

portfollio

SZUHUA CHEN

INDUSTRIAL DESIGN | 2024

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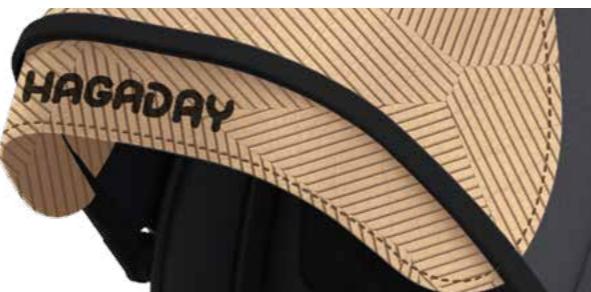
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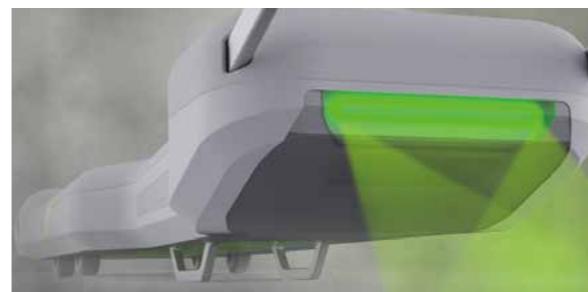
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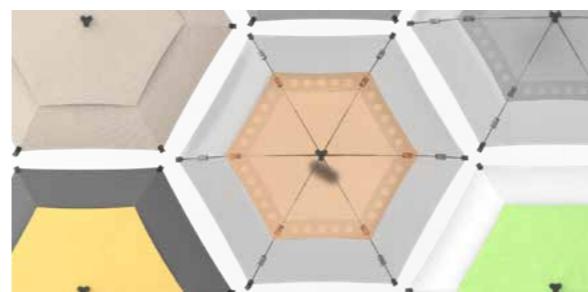


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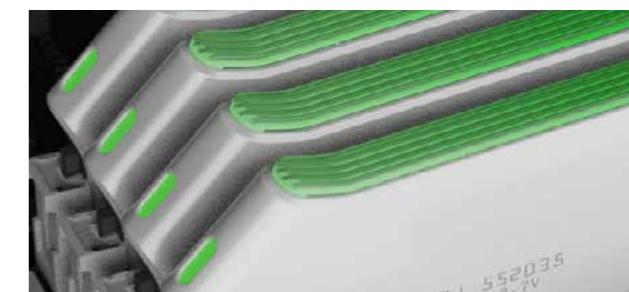
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GBA4

A Versatile Transforming Back Armour

Designer

Szu-hua Chen | Chun-hao Yang



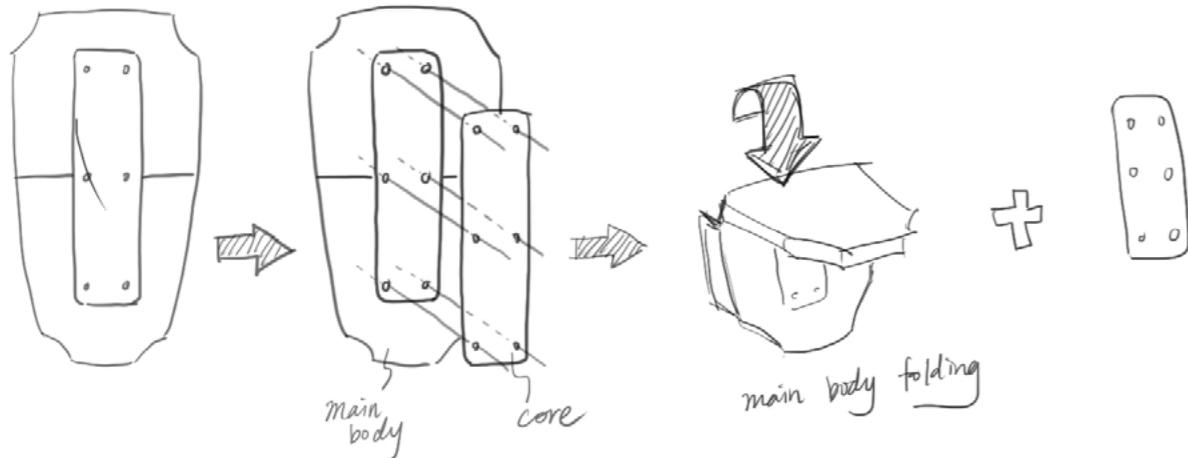
Benefitted from its proprietary Dynamic Hinge and detachable Core, GBA4 can be easily folded in half and carried in half size while traveling. Moreover, instead of replacing the whole pad to upgrade its performance level, it can be simply achieved by switching the Core to freely shift between EN1621-2 Level 1 and Level 2 performance levels depending on your preference and requirement.



Design Goals

1. Focus on Soft Back Protector
2. Improve the convenience of carrying
3. Combine 2 Levels into 1 product

GBA4 idea.



Design of Hinge

In the beginning, I wanted to increase the bendability of the pad with textures (Figure 1). However, during a meeting with the material factory, they pointed out that it would still cause

breakage. After many discussions, we finally found a way to solve the problem of easily broken material: **by using cloth and membrane to cover the hinge part** (Figure 2).

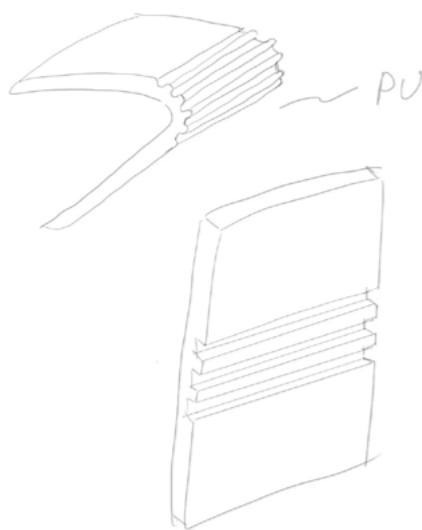


Figure 1

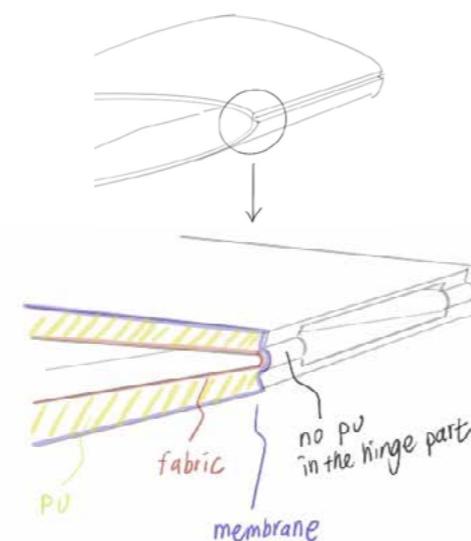


Figure 2

Pad Design

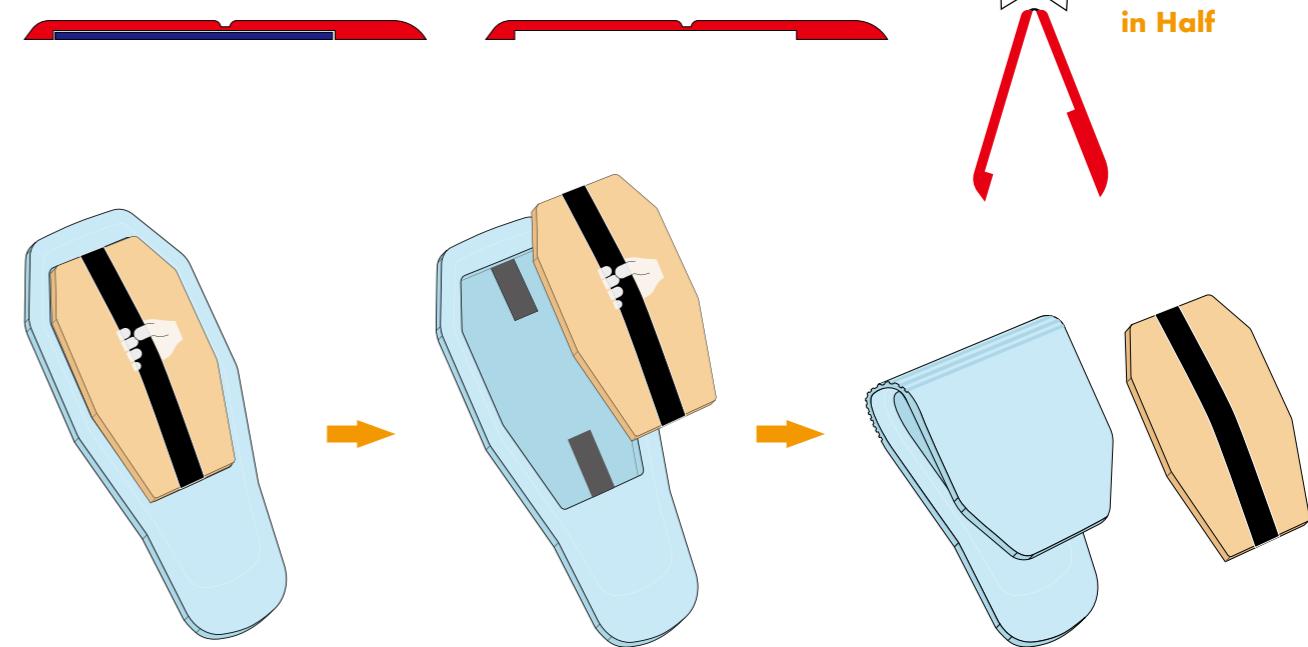
How to increase the portability of the back protector?

The most intuitive idea was to directly fold the product in half, which can not only reduce the size but also fit it into the bag.

How to prevent the folding point from becoming a weakness?

Solution: Add a suitable size pad, CORE, as a support at the turning point when using. Because of its detachable feature, it can be used as the basis for a two-in-one product.

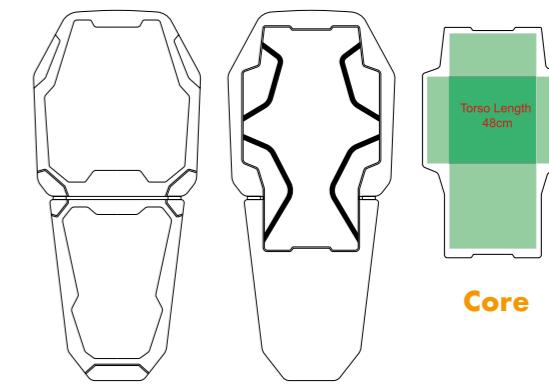
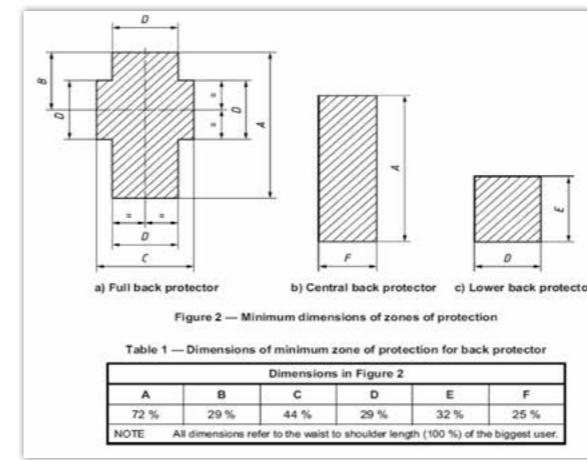
Side View



Shape of Core and Main Body

According to the CE certification regulations, the zones of protection varies according to different **torso lengths**. Therefore, we first defined the height of people from **164 cm to 178 cm** as the size L, and the maximum of torso length is

48 cm. After defining the size of product, we calculated the zone of protection (the green cross-shape area down below) according to the regulations, and then design the shape.



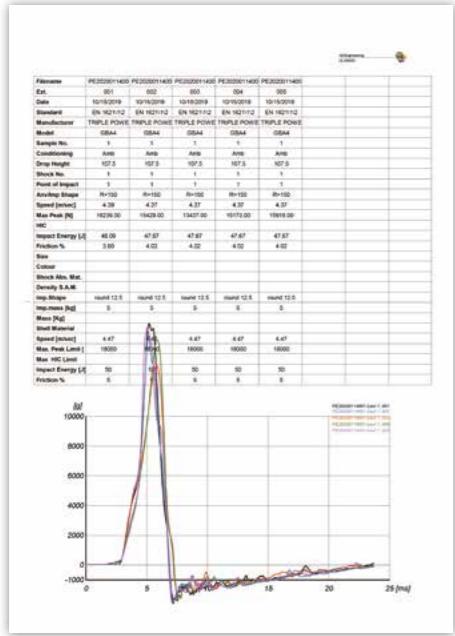
Side View Back View

Thickness

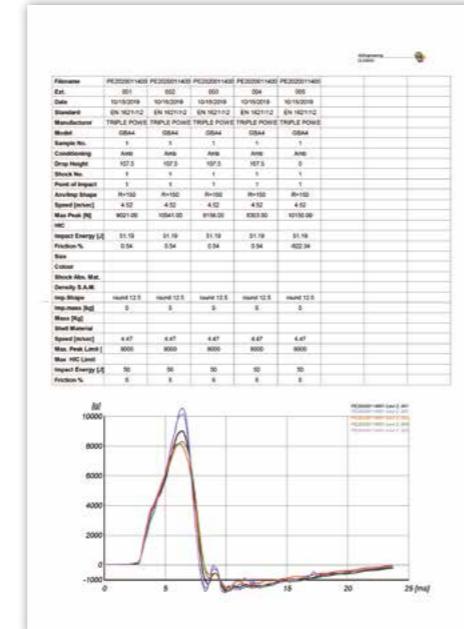
Several impact tests were taken to find the thinnest thickness that can still pass CE certification regulations. The thickness of LV1 back protector

was 13mm while LV2 was 18mm. We defined main body as 7mm. On the other hand, the LV1 core was 6mm and LV2 core was 11mm.

LV1=13mm Impact Test < 18000N



LV2=18mm Impact Test < 9000N

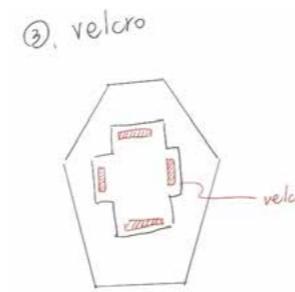
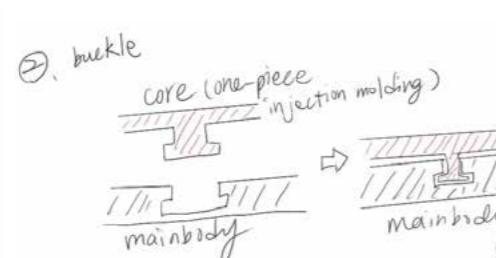
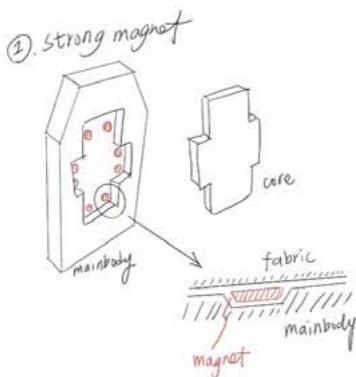


How to attach main body and CORE?

The attaching design had many processing problems, so many meetings were held with the factory. Finally, three feasible solutions came out. The first solution was to embed strong **magnets**; the second was to add a **buckle** on it; and the

third, the simplest and most direct way, was the use of **velcro**. Finally, I chose the first solution. The strong magnet will not affect the appearance of the product, but it also has a sense of feedback in use that can increase user experience.

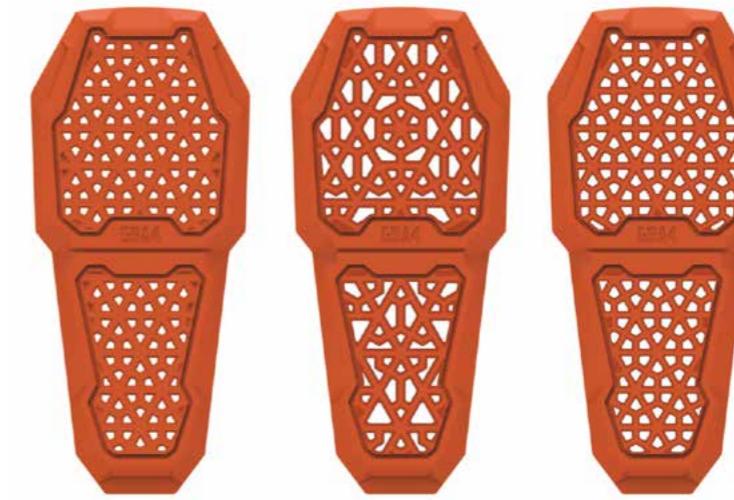
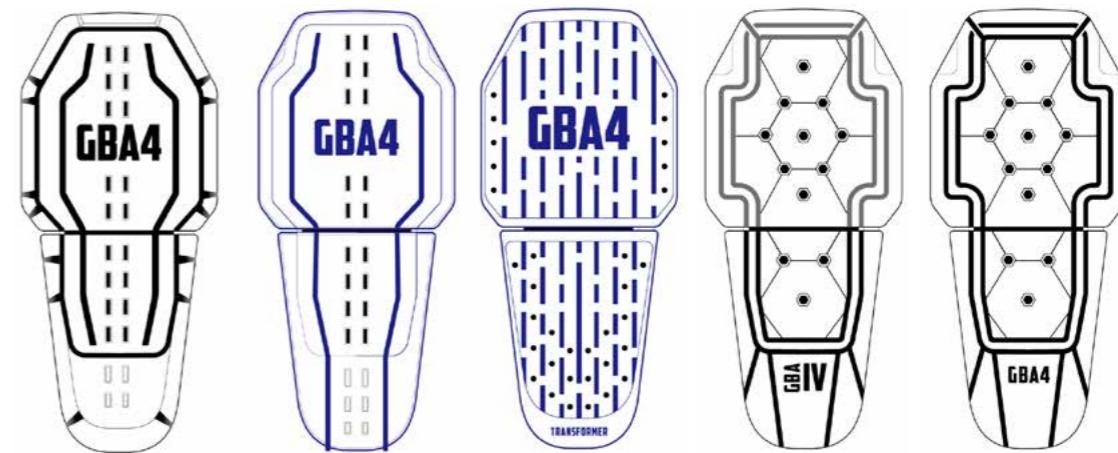
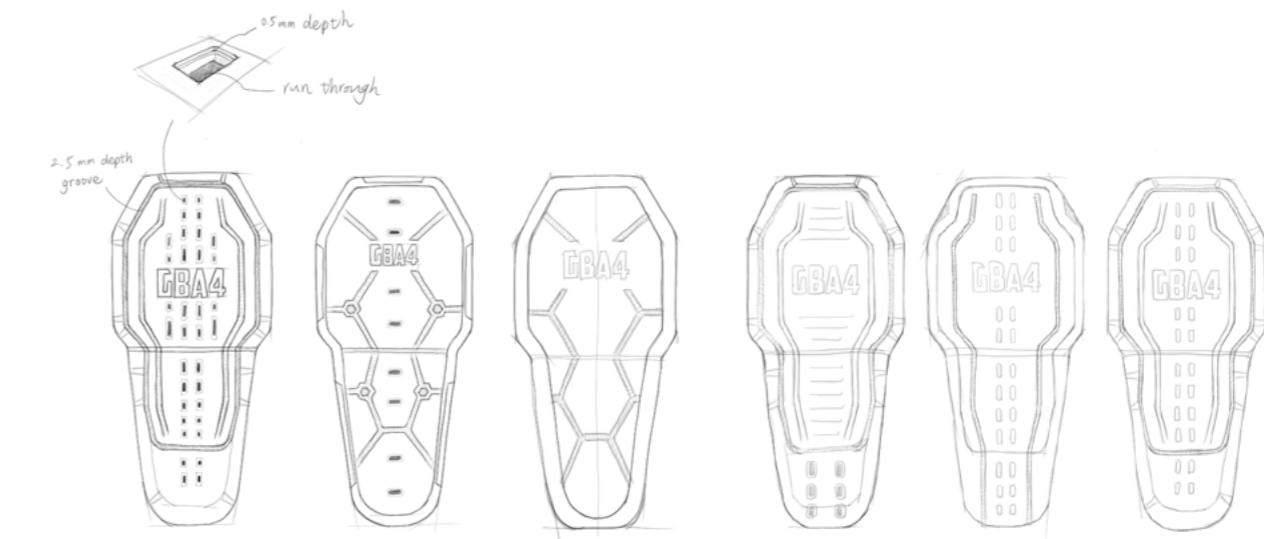
1. strong magnet
2. buckle
3. velcro



Pad Style Design

There are two purposes for designing holes and grooves on the pad. One is to reduce the use of the material and the cost; the other is to increase ventilation to give users a better user experience.

