

Eco Friendly Bike

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Abstract:- In last few decades increase in the automobiles have reached peak. These automobiles use non-renewable sources which produces dangerous fumes, so electrical energy is the best alternative. Among all energy sources available electrical energy is more reliable, efficient and economic. Combustions engines used in automobiles releases huge amount of greenhouse gases in environment which results in increasing global warming and air pollution. So these petrol and diesel vehicles need to be replaced with a best alternative such as electrical vehicles. [1]

The main reason behind handling this paper is to place the idea of electrical bike which is affordable for the common people in our country, and to use these electrical bikes over dangerous fume releasing cars and bikes.

Along, the development of technologies the theory must be also implemented to design and manufacture a product that can be sold off at greater frequency which has a low production cost and with a very good quality to use and implement all those ideas which may reduce the use of fume releasing automobiles we planned to make the design[3].

I. INTRODUCTION

Nowadays energy saving products are preferred all over the world. By, considering this we have designed “ECO-FRIENDLY BIKE” Which works on electrical energy & produces electrical energy. “Hence”, we can save energy.

There are many more features of this paper with various advantages such as more clan light in weight, reliable with a cheap cost and affordable for the customer. This bike is eco-friendly such that it does not lead to any pollution. It does not produce any flue gases during operation. There is a lot of saving of petrol diesel and all other fuels which are used for bikes. [2]

II. RESEARCH ELABORATION

A. Rider

Rider is a user who drives the electric bike. Rider operates the whole operation of electric bike. The unit designed by me is a combination of the standard gear bike with the rider which can be driven completely by an electrically powered motor.[4]

B. Gear

A gear is also known as cogwheel, which is a part of rotating machine having teeth or cogs. It is combined together with another toothed part to transfer the torque. It works on the principle that energy can neither be created nor be transferred but can be transferred from one to another. As we know that power is function of speed, so when we connect small gear on driving shaft and larger gear on driven shaft the speed decreases of driven shaft per unit rotation of driving shaft.[4]

C. Motor:

BLDC motors known as Brushless DC motors are electronically commutated motors. BLDC motors are synchronous motors that are powered by a DC source, which produces an AC signal to drive the motor. We know that, alternating current does not imply a sinusoidal waveform, but rather a bi-directional current with no restriction on a waveform. Additional sensors and electronic controller are used to control the inverter output amplitude and waveform (and therefore percent of DC bus usage/efficiency) and frequency (i.e. rotor speed). A dc gear motor is a dc motor has an extension build on to it to gear down the rotation of the motor moves more slowly for the particular uses. DC geared motor are normal DC motor which have been geared down to decrease. Their speed and torque increases. The GM (Gear Motor) series is a popular type because of their low cost. [4]

D. Motor Controller:

A motor controller is a device that is used to govern the efficient and proper working of an electric motor. A motor controller includes a manual or automatic operation means to start or stop the motor, to select and regulate the speed, limiting torque, and protection against an overload and faults.

Motor controllers are the devices that can be operated remotely, manually or automatically. Motor controller can be used for running of motor or stopping the motor It can be also used for any other functions.

An electric motor controller can be classified by the motor it is to drive such as permanent magnet, servo, series, separately excited, and alternating current.

Battery is connected to motor controller which is used as power source, and control circuit used in the form of analogue or digital input signals.[4]

E. Battery

A device consisting of one or more electrochemical cells that converts stored chemical energy into electrical energy is known as Battery. Each cell contains a positive terminal or

anode and negative terminal or cathode. Electrolytes allow ions to move between the electrodes and terminals, which allows current to flow out of the battery to perform work.

F. Battery Charger

A device used to put energy into or to charge a secondary cell or rechargeable battery by forcing an electric current through it is called as Battery charger.

