



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 5, Issue 2)

Available online at: www.ijariit.com

Design and fabrication (development) of e-bike

K. Sai Chandu

saichandukaligatla017@gmail.com

Avanathi Institute of Engineering and
Technology, Narsipatnam, Andhra Pradesh

G.M.V Siva Kumar

mohanagiduturi@gmail.com

Avanathi Institute of Engineering and
Technology, Narsipatnam, Andhra Pradesh

Kannaji

kannakannaji2@gmail.com

Avanathi Institute of Engineering and
Technology, Narsipatnam, Andhra Pradesh

B. Kiran Kishore

pavanikaligatla@gmail.com

Avanathi Institute of Engineering and
Technology, Narsipatnam, Andhra Pradesh

P. Rama Krishna

pavanikaligatla1234@gmail.com

Avanathi Institute of Engineering and
Technology, Narsipatnam, Andhra Pradesh

ABSTRACT

The technology has been changing day by day, every day new invention and new technology will arrive. Whenever a new technology invented is to solve a past, existing problems. In this era the major problem is pollution and future problem is fossil fuel scarcity. In order to solve these problems, much new technology has been invented. In this invention, one of the best inventions is electric vehicles. These vehicles are free from pollution and also it will help to preserve some amount of fuel to the future generation. The current rate of usage of fuels continuously for the next 5 decades there will be arising from fuel drought.

Keywords— Bi-cycle , Motor (BLDC Motor with Hub), Battery, Dynamo, Throttle, LED Light

1. INTRODUCTION

In this generation bike or vehicle is very important in our fast life for travelling, and also it will help in economic growth but it has drawbacks like pollution, fossil fuel shortage and global warming for this we need a new technology like eco-friendly vehicles for travelling, is E-Bike (electrical bicycle). This E-Bike runs on electricity and this technology has some drawbacks like on full charging of battery works on the period of time only, after that again we have to recharge it for this I introduced a new technology which will generate electrical power with attaching some extra components, it helps to travel some more kilometres. It is basically suitable for young people, the person who likes cycling as an exercise. These E-bikes are futures one of most demanding vehicles

2. LITERATURE REVIEW

2.1 Design and Development of E-Bike - A Review

In this paper, the author explains the modification of E-Bike in order to get maximum speed and efficiency at low cost by reference to previous papers.

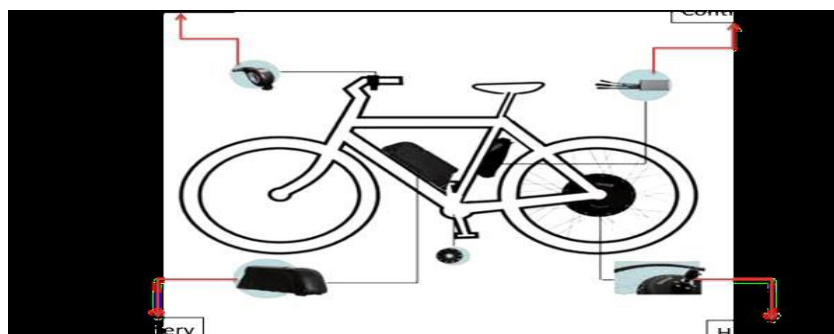


Fig. 1: Design of E-bike

2.2 Design and fabrication of a pedal operated the power generator

In this paper, the author explains how to generate energy from the exercise cycle to use household purposes. He clearly explains how calories are we burn to generate electrical energy.