After the basic functions and forms were designed, I started working on the styling design—the style of the back protector: powerful, minimalist style but with a sense of speed.



3D modeling & rendering (Solidworks & Keyshot)

The most important thing is to discuss the mold tolerance with the mold factory, every detail must be very accurate, and the reserved holes of the magnet must be built.



Clothes Design

1. It is also a complete form after folding (it can be carried in hand, hung on the bag or put in the bag)
2. Adjustable shoulder strap
3. Fabric selection
4. Graphic design

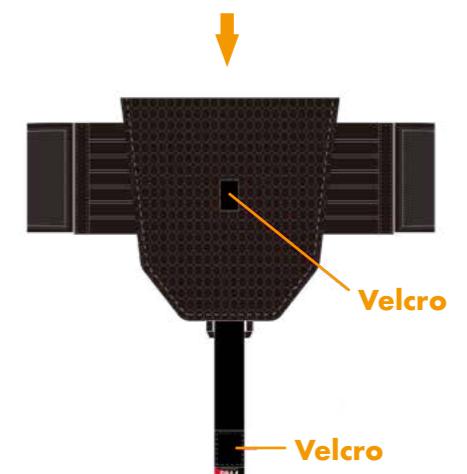
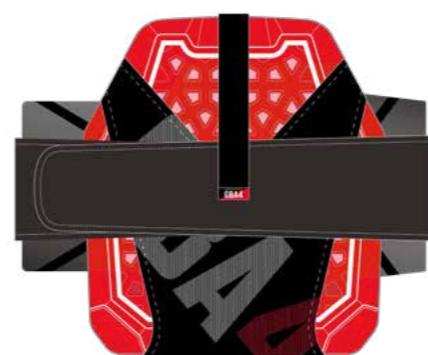
Front Side View



Back Side View



After Folding



Design Details



GBA4 (Genuine Back Armour 4) Features:

1. Patented Nano Polymer tech ensuring protection performance
2. Dynamic Hinge allowing easy folding
3. Core Switch Technology offering seamless experience for versatile challenge demand
4. Reduce carrying size efficiently down to 50%
5. Laminated Fabric for enhanced durability and comfort
6. 13mm ultra-slim thickness to offer EN1621-2 FB Level 1
7. 18mm ultra-slim thickness to offer EN1621-2 FB Level 2 Optimum for frequent traveling amateur and pro athletes

Folding Instruction

- 01  FLIP THE PROTECTOR TO THE BACK SIDE.
- 02  TAKE OUT THE CORE THROUGH SIDE OPENING.
- 03  PLACE THE CORE AS SHOWN BELOW AND OPEN THE FASTENING STRAP.
- 04  FOLD THE UPPER PART DOWN IN HALF AS SHOWN ABOVE AND MAKE SURE THE CORE LIES IN THE MIDDLE BETWEEN WAIST.
- 05  CLOSE THE WAISTBAND AND THE FASTENING STRAP.
- 06  FINISH THE FOLDING AND YOU ARE GOOD TO GO!

User Scenarios

Wearing GBA4 for testing functions and comfort ➤



ISPO Munich Exhibition 2020

I presented at an international exhibition and had my design seen by many world-class brands. At the same time, I also had the chance to have conversations with many potential customers. More importantly, I was able to widen my perspectives and

understand the trend. What made me very happy was that a customer, after listening to my product explanation, immediately said "This is what I want, send me the price and more detail". For me, this was the greatest accomplishment.



MyBaby Crib

Designer
Szu-Hua Chen



Design Direction 1 Quinny Brand Research



- Minimalistic metal extrusion
- Simple circle joint
- Straight push bar
- Continuous loop
- Rear leg and basket frames are outstanding design feature



- Minimalistic design language
- Clean fabric panel
- Strong CMF - high contrast colors
- Target: indoor furniture design

Sketch Exploration



Concept Development

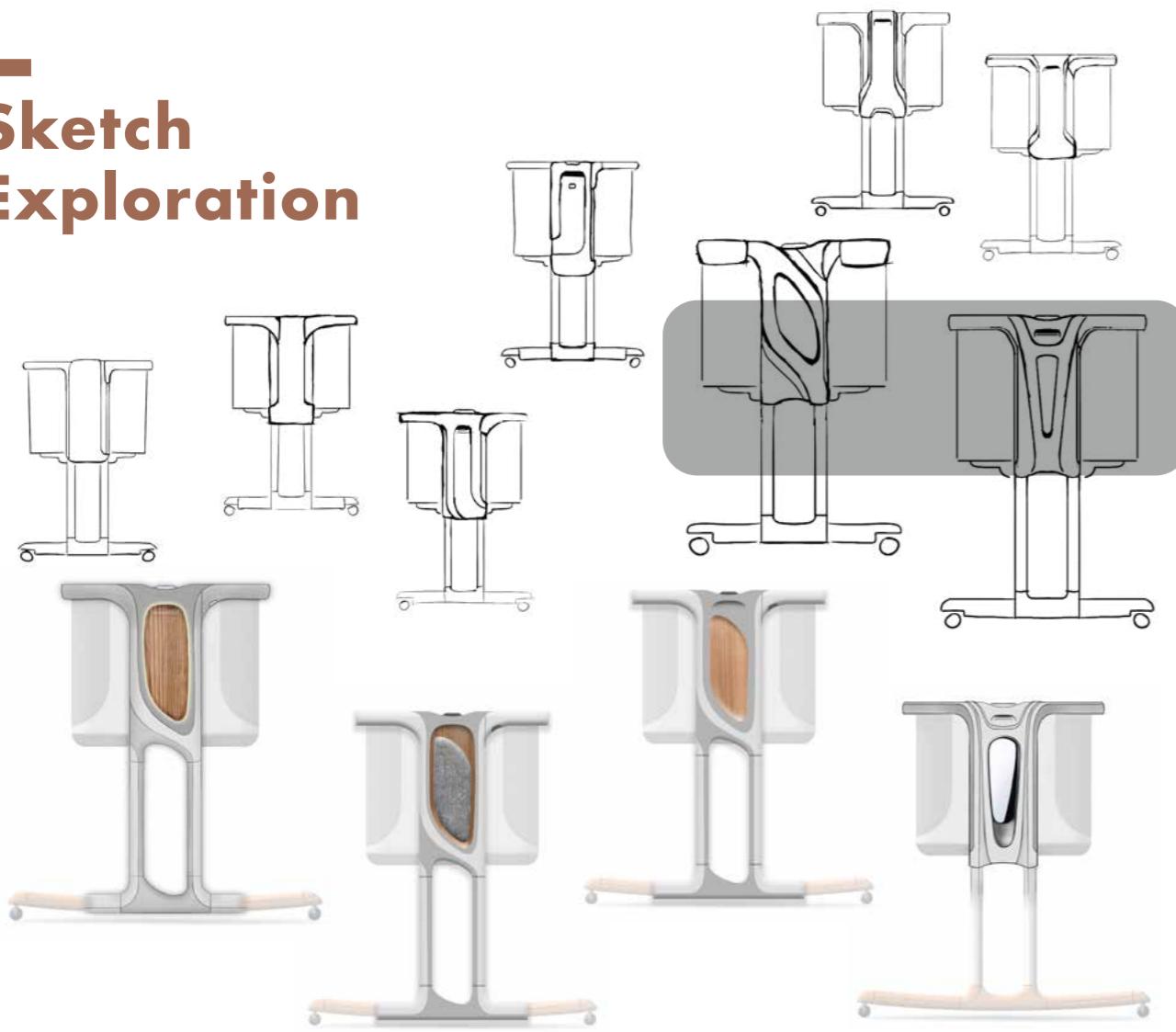
- Indoor furniture CMF exploring
- Applying LED lighting function
- Integrating rocking function



Design Direction 2 Organic Style



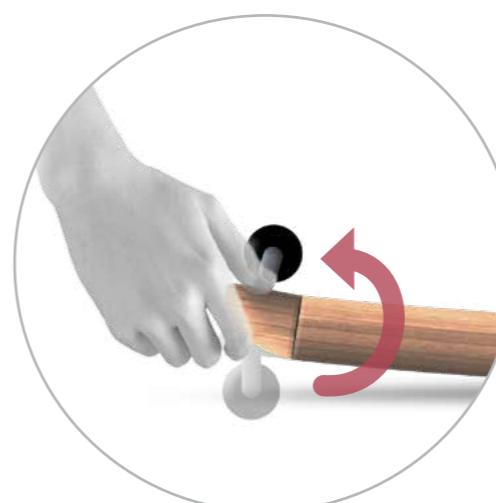
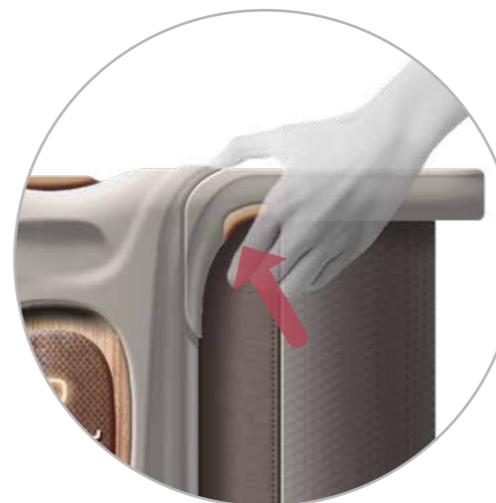
Sketch Exploration



Concept Development



Design Details



Hi-Fortune Wheelchair

Designer
JMDA Design Team



Mood Board

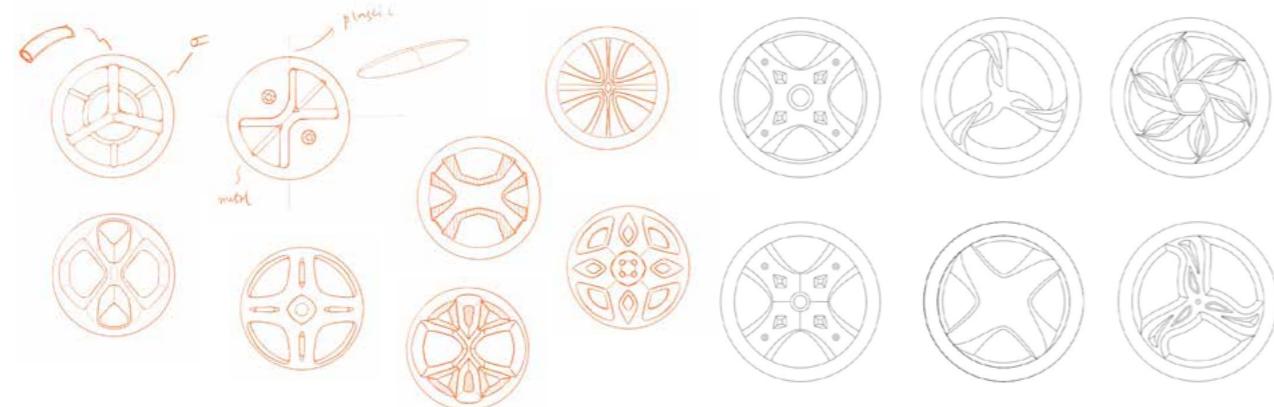
- Mature Softness
- Sleek
- Curved Surfaces
- Crisp Lines
- Refined
- Precise



Footrest



Wheels



Modeling & Rendering



Hagaday Stroller

Designer
Szu-Hua Chen



Mood Board

- Dynamic Tension
- Premium
- Clean
- Strong
- Controlled
- Crisp Lines
- Subtle Curved Surface
- Machined Precision



Sketch Exploration



Concept Development



Design Details





CMF Options



Stair Lift

Designer
Szu-Hua Chen

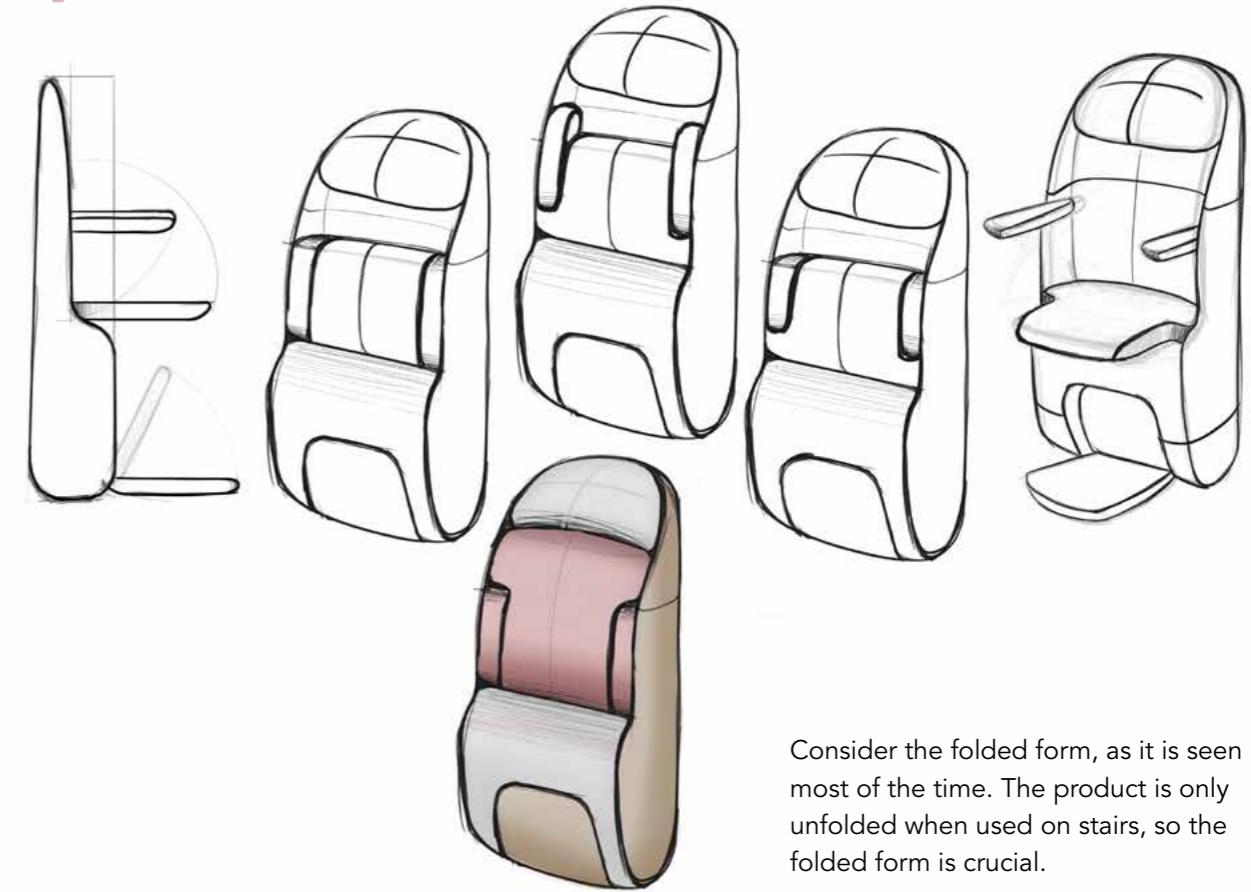


Mood Board

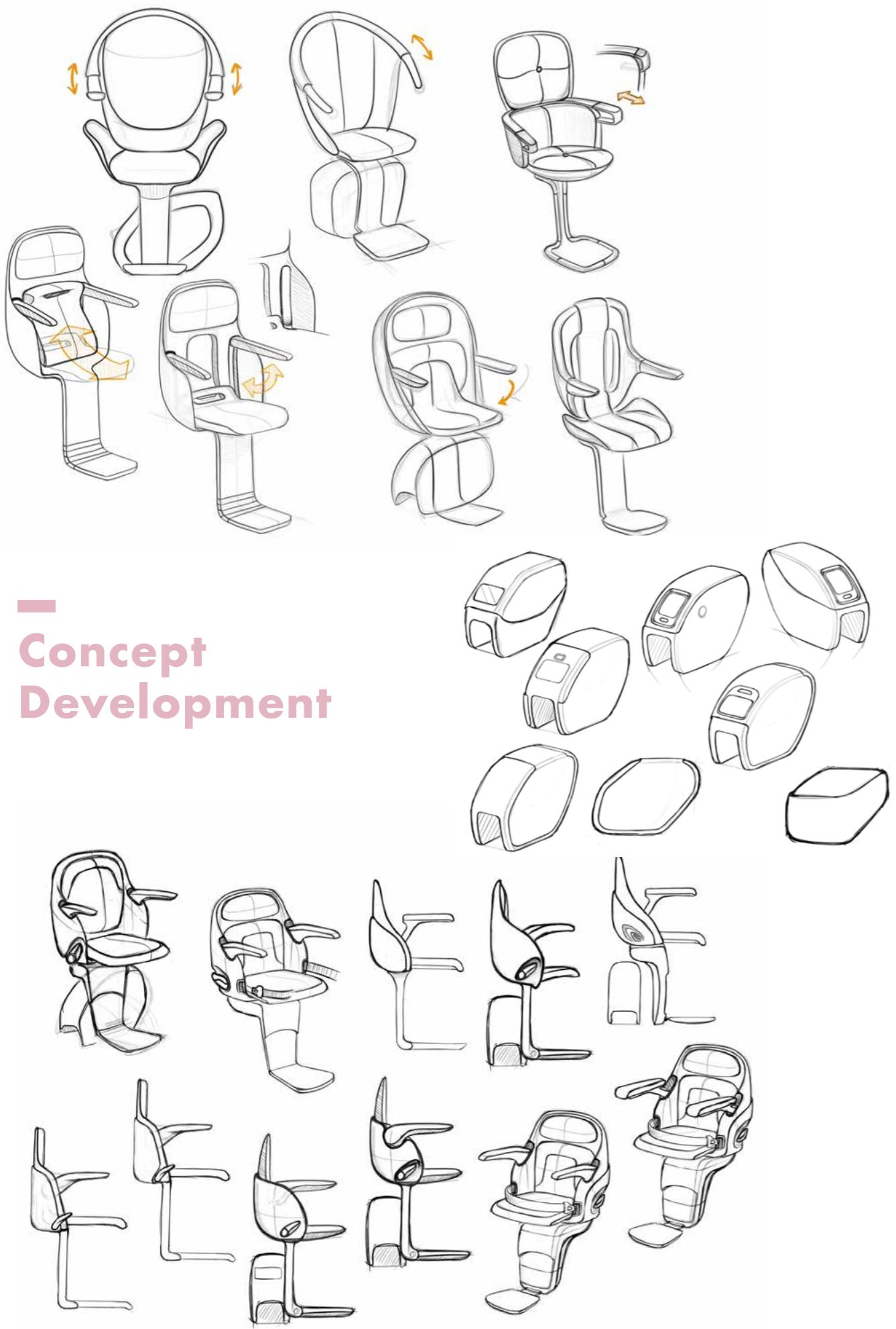
Soft and Friendly



Sketch Exploration



Consider the folded form, as it is seen most of the time. The product is only unfolded when used on stairs, so the folded form is crucial.

