITION 2016

After observing how the viewers interacted with the installation at the pre-exhibition in Year 12 (and upon many requests) I decided that I should attach a motor to the sculpture, as that would further enhance the effect of the waves.

AND SO...I BOUGHT A MOTOR AND MADE AN ACRYLIC BOX



Conceptual sketches



Pieces of the box

Towards the end of Year 12, I bought a motor online and started to investigate how I can attach the motor to my sculpture. During the process, I also made and designed an acrylic box that would accommodate the motor.

CHALLENGE 1: CREATING A "HAND" TO MOVE THE WAVE MECHANISM

Cardboard model

Aluminium model

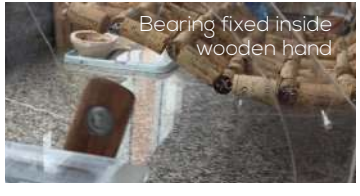
Wooden hand (Chosen)

Another challenge popped up: as the motor was spinning, the strings attached started twisting up., thus only allowing a few seconds of waves.

CHALLENGE 2: SOLVING THE PROBLEM OF THE STRINGS TWISTING/TANGLING TOGETHER

Because the force pulling on the strings towards the centre was too strong, the strings were not able to uncoil and "reset" – this was why the strings started twisting up. To solve the problem, I tried several methods, including evening out the force at the pulling point. Eventually, I discovered the component of bearing that enabled me to successfully fix my motor with *Flight* without the problem of the strings twirling up.

Bearings

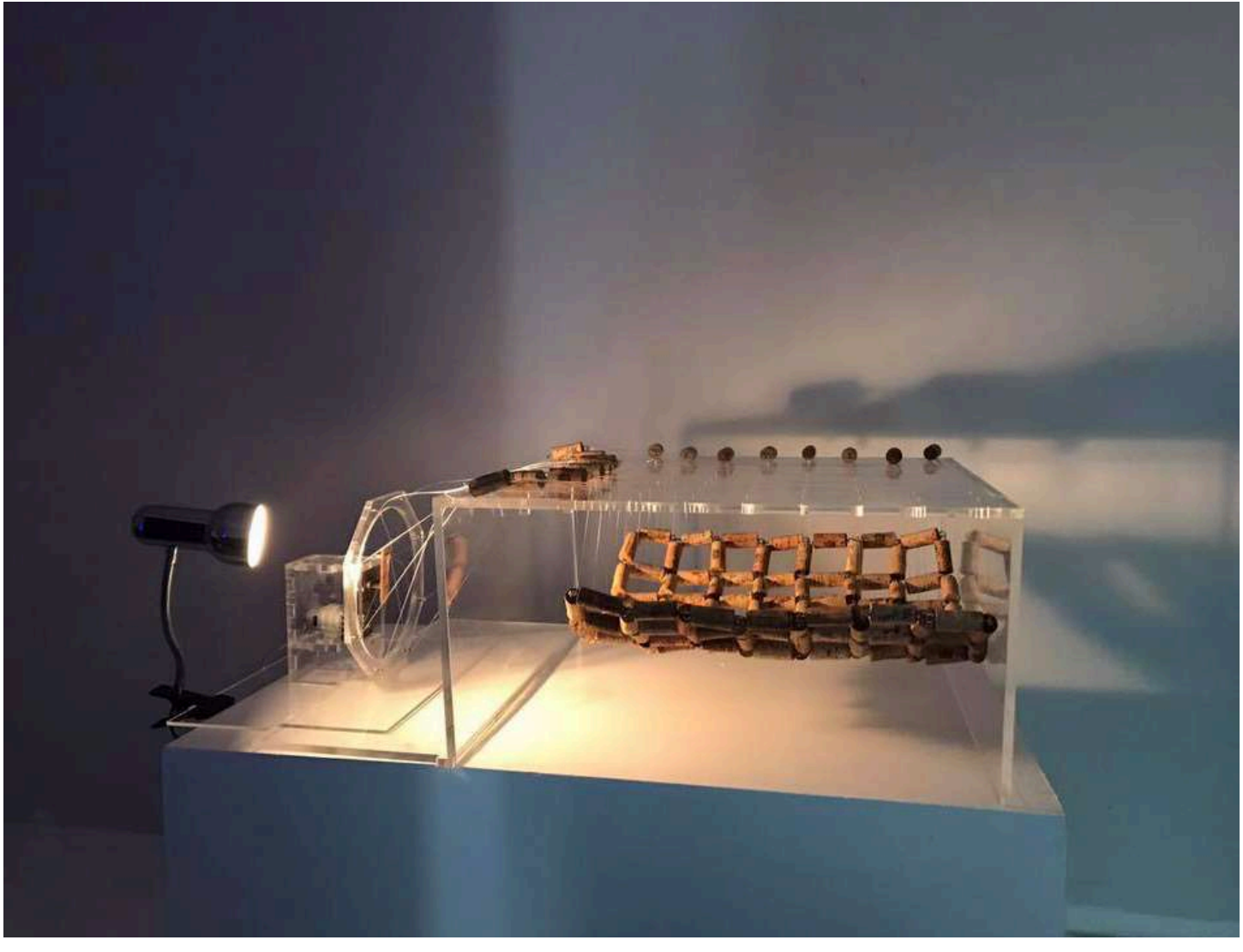


Bearing fixed inside wooden hand

CHALLENGE 3: STRING SNAPPED AND THE SCULPTURE FLATTENED DAYS BEFORE THE EXHIBITION

Three days before my Year 13 final exhibition, the structure of my sculpture got flattened by a display board my classmate was moving around. I cried a bit, but decided to fix the structure with super glue. One of the strings also snapped, so I had to repeat the process of retying the nylon strings and fitting in a new bearing. This time round, I also used thicker nylon strings.

FLIGHT – A SUSPENDED KINETIC WAVE SCULPTURE 65 x 92 x 33cm March 2017



FLIGHT

MEDIUM: KINETIC SCULPTURE

SIZE: 65 X 92 X 33CM

Flight is a kinetic sculpture that contains 112 pieces of suspended recycled wine corks and 8 pieces of 'mother corks' controlling the movements of these suspended pieces. There were highs and lows in creating this project, just like there are highs and lows in our lives, and in some respects, our experiences resemble the movements of the waves.