

FABRICATION OF SOLAR BIKE

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ABSTRACT

There are loads of vehicles that came to persuade in the existing world. Their operating systems are based on normal fossil fuel system. At the current sense the fossil fuel can beat only for a certain stage after that we have to go for a modify to other methods. Thus we have made an challenge to design and fabricate an definitive system (Solar Cycle) which would produce cheaper & efficient result than the obtainable system. This will be extremely useful to the future needs of the world. An attempt is made in the fabrication of a solar powered System for a two-wheeler (Cycle). This works on electric power distributed by the DC electric motor receiving the current from a battery. The motor and the various parts are such as sprocket, chain assembly, cycle and with easily available materials to hand round and fulfill the function of the project. Battery is charged by means of solar panel.

Keyword: - Solar panel, DC electric motor, battery, and sprocket etc....

1. INTRODUCTION

All vehicles that are in the market cause pollution and the fuel cost is also increasing day by day. In order to compensate the fluctuating fuel cost and reducing the pollution a good remedy is needed i.e. our transporting system. Due to ignition of the hydrocarbon fuels, in the vehicle, some time difficulties such as wear and tear may be high and more attention is needed for proper maintenance. Our vehicle is easy to handle and no fuel cost to the other existing vehicles. Hence a need for a change in the existing alternative system which can produce higher efficiency at minimum cost was though about an attempt has been made to design and fabricate such an alternative system. So this project "SOLAR CYCLE" is very much useful, since it is provided with good quality of power sources and simple operating mechanism. Hence "EACH AND EVERY DROP OF FUEL SAVES OUR ECONOMY AND MEET THE NEEDS" is the saturation point that is to be attained as soon as possible. In order to achieve this saturation point we have to save and seek for some other source of power. This power, the alternate power must be much more convenient in availability and usage. The next important reason for the search of effective, unadulterated power are to save the surrounding environments including men, machine and material of both the existing and the next forth generation from pollution, the cause for many harmful happenings and to reach the saturation point.



1.1 SOLAR ENERGY

Solar energy has the greatest potential of all the sources of renewable energy and if only a small amount of this form of energy could be used it will be one of the most important supplies of energy especially when other sources in the country have depleted. Energy comes to the earth from the sun this energy keeps the temperature of

the above that in colder space causes the water cycle and generates photosynthesis in plants. The solar power where sun hits atmosphere is 1017 watts, where as the solar power on the earth surface is 1016 watts. The total worldwide power demand of all needs of civilization is 1013 watts. Therefore, the sun gives us 1000 times more power than we need. If we can use 5% of this energy, it will be 50 times what the world will require.

1.2 NEED FOR NON- CONVENTIONAL ENERGY

Fuel deposit in the world will be soon depleting by the end of 2020. Fuel scarcity will be maximum. Country like India may not have the chance to use petroleum products. Keeping this situation in mind we tried to make use of non-pollutants natural resource of solar energy. The creation of new sources of environmentally acceptable, low cost electrical energy as a replacement for energy from rapidly depleting resources of fossil fuels is the fundamental need for the survival of mankind. We have only about 25 years of oil reserves and 75-100 years of coal reserves. Resort to measure beginning of coal in thermal electric stations to service the population would result in global elementary change in leading to worldwide drought and desertification. The hazards of electric stations are only to will.

1.3 RENEWABLE ENERGY RESOURCES

A renewable energy resource is a natural source of energy which can be replenished with the passage of time, either through biological process of reproduction or any other natural processes. Renewable resources are a part of Earth's natural environment and the largest components of its ecosphere. 16% of total global energy consumption comes from renewable energy resource. Renewable resources may be the source of power for renewable energy. However, the rate at which the renewable resource is consumed should not exceed its renewal rate to ensure its sustainability. A solar cell (also called a photovoltaic cell) is an electrical device that helps in the conversion of light energy directly into electrical energy by creating voltage when it gets exposed to light. It is a form of photoelectric cell which, when exposed to light, can produce and support an electric current without being attached to any external source of voltage, but requires an external load for power consumption.

2. METHODOLOGY

The solar assisted bicycle consist of following components (Fig.1) - hub motor, solar panel, voltage regulator, lead acid battery, motor controller, accelerator, bicycle.