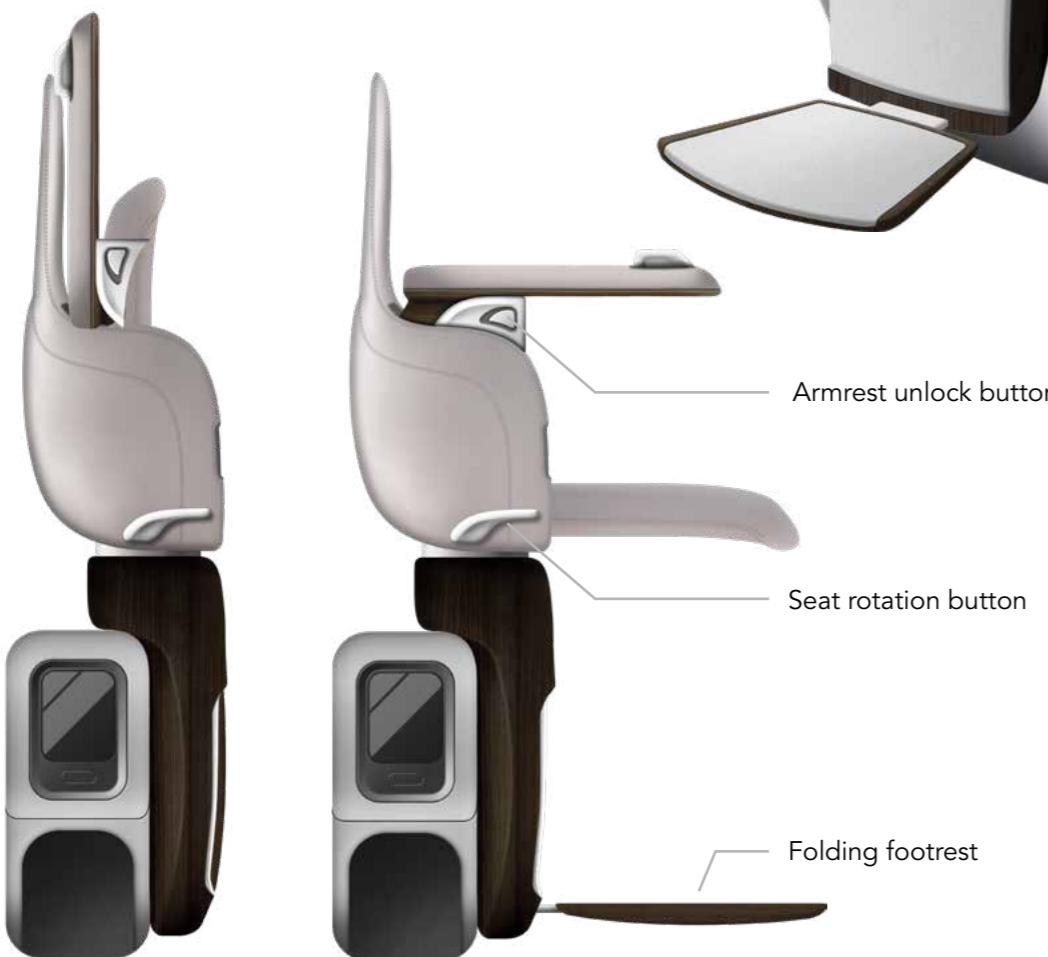


Concept Development



Ai Render

Design Details



Infant Carrier

Designer
JMDA Design Team



Mood Board

- Big Clean Surfaces
- Cutout Design Features
- Puffed Surface
- Echo Friendly Materials



Seat Interior Fabric



- Waterproof, breathable fabric
- Prevents fluid seepage and smell traps.
- Easily wiped clean.
- Inspired by Gore-Tex.

- Absorption mat on top.
- Absorbs fluids, keeping the child dry.
- Removable, washable, reusable.
- Uses diaper technology.

Design Refinement

Carry Handle & Air Vents



Option 1



Option 2

Light-weight Plastic Shell Frame



Option 1



Option 3

Side Impact Protection



Option 1



Option 3

Lie Flat Handle and Rear Belt Guide

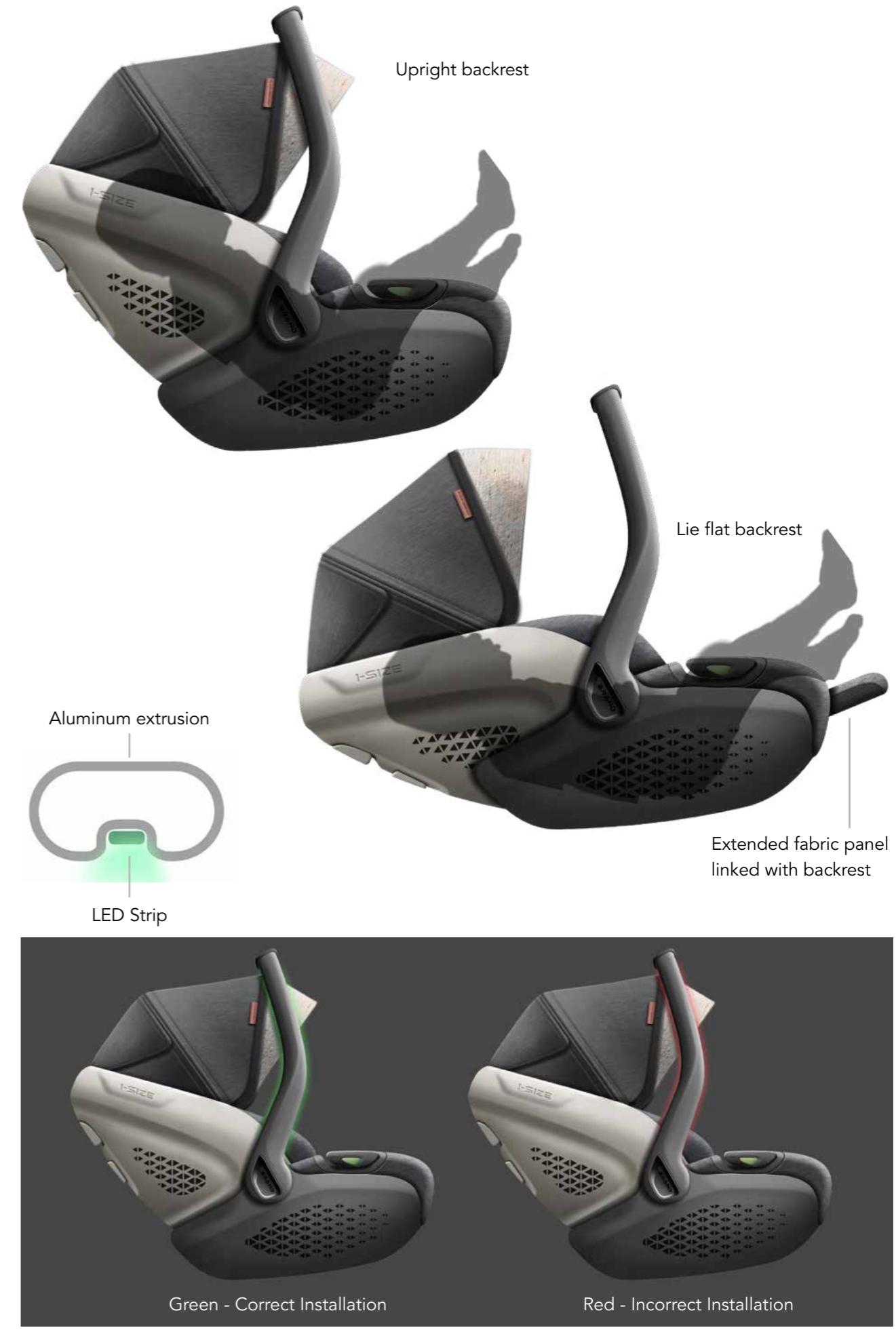


Option 1



Option 2

Design Details



Seasoning Monsters

A New Series of Kitchen Tools

Designer

Szu-hua Chen | Zhihao Hu

Intro

To increase the user experience of cooking, Seasoning Monsters is created. There are five different tools within the series. By using Seasoning Monsters, you not only can avoid many difficulties when cooking, such as sauce packets being hard to be opened and the situation of seasoning being spilled but also make them become decorations while not using them.



Design Motive

There are jagged marks on the sauce packets for us to use. However, they are still hard to open due to the plastic material.

Nowadays, there are more and more people dining out. They quite often have to face the kind of trouble of not being able to open something as simple as a sauce packet. So we designed a set of small tools with the function of knife that can be carried everywhere.

Design Inspiration

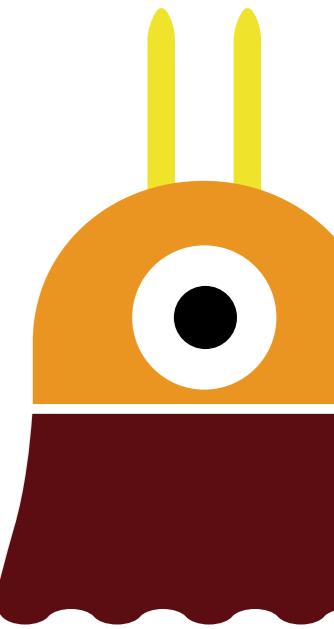
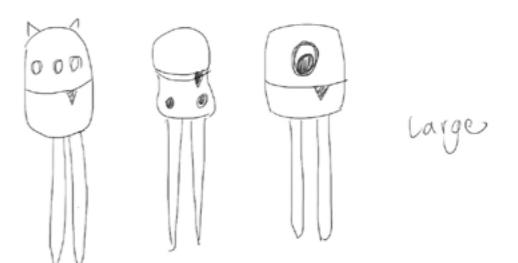
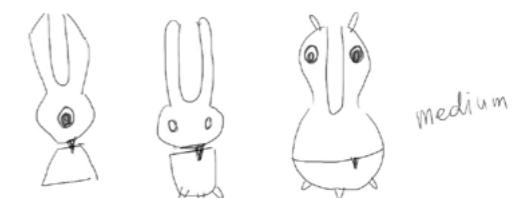
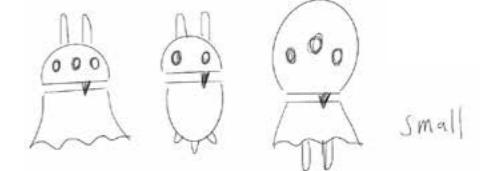
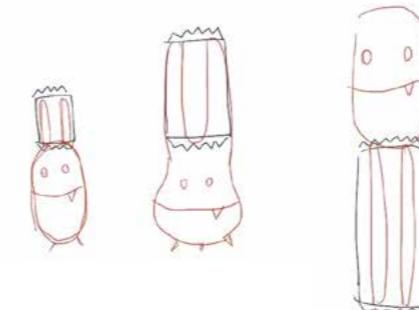
When the sauce packet is torn apart, the sauce sometimes spills out accidentally, forming irregular shapes, uncontrollable, unpredictable and irritating like a monster. Now, with the tool, let's conquer these annoying sauce bags that hinder a good time for dining.



function ①: cut (teeth → small blade)

function ②: squeeze sauce (legs / horns)

different sizes of sauce bags



Usage Scenarios

1 Cut

Simply open the sauce packet by using Joe's little tooth.



2 Squeeze

Use the legs of Joe to squeeze out the sauce without staining hands or table.



3 Clean

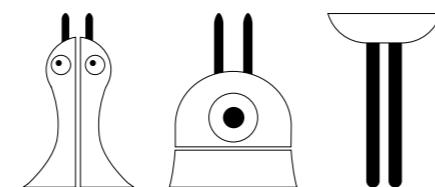
Separate the head and body in order to clean the inside part of the product.



Concept Development

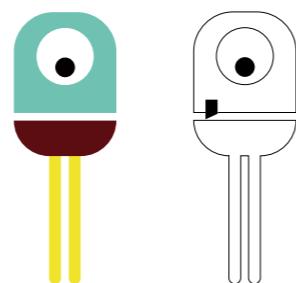
Legs / Horns of monster

Squeezing different sizes of sauce packets with three different lengths of feet / horns.



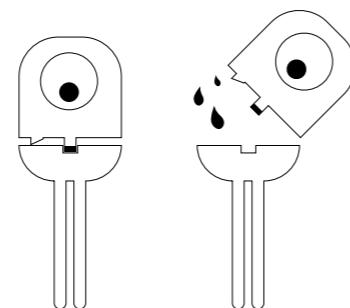
Tooth of monster

The switchable blade is hidden inside the head to prevent cutting from happening.



Magnet

To attach head and body with the function of easy disassembly for cleaning.



When cooking, people often encounter many annoying things, such as accidentally adding too much when seasoning, difficulty to tear the sauce packet, inability to squeeze out the remaining ketchup, and inability to pour a certain amount of oil or soy sauce. So we designed a set of small tools with multiple functions and eye-catching exterior design with monsters as elements.



Seasoning Jar - Granular Seasoning

Seasoning jars with spoons are usually designed to be fixed with the lid, so when the seasoning is almost used up, the spoon cannot take out the seasoning due to the limitation of displacement, so we design a ball joint to improve this problem. In addition, we integrated the function of spreading seasoning into this design, which is a two-in-one seasoning jar.



Squeeze Condiment Bottles - Viscous Sauce

When using ketchup or mayonnaise, it is difficult to squeeze out every time, and it is also difficult to use up the last remaining sauce, which is not only wasteful but also makes people feel bad. So we incorporated the piston into this design and the appropriately sized hole to squeeze the sauce out.



Oil/Soy Sauce Jar - Liquid Sauce

Usually used to hold oil, soy sauce, etc. The opening of the existing container is generally too large, and it is easy to accidentally add too much oil or soy sauce during use, resulting in a poor user experience, so we improve this with a smaller hole. And this type of seasoning usually requires a specific amount, so we designed a small graduated cup above the container, and there are grooves to fix the small cup.



Spice Grinder - Lumps Ingredients

In addition to adding a curved surface to the pestle to make it easier to hold, we add a lid to the bowl to avoid spraying out when grinding ingredients. The dizzy expression is designed on the pestle, which echoes the scene when using the spice grinder.

This set of designs includes a sauce packet opener and four types of seasoning containers. There are four different types of seasonings, granular, liquid, viscous fluid, and lumps. We analyzed the existing containers corresponding to these types of seasonings and found some problems for these four different types.

1.

Open the packet by the hidden blade.

**2.**

Squeeze out the sauce.



Sauce Packet Opener

Help users to extrude sauce more easily.

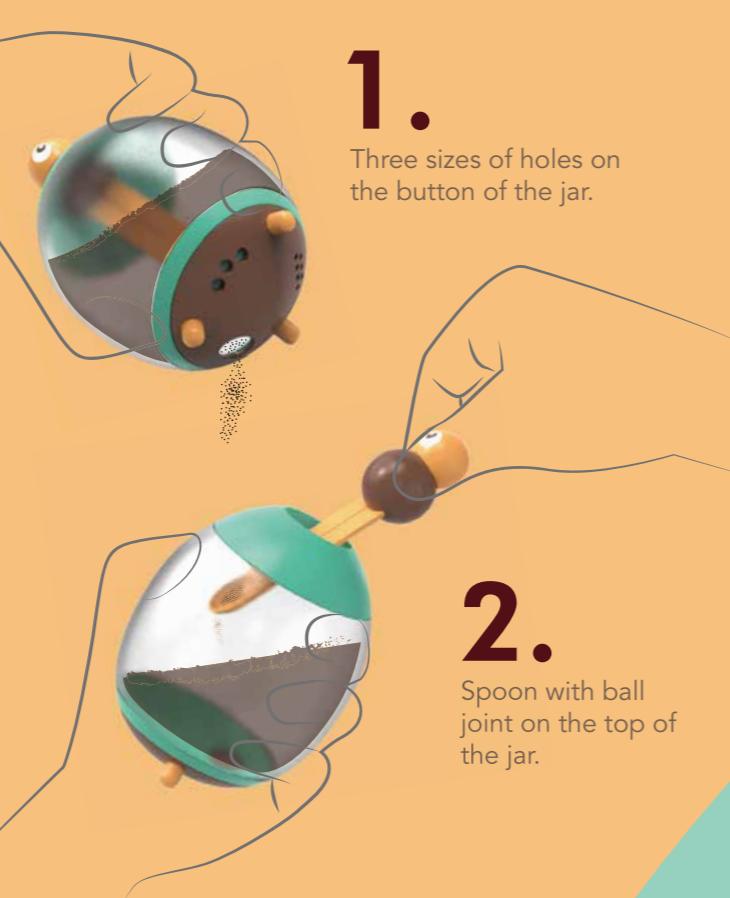


Seasoning Jar

Help users to use granular seasoning more accurately.

1.

Three sizes of holes on the button of the jar.

**2.**

Spoon with ball joint on the top of the jar.

Spice Grinder

Help users make crushed solid seasoning.



Squeeze Condiment Bottles

Help users to extrude the remaining sauce.



Oil / Soy Sauce Jar

Help users to pour an accurate amount of liquid seasoning



Surfival

Designer
Szu-hua Chen



Background



The Grenfell Tower Fire

While the Grenfell Tower Fire claimed the lives of 72 people, 40% of whom were disabled. Most tenants with disabilities were forced to live at Grenfell Tower due to financial difficulties; they had no other option. Additionally, they were not allowed to choose their residence floor and were even put in dangerously higher floors. The community committee's reaction to their complaint that their living arrangements are not accessible for those with disabilities was, "If you don't want to live on this level, you can choose not to live in this building." They were forced to compromise and consent to living in such an unfavorable atmosphere because they had no better options. Such a biased phenomenon happens not just in Grenfell but throughout the world. As a result, those with disabilities have a substantially lower chance of surviving a fire than others.

