Project synopsis

1) Project Reference Number : **46S_BE_0758**

2) Title of the project : DESIGN AND FABRICATION OF ELECTRIC GO-KART

3) Name of the College & Department : Dayananda Sagar College Of Engineering

4) Name of the students & Guide(s) : **Students** : PRAMMIT, LALUPRASAD YADAV K, NANDAKUMAR R, ACHYUTA B.

Guide : Dr. Santhosh K

6) Introduction

The main problems of this go-kart is that it doesn't follow any emission norms which are the main cause for automotive pollution in environment. The current automotive scenario encourages eco-friendly vehicles to attenuate the damage done by the emissions. An efficient alternative for the engine is electric motor which as compared can give an equivalent output power. This can also be implemented within the karting field.

An electric go-kart is a sort of go-kart that is propelled with an electric motor and batteries. Motor replaces the engine and hence the kart gets dramatically changed in both design and performance. The vehicle, hence runs only on electricity and is designed to satisfy the mandatory requirements for karting. The design of the frame indicates that it is an open kart with a straight chassis. The frame acts as a suspension in karts. It must also be rigid to not break under extreme load conditions. The center of gravity is kept as low as possible to get maximum stability. The length of the vehicle is shortened so as to reduce the weight of the vehicle. The wheelbase and track width of the vehicle are chosen accordingly. The front track width is minimized to reduce the turning radius of the vehicle and to increase the maneuverability. Torque in electric motor is typically more noteworthy than that of a petrol engine . Electric go-karts don't have gas tanks. Hence, there is no contamination and emanate no smoke. The above mentioned advantageous features makes us to choose electric motor performance than an conventional IC engine.

7) Objectives

The main aim of this work is to design, analyze and fabrication of an electric go-kart vehicle. This helps to reduce the use of fossil fuels in the go-karting and also helps to reduce the regulated emissions from go-kart. The engine used in the traditional go-kart is 2 stroke engine to produce the more power which affects adversely on environment by producing more

emission. Electric go karts, on the other hand, produce zero emissions from exhaust fumes for a cleaner and safer driving experience. Hence, it is important to design such vehicle that could work on electric energy rather than fossil fuels.

The main objectives of this work is to design and analysis of chassis, battery pack, breaking and steering system and modification of power train.

For design and analysis of chassis is done by using Solid works, the performance analysis of the battery is done by using Simulink.

Power train is specially designed to get maximum speed and torque for high performance which can be given by the any other geared vehicle.

Stress, displacement and load distribution of the chassis is been analyzed and the desired stiffness of the structure is known. This analyzed data is used for further fabrication purpose.

The design of power train system is done to achieve high torque, with the gear ratio of 1.45:1, by which peak torque and speed can be achieved in the motor.

8) Methodology

Planning - Literature Survey, Market Survey

Design and Analysis :

Chassis - the design and static stress as well as load distribution analysis of chassis is done with the solidworks software

Battery Pack - the analysis of battery pack i.e, rated voltage, rated current, voltage curve , current curve and state of charge of the battery which has 1c rating per cell during discharge is done using simulink software

Power train - the calculation for sprokets, motor and braking is calculated and will be applied during fabrication

Fabrication - the process of assembly of the components and the complete prototype building is in process

Testing - the complete prototype will be tested in a track and the results during the run will be taken and produced

9) Results and Conclusions

The go-kart is equipped with a powerful electric motor of 750W and a high-capacity battery pack of 1.15kW. The powertrain provides smooth acceleration and maintained consistent performance throughout the time.

The electric go-kart demonstrated performance capabilities. It has quick acceleration, allowing it to reach high speeds in a short amount of time. The electric motor delivered instant torque, resulting in a thrilling driving experience.

The electric go-kart was an eco friendly alternative to its gasoline counterparts. It produced zero emissions during operation, reducing the carbon footprint associated with go-kart racing.

The electric go-kart allows easy handling and control for the driver

The electric go-kart required less maintenance compared to traditional gasoline go-karts. It had fewer parts, resulting in reduced wear and tear. The cost of operating the electric go-kart was lower compared to gasoline.

The Electric Go-Kart project will be successfully developed with high-performance and high sustainable. The project demonstrates that electric go-karts can deliver thrilling racing experiences while being environmentally friendly. The implementation of electric powertrain technology in go-kart racing has a high chance to change the industry by reducing emissions, lowering operating costs, and providing exciting driving experiences.

10) Scope for future work

- Battery swapping
- Quickly replacing a depleted battery with fully charged one
- It helps to solve the problem of setting up charging stations and also reduces the range anxiety of drivers
- While charging the battery it takes lot of time to charge the battery . instead we swap a depleted battery with the fully charged battery
- Super-capacitors
- They are used to provide high transient current but they have a low energy ability compared to the battery.
- It have a number of cycles of charging and discharging 1000 times greater then the one battery but the price and size of super-capacitors do not allow yet a sustainable use for an electric go-car
- Light weight materials
- Regenerative braking
- Saftey features
- Smart motoring
- IOT