

DESIGN AND FABRICATION OF DRIVE SYSTEM OF A TELESCOPIC THREE WHEEL GO-KART

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Abstract - 3 Wheel electric (battery powered) Go Kart is one of the less weight designs that consumes less energy and adds no pollution to the environment. As a part of our project dissertation, we are planning to fabricate drive system for telescopic 3-wheel go-kart.

1. INTRODUCTION

A go-kart, also written as go-cart (often referred to as simply a kart), is a type of open-wheel car. Go-karts come in all shapes and forms, from motor less models to high-powered racing machines. Some, such as Super-karts, are able to beat racing cars or motorcycles on long circuits.

Gravity racers, usually referred to as Soap Box Derby carts, are the simplest type of go-karts. They are propelled by gravity.

Many recreational karts can be powered by four-stroke engines, while racing karts use a two-stroke or, rarely, higher powered four-stroke engines. Most of them are single seater but some recreational models can accommodate a passenger.

In some countries, go-karts can be licensed for use on public roads often referred to as street tracks. Typically, there are some restrictions; in the European Union, a go-kart modified for use on the road must be outfitted with headlights (high/low beam), tail lights, a horn, indicators, and an engine not exceeding 20 hp (15 kW).

Besides traditional kart racing, many commercial enterprises offer karts for rent, often called "recreational" or "concession" karts. The tracks can be indoor or

outdoor. Karts are rented by sessions (usually from 10 to 30 minutes). They use sturdy chassis complete with dedicated bodywork, providing driver safety. Most of these enterprises use an "Arrive and Drive" format which provides customers with all the safety gear (helmets, gloves and driver outfits) necessary, and allow them to show up anytime to race at a reasonable price, without the problem of having to own their own equipment and gear.

Outdoor tracks can offer low-speed karts strictly for amusement (dedicated chassis equipped with low powered four-stroke engines or electric motors), or faster, more powerful karts, similar to a racing kart, powered by four-stroke engines up to 15 hp (11 kW) and, more rarely, by 2-stroke engines, but designed to be more robust for rental use. Typically, outdoor tracks are also be used for traditional kart races.

Indoor kart tracks can be found in many large cities in different parts of the world. These tracks are often located in refurbished factories or warehouses, and are typically shorter than traditional outdoor tracks. Indoor karts are usually powered by a four-stroke gasoline engine producing anywhere from 5 to 13 hp (4 to 10 kW), or sometimes by an electric motor. Many tracks offer competitive races and leagues. At the top level, an Indoor Karting World Championship (IKWC) exists.

Power is transmitted from the engine to the rear axle by way of a chain (some rentals use a belt).

Four-stroke engines can be standard air-cooled industrial based engines, sometimes with small modifications, developing from about 5 to 20 hp (4 to 15 kW). Briggs & Stratton, Tecumseh (company closed in 2008), Kohler, Robin, and Honda are manufacturers of such engines. They are adequate for racing and fun kart applications. There are also more powerful two-stroke engines

available from manufacturers like Yamaha, KTM, Biland, or Aixro (Wankel engine) offering from 15 to 48 hp (11 to 36 kW). They run at up to 11,000 rpm, and are manufactured specifically for karting. PRD makes the PRD Fireball, a two-stroke engine delivering 28.5 hp (21 kW) at 15,580 rpm.

Electric go-karts are low maintenance, requiring only that the lead-acid or lithium-polymer batteries of the karts be plugged into an array of chargers after each run. Since they are pollution-free and emit no smoke, the racetracks can be indoors in controlled environments. Electric karts powered by lead-acid batteries can run a maximum of 20-30 minutes before performance is affected, while those powered by lithium batteries may last up to 1 to 2 hours on a single charge. Some karts have been fitted with hydrogen fuel cells.

Nowadays most of the racers are using 4-wheel petrol (or) diesel powered go-carts which are expensive, heavy in weight and pollutes the environment. As the fossil fuels are depreciating and cost of the fuels is also increasing rapidly in global markets, it is very much essential to develop new go-karts with less weight, runs on electric energy / battery so that it is not dependent on costly imported fuels like petrol / diesel and consumes less energy

3 Wheel electric (battery powered) go-kart is one of the less weight designs that consumes less energy and adds no pollution to the environment. Through this project we have made an effort to make less weight 3 wheel go kart chassis which is capable to take 200Kgs Load (50kg Chassis + 150Kg Men) and also support parts like motor, batteries, steering, controller etc., the chassis is provided with retractable seat for passenger making it a 2-seater go-kart, yet easy to transport.