How to face a fire

Step 1:

Find a room with an external window.

Step 2:

Close the door, open the window to allow air circulation in the room.

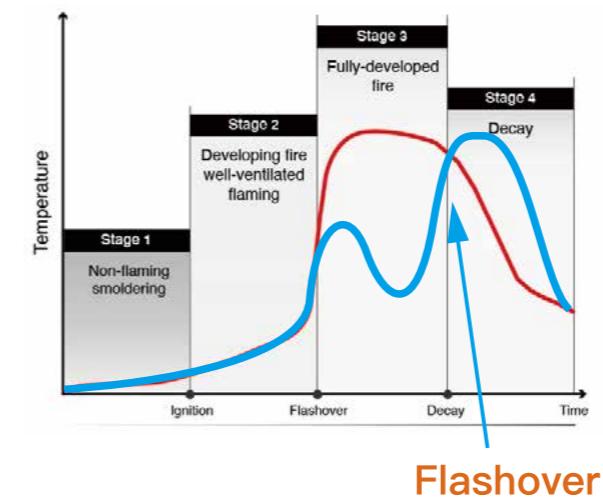
Step 3:

ask for help, and wait for rescue.

One of the unique contents is a fire accident in Taiwan. There was a severe fire accident in a house, and six people were killed. They were found in the toilet, living room, and other places. However, after the investigation, it was found that there was almost no trace of smoke intrusion in one of the closed rooms, which means that closing the door and staying in the room can actually improve the probability of survival. **To face a fire, the thing that should be done is to try to survive rather than evacuate.**



Environment



Target Environment

Multi-story residential buildings are designated to be the target environment for this design. The changes in the environment during the fire can be represented by the fire growth diagram. As shown in the figure, the fire growth can be roughly divided into four stages. It only takes 30 seconds for a fire to develop from stage one to stage two and a few minutes into stage three. After the "flashover" occurs, the fire is fully developed, at which point smoke, heat, and visible exterior flames are severe and fatal, and the temperature can reach 700 to 1200 degrees C. Hot air and smoke gather on the ceiling and then move to the ground constantly. Therefore, the closer to the ground, the longer people can survive. Moreover, according to the actual combustion experiment of NFPA, when the temperature outside the door is as high as 150 degrees Celcius, the temperature in the room is only 25 degrees Celcius if the door is always closed. It means that the door can effectively block the rapid rise of the ambient temperature.

All in all, breathing problems, vision sense, and high temperature are the main three difficulties needed to be overcome while trying to survive in a fire, especially considering the limited bodily functions of disabilities. These latter two phases are the most important.



Target User

People in wheelchairs who can live independently.

People in wheelchairs

40% of people who lost lives in the Grenfell Tower Fire were mostly in wheelchairs.

Live independently

People in wheelchairs need to deal with much more difficulties in an emergency compared with those who have flatmates, in which they will not be able to get help from others.

Current Fire Equipment

According to the analysis of current fire equipment that I mentioned previously, most of the product can only be used by healthy adults, while children, pregnant women, elderly, as well as the disabled are not able to use it.



TYPES OF PARALYSIS



MONOPLEGIA



HEMIPLEGIA



PARAPLEGIA



QUADRIPLEGIA

Paralysis Types

Since I decided to focus on people on wheelchairs living independently, I have searched for information on this user group, finding that there are several different types of paralysis, such as monoplegia, hemiplegia, paraplegia, and quadriplegia.

The one that meets my target user statement is **paraplegia**.

Interviews

Jimmy and Nina

They are the people that I met on the street, and they showed me how to transfer from the wheelchair to the stairs.

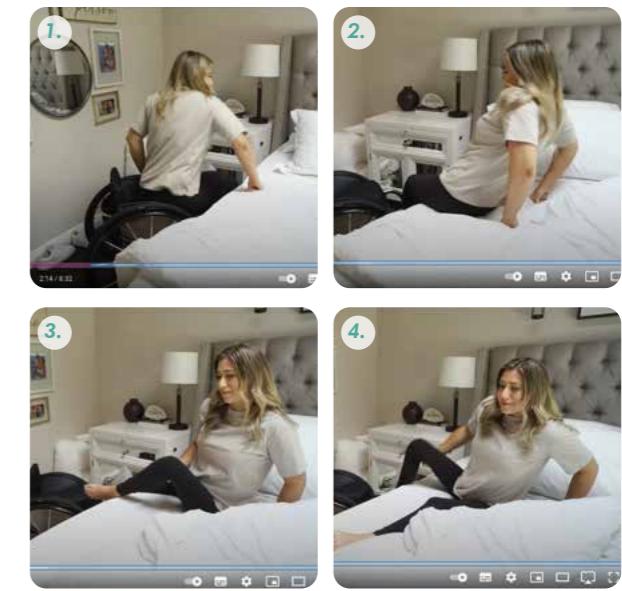


Youtube Videos

There are so many videos about the lives in wheelchairs, and I have learnt a lot from them. Especially how they transfer to beds and wheelchairs.

Youtube Channel:

Finding Ren, Wheels2Walking, Wheelsnoheels - Gem Hubbard and Chelsie Hill

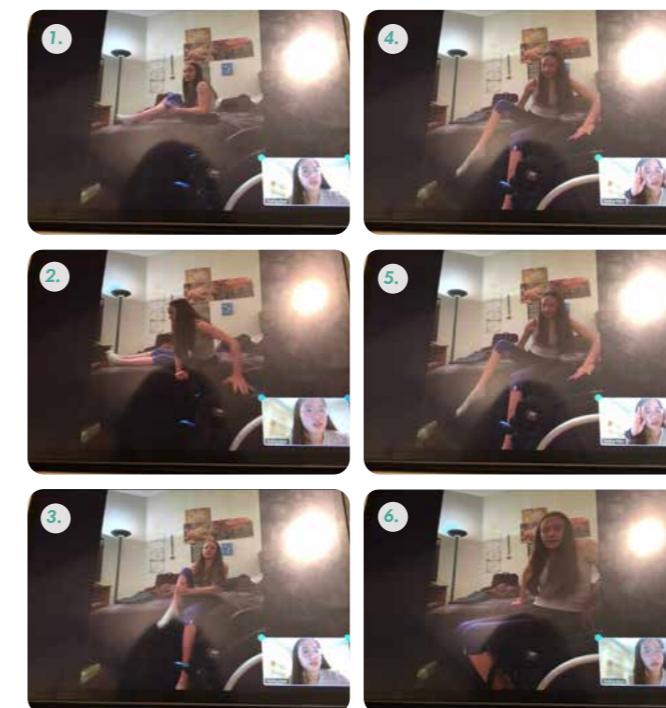


Lorie, 23 years old. Born in Italy, now living in the USA.

She had a severe accident when she was 19, almost taking her life. Fortunately, she survived but needs to spend the rest of her life in a wheelchair. Her paralyze type is paraplegia, which met the target user statement. Nevertheless, she is a positive woman and passionate about life. So when I contacted her through Instagram, she was the one that replied to me immediately and was interested in my project. After having a zoom meeting with her, I have known more about the target user.

Essential Points:

1. Sensitive skin on their legs because of muscle atrophy causes a lack of protection for their legs.
2. They can slightly use the muscle on their legs but can not support their weight.
3. Have muscular upper body strength such as core and arm muscles to move their body within a limited space.

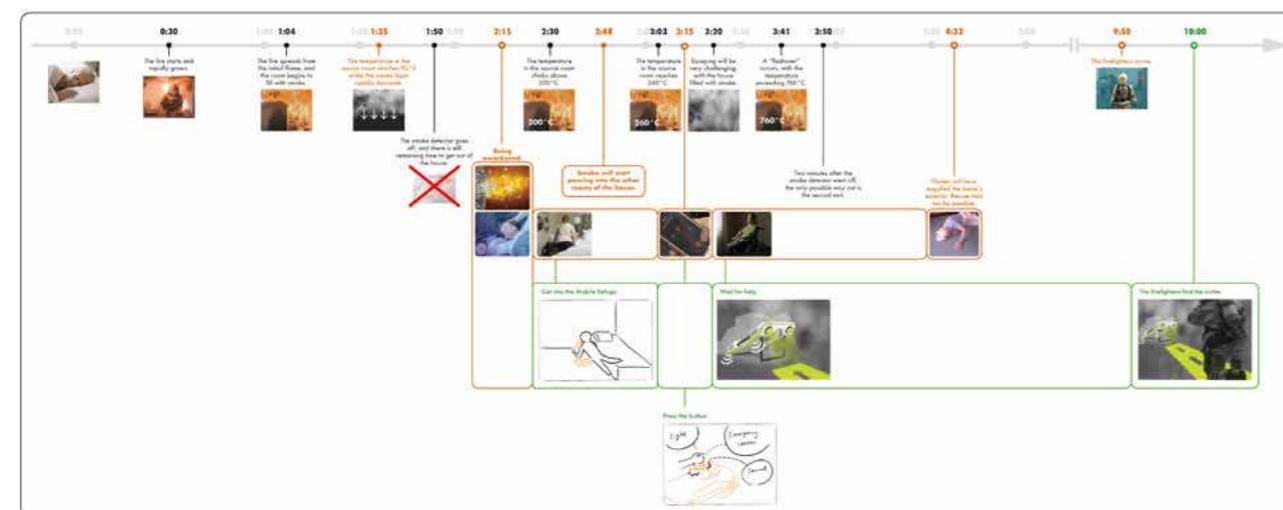


Key Points Summary

Timeline

After interviewing Gordon and Chris, I integrated their professional advice and data from the UK website to create this timeline. This timeline highlights the value of Mobile Refuge.

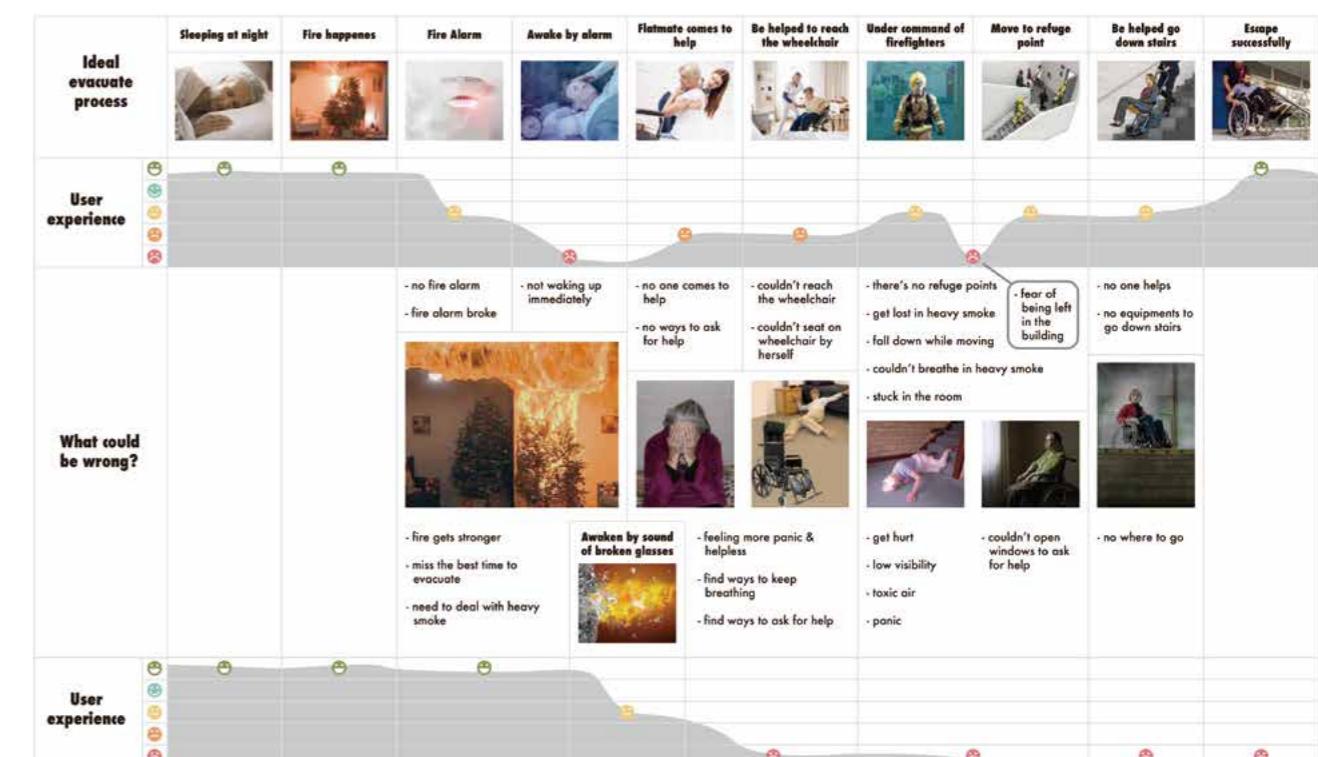
The timeline compares an extreme fire incident with and without the use of Mobile Refuge. Usually, it only takes about five minutes to generate enough smoke



to cover an entire room, and because the disability limits mobility, one can not escape by him/herself. Furthermore, according to the UK government website, on average, firefighters take about seven minutes to arrive at the scene after being notified, which is at the tenth minute, which is too late to rescue. On the other hand, one can stay alive until rescued, as highlighted in green.

User Journey Map

- Because most fire accidents occur at night, so the User journey Map begins at night. And it is also the reason that I design to place the Mobile Refuge close to the bed.
- Due to the lack of fire alarm installation, there is a high probability that the user may not be aware of the fire until they hear the sound of burning furniture, which leads them to the deadliest killer
- in a fire: the smoke.
- the refuge point, which is a relatively safe space for the disabled to wait for help, is only designed for commercial buildings.
- Even if the disabled reach the exit stairs, they would not have the ability to go downstairs by themselves.



Problems

- Heavy smoke
- Breathing problems
- Visual problems
- Communication/positioning (relex panic emotion, be found faster, be helped efficiently)
- Fall from wheelchair/couldn't get into wheelchairs with panic emotion
- Can not go down stairs by themselves
- Don't know how to survive

Opportunities

- What if they can go downstairs by themselves
- What if they can get out of the building without going downstairs
- What if they can create a refuge space to survive until firefighters come

Target User

- People in Wheelchairs
- Live in the residential building with stairs
- Reality makes them have no choice but to live in upper floors
- People who already lived at upper floor before needing wheelchairs

Environment

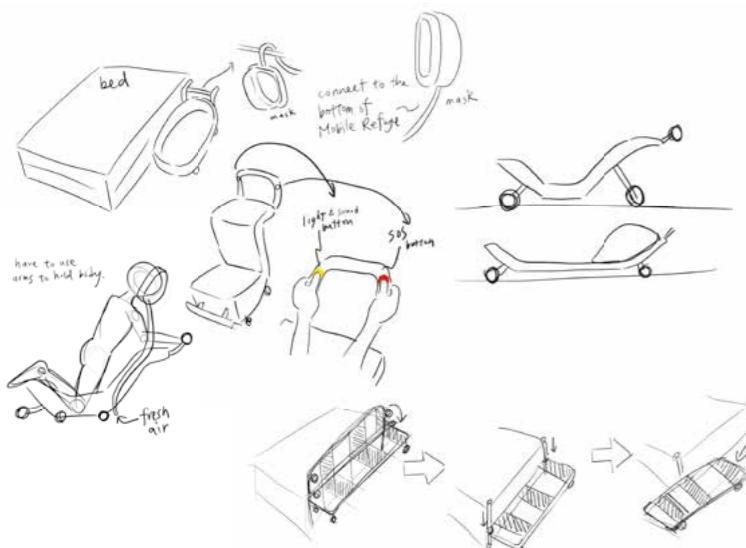
- Residential buildings
- Mutiple floors
- stairs
- no flatmates nor roomates

Concept

Initial Concept

Three concepts are created:

1. The first concept is going downstairs without any help. Some products already exist in the market to help the disabled go downstairs, so the design opportunities are relatively limited.
2. The second concept is getting out of the building without going through stairs. After brainstorming, the ideas were too unrealistic to put into practice.
3. The third concept is creating a refuge space to wait for rescue, which is the chosen concept for further design.



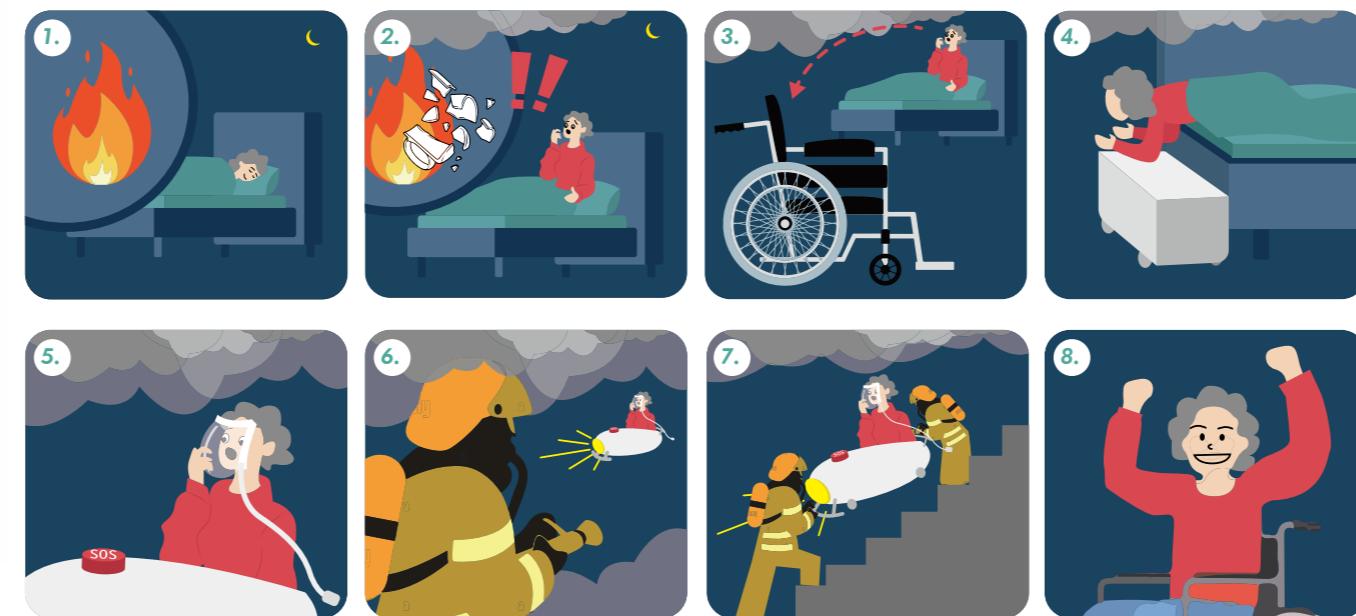
Brainstorming of the way to integrate the Mobile Refuge into bed railings.

Key Insights

People with disabilities need extra time to get into wheelchairs, so when the fire breaks out, they easily miss this best time to evacuate. Not all multi-story residential buildings have a refuge point for disabled people, so they may not find a place to be rescued. In this circumstance, how can they survive in the fire until someone comes to help? Moreover, they can not even do a specific pose to avoid toxic smoke.

