

Electric Wheel using Non Rotating Tri Spoke

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Abstract – The main motto of this review paper is to present the idea and design of electric wheel. There are many electric vehicles are present in market but the innovative thing about our project is the position of all components like motor, battery, controller, generator fixed in wheel. Traveling plays the very important role in human being .as we go forward the need of vehicle increases day by day which in turn increase the emission.so now there is need of another substitution of petrol based vehicle which should be durable, efficient, time taking for traveling should be less and also it should be economical and easily available as compared to present transportation and traveling system..

Keywords – E-bike, In wheel motor, Electric wheel, BLDC hub motor.

I. INTRODUCTION

In the present the demand of electric bike or electric scooter for short as well as long distances increasing day by day. This trend is boosted by the increasing awareness to avoid polluting and harmful emission from gasoline and diesel engines.

The compact vehicle like scooter and cycle is especially useful during heavy traffic and also during parking space limited. For short distance, petrol or diesel bikes are not economical as price of fuel is very high hence there is a demand of such substitution which fulfill all the customers need and overcome the drawback of conventional system of travelling.

In present there are lots of electric based bike is present in Indian market with some drawback like low speed and there is still need to work on drive efficiency, reliability and energy density.in addition with this torque to weight ratio and price have to be further reduced.to reach this aim and overcome some of above drawback lots of research has been done.

1. What is electric bike?

The bike which is powered by battery and which is Coupled to electric motor.

2. Main Principle It works on the electromotive force principle. Where a current carrying conductor is placed in magnetic field which experience motive force due to which motor start rotating

3.Electric wheel

At the starting the basic idea was to attach the motor to the cycle so that it can move without any human effort for a certain distance. A motor which is powered by

battery and which can be switched on during difficult road condition or during climbing and switched off and pedal during flat road condition so that battery will get charged. At the different stages of project various idea was come into mind. Firstly we wanted a dc motor which will satisfy the basic requirement like speed, low weight, low maintenance, cost and etc.

After lot of searching we found a motor which satisfy nearly all requirement but the weight is too high then a new concept of dc motor known as BLDC motor which is able to provide high torque good speed as well as has very low maintenance and weight is also less.

Then next thing is we want a regenerative system so that when battery is discharged then by paddling battery get charged for that purpose we use a dynamo or dc generator and installed such that when wheel rotate the dynamo shaft will also rotate and the current generated is supplied to battery but the Arrangement utilize the part of energy of paddling which was not efficient.

Hence we need such structure where the dynamo utilize very low energy of rotating wheel and produce the required voltage to charge the battery. The third one is very important which is a source of energy i.e. battery we need a battery through which motor will get energized and run for sufficient time.

The battery should be such that it will easy to handle portable very low weight as compared to normal lead acid battery and also have high working cycle this all requirement is fulfill by lithium ion battery.

II. PROBLEM DESCRIPTION

As we all know about our transporting system the maximum or we can say that the complete transporting system is powered by petroleum based fuel which pollute the environment in large extent and which is major reason of ozone depletion, in many states the pollution is above the limit which harm the human life rapidly the current example is Delhi.

So to avoid this issue related to petrol based fuel and pollution there is need to find a different safe ecofriendly way of transporting which is more or equally efficient as compared to petroleum based vehicles.

III. OBJECTIVES

The objective of this philosophy project;

- Designing.
- 2 simulations.
- Analysis.
- Fabricating.

IV.SCOPE

- Ecofriendly.
- Costing is Low.
- Easy to Handle and Carry.

V. METHODOLOGY

Regular Electric Bike Components of Electric Wheel Working.

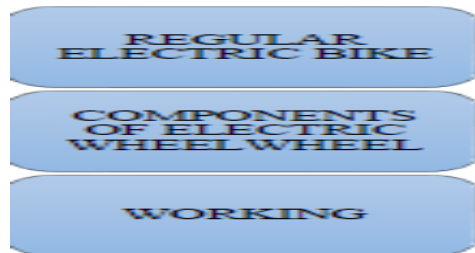


Fig.1 Block Diagram.

