Background

The desk lamp is an electric appliance, a desk lamp, which is necessary for every household, and is a kind of lamp, which is mainly placed on a desk or a table to be used for lighting. The bright illumination scope of the lamp is relatively small and concentrated, so the light of the whole room is not affected, and the function is limited to the desk lamp, which is convenient for reading, learning and saving energy.

But ordinary desk lamp is not convenient.

Desk lamp is a kind of home appliance used for lighting in people’s life. It is generally divided into two kinds, one is the column type, one is the clamping type. Its function is to focus on a small area of light, easy to work and study. General lamp bulb is incandescent lamp, energy-saving bulbs, as well as the popularity of the market eye protection lamp, part of the table lamp and emergency function that comes with power supply for power outages lighting emergency.

Research

The dragonfly balance light modelling using the principle of balance, the lamp can adjust light angle.
People need a desk lamp that suits their needs.

**Desk lamp functional requirements**
- Illumination Uniformity Requirement
- Decorate
- Eye Protection
- Lighting
- Entertainment
- Height
- Safe
- Shading Property
- Read
- Desktop Illumination Requirements

People need a desk lamp that suits their needs.

**Aylysis**

### Desk lamp function
- Reading desk lamp
- Decorative desk lamp
- Portable desk lamp

**Intitals ideas**

Dragonfly forewings and hind wings to individual action swing, two pairs of wings with different frequency, vibration and flying, this ability enable it to draw a 8 pattern in the air, it can make static, rotating, forward, backward flight maneuvers.

I can use the characteristics of the dragonfly wings, the design of a dragonfly wings like a desk lamp, can be rotated, so that people find suitable for their own light source.

**2D development**

I hope this product will be turned over like a dragonfly.
Material election

<table>
<thead>
<tr>
<th></th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>environmental protection</td>
<td>inflammable</td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>solid</td>
<td>bad flexibility</td>
<td></td>
</tr>
<tr>
<td>Metal</td>
<td>good gloss</td>
<td>heavy</td>
<td></td>
</tr>
<tr>
<td>Bamboo</td>
<td>good flexibility</td>
<td>easy fade</td>
<td></td>
</tr>
<tr>
<td>Plastic</td>
<td>cheap</td>
<td>not environmentally friendly</td>
<td></td>
</tr>
</tbody>
</table>

I choose bamboo, because it is more flexible, suitable for multi angle deformation, more environmentally friendly, high yield.

Final product

360 DEGREE ROTATION
Ocean wave energy has many advantages like wide range of distribution, high energy density, clean and renewable. According to statistics, in theory, the global ocean wave energy can be renewable power up to 76 billion 600 million kilowatts. Therefore, the research, development, and utilization of wave energy is of great strategic significance to realize the sustainable development of energy and to meet the needs of human beings.
With the continuous development of society and economy, the world’s demand for energy is increasing rapidly, the search for alternative, renewable and clean energy has become the consensus of all countries in the world. Sea water, which cover 71% of surface of earth, is a kind of renewable energy. Compared to other forms of ocean energy, wave energy has the characteristics of high energy density, no pollution, high quality and availability. In theory, there are renewable ocean energy in about 76,600,000,000 million kilowatts, the technology allows the use of 6 billion 400 million kilowatts of power.

Research

Several common types of wave energy power generation device.

<table>
<thead>
<tr>
<th>Type</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Application</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>WaveDuck</td>
<td>Clever idea; perfect principle; ideal operation; high efficiency (close to 90%); the actual general is only 40%.</td>
<td>The structure is complicated; the excessive active part is exposed in the sea water; the device is poor in reliability, and is easy to be damaged.</td>
<td>Suitable for ideal sea conditions, regular waves.</td>
<td></td>
</tr>
<tr>
<td>Oscillating Water Column</td>
<td>The energy of the low-speed moving wave is converted into the air flow of the high speed through the air chamber through the air transmission energy; the energy of the low-speed moving wave is good.</td>
<td>The construction cost is high; the conversion efficiency is low (10%-30%); the cost of electricity is high.</td>
<td>Suitable for large area of wind and waves.</td>
<td></td>
</tr>
<tr>
<td>Pendulum (wab)</td>
<td>The cost is slightly lower, the conversion efficiency is high.</td>
<td>Poor reliability, extremely easy to damage; maintenance is more difficult, high conversion efficiency, but not stable.</td>
<td>Large power generating device suitable for breakwater.</td>
<td></td>
</tr>
<tr>
<td>Oscillating buoy</td>
<td>The difficulty and cost of construction is lower than other wave energy device.</td>
<td>The excessive impact, easy to damage.</td>
<td>Due to a smaller location, suitable for a number of Lighthouse, rocky, to provide power.</td>
<td></td>
</tr>
</tbody>
</table>

The basic principle of wave energy power generation is to make the system work and drive the generator to generate electricity by pushing the wave, and the wave energy can be converted into electric energy. It can be seen from the above table, although there are a wide variety of existing power generating equipment, power generation mode is different.