What if Question / Identified Opportunity

What if they don't need to leave their bed and can still be safe until getting help?



Concept Description

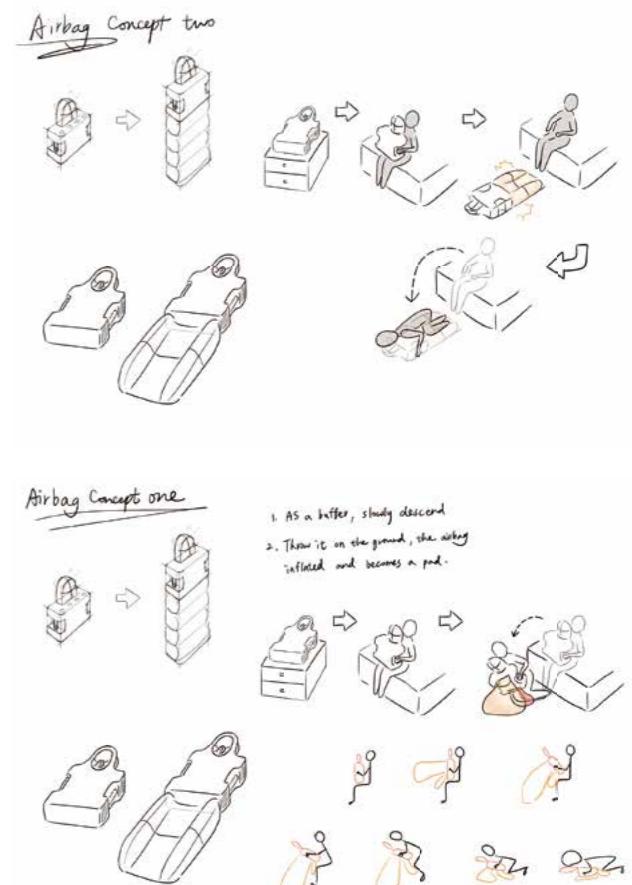
The storyboard (figure 7) shows the concept about creating the Mobile Refuge.

1. The fire occurs.
2. The sound of broken glasses awakens the user.
3. The user realizes the fire and wants to get into the wheelchair. However, the wheelchair cannot help the user to stay in a space with smoke.
4. The user gets into Mobile Refuge.
5. The user puts on the air mask and presses the button that triggers calling the emergency center, turning on the light, and making the sound.
6. The firefighter arrives and notices the light and the sound, so the user is found.
7. The firefighters carry the Mobile Refuge to evacuate the user.
8. The user survives.

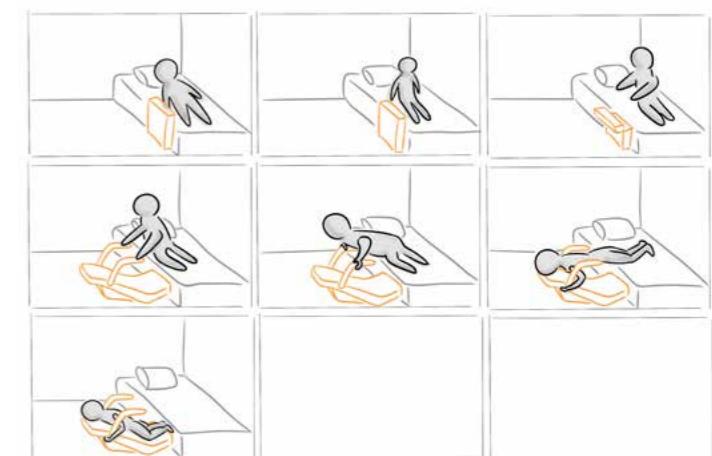
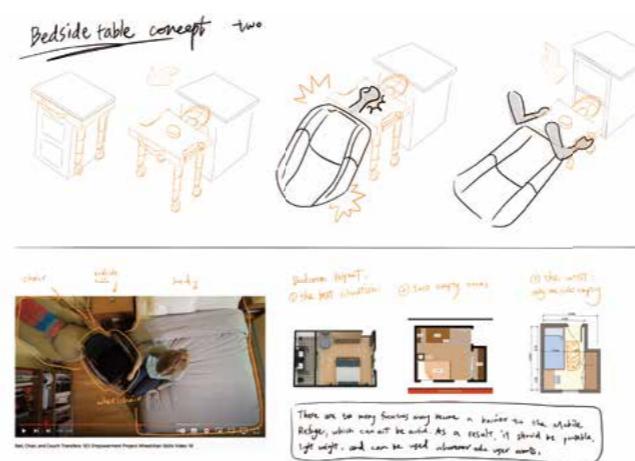
Ideations and Sketches

As the target user is defined as people sitting in wheelchairs and living independently, investigating how the target user transfers between the bed and the wheelchair in an emergency is significant. There are three problems:

1. Failing to reach the wheelchair.
2. The person can not do the lie-down pose in a wheelchair.
3. The transfer time is inefficient.



Different ideas of deployments.



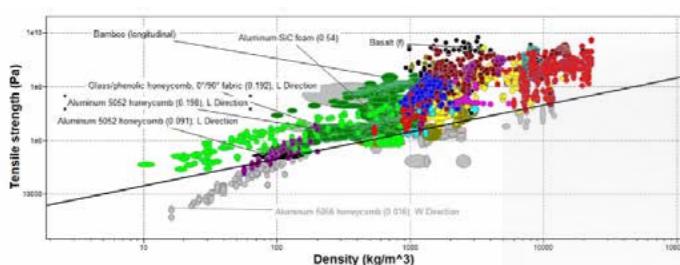
Detailed Design

Mainbody

The main body is composed of the frame, fabric, and cushion. The selection of fabrics and cushions needs to be fireproof following the British Standard 5867:Part 2:1980-Type B.

Frame Material Analysis and Selection

The following three materials are searched from the GRANTA EduPack for comparison. Basalt has the best maximum service temperature and tensile strength, yet the high density makes the product too heavy. The densities of Aluminum 5052 and bamboo are both within the acceptable range. Although Aluminum 5052's tensile strength is slightly lower than bamboo, the service temperature of Aluminum 5052 is better than that of bamboo. Furthermore, in the fire incident circumstance, the service temperature is the crucial factor in selecting **Aluminum 5052** as the material of the frame.



Alert

This feature is designed to give rescuers audible clues to find victims faster in environments with limited visibility. The audio's volume and frequencies are followed by the Standard on Personal Alert Safety Systems.

Volume	(93 dB/W)
Rated Power	3 (W)
Frequency	150 (Hz) - 20 (kHz)

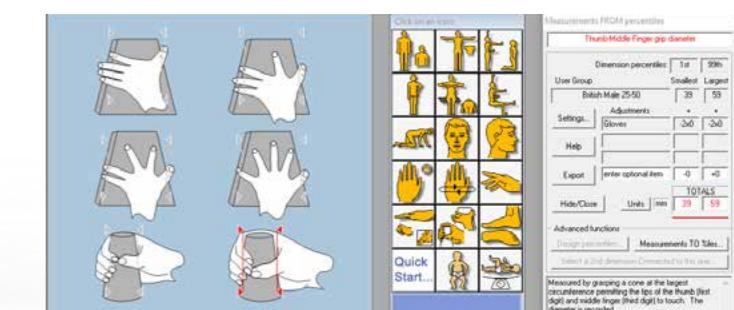
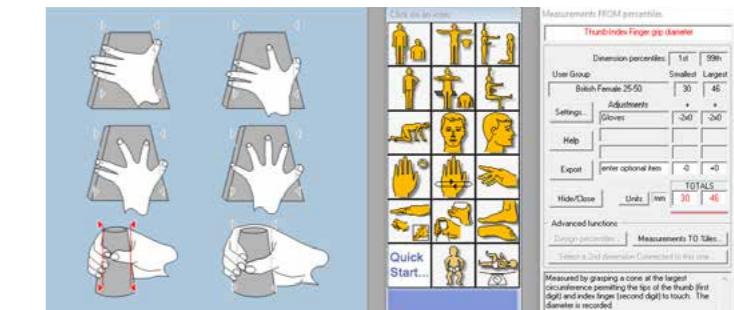


Transparent cover

Transparent cover allows users to see through while protecting from poison gas intrusion.

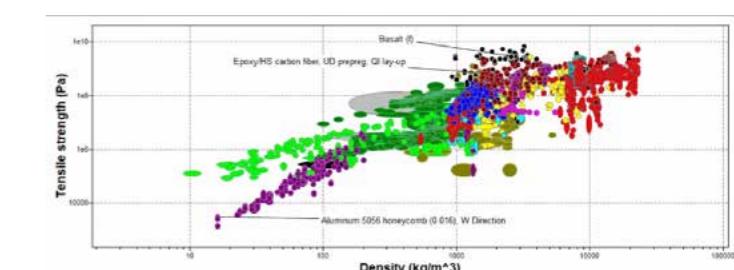
Handles

Using Peoplesizes software, the ideal diameter for a tool handle is calculated to be **33 (mm)**, which is also the finding that validates an existing biomechanical model of the hand.



Handles & Foothold Material Analysis and Selection

Basalt has high tensile strength and the best heat resistance, yet its density is the highest of the three materials. Aluminum 5056 is the lightest material, but the tensile strength is too low. Epoxy/HS carbon fiber's heat resistance is slightly better than aluminum 5056. However, after calculation, the price of this product is almost ten times that of the other two materials, so it is not taken into account first. One of the necessary conditions for the handles and foothold is to bear the weight, so the Aluminum 5056 with a minor tensile strength was removed. Basalt was the final choice.



SCBA

The **open-circuit SCBA** is selected in this design because the close-circuit contains pure oxygen, which is unsuitable for fire circumstances. The SCBA should provide fresh air to **breathe for an hour** to achieve the PDS, and the volume is calculated as 11.34 (L).

Material of the Air Tank

The material of the air tank is typically made of aluminum, steel, or composite construction. The composite construction has the lowest density and the lowest lifespan that must be taken out of service after 15 years. Hence, the second priority material is **aluminum**. Besides, the shape of the air tank is different from the existing products, which are designed to fit the Mobile Refuge. Both features and materials of the existing air tank are applied to the design.



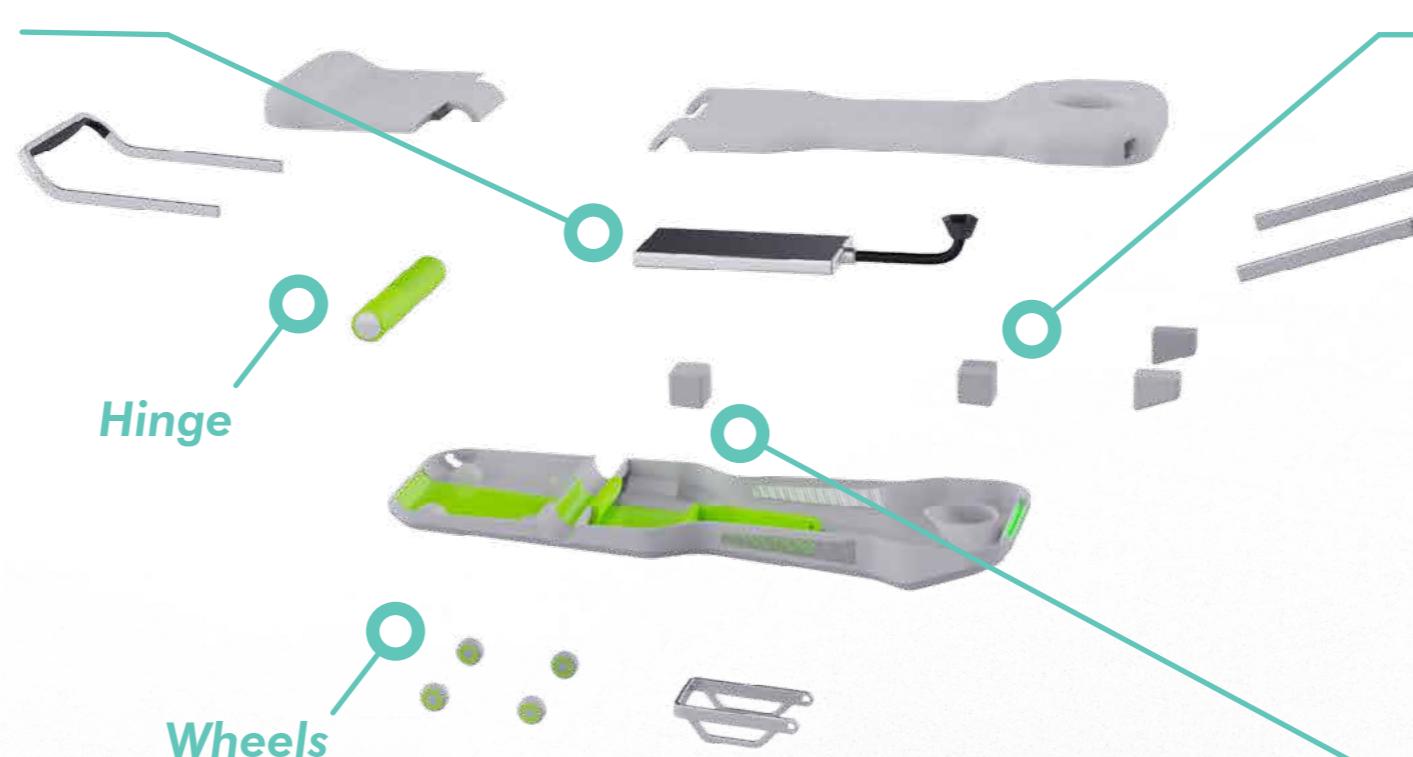
Hole for Breathing

The design of the sharp corners under the oval shape enhances the user experience. In addition, in an emergency, just lying directly on the Mobile Refuge and getting fresh air in a thick smoke environment without additional actions. An air mask is included in the hole.



Foothold

The foothold in the bottom is vital to support the weight, and also, when it is rotated out, it triggers to turn on all the features, including calling the emergency center, light, and alert. The user need only one move to use the product, considering the panic emotion in an emergency.

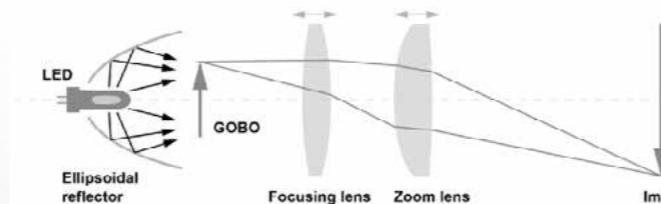


Light

This light's design aims to increase the possibility for the victim to be located within a particular radius in an area with a lot of smoke and poor vision. The light projects arrows on the ground leading the victim toward themselves using **green LEDs**. The arrow projected on the ground can be fulfilled with the light glass projection principle.

Why Green?

1. Green light performs less distortion when it is diffracted and scattered by smoke
2. People typically interpret green as "safe".



Handle Cusion

high-temperature resistance, increasing friction, improving the experience when holding



Communication System

Once the foothold has been rotated out, and calls may be placed, the communication system is activated to establish a connection to monitoring centers. This feature may make use of the Tunstall brand's existing system. Tunstall's product is called "The Lifeline Smart Hub," which connects to monitoring centers using IP technologies and VOIP over a 4G connection.



Voltage	3.3 (V)
Current	1.5 (A)

Batteries

The battery provides energy to lights, the alert, and the communication system. The product has to be used continuously for at least an hour, using the specifications to calculate the needed power of each feature. The total energy needed is 12.99 (Wh). **18650 battery** is selected to apply in this product and to provide enough energy, the product needs at least two 18650 batteries, which is 24.12 (Wh).



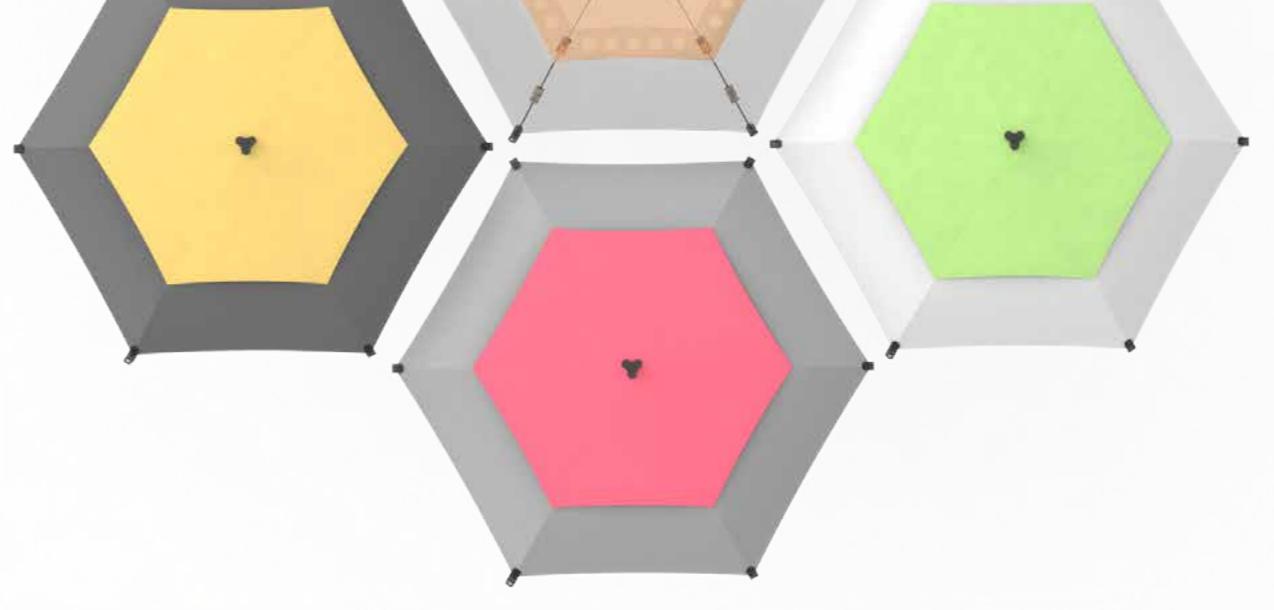
Brand	Sinowatt
Model	34MP
Diameter	18.6 (mm)
Height	66.1 (mm)
Nominal Capacity	3350 (mAh)
Nominal Voltage	3.6 (V)
Discharge	3A Max Continuous
Weight	49 (g)
Light type	12LED*2
Color	Green
Battery	3.6 (V) 700 (mAh)
Lifespan	100,000 hours
Brightness	16 Lux

