DESIGN AND DEVELOPMENT OF SOLAR BICYCLE USING LEAD ACID BATTERY

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ABSTRACT-As we all know the fuel prices especially the petrol is rising steadily day by day. Again the pollution due to vehicles in metro cities & urban areas is increasing continuously. To overcome these problems, an effort is being made to search some other alternative sources of energy for the vehicles. Again, it is also not affordable to purchase vehicles (mopeds, scooters or motorcycles) for all the class of society. Keeping this in mind, a search for some way to cater these economically poor people as well as to provide a solution for the environmental pollution was in progress. The solar assisted bicycle developed is driven by DC motor fitted in front or rear axle housing & operated by solar energy. The solar panels mounted on the carriage will charge the battery & which in turn drive the motor. When the bicycle is idle, the solar panel will charge the battery. This arrangement will replace the petrol engine, the gear box & the fuel tank in case of a two wheeler or a chain sprocket, chain & gear shifting arrangement of a conventional bicycle being used by most common man. As a part of dissertation work, the solar assisted bicycle is fitted with a dc hub motor on axle of a bicycle with power rating of 250W and with a travelling speed of around 15-20 kmph. It is provided with a pair of lead acid batteries of 35 Ah each, a photovoltaic solar panel with capacity of 20 watt, a voltage regulator of 24v 10 Amp, accelerator and motor controller of 24v 25Amp. There is also a provision for charging of the battery with 220-240V, AC wall outlet supply, in case of poor solar supply due to cloudy weather.

1 INTRODUCTION

A sunlight based bike is a bike which runs utilizing the electrical vitality of battery to run the centre point engine which at last runs the bike. Sunlight based vitality is utilized to charge the battery. Photovoltaic cells are utilized to outfit sunlight based vitality to create voltage to charge the battery. Battery gives the necessary voltage to the centre engine mounted on the front wheel to run the bicycle.

Sunlight based bike are not sold by and large in our ordinary life however there assembling can be expanded to forestall ecological contamination. These are fundamentally utilized as a reasonable activities and are additionally once in a while supported by government organizations

There have been numerous licenses on electrical vehicles in various nations and in this way electric vehicles are not an exceptionally new idea. Using sun oriented vitality to charge the battery and consolidating this idea with the idea of power age accelerating is another idea and there have been very less research right now Sunlight based bike utilize photovoltaic cells that convert sun oriented vitality into expected voltage to charge the battery. There are two sorts of sun based boards that

are for the most part utilized that is polycrystalline boards and microcrystalline sun oriented boards. The polycrystalline boards are having less productivity when contrasted with microcrystalline boards. Polycrystalline boards have productivity of around 15 – 20% while microcrystalline boards have productivity of 50 - 60%.

There are various sorts of batteries utilized in electric vehicles like lead corrosive batteries, lithium particle batteries, Nickel cadmium batteries, and so on. Unique batteries they have their various points of interest for various applications. To the extent sun oriented bikes are concerned lead corrosive and lithium particle batteries are most generally utilized. Lead corrosive batteries have lower cost, higher current conveying limit however have little life what's more, are heavier. While lithium particle batteries have lower weight however have greater expense and thereare odds of blast. Gradually sunlight based bicycles have assembled consideration from all over the world and there have been numerous tasks being done on this point. The motor utilized is a dc motor which will be mounted on the back wheel. While a chain and sprocket instrument will be given on the back side of the vehicle to run the motor.

2. OBJECTIVE

The main objective of this paper is to generate the zero emission for electricity by using the natural source and to provide a better solution and to minimize the interruption of electric power supply and to make an easy to use ,for all intents and purposes ,which adaptable from efficient power supply and where the weight is less, controlling is also easy ,and this also make convenient for use by anyone.

this type of solar bicycle may also used to reduce the pollution and also we can charge this on site without any coal plant ,where by bicycling we can keep our body fit and healthy.

III. SOLAR PANELS/CELLS



Fig 1.Solar panel

Sunlight based bike is worked by sun oriented energy. the lead corrosive battery is accused of voltage produced because of sun based vitality with the assistance of a photovoltaic cell .sun powered cells convert the sun oriented vitality straight forwardly into power utilizing photovoltaic impact. this photovoltaic and photoelectric are related to sunlight, in any case, the distinction in that electrons are launched out from material surface upon presentation to electromagnetic radiation of adequate vitality in photoelectric, and in this way the electrons that are produced are moved to various groups of valence to conduction inside the materials accordingly this outcomes into develop of voltage between two anodes in photovoltaic .solar cells are associated electrically and made as a module with a sheet of glass on top to permit light to pass and shield the semiconductor from the weather.to acquire the voltage of 24 V two boards of 12 V each are associated in arrangement.

3. MOTOR CONTOLLER



Fig 2.contoller

An engine controller is a significant component of the sun oriented hybrid bicycle or can be called as the cerebrum of the vehicle. it controls the measure of intensity provided to the hub motor and furthermore to the lights and horn if required. the engine controller plays out the capacity of change of the DC voltage from the battery to a rotating voltage with variable amplitude and frequency that drive the hub motor at various speeds.it fundamentally comprises of MOSFET transistors and little microchip that shift from recognizing any breakdowns with the engine corridor sensors, the throttle to secure capacities against over the top present and under-voltage.

