Background

The purpose of this project is to design a swing that will provide comfort to a client who has the genetic disorder CDKL5. This device will also be beneficial for others with developmental disorders and conditions, and therefore is designed with people of varying ages, sizes, and dispositions in mind.

Summary of User Needs

- Moderately priced
- Compact – possible outdoor use
- Supports adolescents of varying sizes and weights
- Comfortable and adjustable seat
- Adjustable swinging speeds
- Safe to leave a child alone while in use

Design Input Summary

Constraints

- Accommodating seat
- 75 KG max user weight
- Contains appropriate safety features
- Structure is at maximum $1.8 \times 1.8 \times 2 \text{ m}^3$
- 4.6 hours daily operation

Goals

- Cost below $2000
- Lightweight frame - no more than 100 KG
- Quiet - no more than 50 DB
- Multiple swinging directions
- Conditioned for outdoor use
- Secondary power source

Design Concept

Design Output Summary

- Carbon steel and aluminum frame pieces
  - Carbon steel primary legs and ‘spine’
  - Aluminum curved supports
- Flat back to push against wall – saves space
- Dimensions: $1.8 \times 1.8 \times 1.2 \text{ m}$ depth
- Adjustable harness with buckles
- Interchangeable padding to accommodate many users
- Adjustable seat angle
- 90 degree seat rotation for two perceived swinging directions
- Auxiliary input for external music device
- Control panel and remote control
- Emergency stop button

Design Specifications

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Future Plans

- Create prototype
- Commence validation testing
- Remove excessive weight from beam thicknesses
- Re-evaluate design output
- Test in market

References


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