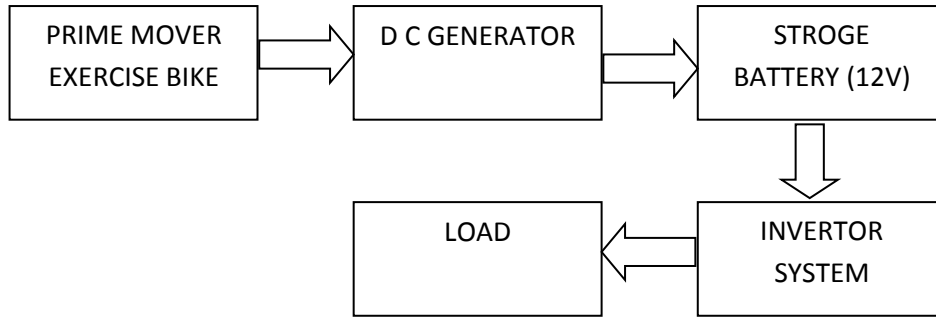


Fig. 2: Block diagram of the generation system

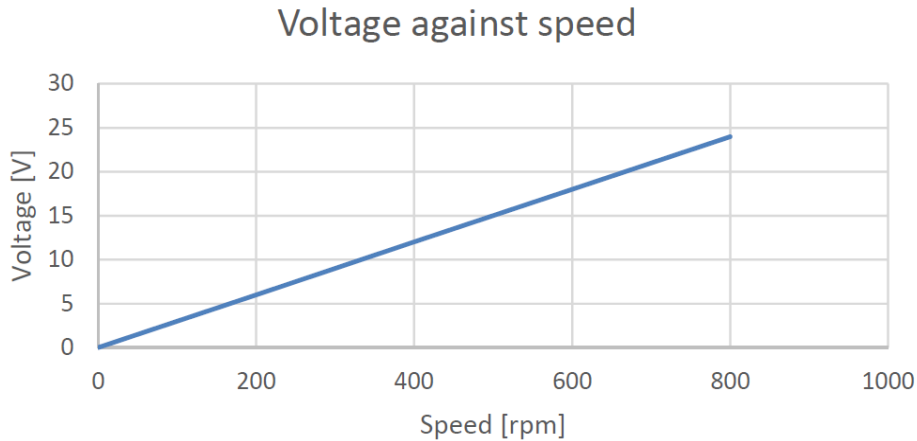


Fig. 3: Graphical depiction of voltage against speed

3. CAMPUS MOBILITY FOR THE FUTURE: THE ELECTRIC BICYCLE

This paper presents the various outcomes and results of the study containing visions into the scheme. Electric bikes, of much sort, have been surveyed by and by in a semi-open contract conspire on the Nanyang Technological University campus in Singapore. According to this campus, it is a famous and helpful administration, with a few models of the electric bike being exceptionally very much utilized. Riders contemplate the premiere of the electric bikes to be both agreeable and engaging while at the same time utilizing it, and extremely suitable for campus travel. Understudies and general society alike view the plan unhesitatingly, and creators have seen a lessening in the number of miles driven via auto inside the grounds for the dominant part of clients who are additional drivers.

In this paper, authors have sensibly inspected the utilization of bikes on campus, displaying and investigating review results that endeavour to clarify blocks to the bigger acknowledgement of the bike. Authors likewise bolster the general public by giving arrangement that if this information is coordinated with a portion of the qualities of the campus encompassing, it is conceivable to suggest specialized, arranging and reasonable arrangements that together should help the more prominent acknowledgement of bike transport. This is the concentration of the rest of the paper.