Analysis

What are the factors that affect the wave energy power generation?

But there are problems as following:

1. only by means of single usage of energy in one direction, energy in the remaining direction has not been fully utilized, the energy utilization rate is low.

2. because most parts of the device are exposed to sea water and the weather conditions in Shanghai is poor, hence the existed device is vulnerable to damage and less reliability.

1. full use of wave energy
2. Avoid environmental impact
3. Multi angle power generation
Initial ideas

First

Second

Finally

It is a floating wave energy generation system, which is based on the disadvantages of the traditional power generation device, and the design requirements of the system are presented:

1. The wave force from any angle to the device will be decomposed into three directions X, Y, Z, to realize the use movements in three directions to generate power and full use of wave energy.
2. To achieve the internal structure and the external environment of isolation. To avoid the influence of the bad environment of the sea, to improve the anti-interference and reliability of the system, and to prolong the service life of the device.

Model making

Material selection

<table>
<thead>
<tr>
<th>Material</th>
<th>Why</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymethyl Methacrylate</td>
<td>Good transparency, chemical stability and weather resistance, easy to dye, easy to process, beautiful appearance</td>
<td>Shell</td>
</tr>
<tr>
<td>Aluminium alloy</td>
<td>One of the most widely used non-ferrous metal structure materials in the industry, in the aerospace, automotive, machinery manufacturing, shipbuilding, aluminium alloy</td>
<td>Inner shell</td>
</tr>
</tbody>
</table>

CAD annotation

The design to avoid the upper and lower shell bolt hole and the positioning pin hole indirectly dislocation, using theorem 3.1, depending on the positioning pin hole center positioning hemispherical shell on the flange connecting bolt hole center and hemispherical shell vertex center. In the upper and lower two hemispherical shell connection, equipped with a waterproof washer, to improve the sealing performance of the shell.

Physical display

The shell is mainly composed of two acrylic shell composition, shell between the two halves connected by 12 connecting bolt holes on the flange of. The inner wall of the upper and the lower spherical shells are respectively provided with three limit disks, and the positioning pin is positioned by the positioning pin hole and the positioning pin to ensure that the limit disk in the upper and lower spherical shell is in a 22 parallel position when the installation is installed.
1. Full use of wave energy, improve the efficiency of power generation.
2. Totally enclosed structure to avoid the interference of bad environment at sea, and to improve the stability of the system.
3. Adopt spherical structure, reduce local fault.
Guangfu area has a long history of the tea culture, but now there are less and less young people paying attention to inheriting this culture.

Inspired by my experience for Cantonese culture which has a long history of tea culture. At the same time, I noticed that most of the Kung Fu tea drinkers are the elderly, so I hope to optimize the traditional Kung Fu tea by improving the production process, to attract more young people to experience Cantonese characteristics of tea culture.

Now people born in 80s and 90s are beginning to play their role as parents. Born in 90s under the one-child policy, in my memory, most of my childhood time was spent in playing with my friends or alone. Parents found it difficult to join us in playing and what they could do was buying some toys for us. This kind of memory inspired me to design a toy for both parents and children to play and create more quality time for them.
Guangfu culture

Cantonese culture, namely Han Guangfu culture, in various fields are often regarded as Guangdong culture, such as Cantonese and Cantonese opera. It is originated from the ancient Central Plains, with Guangzhou, Hong Kong as the center, with the Pearl River Delta as the prevailing area, with Guangdong, Guangxi, Hainan as the popular region of the Cantonese culture. Kung Fu tea originated from the Song Dynasty (2000 years ago), it is one of the famous customs in Chaoshan area.

Traditional tea culture

Traditional teaset

1. Disinfection pot
2. Brush
3. Kettle
4. Filter cup
5. Cup
6. Base

Drinking steps

1. Prepare tea
2. Into tea
3. Heating cup
4. Wash tea
5. Tea
6. Tea separately
7. Pour
8. Drink tea

- Traditional tea set: 6 items
- Making tea process: 8 steps
- Time spending: 2 hours

The traditional way of drinking tea is not suitable for young people.

Young people food culture

With the development of society, the pace of life is speeding up, young people prefer fast food. The traditional Kung Fu tea is not suitable for the modern young people, and it needs a more convenient tea set, and a continuation of the traditional Kung Fu tea culture.

Analysis

What causes the young people to drink tea

- Traditional tea set
- Making tea process
- Time spending

How to improve drinking experience to attract young people to contact tea culture?

1. To reduce the time of making a Kung Fu
2. Simplified tea set, more stable, not easy to break

Office
Taste
Time
Solid
Size
Taste
Health
Fashion
Initial ideas
design brief & sketch

- Who? young people 18-30
- What? Teasets
- Where? domestic
- When? tea time
- Why? Let more young people drink tea in a traditional way
- How? Simplified procedure

Plan 1

Plan 2

Plan 3

I chose plan 2 - Guangfu cup

Design inspiration comes from the Guangfu historic building, through a special base design, combined with 4 cups, the bottom of the cup groove enable the cup to be fixed on the base.