PRESENT WORK

Assembling a drive system to the 3 wheel go-kart. The drive system consists of motor, batteries, controllers. The sets can be as follows

- **Read the Manual:** Always start by reading the instruction manual provided with your motor, batteries and

the controllers. It will contain specific instructions and safety guidelines.

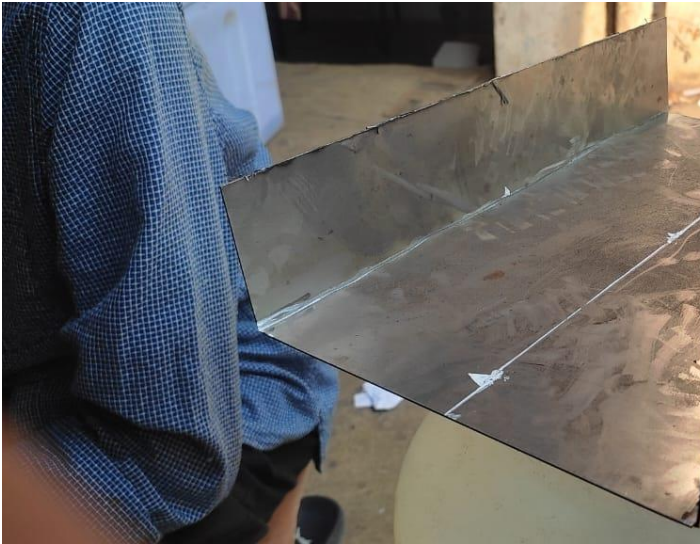
- **Prepare Your Workspace:** Make sure you have a clean, well-lit area to work in. Gather all the parts and tools you'll need.
- **motor Assembly:** the motor is assembled to the chassis of the go-kart using arc welding machine
- **Attach motor to the controller:** attach the motor to the controller to make the motor rotate in two directions.
- **Install batteries:** batteries are the main power source in the Ev vehicles. Batteries are installed in to the chassis.
- **Connect Components:** Connect the controllers, motors, and batteries according to the wiring diagram provided. Double-check all connections to ensure they are correct and secure.

ASSEMBLING OF DRIVE SYSTEM

Drive system consists of motor, batteries, controllers. For the assembly of batteries we have fabricated a 2mm plate and designed the borders as the surface area of the batteries that is 90mm x 300mm



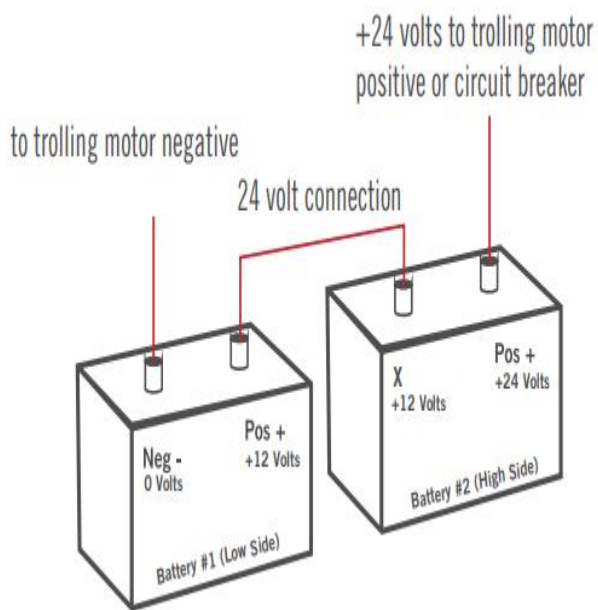
After drawing the outline of the batteries support frame. A slot or a groove is made on the outer lines of the drawing using angle grinder. And bended inwards making 'U' shape.



The plate is then screwed to the chassis using hand drill machine and screw. Then batteries are installed inside them.

