



Accident Site Visibility Enhancement

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MFA Advanced Product Design Term Project/ Fall Semester 2022/2023

The safety triangle is the most commonly used equipment in traffic police's vehicles.

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"Gear is not easily adjustable between high and low **visibility**... "

"Other cars might **ignore the secured area** and drive through anyways... "

"The **visibility** now is not enough, sometimes other people can't see us st all, they don't know it's an accident site... "

> "Sometimes people **don't respect** us enough, although we've lightened up the warning signal they still drove really fast - which is dangerous to us."

"Putting up warning equipment is generally time-consuming and easy to forget."

Handling

Due to the triangle's frame being covered by canvas fabric, it's difficult to grab it by bare hands.



Weight

Due to the reason it has to stand stablely against strong wind, extra steel cube are added on four feet.

VETEKO

BATTER

JWL WEIGHING SCALE

CHARGE HI OK LOW

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M-SET

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Height

The height for now is around 90 cm which is easy to be blocked by the police vehicle.



Visibility

In order to achieve better visibility, the police used a new tent version which has brighter color on each side.



Fabric

The product currently has a bag to put in, but due to its structure it is very difficult to fold it away completely by one person.

Size

The over product now has a length of 110cm in total, which makes it hard to fit inside a police car.





Handling Inconvenience

Due to the triangle's frame being covered by canvas fabric, it's difficult to grab it by bare hands.



Visibility Need

In order to achieve better visibility, the police used a new tent version which has brighter color on each side.



2. Unnecessary Weight

Due to the reason it has to stand stablely against strong wind, extra steel cube are added on four feet.



Fabric

The product currently has a bag to put in, but due to its structure it is very difficult to fold it away completely by one person.



3. Insufficient Height

The height for now is around 90 cm which is easy to be blocked by the police vehicle.



6. | Size Control

The over product now has a length of 110cm in total, which makes it hard to fit inside a police car. How to offer them with a new product which can fulfill these 3 requirements:

"Ergonomically Friendly"

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Easy to use instead of being over time-consuming.

"More Portable"

In a more smaller volume

"More Visible"

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he visibility can be more flexibly adjustable.







Cons: Fragile Structure **Pros:** Lightweight, Foldable.

Cons: Fragile Structure **Pros:** Lightweight, Foldable; Handle. **Cons:** Curvatual structure hard to fit inside the car **Pros:** Foldable, Clean.

Cons: Strange structure; Cannot stand in hard wind. **Pros:** Foldable, Extendable. 06.

paper cardboard prototypes

05.





Cons: Fragile Structure **Pros:** Lightweight, Foldable, Fast-deployed. **Cons:** -**Pros:** Professional, Relatable, Stable.

* Selection Standard: Direct and simple structure



05.

steel wire prototypes





mixed material prototypes

07.



paper cardboard prototypes

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Cons: Fragile Structure **Pros:** Lightweight, Foldable. **Cons:** -**Pros:** Professional, Relatable, Stable.

* Selection Standard: Direct and simple structure

"High Readability"

The product needs to have a clean and comfortable structure for user to grab on and unfold.





Handling Inconvenience

HABRIC

By making it more compact and weight-balanced to offer user with a better experience when using it.

> Height solution

> Fabric solution

> Weight solution



Unnecessary Weight Due to the reason it has to stand stablely against strong wind, extra steel cube are added on four feet.

Volume Control

The over product now has a length of 110cm in total, which makes it hard to fit inside a police car.



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TRANC TESLE



Plan C (feet)





By making it more compact and weight-balanced to offer user with a better experience when using it.

> Height solution

> Fabric solution

> Weight solution



Original Weight: 6kg



Unnecessary Weight Due to the reason it has to stand stablely against strong wind, extra steel cube are added on four feet.

Volume Control The over product now has a length o 110cm in total, whic makes it hard to fit



By adding heavy block cap at the top point of the leg to achieve stability.

old height:

88cm

By increasing the height or adding on light and sensor to enhance the warning signal's visibility.

