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COST EFFECTIVE ELECTRIC GO KART

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ABSTRACT
Each and every day the prices of petrol and diesel keep on fluctuating. They increase with higher rate but rarely falls down. This is tremendously depleting the fuel reserves. So basically it is important to design such vehicle that could work on electric energy rather than fuels, as electric energy is available in larger amount compared to fuels.

This paper aims to design and development of working model of cost effective electric go-kart. Main objective behind designing and fabricating the electric go -kart is to make it available in cheap price, making it simple in working for even nonprofessional drivers, increasing is strength so that it can sustain more weight and providing it with all the best available facilities in lower cost . The paper mainly focuses on the material selection and designing of cheaper electric system compared to other electric go-karts manufactured, calculations required for designing the kart, basic required analysis

KEYWORDS – Wheels, PVC Pipe, Plywood Analysis. Material selection. Electrical connection. Motor. Battery.

I. INTRODUCTION

Go-kart is a four wheeled, mini racing car used mainly in United States. It was manufactured in late 1950's by Art Ingles. Kart racing is generally accepted as the most economic form of motor sport available. A go-kart is basically a type of mini car without suspension system and even without differential due to least clearance between karts base and the track.

Go-kart racing is basically preferred for introducing the drivers to motor sports. They resemble to the formula one cars but it is not as fast as F1and also costs very less. This helps racing enthusiasts in adopting the racing environment as, go-karts are even used as training vehicles before entering into professional motor sports world where F1 cars are the only option.

II. PURPOSE OF THE PROJECT :-

The overall purpose of this project is to provide the client with a go-kart that will allow him to experience the thrill of driving just like a person without cerebral palsy can. This go-kart is intended to be a much needed outlet for fun and stress relief in the life of the client. The client's condition does not allow him to control a go-kart in the tradition sense, so other methods of control must be developed. To allow for the client's continued development of motor functionality three progressive methods of control will be implemented. The go-kart will also meet all of the positioning and restraint requirements to allow the client the most safe and

comfortable ride possible. The most important part of this go-kart is to maximize the client's safety and fun while using it.

III. PARAMETERS OF THE DRIVE SYSTEM:

Any equipment (not only electrical) is estimated from the point of view of its supply, load and specific features. In the context of choice of electric drive the supply is an autonomous electrical energy source, load is estimated through its mechanical parameters (weight, top speed, acceleration and output power) while the specific requirements mostly regards the power electronic converter of the drive. In this section main parameters are defined.

Supply :-

The voltage source of an electric vehicle is most typically a battery of some sort. Easily accessible and reasonably cheap batteries are lead-acid 12 V batteries. Such batteries can be connected in series to achieve a higher voltage, however due to their weight and size it was decided to settle for a total of two batteries giving 24V/50 Ah. Further development of the vehicle includes also installation of some more capacitive energy source like a fuel cell but this topic is not included in this report.

Top Speed :-

As it was mentioned above one of the main goals is to match the performance of the combustion engine. The top speed is chosen to be 60 km/h, in order to show reasonable performance in comparison to commercial karts, while still aiming to design a model for academic research, which involves certain safety limitations.

Electrical Drives :

With the different parameters selected, the next step is to choose the drive system for the electric kart. There is no definite best solution for an electric drive system. So, different configurations of the drive should be analyzed in respect to needed performance of the system.

The analysis includes DC motors with permanent magnet and electric excitement, AC squirrel-cage motors, AC permanent magnet synchronous motors and suitable power electronic converter for each machine.

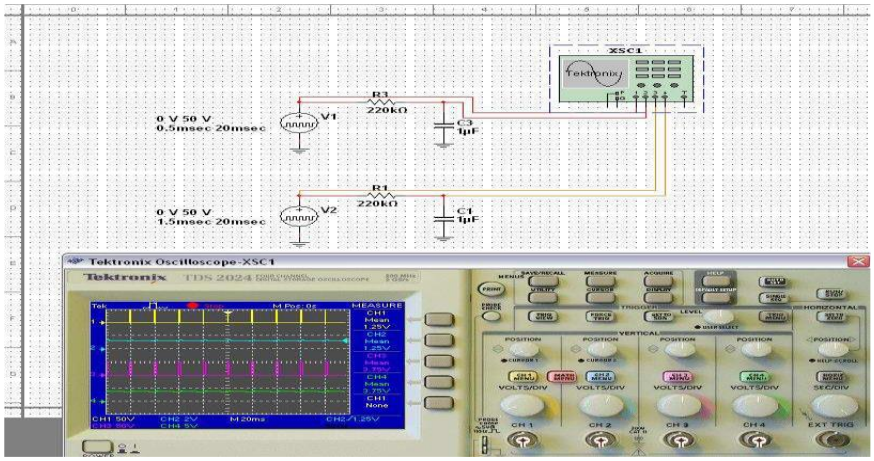
1- DC Machines

DC machines are the oldest machines introduced in the market, but even though, they still show good characteristics. DC machines can be driven with simple and efficient circuits with low number of components, and are widely available.

Design & Fabrication of Frame :-

While designing the frame, the main aim was to make it as light as possible to maximize power to weight ratio. Secondly to make the frame strong enough to withstand static loads and impact loads. The other design considerations kept in mind were to make a compact & durable vehicle with low Centre of Gravity and adequate driver safety.

IV. CIRCUIT DIAGRAM :-



The software control for steering is responsible for taking information from two main inputs andusingthe gathered information to update a single output. The inputs for the steering control come from the LGW position transducer and the steering output from the selected.

Both input signals undergo ADC and are stored as finite, 10-bit, values. The software takes the 8 most significant bits from these values and stores them as designated variables. One input represents the wheel position and the other represents the desired wheel position. When both inputs are close in value the wheels are essentially in the correct position. If the control value is much different than the wheel22values then the software must configure the output so the gear motor can move the wheels to the correct position.

Electric Connection:-

The main processing unit of the electrical system is ESC (Electronic Speed Controller). It itself consists of different port right from brake light up to accelerator. Battery is connected to battery port and throttle pedal is connected to derailleur in ESC unit. The battery need to be connected in series for getting complete power output. i.e. for 36V we connected 3*12v batteries in series. For power output short the power switch. And only on pressing throttle pedal, the current is passed to motor through the battery.

V. PHOTOGRAPH OF ACTUAL PROJECT :-

Future Scope :-

The future scope of this research can be aimed towards design of hybrid karts, solar powered karts, fuel cell powered karts, and hydrogen powered karts in order to reduce the use of fast depleting fossil fuels. Aerodynamic studies can play a major role in future if the karts are designed for high speeds

VI. CONCLUSION:-

Manufacturing of electric go kart is done successfully, according to planned schedule. According to calculations, it is able to sustain weight and speed achieved around 40-45 kmph. It was successfully built in less than Rs.10,000 as expected, without compromising in its strength or other components quality.

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