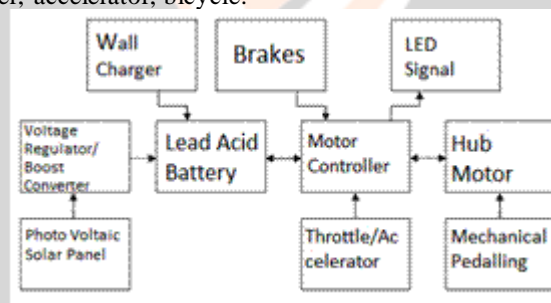


Fig 1 - Block Diagram of a Solar Assisted Bicycle

2.1 BLDC MOTOR

Brushless DC (BLDC) motors are synchronous motors consisting of armature windings on the stator permanent and magnets on the rotor. The stator of a BLDC motor consists of stacked steel laminations with windings placed in the slots and these stator winding can be arranged in two patterns i.e. a star pattern or delta pattern. The major difference between the two patterns is that the star pattern gives high torque at low RPM and the delta pattern gives low torque at low RPM. There are many advantages of BLDC motor such as better speed versus torque characteristics, high dynamic response, high efficiency, long operating life, noiseless operation, higher speed ranges. The main characteristic of Brushless DC Machines is that they may be controlled to give wide constant power speed ranges. Electric motors have greater torques at startup, making them more suitable for vehicles as they need the most torque at startup too. The idea of "revving up" so common with internal combustion engines is unnecessary with electric motors. Their greatest torques occurs as the rotor first starts turning and this is why electric motors do not require a mode. A gear-down arrangement might be needed, but unlike in a transmission type combustion engine, shifting is not needed for electric motors.

Table -1: SPECIFICATION OF MOTOR

Type of motor	Hub motor
Design of motor	BLDC (Brushless DC)
Power rating	240W
Torque	12N-M
Speed	300
Rated voltage	24
Efficiency	>80
Weight	4

2.2 SOLAR CELLS/ PANELS

As the title suggests the bicycle is operated by solar energy. The lead acid battery is charged with solar energy with the help of a solar cell. Solar cells convert the energy of sunlight directly into electricity through the use of the photovoltaic effect. The photovoltaic effect involves the creation of a voltage into an electro-magnetic radiation. The photoelectric and photovoltaic effects are related to sunlight, but are different in that electrons are ejected from a material's surface upon exposure to radiation of sufficient energy in photoelectric, and generated electrons are transferred to different bands of valence to conduction within the material, resulting in the build-up of voltage between two electrodes in photovoltaic.

**Fig -2** Solar panel

3. WORKING

The working of battery-motor drive mechanism is explained below. The working principle of the system starts with the battery connections. In battery there are two terminals. The battery is charged by using solar panel. One is the positive terminal and another one is the negative terminal. The wire connections were made for the flow of electrons from one part to another part. When the motor energies through the current, the stator field coil gets magnetized and induces the rotor shaft to rotate in the counter clockwise direction. At the end of the motor shaft relevant conditions were made for the seating of sprocket assembly. Sprocket-chain arrangement is a power transmission device, which gives drive to the rear wheel.

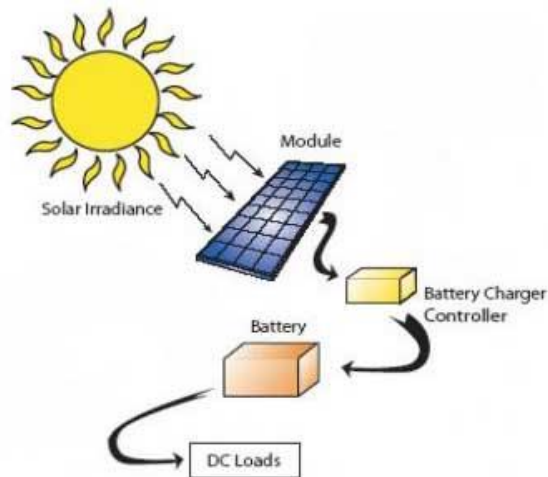


Fig -3Working principle

3.1 Electrical accelerator

An electrical signal accelerator (Figure 3) works on the principle of Hall Effect generator, which produces speed controlling signals based on the rotation of the actuator



Fig -4: Electrical accelerator

The maximum speed of a bicycle is 30 kmph. It is required to vary the speed depending upon the road conditions & traffic. Therefore an accelerator or a throttle (Fig.13) is necessary. Throttle allows us to drive the motor from zero speed to full speed. The throttle is fitted on right side of the handle bar and is connected to controller. The throttle converts DC voltage from battery to an alternating voltage with variable amplitude and frequency that drives the hub motor at different speeds. It consists of MOSFET transistors and a small microprocessor.

This throttle is technically referred to as a Hall Effect type. The throttle has three wires: contains a black, red, and green. The supply voltage is via red and black wires and is usually around 4 volts. Green wire voltage increases as the throttle is turned.

4. CONCLUSIONS

We are proud that we have completed the work with the limited time successfully. The NON CONVENTIONAL CYCLE is working with satisfactory condition. We are able to understand the difficulties in maintaining the tolerance and also quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed a "NON CONVENTIONAL CYCLE" which helps to know how to achieve low cost pedal wet grinder model. By using more techniques, they can be modified and developed according to the application.

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