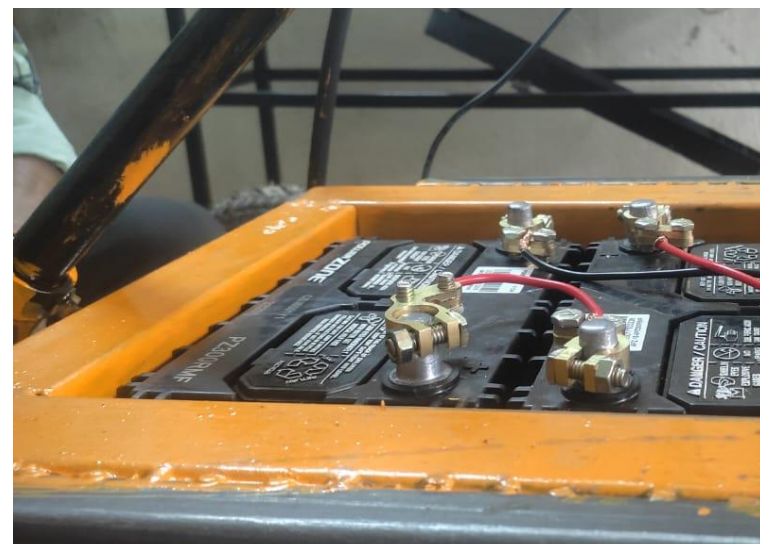


Then the bended plate is screwed to the chassis using hand drilling machine. The support structure is fabricated and it is welded to chassis.



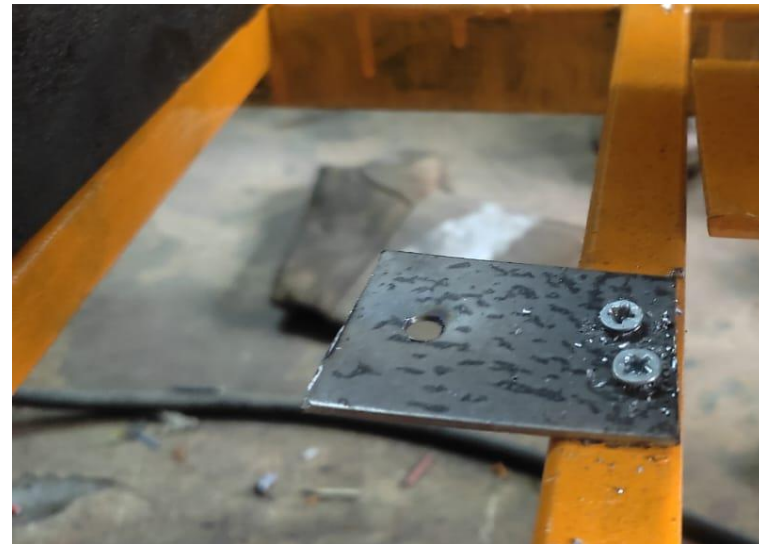
4.4.1 EXTENSION OF BATTERIES TERMINAL the batteries are placed in series connection, the positive and negative terminals of the batteries are connected and other two terminals are extended.

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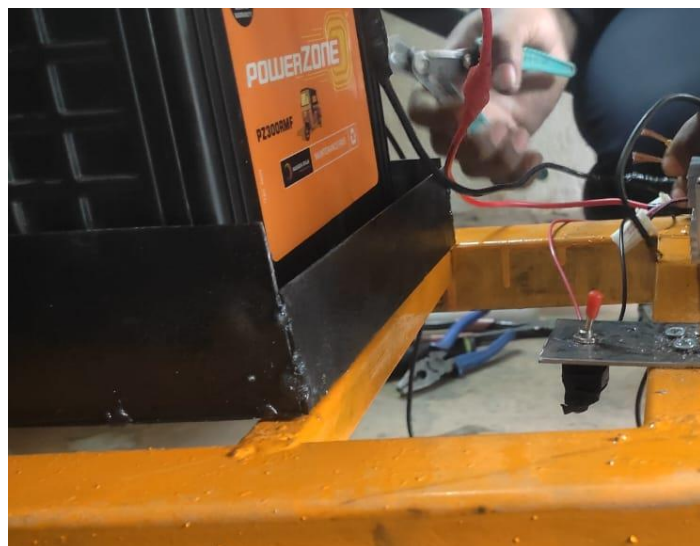
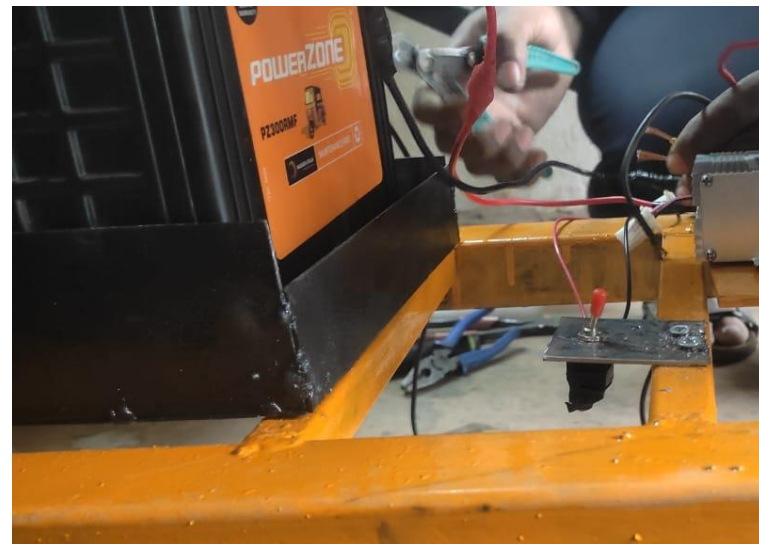


