Automated Retracting Slide Coaster
ARC Slide

Design Proposal

Team #7

Sarmad Ahmad

Hillary Doucette

Stephen Kustra
Client Background

- Joey Toce
- 6 years old
- Weight: 35 lbs
- Height: 3’
- Cerebral Palsy: unknown reason, damage to cerebellum.
  - Joey does not have full control of the muscles in his torso and limbs.
  - Needs support for his trunk to maintain upright position.
The Step2 Coaster Slide

[Image of the Step2 Coaster Slide]
Related Products and Patents

- Very little in outdoor playground equipment for the disabled.

Self operable transfer system for the disabled.
Related Products and Patents

• Recreational Device for physically disabled user. Wooden wheelchair Ramp.

• Heavily rely upon a supervisor.
Our Objective

- Successfully design an adaptable slide for a user with weak trunk muscles and decreased motor control.
- The slide must include:
  - Winch to retract the coaster car.
  - Status Lights during operation.
  - A lift motor to tilt the upper platform and initiate descent of the car.
- The coaster car must include:
  - Trunk restraints, head support, lower limb restraints.
  - Adaptability of segments to user growth.
Additional Features

- Custom Built Car with necessary harnesses
  - Trunk
  - Leg
- Steel Track with upper rest platform
  - Photoelectric sensor to sense car
- Lift motor to tilt upper platform
- RF controls to wirelessly operate system.
The Slide

- The entire slide will be built in 2 sections: the platform and the track.
- Platform will hold the two motors and will be the starting point of the cart.
- The frame will be made of stainless steel 304 grade.
- Polyethylene housing.
Stainless Steel Grade 304 properties

- Grade 304 is the standard "18/8" stainless.
- Most widely used due to its excellent forming and welding characteristics.
- 25%-35% cheaper than 316 stainless steel, with no major differences in weldability.
- However, 316 is more resistant to corrosion.
Rear view of the platform
The platform will be at 40 inches high, 30 inch wide and 30 inch in length.

Winch mounted on the rear of the platform-as seen to the right.

This is a right-side view of the upper platform.
The drawing below shows the location of the hydraulic pump in yellow.

Right side view.
The Track

- The track of the slide will be made as a separate piece and welded on to the platform once completed.
- The track will be 9 feet in length.
- Steel Grade 304 frame.
- Supports.
Two 2” wide indents running the length of the track 15” apart and ½” away from the edges of the slide. These will serve as the pathway for the cart to go down the slide, will prevent the cart from rolling out of the track and enable the car to leave the slide in a relatively straight line.
ARC Slide Track
The Car

- Seat must have hip, trunk, and leg restraints for user’s safety.
- 6” wheels, steel shaft.
- 10° Recline angle.
- Hand grips on side.
- Adjustable length foot rest.
- Cover: polyethylene polymer.
The Car

Side View
The Wireless Control

- RF Control.
- Make retraction and automation system more user friendly.
- Take a great deal of the physical strain off the operator.
The final product
Polyethylene

- Polyethylenes are characterized by toughness, excellent chemical resistance and electrical properties, low coefficient of friction, near-zero moisture absorption, light weight and cheap.
- It will be used to serve as “housing” for the side walls and the bed of the slide.
- For cosmetic purposes.