4. BATTERY

In this project we are using LEAD ACID BATTERIES. There are 2 LA batteries of 12V each. Lead acid batteries, invented in 1859 by French physicist Galstron Plante, are the oldest type of rechargeable battery. Despite having a very low energy-to-weight ratio and a low energy-to-volume ratio, their ability to supply high surge currents means that the cells maintain a relatively large power-to-weight ratio. These features, along with their low cost, make them attractive for use in motor vehicles to provide the high current required by automobile starter motors.

Batteries use a chemical reaction to do work on charge and produce a voltage between their output terminals.

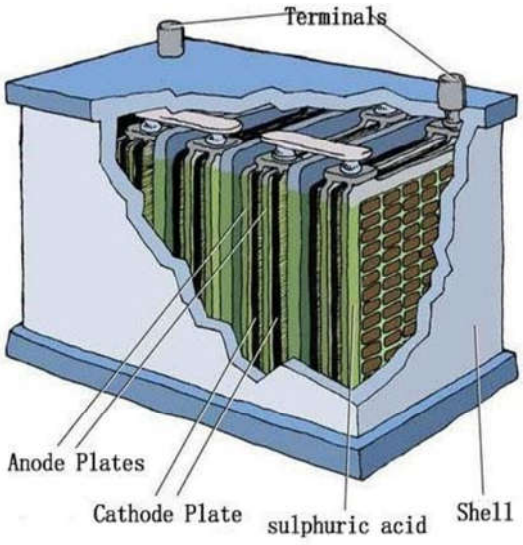

Fig 3 schematic diagram of lead acid battery

5. WORKING

The solar bicycle is an electric vehicle that provides the alternative by harnessing solar energy to charge the battery and provide required voltage to run the motor.

The 12v,50w solar panel is connected to the solar controller through which we can generate the output of 24v to charge the battery. The battery is connected to the motor controller through which we will be able to control the motor. The supply from the battery is given to the motor controller which gives the supply to the motor. The motor controller is also connected to the accelerator and also the switch which turns on the motor. When the switch is in “OFF” position the supply doesn’t reach the motor, when the switch is in “ON” position the supply reaches the motor. With the help of the accelerator we can run the motor for the required speed.

When the motor starts rotating the sprocket connected to the motor also starts rotating which results in the moment of the cycle. Thus we can run the cycle for the required speed.

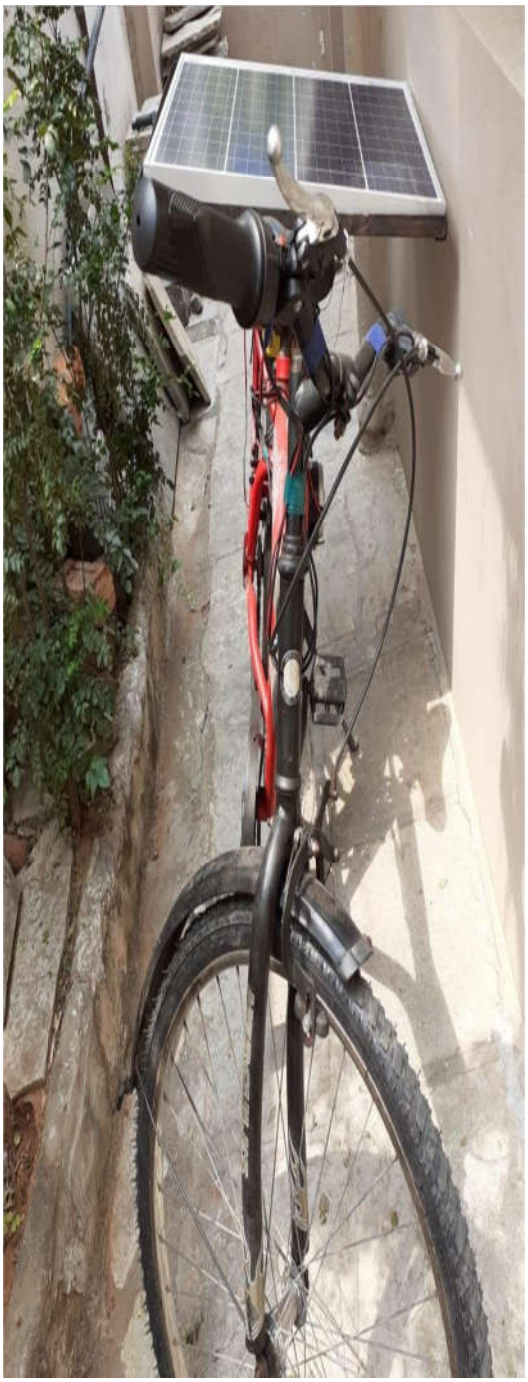

Fig 4.Solar bicycle



Fig 5.Motor

TABLE

S.No	Equipment	Input	Output
1	Solar panel	Solar radiation	12volts
2	Solar controller	12volts	12volts
3	Battery	12volts for 2units	24volts
4	Motor	24volts	1250rpm
5	Motor controller	24volts	24volts

6. CONCLUSION

This project **'Design And Development Of Solar Bicycle Using Lead Acid Battery'** the installation cost is more compare to normal bicycle ,because the equipments we are using are solar panel, motor controller, battery, motor, solar controller and bicycle these equipments are costly ,where the major advantage of this solar bicycle is environment pollution may reduces why because we are not using any fuels ,we are using the solar as a main source for running of bicycle, and when ever battery may discharges then we can run the bicycle by using the pedals.

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