

Battery Swapping Mechanism

Mechanical Engineering

Students: Samuel Aleman III, Adrian Avila, Thomas Mertens, and Karina Meza

Advisors: Dr. Yuanyuan Xie

FRESNO STATE

Lyles College of Engineering

Abstract

With current technology today, electric vehicles (EV) are struggling to take over the market due to their limited range and high price tag. Internal combustion (IC) engines that operate on either gasoline or diesel have the advantage of range and price. ICs greatest advantage deals with the problem the project can solve, refueling. The solution to this problem is to implement battery switching stations for EVs to swap depleted battery packs with an energized battery pack on Fresno State's utility cart.

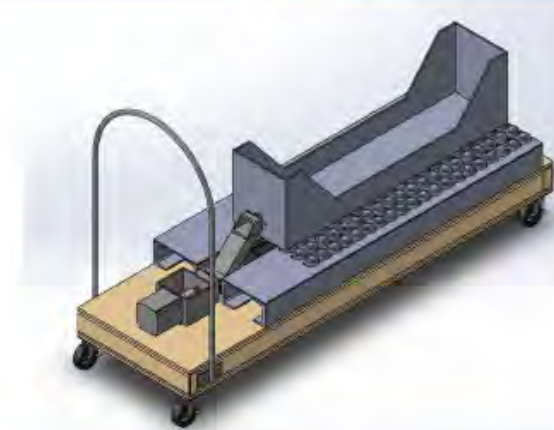
Design

The objective of the battery switching mechanism to design a mechanism capable of swapping a utility's cart battery pack within the time frame of 3 minutes. A simplistic design is required to for ease of insert and removal of the utility cart battery pack. Lastly, the mechanism should be installer friendly.

As Built Prototype



CAD Model



Conclusion

The end user is able to remove the old battery unit and install a fully charged battery unit into the utility cart. With the total weight of the battery unit totaling around 460 lbs, a fast, easy, durable, and reliable system is needed to exchange a battery unit of that magnitude without the end user getting injured. With an easy-to-use design of the battery switching mechanism, the end user can accomplish this all on their own within a 3-5 minute span.

Sponsors

Ajith Weerasinghe, Ph.D

Nils Tellier, PE

EPSM
Energy Process Solutions Management