Rain O Shine

A Modular Umbrella Design

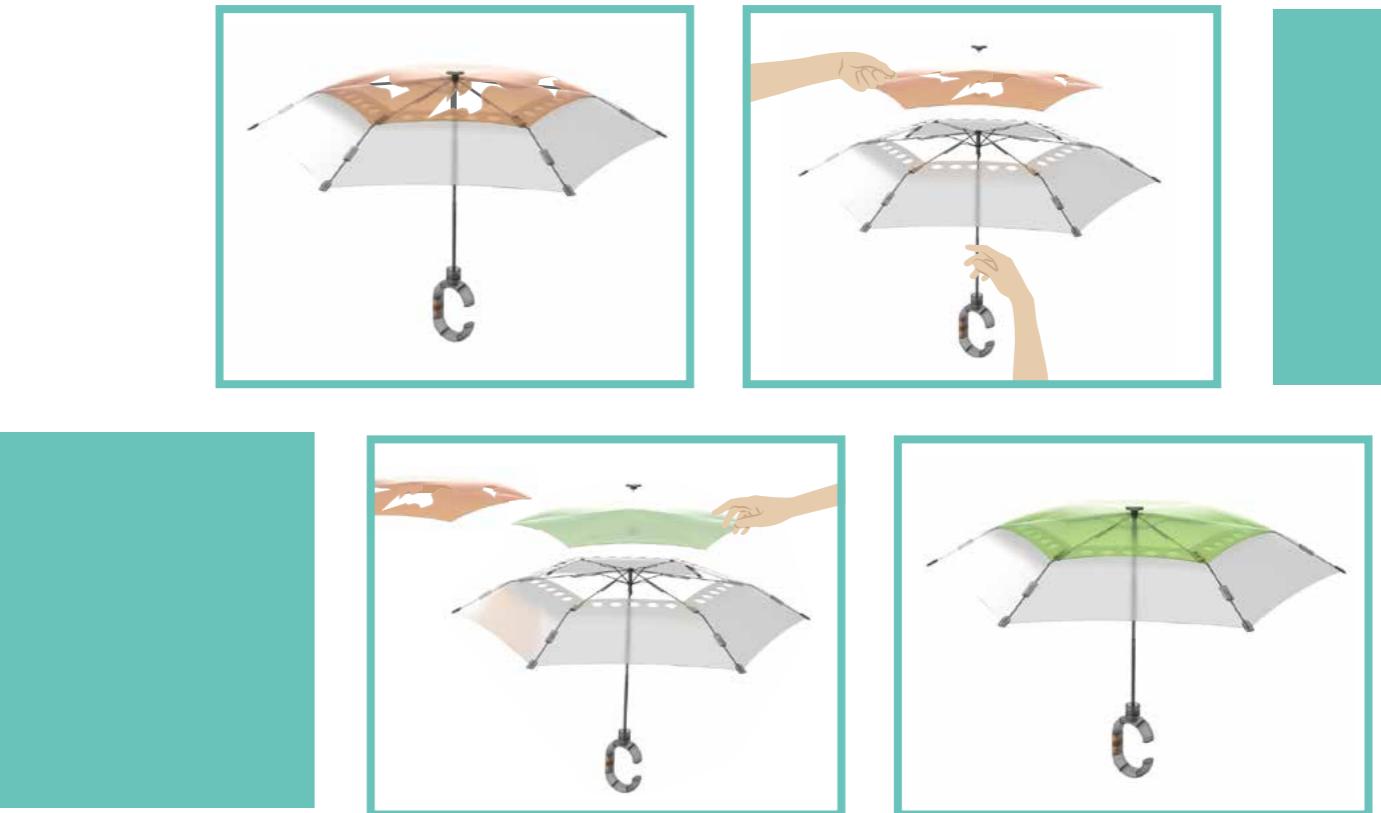
Designer

Szu-hua Chen | Zhihao Hu | Rahul Verma



RAIN O SHINE

Rain-O-Shine is a repairable and recyclable umbrella designed to give modular functionality. Users can change the parts without discarding the whole umbrella saving in costs and material waste, and they can also replace components that fit the desired needs. This product is a step to improve recyclability and help to curb environmental pollution.





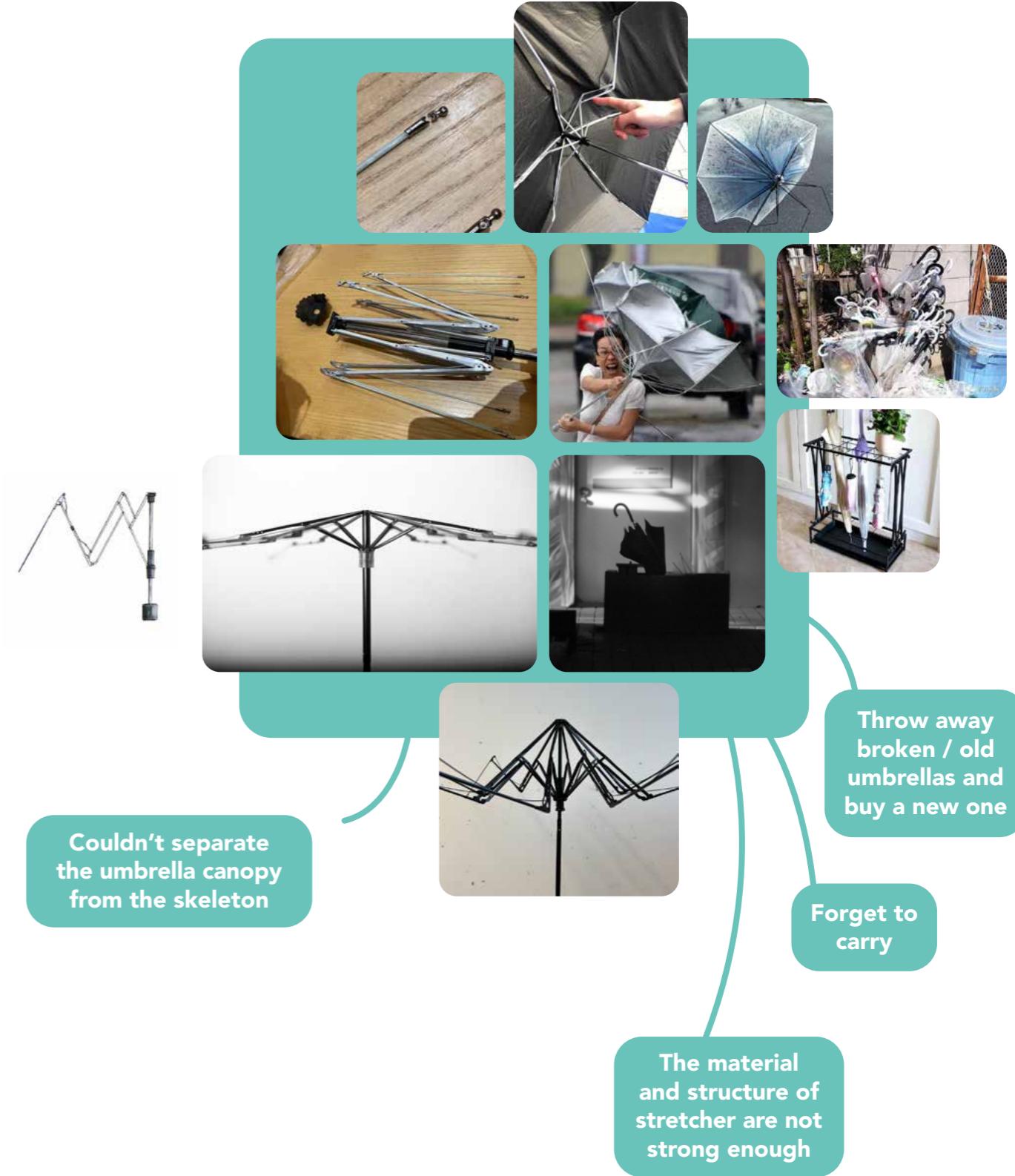
Background

Why Choose The Umbrella

Starting from daily life, I found much waste of disposable supplies. After a series of investigations, I decided to focus on the products that are easy to discard during the travel process. In the idea of travel, I divided travel into several different areas to discuss, such as picnics, camping, road travel, and so on. I listed the products that will be used in these activities and found many repetitive things. To classify these things, I start from materials that are easy to recycle, such as fabric and metal. The focus is on umbrellas. Umbrellas are items that are used in every travel. Although they are not disposable

products, they have a high replacement rate. This has attracted my attention. Is the umbrella too fragile and easy to break, or is there another reason? Such as buying new ones because of forgetting to bring umbrellas or accidentally losing umbrellas. And it is common to see broken umbrellas in bins because of the fractured skeleton and canopies.

Insights



Initial Concept

Sketches

Visualizing problems and think the most straightforward way as solutions.

1. Hanging the umbrella on the table prevents people from forgetting to carry it.
2. Let the wind go through the canopy in order to reduce the damage.
3. Disassemble and modular design enable people to recycle umbrellas well.

Concept 1:

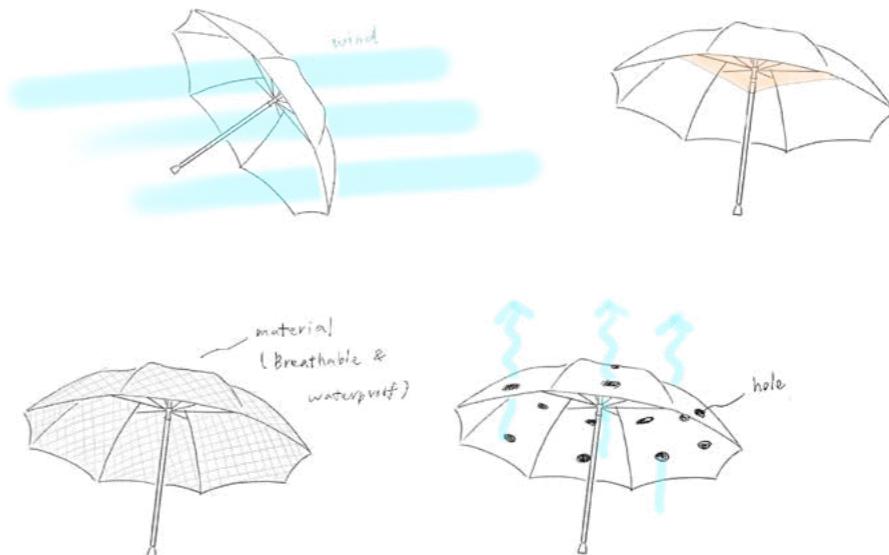
We often find broken umbrellas in the bins without recycling, causing environmental issues. Most people do not know that the umbrella needs to be disassembled to recycle or repair because it is difficult/unable to do so. Designing a modular and dismantled system can be a solution.



Concept 2:

The most common damage is the structure of the umbrella. And most of the time, the umbrella could not hold the strong wind. The solution for

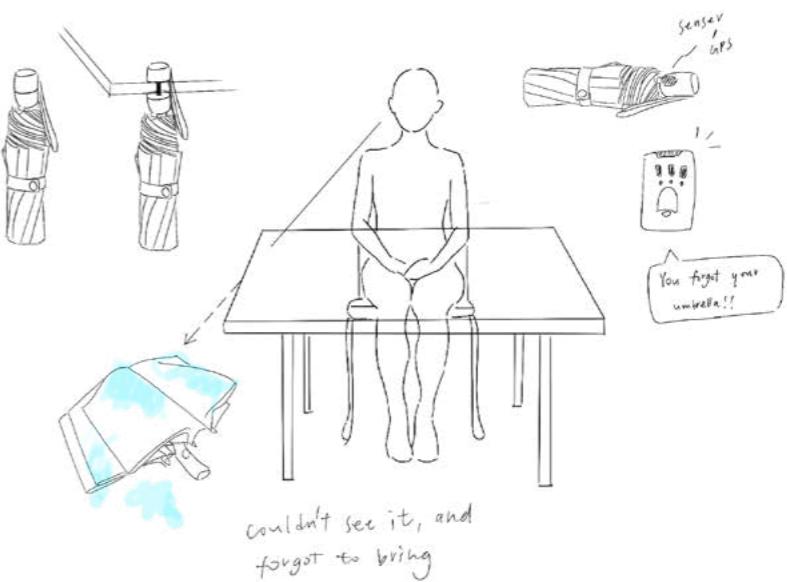
this problem is: the umbrella canopy can let the wind pass through it or handle the heavy wind without structural damage.



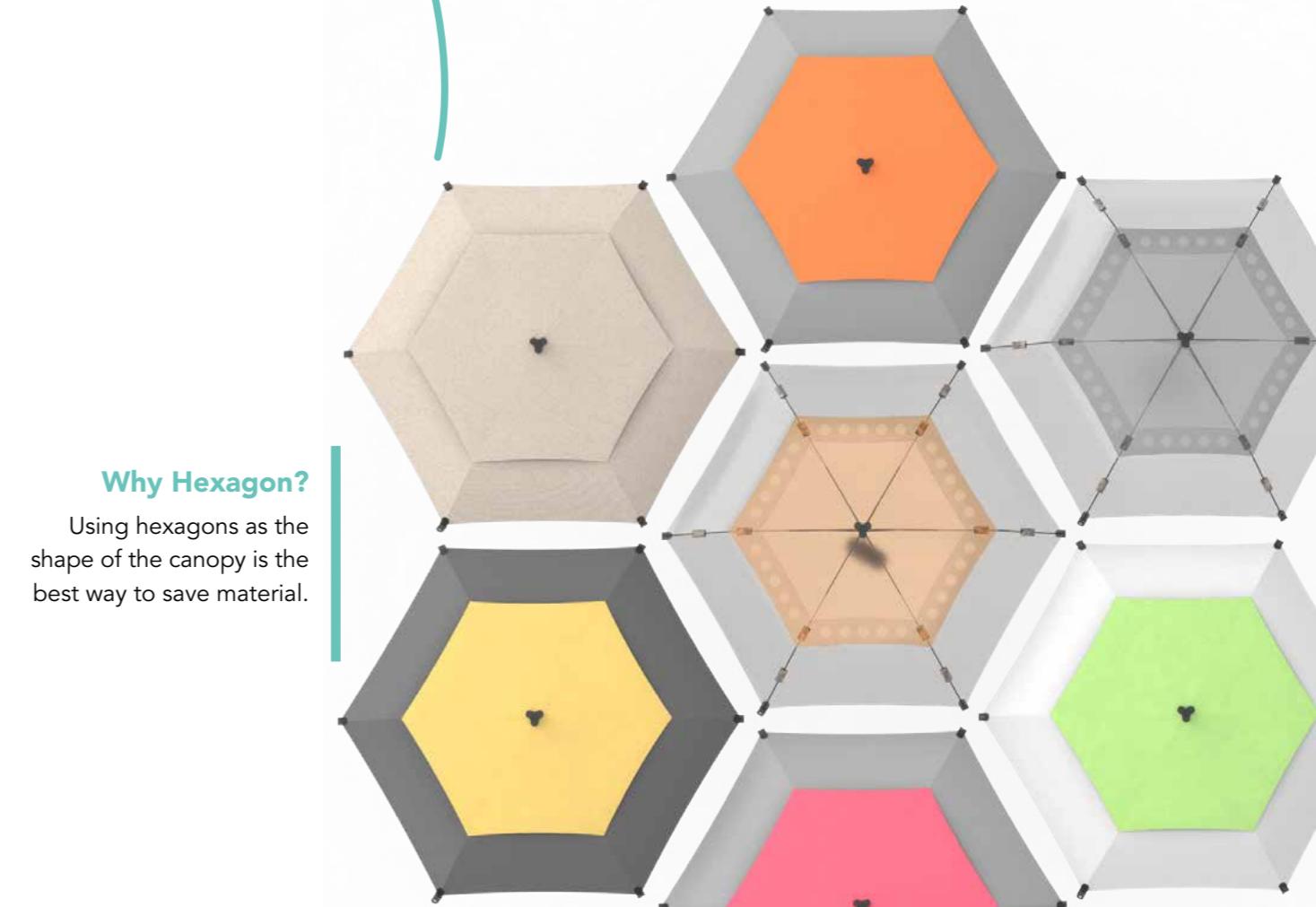
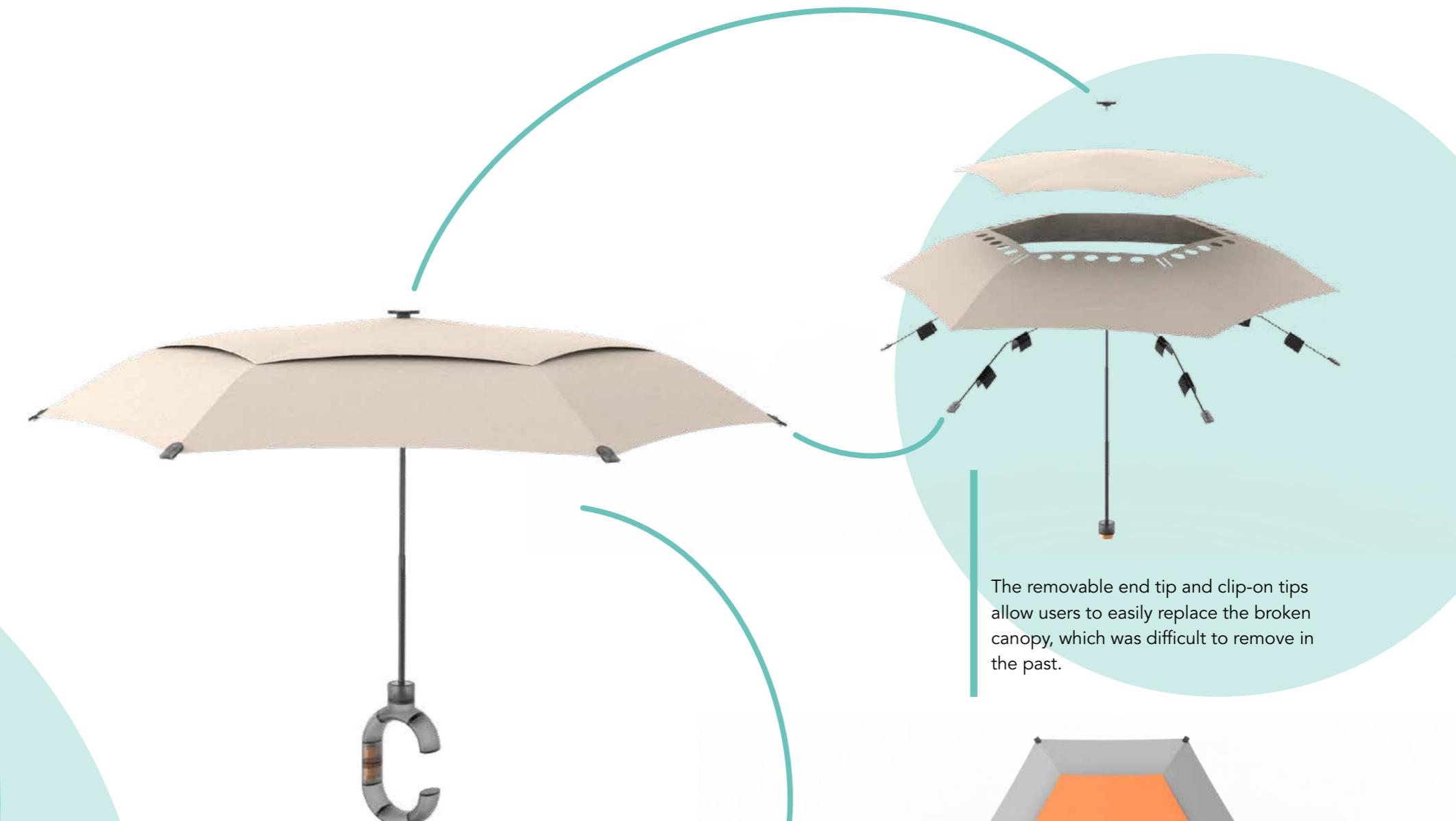
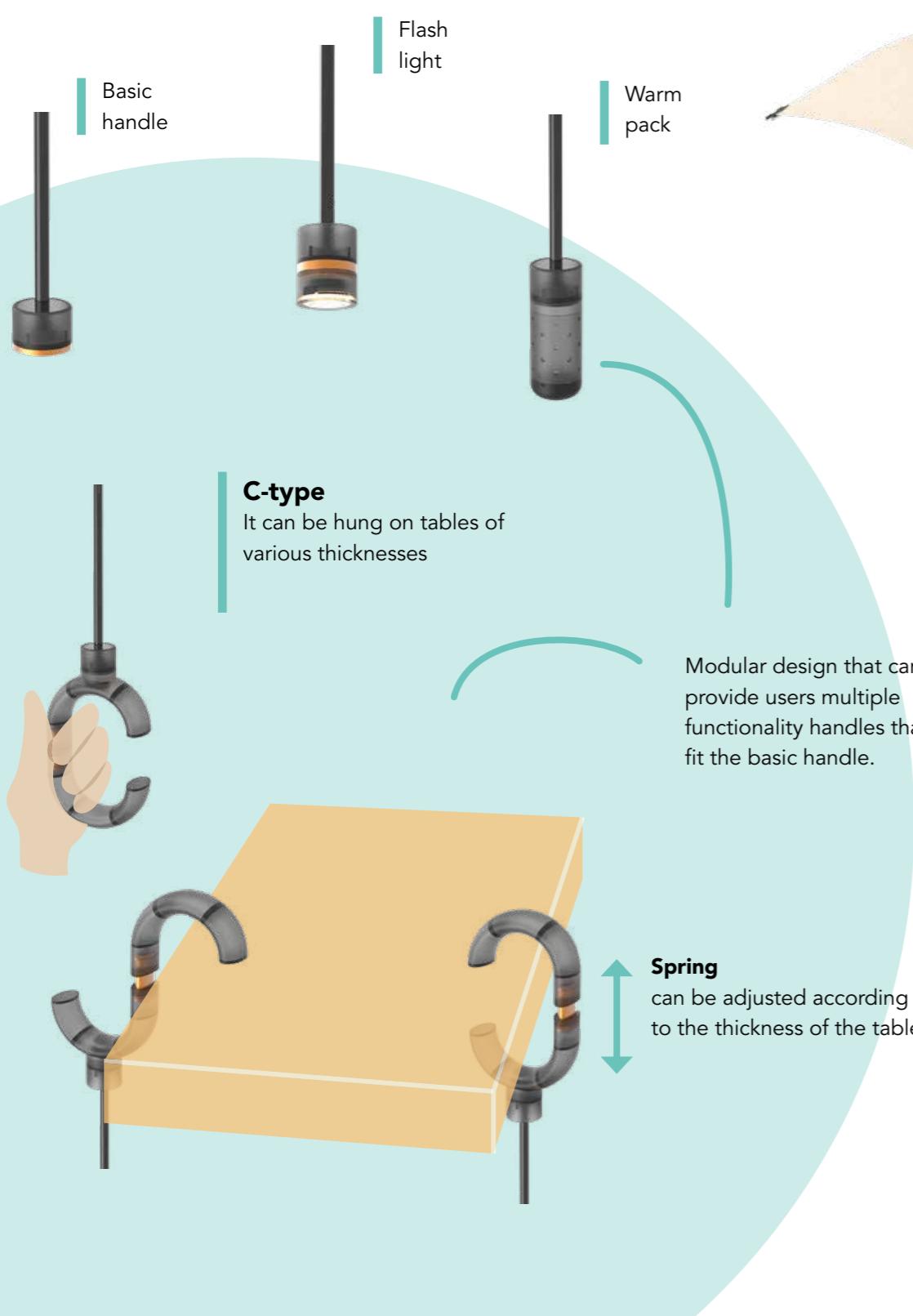
Concept 3:

There are many umbrellas in the lost and found office because umbrellas are too easy to be forgotten and lost. Hanging the umbrella on the table can effectively remind the user to remember

to take the umbrella. Moreover, Combining the modular design concept to the handle, users can select appropriate functions according to their needs (such as App reminding).



Concept Development





Introductory video



Material Research

In addition to extending the service life and recycling rate of umbrellas, the selection of materials is also significant. In order to approach the circular economy, we researched environmental protection materials. We found a fabric made of bamboo as raw material, which is suitable for our needs, waterproof, solid, and environmentally friendly.

Canopy

Bamboo Fabric: It is a sustainable material, and it is worth doing further research on it. For example, how to make it more waterproof and apply it to the canopy.

Scenario 1

When the user has too many things to hold on hands, the C-typed modular handle design provides another convenient way to use the umbrella.



Using a handle with flash light at night.



Using heater handle to keep warm in a cold day.



Scenario 2

When the canopy is broken, the user can easily replace it using the velcro and end tip. Because of the removable design, the umbrella life span is extended.

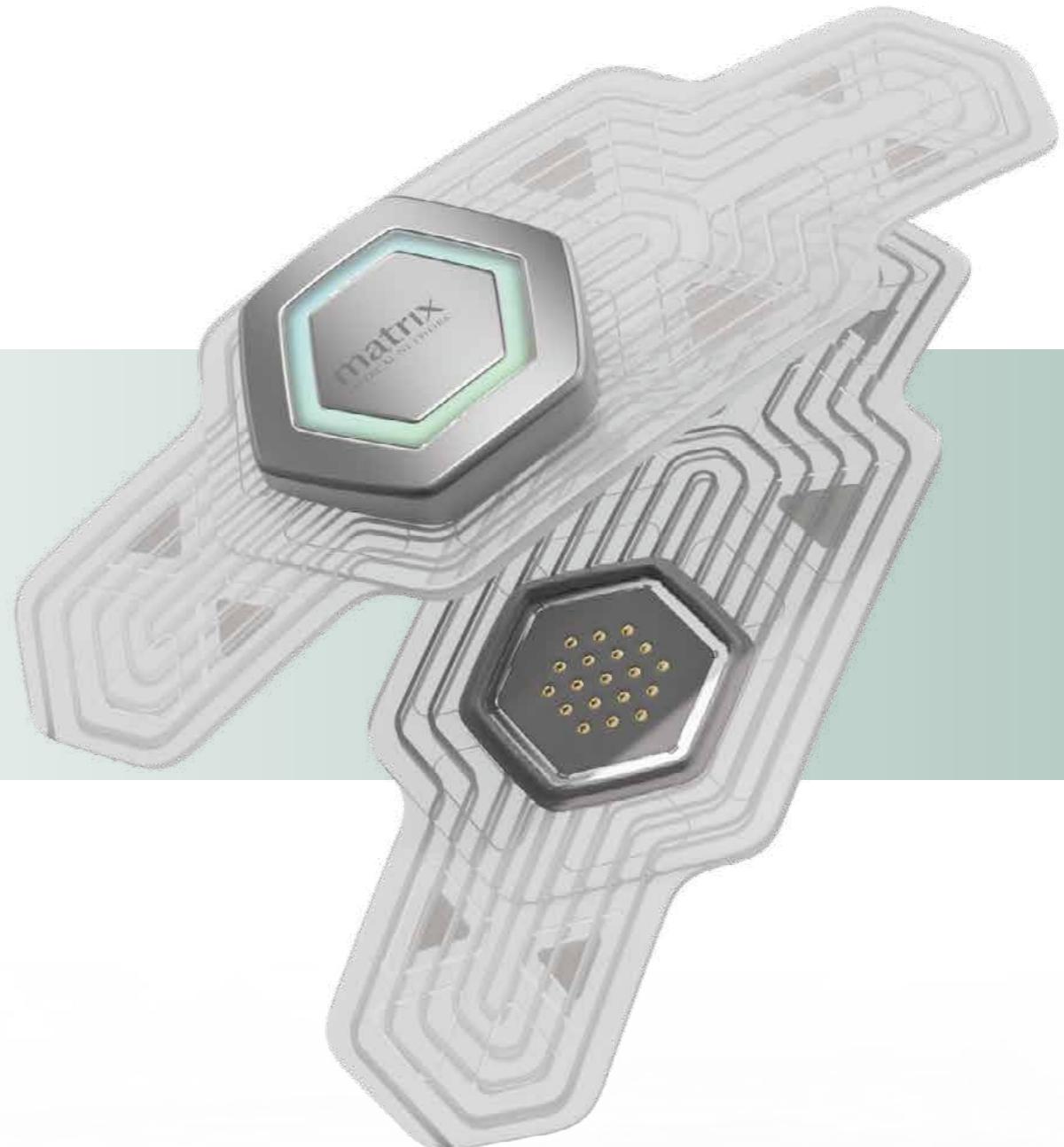
Sweat Detector

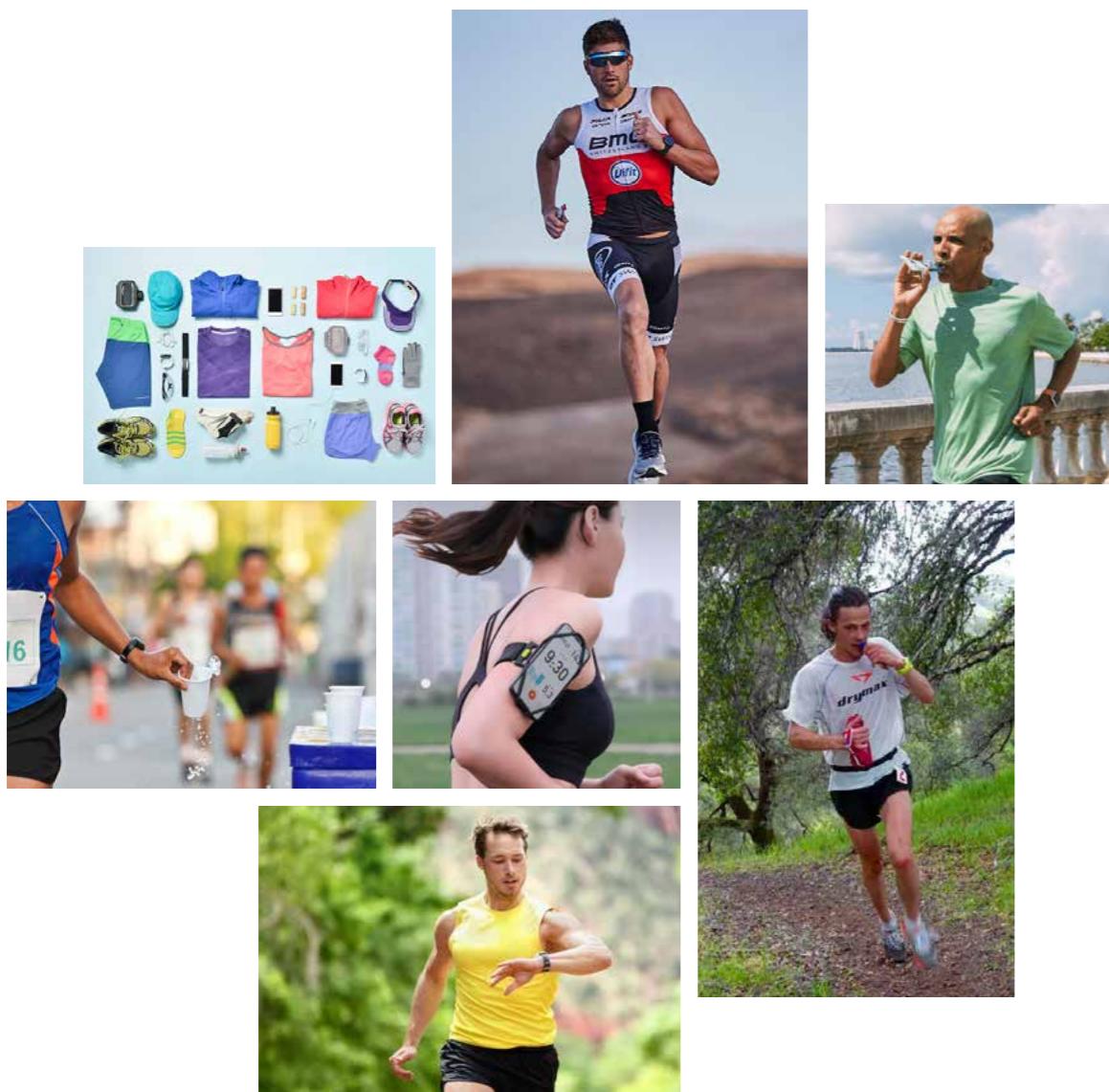
Designer
Szu-hua Chen

Intro

Medical technologies related to human body data detection have existed on the market for many years, such as blood, urine, and stool analysis. But the most common and readily available form is the least used sweat. Now that the technology for analyzing sweat is known finding a suitable target user and its application method is necessary.

This product is a sweat detector designed for joggers. According to the data analysis of changes in sweat ions during exercise, athletes can replenish hydration and nutrition accurately to improve sports performance efficiently. Moreover, quantifying the athlete's body data and energy supply can better realize scientific training.





Target User

Supplement during training

Supplement for training:
The supplement of water and nutrition is required during training. Replenishing water and energy needed during long-distance running can effectively improve sports performance. The traditional method is to have supplement stands within a specific distance. However,

according to the change in sweat composition over time, it can be more effective to replenish a particular amount of supplement when the body really needed. Moreover, sweat detection can quantify the athlete's body data to fulfill the scientific training method better.

Style

- Speed
- Personalized
- Concise
- Neat

Common accessories

- Smartwatch
- Sports phone arm bag

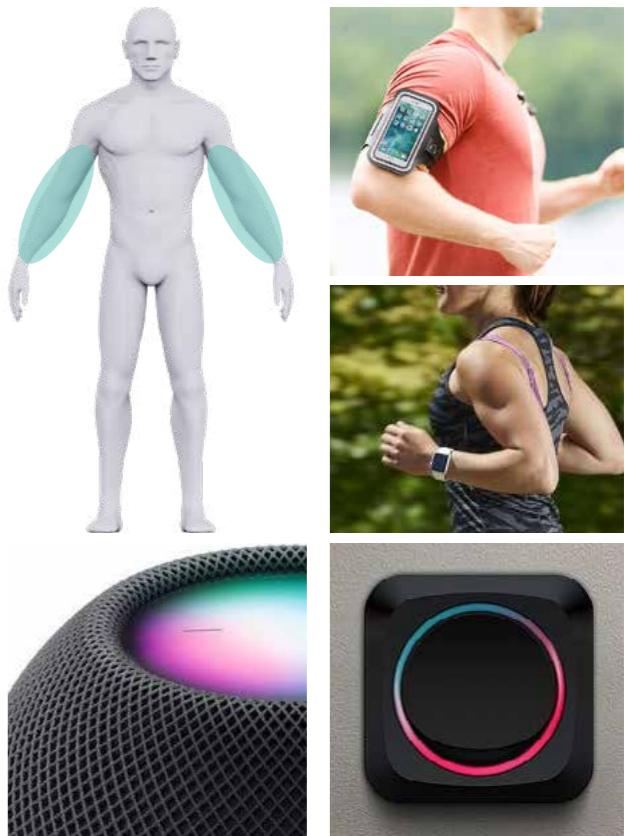
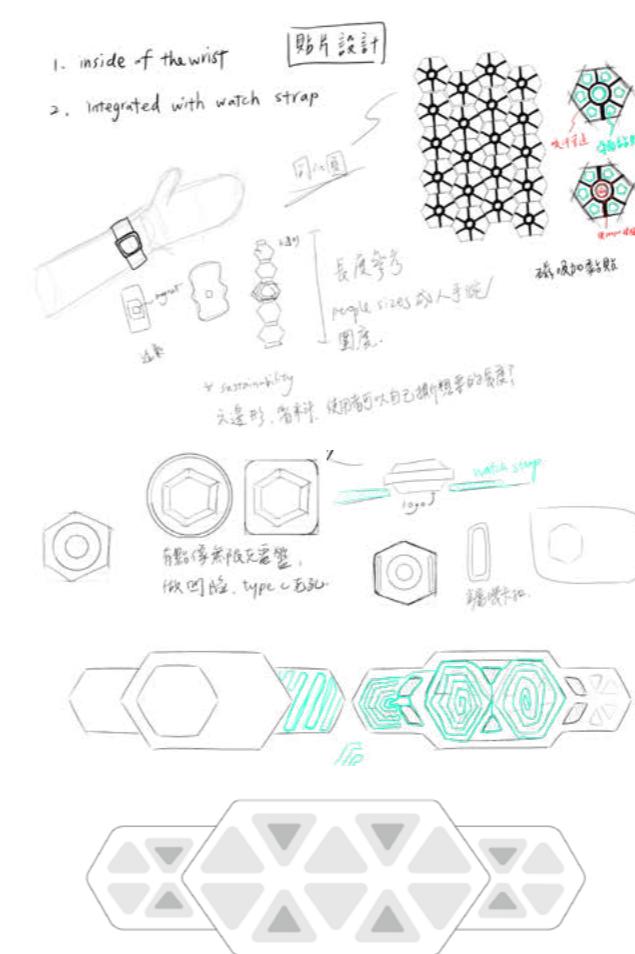
Product UX

Why is the device placed on the arm?

