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Solar Power Go-Kart

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ABSTRACT: A Go Kart is a four-wheel vehicle designed and meant for racing purposes only (though in some countries it is used for fun personal uses). It is a small four-wheeler run on Electric Motor. It is a racing vehicle made on a smaller scale or is made to give the feel of the racing cars. Go Kart is not a factory-made product; it can be made by any Automobile or Mechanical students. This report describes the process and methodology to a low-cost gokart. Simple but innovative. We are reviewing the data in various papers about go-karts. We will review various electric types of go-karts. We have kept our focus majorly on eco-friendly (Solar) karts and the data presented in the papers. One of the front runners in the area of renewable energy resources today is solar power. Photovoltaic cells are used to convert solar energy in to useful electrical energy. The objective of this paper is to construct an efficient solar Go-kart, for the daily commuters so that they can travel a short distance that they need to commute every day on a reliable and economical Go-kart that essentially runs on free renewable solar energy. The paper illustrates how the charge generated by an array of solar panels is received and its flow in and out of a battery pack is to be controlled using a microcontroller based charge controller to ensure efficient storing of charge in a battery pack. The stored energy would be divulged to a DC motor which would run the car. [1]

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KEYWORDS: Eco-friendly use, Go-Karts, Solar power.

INTRODUCTION

The general definition of any kart, a vehicle without suspension and differential. It is a vehicle specially designed for a flat track race. A wide range of engine karts were on track since the mid of the 20th century. The present automotive scenario motivates the eco-friendly vehicles to minimize the damage done by the harmful emissions done by the IC engines. As an alternative for the engine there is the electric motor which in comparison can give the same or even more power output. This can be implemented in the karting situation. Motor acts as a substitute for the engine and hence the go-kart gets drastically changed in both in its performance and design. The go-kart, thus runs only on electricity and is designed to meet the requirements for go-karting and also is being powered by the solar energy provided by the sun. The frame mostly acts as a suspension in go-karts. It must also possess sufficient strength not to break under extreme loading. So, flexibility should be compromised with more stiffness in the go-kart. The primary objective is to design a go-kart for the people. [1]

If we could drive a solar-powered car, that auto dream would come true. Solar cars would harness energy from the sun from the solar panels. A solar panel is a packaged, connected assembly of solar cells, also called photovoltaic cells which are solid state devices that can convert solar energy directly into electrical energy through quantum mechanical transitions. They are noiseless and pollution-free with no rotating parts and need minimum maintenance. The electricity thus generated would then fuel the battery that would run the go-karts motors. Therefore, we would obtain an electrically driven go-kart that would travel on "free" energy with no harmful emissions, that can utilize its full power at all speeds, and would have very little maintenance cost. There is growing demand for fossil fuel like diesel and petrol to power the automotives and cater other needs of human. Fossil fuels are being depleted because of their excessive use and limited stocks. Further the use of fossil fuels is polluting the environment. In metro cities like Delhi, Beijing, level of pollution from vehicles, during peak hour is dangerous. Because of this people are fragile to wear mask for filtering the polluted air for respiration. Further, there are frequent traffic jams on the road due to this there is wastage of fuel and time. All these factors are responsible for various problems in human such as headache, stress, reduced performance etc. To minimise all these problems and to keep our earth free from pollution and human health and fitness, there is an urgent need to explore alternative in place of fossil fuel powered vehicles. Efforts are being put to develop vehicle powered by solar energy, hydrogen, biodiesel and batteries. Battery powered vehicle are not so popular in India because they need frequent charging, small distance travelled in single charging, small range of speed in comparison to conventional automotives short battery life etc. In order to overcome above mentioned problems an attempt has been made to design and fabricate environment friendly, battery powered, single passenger Eco-kart. [2]

LITERATURE REVIEW

Koustubh Hajare (2016), Their paper aimed on the design analysis of the go kart chassis. The main intention for them was to do the modelling and static analysis of go-kart chassis. The paper highlighted the material used and structural formation of chassis. The strength of material, rigidity of structure and energy absorption characteristics of chassis was discussed.

The objectives of their paper were as follows:

1] The selection of material for chassis.
2] To construct the appropriate chassis for go-kart.
3] To determine the maximum stress concentration areas.
The analysis of design of their go-kart determined the stresses developed in the chassis which plays an important role in factor safety and further means to safeguard the chassis by performing its analysis. [3]

Abhishek K. Saw**,** they proposed that the main contents of their paper were Solar PV panel, Brushless PMDC motor, Charge controller and battery. They discussed about the main idea of the components and they compared the different components. With that project they designed and manufactured a system to convert the hand powered tricycle to an electric motor-powered version. Solar - powered vehicles (SPVs) use photovoltaic (PV) cells to convert sunlight into electricity. The electricity goes either directly to an electric motor powering the vehicle, or to a special storage battery. PV cells produce electricity only when the sun is shining. Without sunlight, a solar powered car depends on electricity stored in its batteries. Hence, they explained components which were used for the fabrication of the solar powered tricycle. The recharging capacity of the panels was satisfactory. [4]

