



Electric-Kart Battery Mount

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Introduction

A survey of faculty and students showed strong demand for better go-kart reliability. Testing identified the battery mount as a weak point, so this project aims to make it more secure and stable to withstand vibrations, reduce maintenance, and boost performance.



Background

Problems with Kart:

- Batteries Fail To Mount To Kart
- Several Electrical Components don't work
- Throttle Pedal Levitating
- Several Tires Are Ruptured

Current Throttle Pedal



FIGURE 1. Throttle Pedal

The throttle pedal levitates off its mount, creating a potential hazard for riders. Any external impact could have damaged the pedal, negatively affecting the driver's experience. While this was an important safety concern, it is not a focus area for this project and has since been addressed.

Current Battery Selection

EGO Li-Ion Batteries

- 4 @ 56 V in parallel for 56 V
- 7.9 lbs. each
- Estimated peak output: 19.5 kW (26.3 hp)



FIGURE 2. 56V E-Go Battery

Design Requirements

The goal is to have the battery mount work and be implemented into my kart. This project does not focus on components like the throttle pedal. Instead, the main priority is securing the electrical setup through a reliable battery mount and proper wiring.

Design Requirements:

- Battery Mount Stability: Ensure a secure fit whilst also establishing a connection
- Wiring Maintenance: Repair or replace any worn or damaged wiring.
- Tire Maintenance: Fix Tires on Kart
- Electrical Maintenance: Repair and replace any electrical components

Quality Function Development (House of Quality)

Customer requirements discovered via classmates/faculty and survey used to develop House of Quality. Engineering specifications were used to focus product development and compare the design with existing go-karts and last year's go-karts.

What		
Level 1	Level 2	Level 3
basic		Wiring Schematic
basic		Neatly organized wiring
basic		Battery Protection
basic		Emergency Stop/Disconnect
performance		Seat (comfortable position for average person)
performance		Tires that don't disintegrate
performance		Battery Mount needs to hold multiple w/o breaking
performance		Low Voltage cut off for EGO batteries
performance		Safety Bumper to prevent injury
excitement		Headlights and turning lights
excitement		Adjustable Seat
excitement		Sound symposer for engine sounds

Figure 3. House of Quality

Bill of Materials/ Cost Analysis

Budget					
Item	QTY	Name	Material	Source	Price/per item
1	1	Speedometer	Plastic/LED	Amazon	\$11.99
2	1	Battery Display	Plastic/LED	Walmart	\$9.02
3	1	Solenoid	Electric	MotoFork	\$92.70
4	1	6 AWG Wire	Electric	Amazon	50.99
5	1	Ignition Switch Panel	Electric	Amazon	\$60.99
6	1	Pedal	Metal	Amazon	\$29.00
7	3	Tires	Rubber	GoPowerSports	\$26.00
Total					\$281
Limit					\$887.60

Figure 4. Bill of Materials

Design of Battery Mount

Priorities:

- Battery connections (physical/electrical)
- Electrical Connection
- Weight Distribution for neutral handling

Last Years Project Design

Last year, the team positioned the batteries at the front of the kart to improve front tire traction, which enhanced handling and stability. However, the printed battery mount failed under stress, cracking and deforming due to constant vibrations and forces. This caused the batteries to shift, disrupting the power supply and affecting the kart's handling and battery connection.



Figure 5. Last Years Battery Mount

This Years Project Design

This year, I designed my own battery mount that holds four batteries side by side, ensuring both stability and a secure connection. As shown in the Inventor drawing below (Figure 6.), the design provides protection for the batteries, shielding them from potential external damage while establishing a reliable connection. The single battery mount in (Figure 8.) was also invented which securely holds the batteries in place, preventing any movement, while simultaneously providing solid connections to ensure optimal performance.