4.4.2. CONNECTING BATTERIES TO THE DC – DC CONTROLLER.

The positive and the negative terminals are connected to the positive and negative terminals of the batteries.



The switch then connected to the plate. The switch is connected to the controller's short circuit extension.

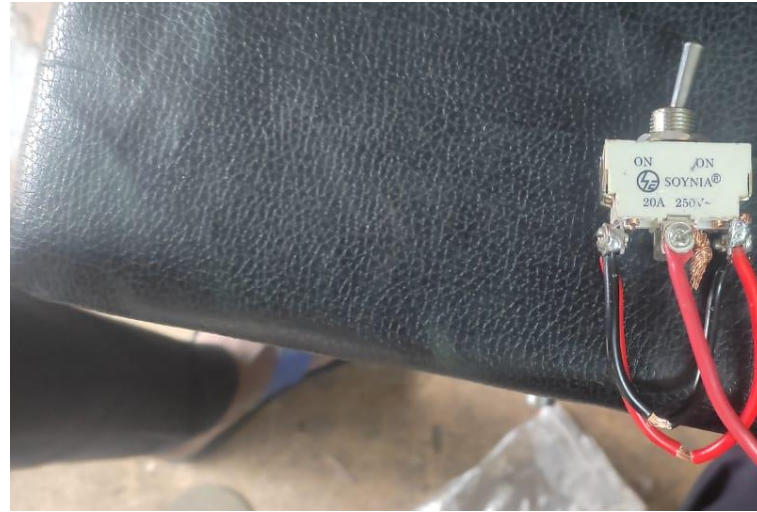


4.4.4. connection on throttle to the controller

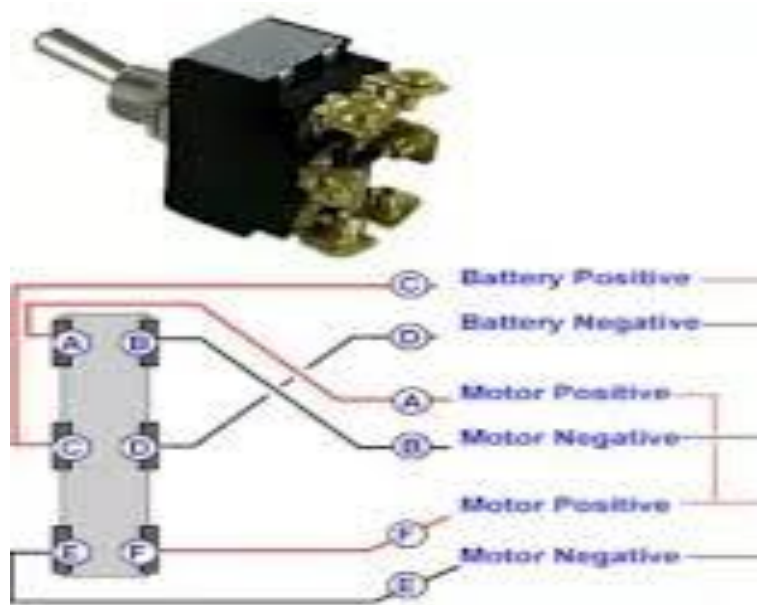
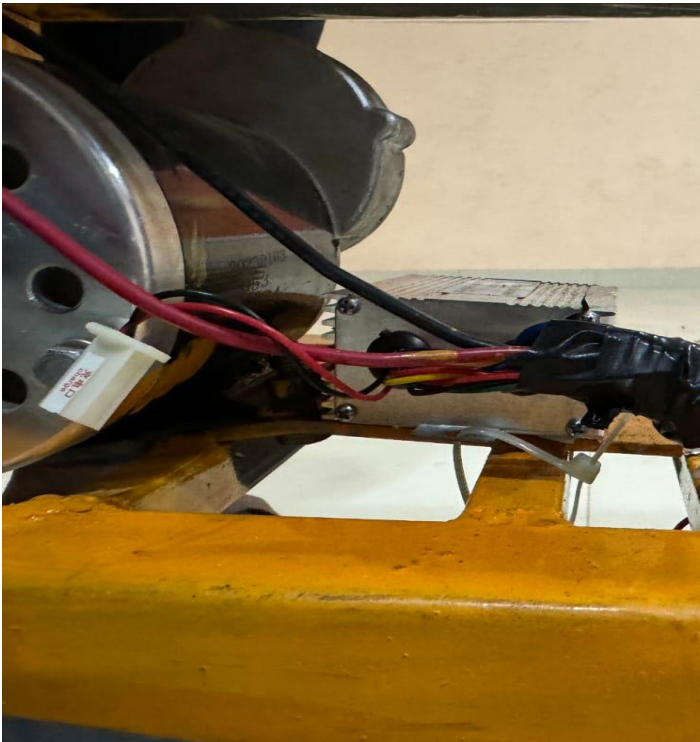
The throttle of the go kart is fixed to the handle. Then the wire extensions are connected to the dc-dc controller's throttle extensions.

4.4.3. connection of power switch

The power switch is fixed to a small plate which then screwed to the support structures that was welded to the frame. Then a 4mm drill is performed using a radial drill machine.



The 2-way switch works a gear in the EV. It is used to change the motion of the motor i.e, forwards or backwards. the following is the circuit diagram shown.



4.4.5. connection of motor to the controller using a two-way switch

The motor is connected to the controller using a 2-way switch. The 2-way switch acts a bridge between the controller and the motor.

the 2-way switch is then attached to the chassis using the same plate that we have used for the power switch. The plate is the screwed to the chassis support structures using hand drill machine



3. Result and discussion