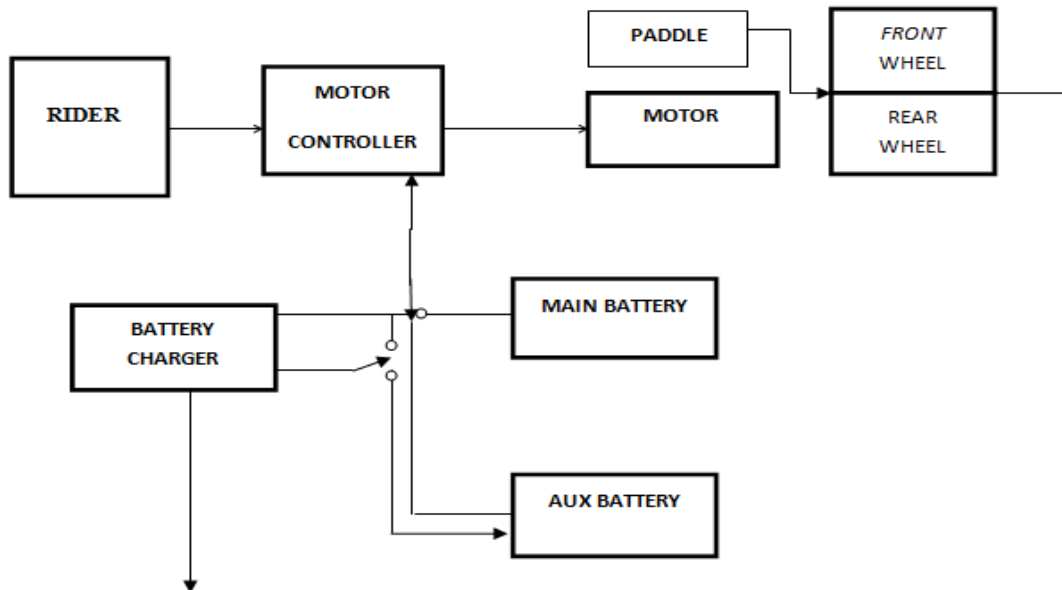
III. WORKING OF ECO-FRIENDLY BIKE

In this paper, we will use BLDC Motor which works on 48 volt DC supply. In this bike we can charge the batteries initially with an external charger or can use paddles for driving the bike and charging the batteries. Then we can use this battery power to run the motor. So this charge is given to the motor. After this, motor drive is transmitted through chain

drive given to the rear wheel of bike and required torque is obtained by using gear drive. To control the speed of BLDC motor we have used a controller.

Generators are placed in front and rear wheel which produce 3 phase electrical energy. This 3 phase energy is converted to DC via 1 phase converters and all other kits like bridge rectifiers. This DC supply is given to the battery which charges the motor. Here two 48 volt DC battery sets are used. When First battery set is giving supply to motor, Simultaneously Second battery set charges from Front wheel and rear wheel. When First battery gets completely discharged, then change over switch switches to the second battery. Means now the First battery is charging & second battery is giving supply to the bike. So the bike runs now continuously. [4]

BLOCK DIAGRAM



IV. APPLICATION

- It can be used in regular uses too
- It can be used in industries
- It can be used for agricultural purpose
- It can be used for long distance travelling

- It can be used for long travelling too
- It is more efficient with a higher speed
- It has more capacity
- It is smooth in running

V. ADVANTAGES OF PAPER

- This bike is more clean an easy to use
- It does not need any type of fuel for its operation like petrol, diesel
- Cost of the bike is very less
- This bike can be used anywhere
- It is a self-powered bike
- It does not create any pollution

VI. LOSSES

There are more losses in new tire because there is more mass in the fread block. Road type can affect the bike’s speed. The region having 10⁵-10⁸ Hz Tan δ is very beneficial for wet skid performance in tread blocks. Side and thread have less losses at high pressure. [6]

Rolling Losses

Pure natural rubbes has low modulus of Elasticity & very low Dissipation Factor & Loss tangent or Loss Angle lower than 0.1. There is addition of some materials to reduce ageing. There is a protection belt layer inside tire tread made

of Natural Rubber which increases the rolling loss, but increases reliability. There are 2 types of friction viz: static and kinetic friction. [6]

$$F = Cr * m * g$$

F= Friction loss

Cr= Friction Coefficient.

STATIC FRICTION: It prevents two non moving bodies from slipping against each other when external force is applied to them.

KINETIC FRICTION: It is not an useful friction. It produces irritating losses of energy. It is because the tires used are not perfectly circular but are deforming.

In summary:

- The force of static friction keeps stationary things from moving when you push on them.
- The force of kinetic friction is the push you must apply to keep moving things in motion. [5]

Drag & Wind

$$Cd = D / PAV^2$$

Cd= Drag Coefficient

V= Velocity

A= Reference Area

There is a compromise between price, lifetime, reliability and rolling resistance for tires. In electric bicycles improving the drag would end up in faired bicycles and velomobiles. Still future improvements can be expected from the efficiency of motors, converters and gears. Improving efficiency reduces the cost of the battery which might be typically 60% of the vehicle cost.[6]

VII. WORKING OUTPUT

Type of model: Working

Choice of technology: Self powered

Eco-friendly: Yes, Non-polluting

Best use of available: All raw materials.

Functionality: Speed 45 km/h and average 30 km.

Aesthetic and completeness of paper: Look like perfect bike.

Ingenuity and innovativeness of paper: A Geared bike with self-charging.

Social impact of paper: Affordable for everyone.

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