> new height: 200-250cm



Insufficient Height Due to the reason it has to stand stablely against strong wind, extra steel cube are added on four feet.

Visibility Need

In order to achieve better visibility, the police used a new tent version which has brighter color on each side.



Feedback: Shine on the fabric

Leg Structure

The structure frame has a more lightweight structure than the old version, while the main weight is gathered on feet.



Flip Buckle

The buckle surface is designed larger to fit people's hand in a more user-friendly way.



Light Structure

The light is divided into 2 parts: one on the bottom and one above, with a 360 degree lighting area, for the vehicle to see clearly from a certain distance.











































1:1 Prototyping

Leg Design

Some variations both in model software and sketch. The final design should look consistent with other parts.



Leg Design

The tooling I selected for leg prototyping was **3D printing** for it has a fast and easiest way to see the outcome quickly compared to metal bending.

The model being printed out has correct dimension and nice compatibility except for the locking screw 3cm in width is too small.).



Neck Design

Some variations both in model software and sketch. The final design should look consistent with other parts.







Concept Development



Concept

A warning equippment placed at the scene of an accident to enhance the visibility of traffic police, in order to provide safety.









"Ergonomically Friendly"

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The product needs to have a clean and comfortable structure for user to grab on and unfold.

"More Portable"

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By making it more compact and weight-balanced to offer user with a better experience when using it.

"More Visible"

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By increasing the height or adding on light to enhance the warning signal's visibility.

"Ergonomically Friendly"

The product needs to have a clean and comfortable structure for user to grab on and unfold.



> Height solution
> Fabric solution



190 cm

By increasing the height or adding on light and sensor to enhance the warning signal's visibility.

> Height solution > Fabric solution



By increasing the height or adding on light and sensor to enhance the warning signal's visibility.

> Height solution > Fabric solution

> Fabric solution > Light solution



Button

By increasing the height or adding on light and sensor to enhance the warning signal's visibility.

> Height solution

> Fabric solution

> Light solution

The textile is a highly reflective, waterproof mesh material that can withstand extreme weather and has a long service life; the mesh material also allows wind to pass through, improving stability.

Similar as the pop-up structure of the top of a ballpen, the light bulb surface can be popped up by pressing the top of the light surface and the light comes on. User can then extend the lever easily.

> Height solution
 > Fabric solution
 > Light solution



Press!

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> > Height solution > Fabric solution > Light solution



3 heavy metal blocks was embedded in all 3 top of feet inorder to increase the stability, while instead of making it over-bulky.

> Weight solution > Charging solution

> Packing solution



The overall construction of the frame is made of lightweight aluminium, resulting in a low overall weight that is mostly concentrated on the legs.

> Weight solution

Charging solution
 Packing solution



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> Weight solution

> Charging solution> Packing solution





As traffic police officers need to put the products in their vehicles for long periods of time, the power cord supply method is not reasonably convenient. Therefore, the lights are all powered by removable and rechargeable batteries seperately.

> Weight solution

> Charging solution 01

> Charging solution 02> Packing solution



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> Weight solution> Charging solution 01

> Charging solution 02

> Packing solution

2 FUNCTION FULFILLMENT

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> Battery Retractable Structur

Made from durable nylon material, the hand bag is easy to carry around between different locations for traffic police.

- > Weight solution
- Charging solution
 Packing solution



the hand bag is easy to carry around between different locations for traffic police.

- > Weight solution
- Charging solution
 Packing solution



Charging solution
 Packing solution

> Carrying Strap

3- PARTS & COMPONENTS

Buckle

Stainless steel





Buckle

Stainless steel









Leg joint *3

4- FRAME OVERVIEW

Frame Overview

In conclusion, the frame made from aluminum has a much more lightweight weight than the previous product, by which it achieves the goal of being weight-balanced.

Besides it fulfills the all 3 requirements of the "design goal", it is made as its best to be conceptually manufacturable.



Frame Overview





Thanks for watching! ;) 谢谢