The design and fabrication of drive system is done successfully. We used the 34Ah (2) batteries which take 5 hours to fully charged and gives the range of 1 hour

4. **Conclusion:** The designing and fabrication of drive system is successful and the vehicle is in good condition. The future scope of the vehicle is to increase the safety of the vehicle.to increase the range of the vechile.

References

1. Company, Houghton Mifflin Harcourt Publishing. "The American Heritage Dictionary entry: chassis"
2. *Sturme, Henry (2 April 1908). "The Use of Unsuitable Vehicles". Commercial Motor. 7 (160): 146–147. Retrieved 10 September 2010.*
3. *Pfeffer, Prof Dr Peter E. (2017). 8th International Munich Chassis Symposium 2017: chassis.tech plus. Springer. p. 176. ISBN 9783658184599.*
4. Jump up to:^a ^b "Tatra takes you further". Retrieved 1 July 2015.
5. "Tatra AS". *Archived from the original on 28 March 2010*. Retrieved 22 August 2013.
6. "Triumph Herald 2000 chassis". *Triumph Herald 2000 and Viking Fibreline Caravan*. Paul.
7. "Build your own TATRA - Segment selection". Retrieved 1 July 2015.
8. "An all time longest and heaviest TATRA has been produced!". *Tatra*. 21 August 2015.
9. *Grenzeback, Lance R.; Lin, Sandi; Meunier, Jacob (2005). Operational Differences and Similarities among the Motorcoach, School Bus, and Trucking Industries. Transportation Research Board. p. 13. ISBN 978-0-309-08821-3. Retrieved 10 September 2010.*

