# Play It Safe

A motorized child-at-play sign that is taller and more visible than ever.

## A Safer Way to Play

Vehicles are a critical part of our lives that we interact with on a daily basis. While the use of transportation has helped to change our world, there comes some risk with the interaction of th them. The National Highway Traffic Safety Administration reported a total of 6,516 pedestrian deaths inside the United States, 16% of which being children 14 years or younger.

This problem reinforces the need for a solution to help alert drivers. The team's sponsor Tory Campbell had just the idea to try out: a motorized flagging system that is more visible than other products on the market. With the support of local engineering firm Andrews Cooper, the Play It Safe Team started to bring Tory's idea to reality.

### Customer Requirements

- Has a moving component built into the sign
- Lightweight
- Internally powered - does not need to be plugged in
- High visibility
- Stable
- Easy to Move the sign around
- Affordable
- At least 5 ft. 10 in.
- Durable

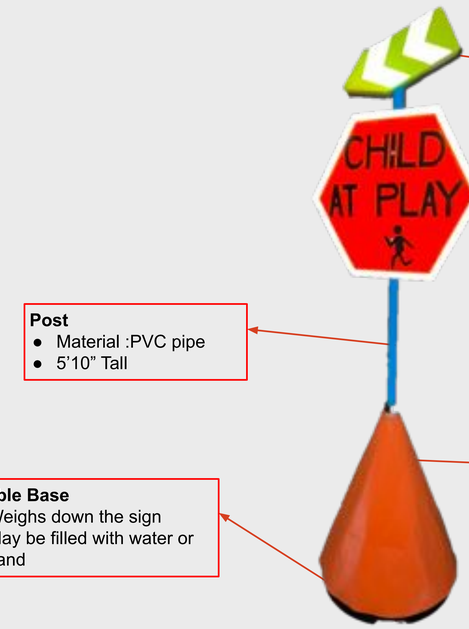
## The Problem : Existing Signs

Step2 Kid Alert Visual Warning Signal


**Positive aspects**
- Can not be stolen easily
- Weather resistant
- Durable

**Negative Aspects**
- Semi-permanent (can not be put up or taken down easily)
- Small
- Easy to miss when driving
- Can be missed in dark environments

## The Product




**Arrow**
- Rotates
- Material : corrugated plastic
- Powered by a battery box on the back the sign

**Sign**
- Material : VHMW plate plastic
- Hexagon
- Color : Neon Orange
- Includes a image in motion

**Post**
- Material :PVC pipe
- 5'10" Tall

**Cone**
- Color : Neon Orange
- Material : Ottertex Orange Waterproof Canvas
- Easily attached by velcro

**Fillable Base**
- Weighs down the sign
- May be filled with water or sand

## Design Process

1. Initial meeting with sponsors and customer
2. Concept generation and customer requirements iteration
3. Downselection of ideas and engineering specifications iteration
4. Initial prototype creation
5. Further concept generation and refinement of ideas (including meetings with sponsor)
6. Assembled final prototype in stages:
    a. Procurement of parts
    b. Creation of cone and arrow
    c. 3D printed component additions
    d. Electrical Circuit
    e. Sign and base
7. Test completion as needed

Figure 1: Rapid prototyping mounts using FDM printing

Figure 2: Cutting canvas for cone in group

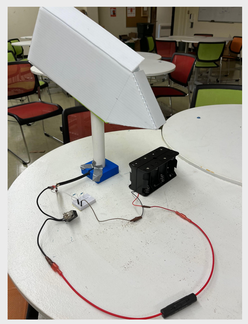


Figure 3: Battery life testing mount

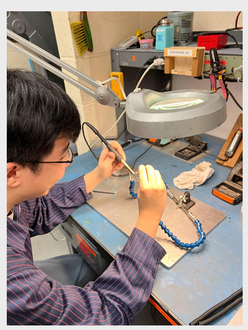


Figure 4: Teammate Sun soldering electrical components

## Build Methods

- Used the facilities provided in the Roger's Hall machine shop to cut the sign and post to size
- The electrical components of the sign required soldering to keep the connections secure
- The craft center in the Student Experience Center provided sewing equipment to construct the cone for the product

## Testing Methods

**Visibility Testing**
-The sign must be visible and legible from 17 meters (56 feet) away. The color of the sign must be eye catching.
-Method: Survey of 50 personnel at a distance equal to or greater than 17 meters on whether they could read the sign form the distance and what color would be most eye catching out of neon yellow, orange, bule, or white

**Water Testing**
-The sign must be water rated at least greater than IP55 which protects electronics from strong jets of water
-Method: Place an water indicator (paper towel) where the electronics will be, then spray pole with a hose.

**Durability Testing**
-The sign must be able to stand in 25 mph winds
-Method: Blow the sign using compressed air at about 25 mph

**Battery Testing**
-The arrow must rotate for a minimum of 12 hours (not continuous) on a single charge
-Method: use a test fixture to run the arrow for over 12 hours

## TEAM 101

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