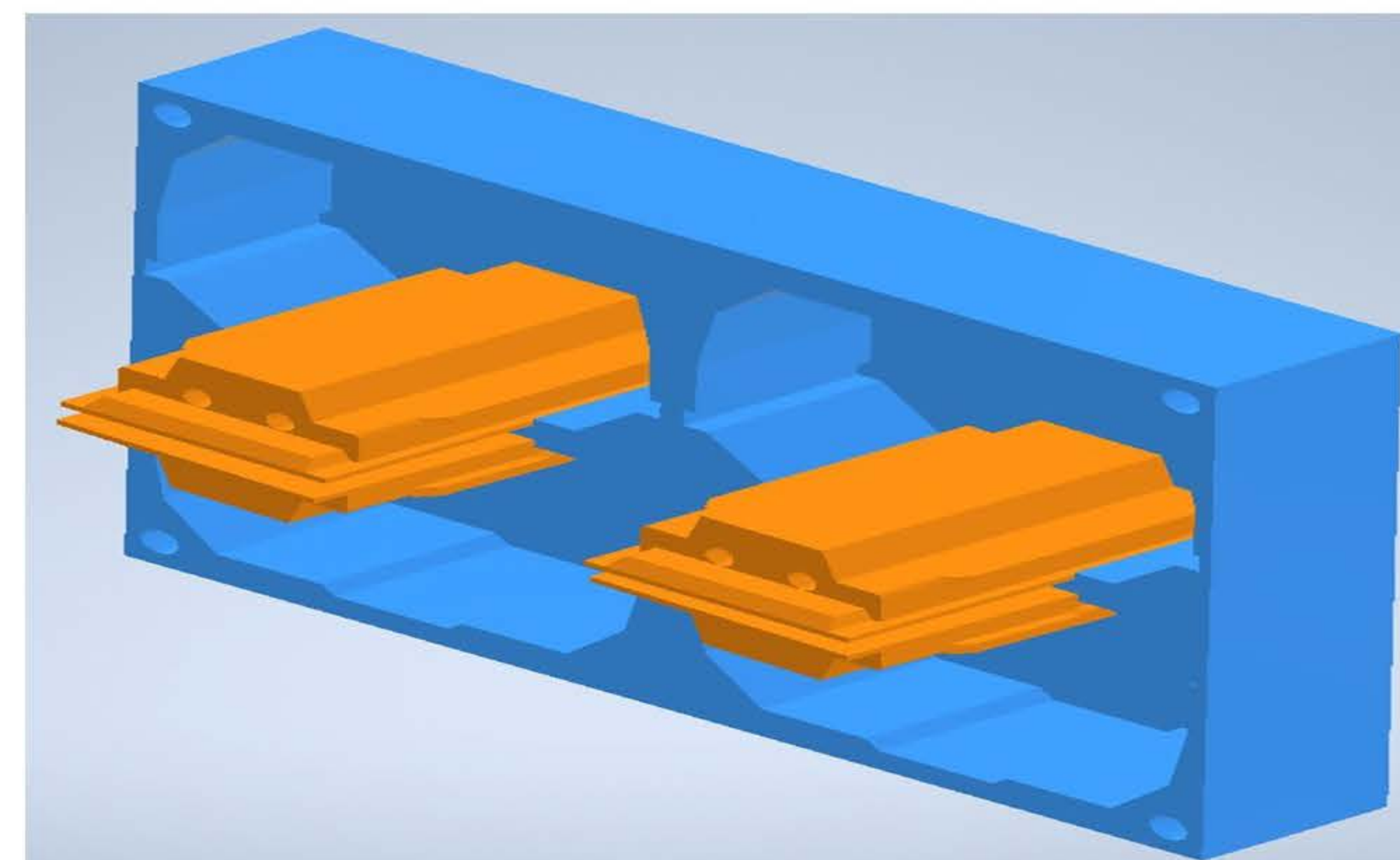


Figure 6. Battery Supports

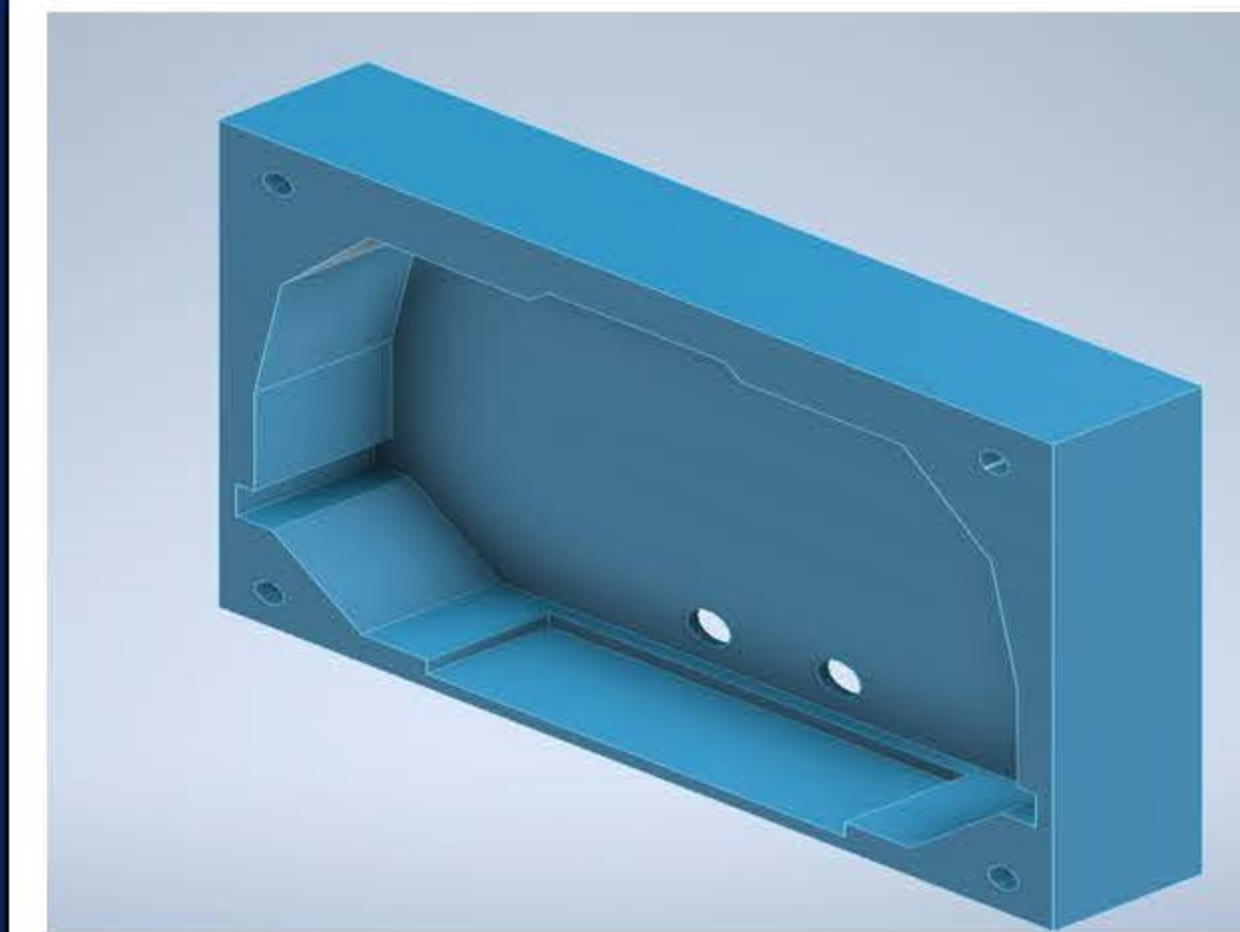


Figure 7. Single Battery Support

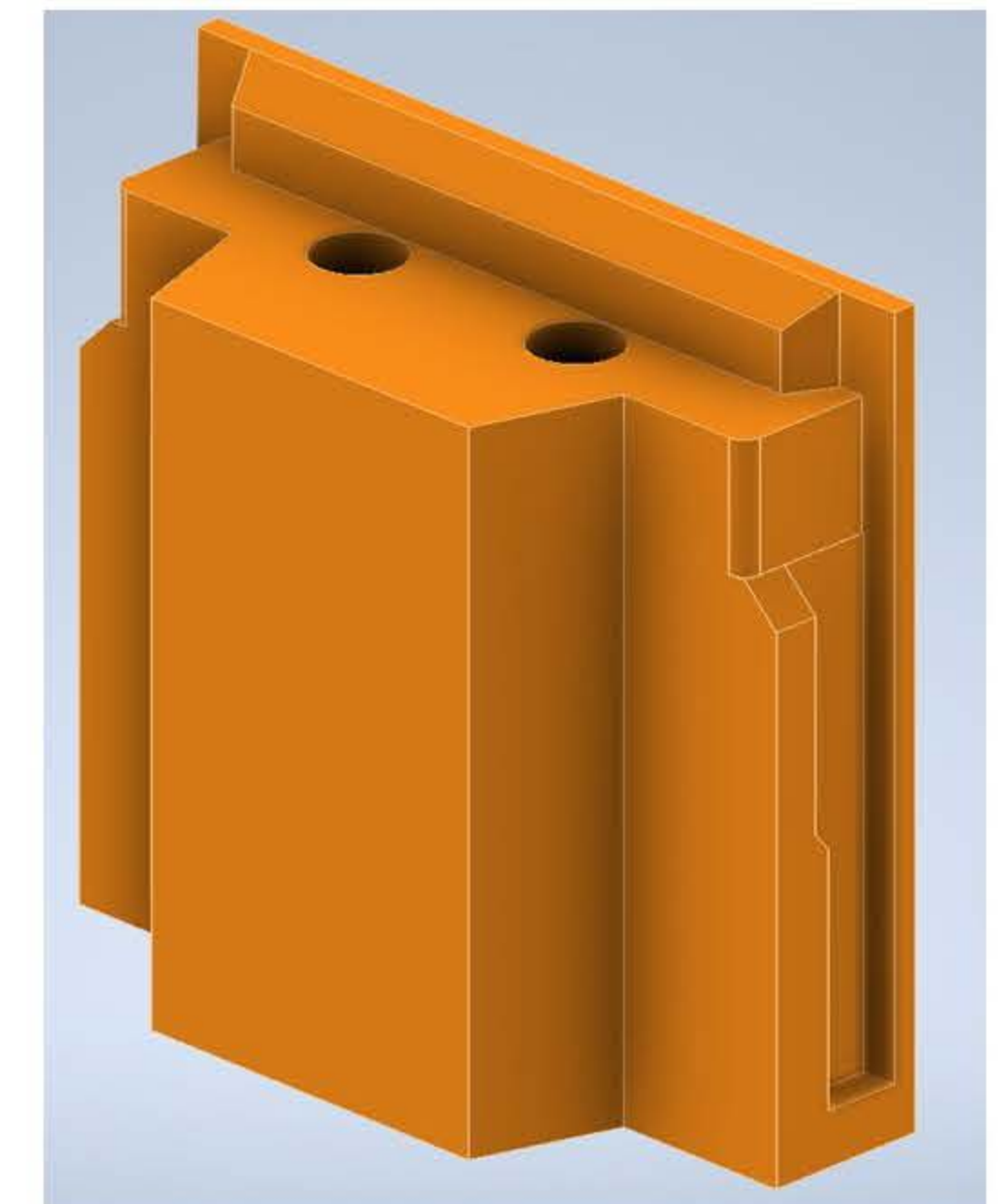


Figure 8. Battery Mount

Conclusions

At the conclusion of my project, I redesigned the battery mounting system on the kart. Instead of exposing the batteries, I created a protective housing to secure them in place and concealed the wiring to reduce hazards.

Key improvements include:

- Redesigned the battery mounting system with a protective housing to ensure secure placement.
- To conceal the wiring to reduce hazards and improve safety.
- The tires will be replaced
- Fix electrical components