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A PATH FOR HORIZING YOUR INNOVATIVE WORK

FABRICATION OF SOLAR ELECTRIC TRICYCLE FOR HANDICAPPED PERSON

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Abstract: Solar plays a vital role in our day to day life. We have developed the solar tricycle especially for handicapped person. In this paper it is discussed that how solar tricycle will help to reduce the effort of handicapped person. All the designs specification considered after analyzing the problems from the handicapped person. Comfort of the person in the tricycle is an important and we have given importance to it. The main content of the tricycle is Solar PV panel, Brushless PMDC motor, Charge controller and battery. This paper will discuss about the main idea of this project and to get a larger picture on what is the problem in the current technologies, what that I want to achieve in this project and the area that will cover on this project. This paper is divided into some categories that are project background to describe the reasons to do this project, problem statement to inform about the problem or weakness of the existing technology, objective to make sure what actually this project must achieve and scope of this project to specify what will be used in this project.

Keywords: Solar panel-PMDC-tricycle

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INTRODUCTION

Electric vehicles, which use 100% electric power, use electric motors instead of an internal combustion engine to provide motive force. 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.

Since the 1970s, inventors, government, and industry have helped to develop solar-powered cars, boats, bicycles, and even airplanes. In 1974, two brothers, Robert and Roland Boucher, flew an extremely lightweight, remote-controlled, pilotless aircraft to a height of 300 feet. It was powered by a PVarray on the wings. (The U.S. Air Force funded the development of these aircraft with the hope of using them as spy planes.) The first totally solar-powered car was built in 1977. It was small, lightweight, and cost relatively little. Experimental SPV‘s, equipped with advanced technology, have been built with the backing of major auto manufacturers, including General Motors, Ford, and Honda.

There will be a big area at the agi campus wardha when it is fully built and operates. So students need a vehicle to move from one side to another. In state of using car or motorcycle that are costly, student will be prefer to used tricycle as their vehicle. There several types of tricycle that can be chosen such as paddle tricycle, motorized tricycle and electric tricycle. But there are some weaknesses about that type of tricycle. To overcome the weakness this project will develop a better tricycle. Because of India is located in the topic of Capricorn area, this project will make used the energy of the sun that rarely used in India to generate the tricycle.

As what had been mention earlier, there are several types of tricycle that can be categories that is paddle tricycle, motorized tricycle, and electric tricycle. The weakness of the tricycle make people do not like to used tricycle. First, paddle tricycle needs a lot of energy to paddle the tricycle. The user will surely be tired after used the tricycle. This will not suitable for student to use to go to the class because they will be tired when they are in the class and will lost their concentration while hearing the lecture. Next, motorize tricycle that used fuel as it prime mover. The tricycle use fuel that is costly. As a student, their allowance is limited and only can be used for their study material and for their food to survive at the campus. Besides that, motorize tricycle will make pollution that can be very bad for our environment especially in this period that global warming happen to the earth. Lastly, electric tricycle that generate by battery can be only be sufficient for about an hour. The user needs to find power supply to

recharge the battery or else they need to paddle the tricycle that used more energy compare to the normal tricycle because of the weight.

- **SCOPE AND OBJECTIVE**

To overcome the problem and the weakness, this project need to do some research and studying to develop better technology. To make it success there are several thing that we need to know such as what will be

the prime mover, how to stored it and the advantages of this new vehicle. In that case, these are the list of the objective to be conduct before continue to proceed on this project:

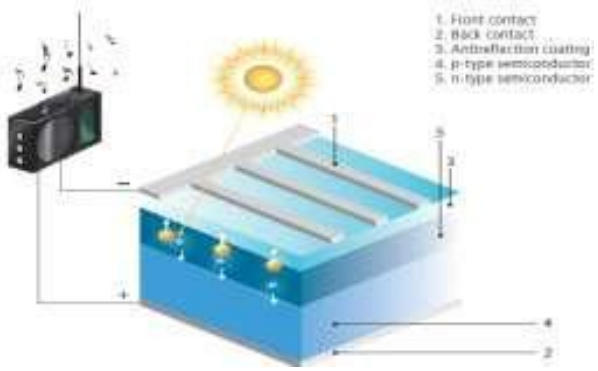
- To develop a vehicle that use renewable energy, environmentally friendly and cheap.
- To develop an electrical tricycle that can charge the battery when it is not in used.
- To develop low speed tricycle, but for a longer distanceclose
- To convert the solar energy to the electrical energy by using solar cells, then Converting this electrical energy to mechanical energy by using dc motor to run the tricycle beside the human paddling.
- To find the alternative of fuel.
- To maintain the ecological balance.
- To form the economical tricycle.
- There is a need for a green energy.