1. Regular Electric Bike

The electric bike uses the dc motor of different wattage to provide the motive power, the motor is of single shaft in which the body is stationary and the shaft is rotating the connection of motor with the wheel is either chain drive mechanism, direct drive using rubber wheel on Motor or belt drive between motor and wheel.



Fig.2 Dc Motor.

In all electric bike the rear wheel is coupled with motor i.e. all electric bike are rear wheel drive. For the accelerating purpose electric throttle is used which

regulate the speed. The power providing component i.e. battery is mostly lead acid which is bulky and need to charge after a certain time interval.



Fig.3 Motor and Wheel Connection.

2. Compinents of Mak Wheel

5.1 BLDC Hub Motor

Brush less dc motor (BLDC) is a special type of dc powered motor this is specially designed in china for electric bike and all the requirement which are need in bike are all full filed by this motor.in this motor the middle shaft is stationary which is used to hold the motor in the axle holder of cycle or bike. The outer body is rotatory .the motor outer periphery is such that it can easily mount in the middle of wheel with the help of spokes.

The motor is not available in the Indian market this sis made as per order and there are many variant based on their power like 250watt, 350watt, 500watt, 1000watt and 150watt and as per their power price is different. To run BLDC motor there is a need of controller which an electronic circuit booster which provide the required amount of power to motor so that it can run efficiently and also control the speed of motor through throttle.



Fig.4 BLDC Hub Motor

3. Lithium Ion Battery

Lithium battery has lithium as an anode. This is also known as lithium metal battery. Lithium battery has high charge density i.e. log life depending upon design and chemical compound used.as these batteries are light hence widely used in portable application and also in electric bike. Lithium battery need a BMS (battery management system) which prevent the battery from over charging and also from over discharging because lithium battery get damage on over charging and discharging.



Fig.5 Lithium Battery.

4. Electronic Controller

Controller is a combination of electrical and electronic components as we know about transformer which is either used step up the supply or step down similarly same operation is performed by this electronic components the advantage of using electronic controller is it is very compact then electrical circuit also less complicated.

Second function performed by controller is it's capable to control the speed it has inbuilt speed regulator, it provide electronic braking system to motor, and anti-theft also there. They performed lots of operation simultaneously and still circuit is small compact and handy. Electronic controller is programmable so with the help of program we can performed lots of operation.



Fig.6 Controller.

VI. WORKING

As shown on fig. There is wheel of cycle of 27inch. normally wheel is supported by 36 spokes. But we removed all the spokes and instead of spokes the MAK (3 SUPPORT) structure is placed. as the spokes are removed the rim of steel is get week hence to provide sufficient strength molded aluminum rim is screwed inside the steel rim. The design of inner structure is such that it will remain fixed stable at the center hub.

The three support are angled at 120 degree. The lower support holds the bldc motor. Motor and rim are in contact and for better gripping we have provided concave and convex surface. When the motor starts due to meshing the wheel starts rotating. Remaining two supports are to hold the rim they simply carry the nylon idler or pulley they also have concave and convex meshing.

As we have discussed above that to installed generator we need such structure which utilize minimum wheel energy for that purpose a gear teeth are produced on pulley and the generator is installed such that it will mesh with pulley the biggest advantage is multiplying gear ratio.

As rim rotate pulley rotate with more speed than wheel and then shaft generator rotate with greater speed than pulley hence continuous and large amount of energy

will produce which can be used to charge the battery. This wheel is for front because it's easy to replace front wheel as compared to rear with this way we are able to make any cycle electric cycle just by installing front wheel.

VII. CONCLUSION

From the set of experiment and reading obtain from the project it is conclude that the electric cycle is more ecofriendly than the petrol based vehicles as well as the price of electric bike is half of that petrol based vehicle. On the basis of reading obtains from setup we nearly achieved the 100% efficiency using the different position of generator and electronic circuits

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