Abhinya Chaturvedi, in this paper they surveyed the history and future of solar and electric vehicles and provided an overview of a typical solar car. This paper discussed about the usage of solar energy to power up the vehicle. In order to achieve the required voltage, the Photo Voltaic (PV) Module would be connected either in parallel or series, but it was costlier. Thus, to make it cost effective, power converters and batteries were being used. Also, they concluded with the rate of conversion of energy was not satisfactory (only 17%). But these disadvantages could be easily overcome by conducting further research in that area; like the problem of solar cells can be solved by using the ultra-efficient solar cells that give about 30-35% efficiency. [5]

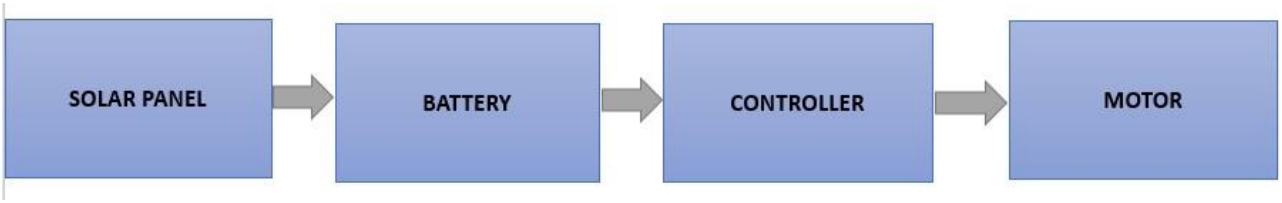
Sathish Kumar, they presented the design and analysis of an electric motor-powered kart. The main aim of this paper was to reduce the usage of organic fuel powered vehicles and to design a vehicle which works efficiently in the emerging electric vehicle sector. An effective alternative for the engine was the electric motor which in comparison could give the same output power. That could be implemented in the karting field. Motor replaced the engine and hence the kart got dramatically changed in both design and performance. The vehicle, hence ran only on electricity and was designed to meet the necessary requirements for karting. They finally settled with a PMDC Motor of 48V and 2.5KW and selected it by conducting both theoretical and experimental studies. Hence, both speed and torque requirements were compromised and so the speed control was achieved through a PWM based voltage controller. Finally, an effective design for the kart was developed which could outperform the existing karts and in the upcoming era of electric automobile vehicles. [6]

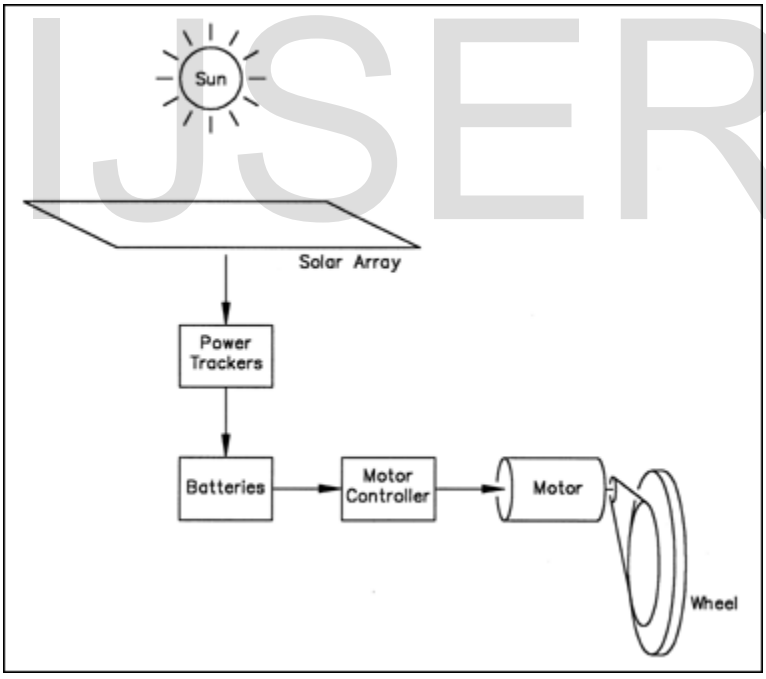
Akshay Pai, in this report they documented the process and methodology to produce a low-cost go-kart. Simple but innovative. We had kept their focus majorly on eco-friendly karts and the data presented in the papers. The hybrid still causes pollution whereas a purely electric is not only pollution free but also lighter in weight allowing better weight to power ratio. By using a mixture of new and old technology to bring out more efficient and productive machines. [7]

PROJECT OBJECTIVES

The main objective of this project is to construct a solar Go-kart to allow transport for people travelling a certain amount of distance every day, for instance, the office commuters or the people using them for their daily needs or to travel to a short distance in Navi Mumbai city with virtually no cost as it will run off free renewable solar energy. Since cars are the major mode of transport for office commuters or for using them for their daily needs or to travel to a short distance in Navi Mumbai city, shifting to this eco-friendly Go-kart would be beneficial on an enormous scale.
The Go-kart would be able to commute safely to a short round trip distance. The solar powered Go-kart to be designed would be light-weight, clean, environment friendly and completely independent of fossil fuels.

MEHODOLOGY





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SCOPE OF WORK

We are going to make the go-kart run on electrical and solar energy which would prove to be beneficial to the environment by producing no emissions and this go-kart would be powered by the electric motor. The solar panels on the contrary would be mounted on the top of the go-kart. Solar energy would also be harvested and converted to power the go-kart in an efficient manner.

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