2D development

Traditional Kung Fu tea have a lot of tea sets and steps, so it will take 2 hours to make, in order to attract more young people to the Guangfu tea culture, Guangfu cup will reduce the number of cups and simplify the making process into 4 steps:

1. prepare tea
2. wash tea
3. pour tea
4. drink tea

Scenarios of use

**Step 1: prepare tea**
1. Put tea leaves into cup 1
2. Pouring hot water

**Step 2: wash tea**
1. Pouring tea into cup 2
2. Leave tea leaves in cup 1
3. Pouring hot water into cup 1 again

**Step 3: pour tea**
1. Pouring tea into cup 3
2. Leave tea leaves in cup 1

**Step 4: drink tea**
Pouring tea into cup 4
Material selection

I analyzed the advantages and disadvantages of several materials, determines the choice of china clay and Cunninghamia lanceolata as the product of the material.

<table>
<thead>
<tr>
<th>Material</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery clay</td>
<td>Good plastic clay</td>
<td>Not resistant to high temperature</td>
<td></td>
</tr>
<tr>
<td>China clay</td>
<td>High plasticity, good gloss</td>
<td>Mining site is not much</td>
<td></td>
</tr>
<tr>
<td>Camphor wood</td>
<td>The whole tree with aromatic wood fine,</td>
<td>The price is high and the output is low</td>
<td></td>
</tr>
<tr>
<td>Cunninghamia lanceolata</td>
<td>Growing fast and resistant to moisture</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ahina clay

China clay is produced in Chaozhou porcelain, Chaozhou porcelain material is china clay, it is a symbol of choice of traditional culture.

Cunninghamia lanceolata

Cunninghamia lanceolata is more suitable for Guangdong humid climate
Adults and children play together hand in hand. Change the traditional mode of playing pinwheel. Wind drives pinwheel generating power to light the pinwheel and the glowing pinwheel will be a beautiful scenery in the night.

Inspiration

Now people born in 80s and 90s are beginning to play their role as parents. Born in 90s under the one-child policy, in my memory, most of my childhood time was spent in playing with my friends or alone. Parents found it difficult to join us in playing and what they could do was buying some toys for us. This kind of memory inspired me to design a toy for both parents and children to play and create more quality time for them.

Background

parent-child time

Through research, most of young parents aging from 26 to 36 are office workers and they usually spend hours from 18:00 p.m. to 21:00 on weekday together with their children.

Relationship

Indoor

- Parents play building blocks with child
- Parents are absorbed in their cellphones and child feels lonely
- Parents and children watch TV together
- Parents and children read story book together
- Parent ignore child
- Parent and children go for a walk together
Idea generation

Through mind map, I extract elements from childhood memory of parents born in 80s and 90s and redesign those elements on base of connections between parents and children. I choose pinwheel which is a toy to be played outdoors to redesign, in order to encourage parents and children to play pinwheel outdoors together.

Mode of Interaction

- Parents
- Children

Place of Interaction

- Outdoors

Time of Interaction

- Weekday
- Weekends

Problem

- Children always play IPAD or mobile phone.
- Parents watch their children play and their participation is rarely.
- Parents and children seldom play outdoors.

Design brief

WHO

- Parents & kids

WHEN

- Parent - child time

WHERE

- Outdoors

WHAT

- Toys

WHY

- Improve Relationship with children

Concept development

2D development

The pinwheel I design is characterized by two handles which is adjustable to a length proper to players for the purpose of parents and children playing outdoors together. Based on the principle of wind power generation, the pinwheel can rotate and generate power to light the LED in center of the pinwheel through the process of parents and children running together.

Principle

The principle of wind power generation is to use wind power to rotate the pinwheel and quicken the rotating speed by speed increaser in order to generate power. According to current techniques of pinwheel, the device begin to generate power as long as the rotating speed reaches about 3 meters a second (to a degree of breeze).
In order to get a sound handle length and width for the convenience of parents and children, I build a model and use paperboard as measuring tool. After tests on different heights and angles, I cut the paperboard to a sound size.

**Mock-up testing**

**Material**

<table>
<thead>
<tr>
<th>Color</th>
<th>Rubber</th>
<th>Led</th>
<th>Pvc</th>
<th>Bamboo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy or girl can choose which color they like</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**How to use it**

1. When not in use, the pinwheel can be hung on the wall.
2. The leaves rotate when wind blows, thereby gaining electrical energy transformed from wind energy and lighting the pinwheel.
3. The faster the rotating speed, the brighter the pinwheel.
4. The handle can rotate in 360 degrees and can adjust to the angle of the regular hand.
5. Parents & kids
6. Parents can play with their children, hand by hand.

**Final**