III design description

The solar powering system of the tricycle consists of:

1. Solar Array which collects solar energy and convert it to electrical energy
2. Power trackers to achieve the proper voltage to be stored in batteries.
3. Batteries to stir power.
4. Motor controller which adjusts the power input to the motor.
5. An electric motor which drives the vehicle

Photovoltaic's is the field of technology and research related to the devices which directly convert sunlight into electricity. The solar cell is the elementary building block of the photovoltaic technology. Solar cells are made of semiconductor materials, such as silicon. One of the properties of semiconductors that makes them most useful is that their conductivity may easily be modified by introducing impurities into their crystal lattice. For instance, in the fabrication of a photovoltaic solar cell, silicon, which has four valence electrons, is treated to increase its conductivity. On one side of the cell, the impurities, which are phosphorus atoms with five valence electrons (n-donor), donate weakly bound valence electrons to the silicon material, creating excess negative charge carriers. On the other side, atoms of boron with three valence electrons (p-donor) create a greater affinity than silicon to attract electrons. Because the-type silicon is in intimate contact with the n-type silicone p-n junction is established and a diffusion of electrons occurs from the region of high electron concentration (the n-type side) into the region of low electron concentration (p-type side). When the electrons diffuse across the p-n junction, they recombine with holes on the p-type side. However, the diffusion of carriers does not occur indefinitely, because the imbalance of charge immediately on either sides of the junction originates an electric field. This electric field forms a diode that promotes current to flow in only one direction. Ohm metal-semiconductor contacts are made to both the n-type and p-type sides of the solar cell, and the electrodes are ready to be connected to an external load. When photons of light fall on the cell, they transfer their energy to the charge carriers. The electric field across the junction separates photo-generated positive charge carriers (holes) from their negative counterpart (electrons). In this way an electrical current is extracted once the circuit is closed on an external load. There are several types of solar cells. However, more than90 % of the solar cells currently made worldwide consist of wafer-based silicon cells. They are either cut from a single crystal rod or from a block composed of many crystals and are correspondingly called mono-crystalline or multi-crystalline silicon solar cells. Wafer-based silicon solar cells are approximately 200 µm thick. Another important family of solar cells is based on thin-films, which are approximately 1-2 µm thick and therefore require significantly less active, semiconducting material. Thin-film solar cells can be manufactured at lower cost in large production quantities; hence their market share will likely increase in the future. However, they indicate lower efficiencies than wafer-based silicon solar cells, which means that more exposure



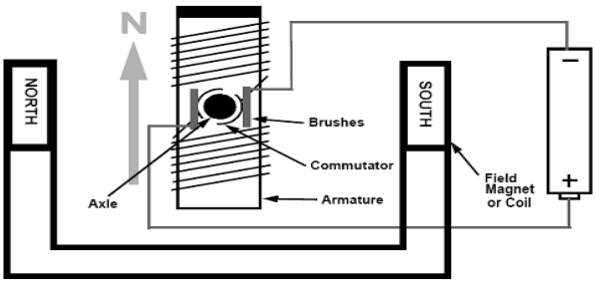
A DC motor is an electric motor that runs on direct current (DC) electricity There are two type of dc motor

- Brushed DC electric motor
- Brushless DC electric motor

Uncommutated The brushed DC electric motor generates torque directly from DC power supplied to the motor by using internal commutation.

IV PRINCIPLE OF OPERATION

The construction of a simple BDC motor is shown in Figure . All BDC motors are made of the same basic components: a stator, rotor, brushes and a commutator.



SPECIFICATIONS:

- Solar panel: 12 volt, 75 W= 2Nos.
- Motor:, brushless dc motor, 24 volt, Maximum load current is. Power rating is 250 W, 300rpm.
- Battery: 12 V- 2 Nos.
- Charging time: 6 hr
- Maximum speed: 33 km/hr
- Frame: Steel in parts with high strength requirements.
- Wheels: Front 20 x 1.75. Rear 23 x 2.00.
- Tyres: Front 23 x 2.50. Rear 20 x 2.00 / 2.25 moped strength.
- Size: Length 2.3 M. Width - 1.2 M.
- Weight: Chassis 98 Kg.
- Load Capacity: 90 kg
- Handlebars: Maxims Design.

Electric Tricycle

Designing and constructing an electric tricycle requires careful consideration of the many different aspects of the vehicle. First, it is important that the frame of the tricycle be selected so that it satisfies the rider's intention, comfort level, and style.

Once the frame is decided on, proper measurements and calculations must be made so that a suitable motor can be chosen. When selecting the motor, it is also necessary to have a desired maximum speed of travel in mind. Sizing the motor depends on multiple factors such as the frontal area of the vehicle, weight, wind drag, air density, friction, and desired Velocity.

The goal for this portion of the project is to select a frame for the tricycle that will allow the rider to be in a recumbent seated position and capable of traveling at speeds around 15 mph.

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