- The muscles are less likely to be stretched during running
- Sweat densely secreted point. For long-distance running, basically, the eccrine glands under the skin of the whole body will sweat, so there is no need to choose a place where sweat is densely secreted.
- Avoid places with hair. It will peel off hair easily and get hurt when the device is torn off.
- The use of the smartwatch and the phone arm bag of runners. Combining the device with those existing wearable products
- One-handed operation

Information Presentation

- Hydration reminder
- Supplementary nutrition reminder
- The color changing of sweat absorption of the patch enhances legibility



Concept Development

Key design element

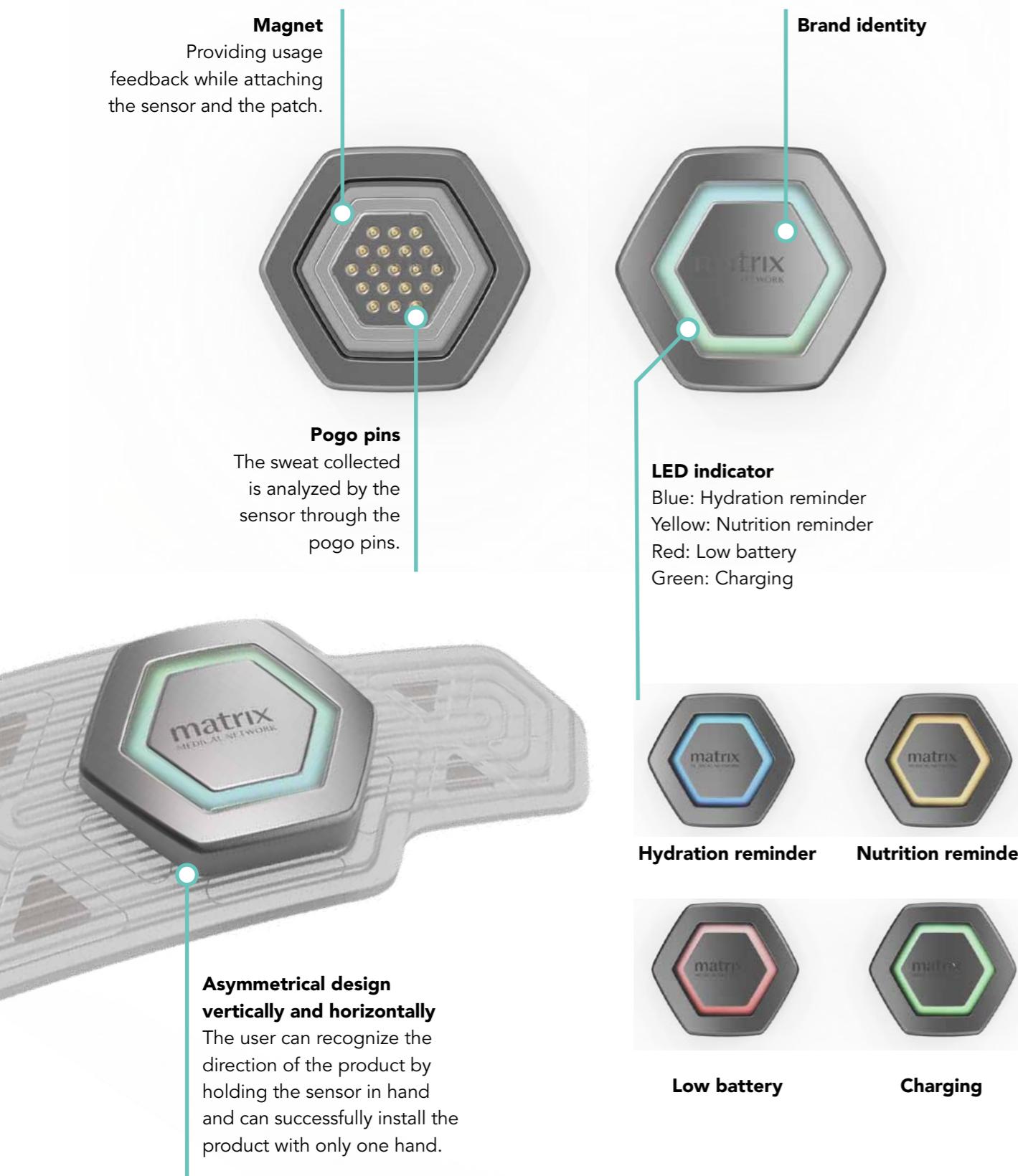
- Athlete-oriented: individuality, strength, speedy
- Medical product-oriented: gentle and approachable

The **hexagon** is the main design element to present a strong style. The rounded corners and curved edges are used as decorations, so the overall product retains the design language of medical equipment.

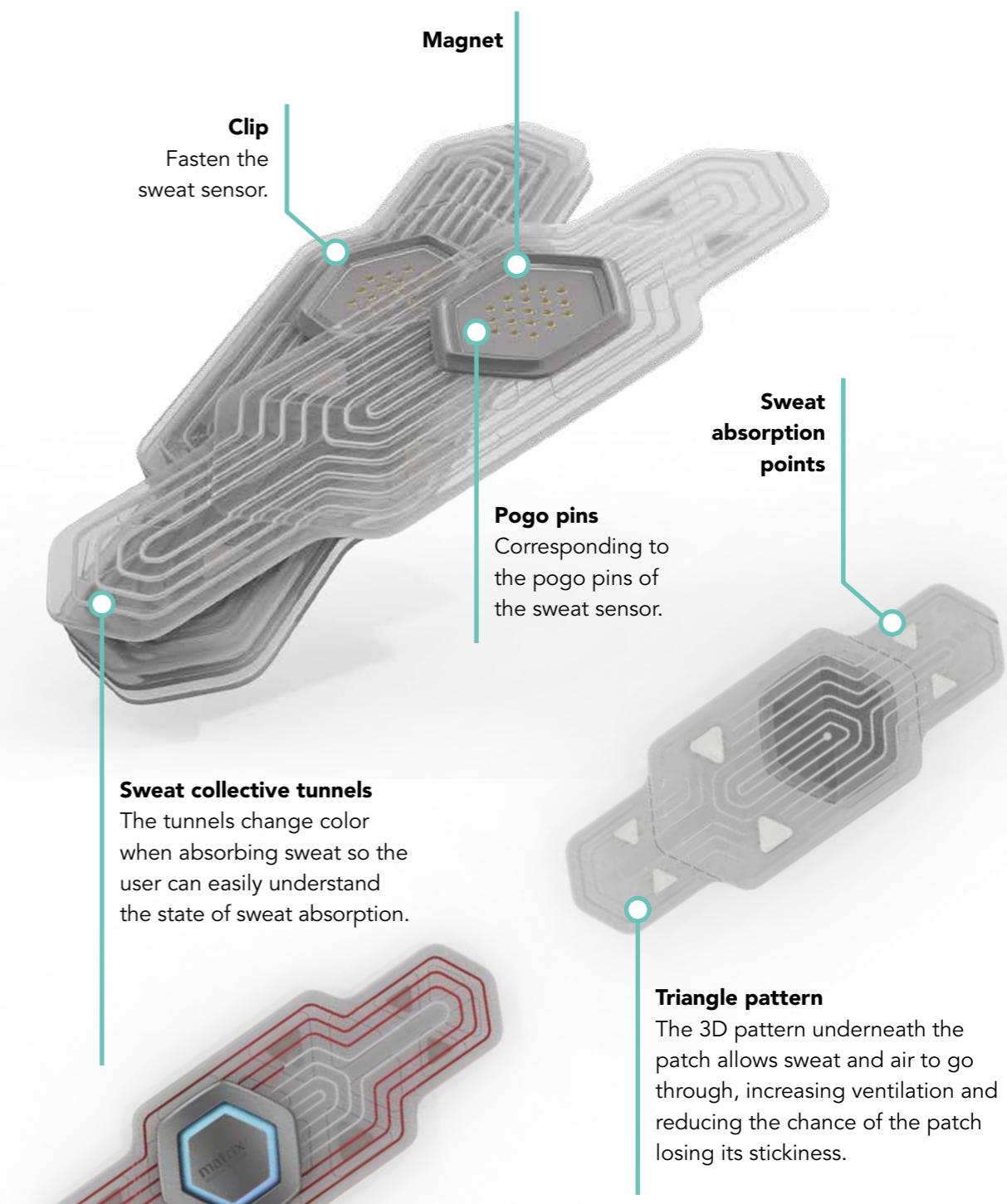
Sweat detection sensor

- Use three colors to indicate a lack of hydration, nutrition, and charging feedback.
- **Magnet** is used to position and provide feedback when attaching to the patch.

Sweat Detection Sensor Details



Sweat Collective Patch Details



Children Watch

Designer
Szu-hua Chen

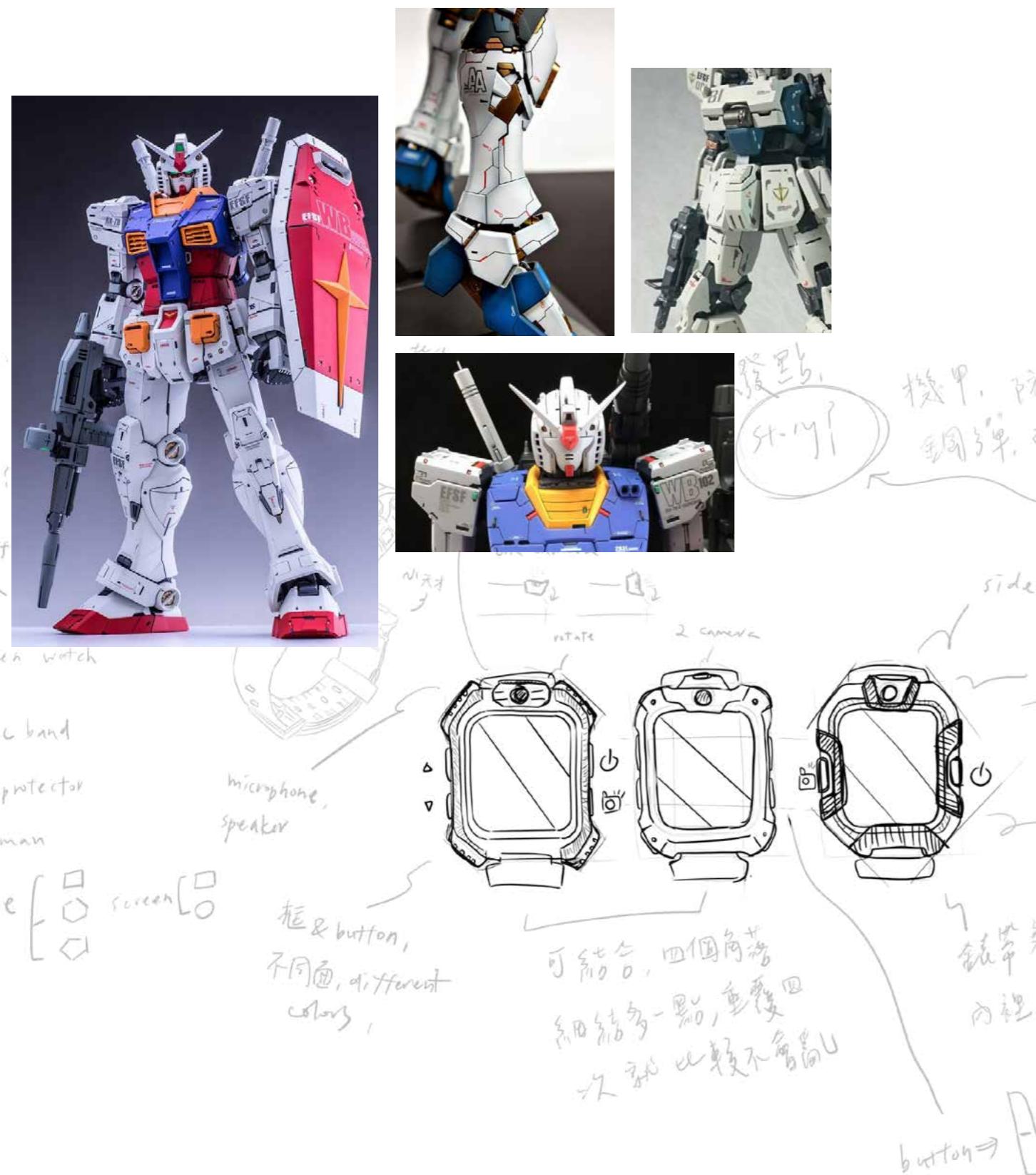


Intro

In recent years, it has become an increasingly popular choice for parents to buy smartwatches rather than smartphones for their children. This design focuses on how children interact with the device and product interface. Moreover, the product style and colors are based on Gundam in order to catch children's eye.



Ideation



Product Details

Large size buttons

Children are still in the growing stage, their fingers are not flexible, and the probability of accidental touch is relatively high, so the buttons are designed with a large size.

Front/rear cameras toggle button

Considering the user requirements, most parents tend to use the video call function to confirm the safety of their children. One of the most important functions is to see the environment where the children are and the children themselves. As a result, the function of toggling front/rear cameras is specially designed into a separate button.

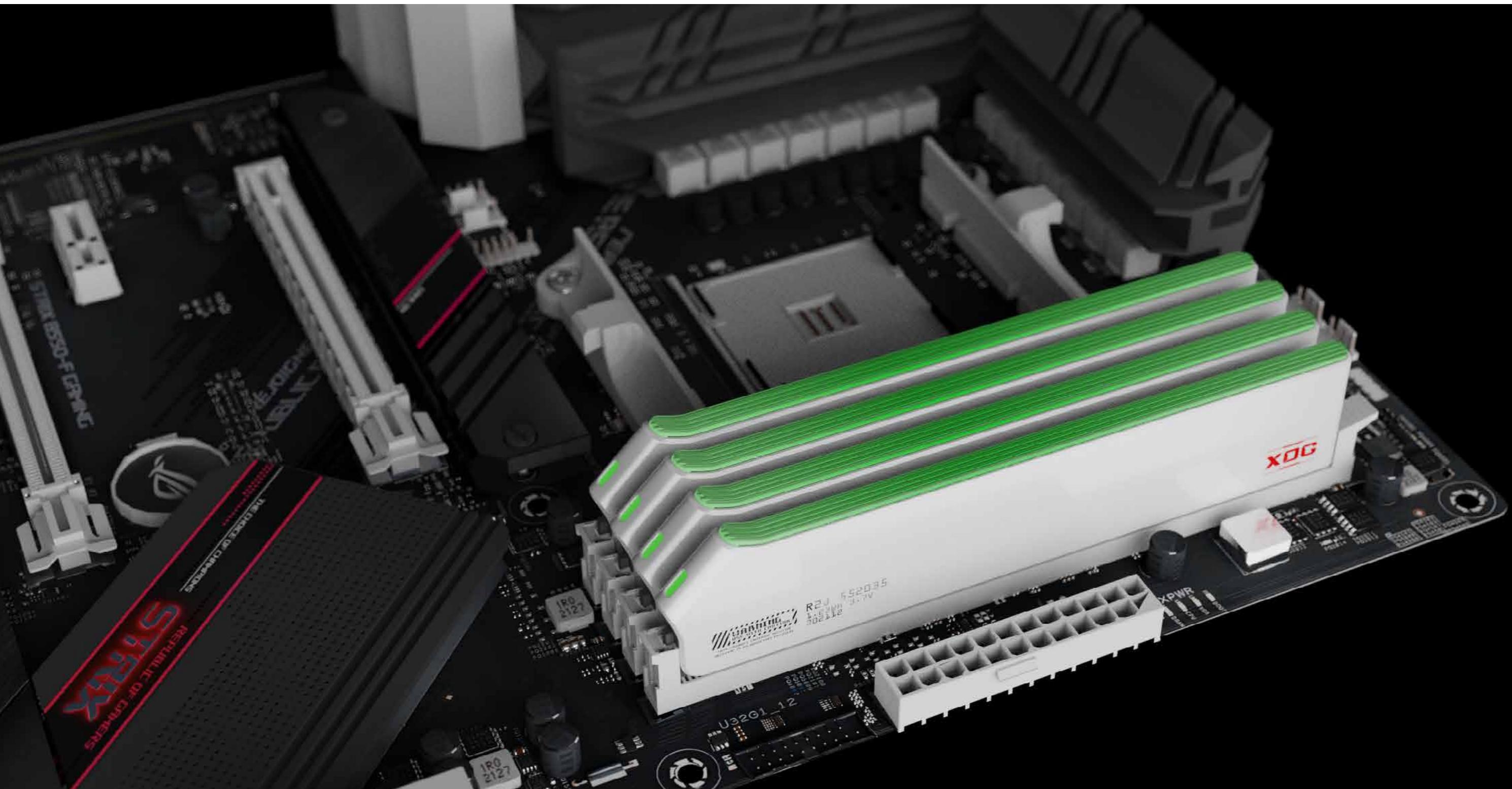


DDR4 RAM Stick

Designer
Szu-hua Chen

Intro

Different from the common RAM on the market, this design targets women. The minimalist style and customized light bar design make the product more individual and unique.



Product Positioning

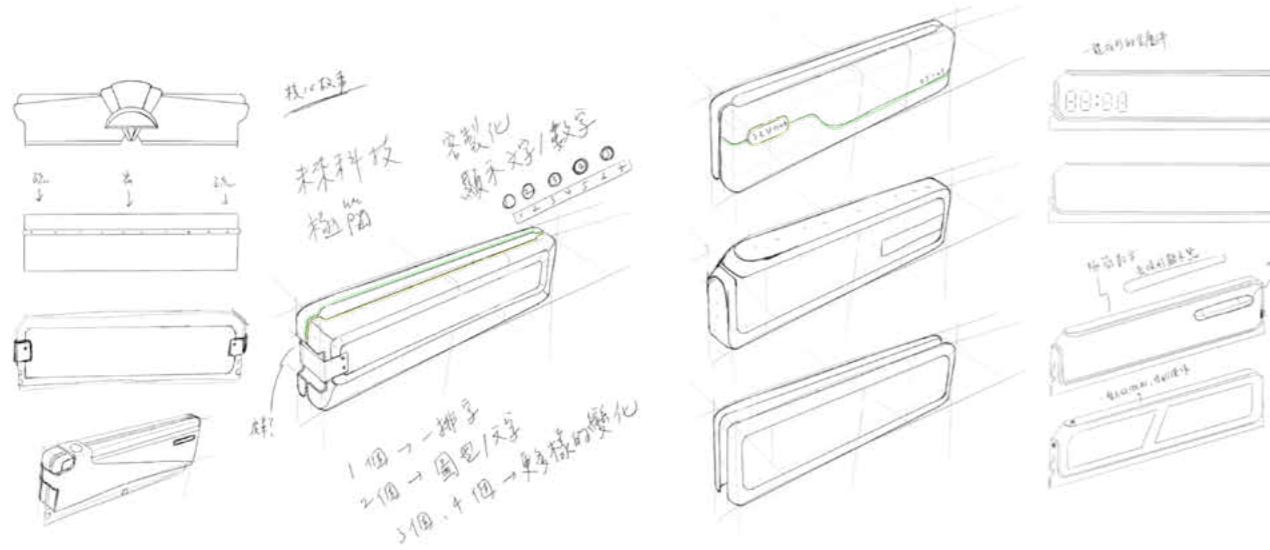
Existing Products

- Mecha
- Lighting
- Sharp
- Masculine

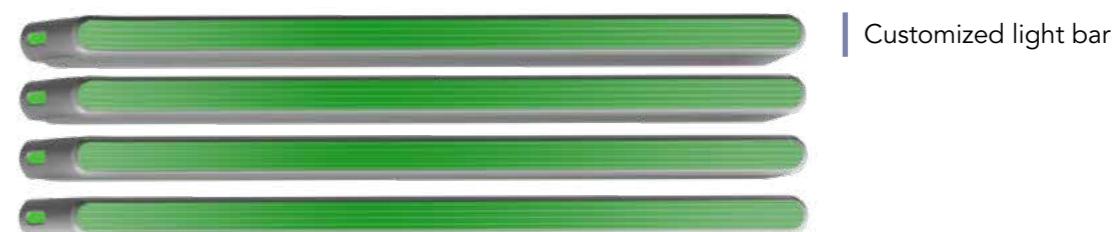


Design Opportunities

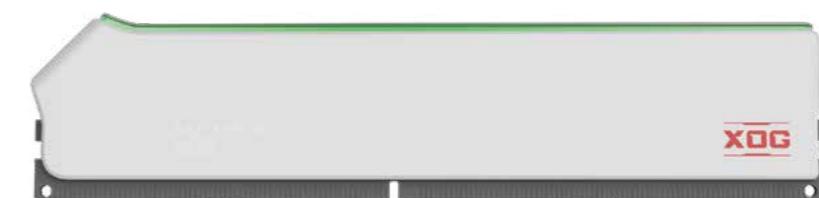
- Neutral
- Feminine
- Streamlined
- Personalized
- Customized



Product Details



Customized light bar



Brand identity



Buckle design



Lighting decoration

portfolio

SZUHUA CHEN

E-mail: note2szuhua@gmail.com

Tel: +44 7565 876075

Linkedin: www.linkedin.com/in/szu-hua-chen-378834130