4. WORKING OF ELECTRICAL BICYCLE

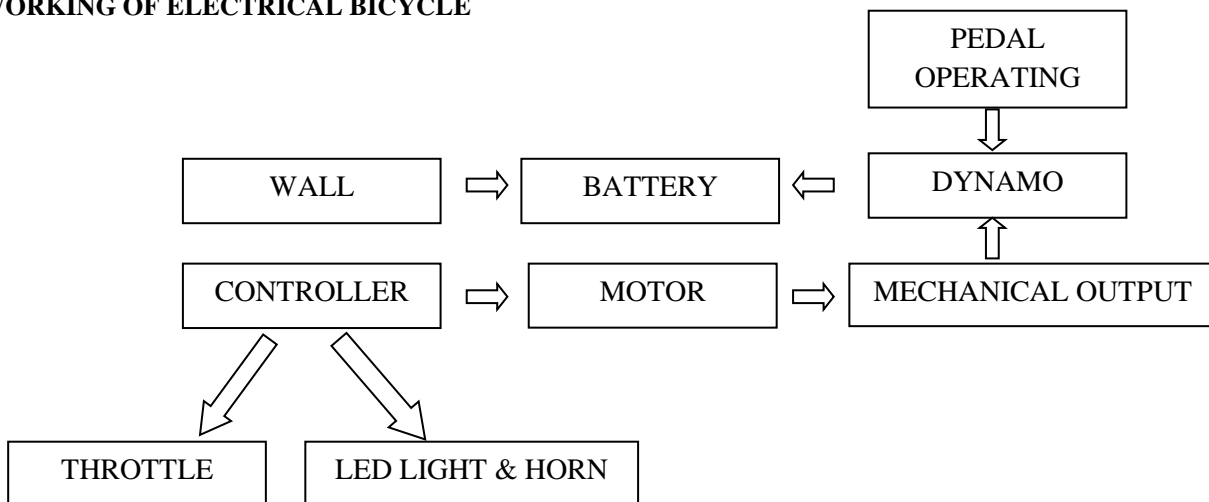


Fig. 4: Working of electrical bicycle

In this process the components are used BLDC motor (350 watts = ½ HP 24v), battery (12v 18ah*2), controller (350watts), throtle (accelerator), head light, fly wheel, and some other components. When the power supply passes through motor through

the controller, the motor converts electrical energy to mechanical output it results in wheel rotate along with wheel flywheel rotate which is connected to the rear axle. With the help of dynamo, we generate power as shown in fig.

4.1 Main Components

4.1.1 PMDC Motor

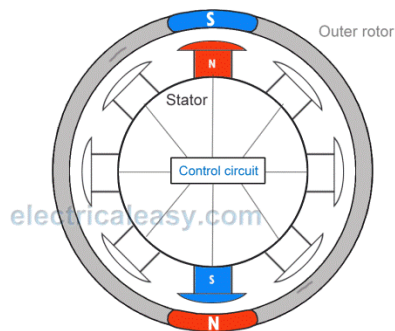


Fig. 1: PMDC Motor

The motor is a device which converts electrical energy into mechanical output. In PMDC (Permanent Magnet Direct Current) motor consists of permanent magnets in the stator, and winded coil is in the rotor. The commutator is connected to the T ends of the winding coils in order to make slipping contact with the brushes. These Brushes are directly connected to DC power supply across motor terminals. Change of direction of rotation can be achieved by reversal of voltage polarity. The when the current flow passes through the coils that create magnetic poles in the rotor these poles interact with permanent magnet poles. In order to maintain the torque generation in the same direction, then the current flow must be reversed when the stator south pole passes to the rotor north pole. For this the slipping contacts are segmented. This segmented slip ring is called commutator.

Motor Specifications- Power: 350W; Voltage: 24V; Current: 19.2A; speed (after reduction):324 RPM;stall Torque:55 N.m; Weight: 2.98Kg.

4.1.2 Battery



Fig. 2: Battery

Batteries are the devices which store energy . The batteries are stores energy in the form of chemical action and it delivers them in form of electrical energy. These batteries are consists of two terminals are positive electrode and negative electrode in this battery the positive electrode use as a lead oxide(PbO_2), and the negative electrode is lead (Pb) here electrolyte is a sulfuric acid(H_2SO_4) these batteries are invented 1859 by French scientist Gaston Planted and this is the first reachable batteries these batteries are low cost and ability to supply a high voltage compared to other batteries, therefore, these batteries are commonly used for any vehicles depends upon required capacity these batteries are can be recycled. In the US during the year of 2009 to 2013.gel designs are sealed, do not require any watering or gas blow-off operations for this reason we can use these batteries with less maintenance.

Specifications- Lead acid battery: Rated voltage : 12V; Rated current: 18Ah; Number of batteries:2; Battery Rating = 12 V * 18 Ah = 216

4.1.3 Fly Wheel



Fig. 3: Fly wheel

In this project, a flywheel is a mechanical device specially designed to efficiently transfer rotational energy to the dynamo. In this fly wheel the rotational speed depends upon its moment of inertia .in this process the fly wheel is directly attached to the rear axle socket, and the wheel with a groove to avoid the belt tripping. When the rear axle rotates fly wheel also rotates. This fly wheel is connected to the generator with the help of a belt (A51grade) drive mechanism.it results when the bicycle is moving then along with back wheel socket fly wheel rotates and dynamo also rotates by connecting with fly wheel by the belt as shown in the figure. This fly wheel is made up of iron.

Flywheel specification- Diameter: 14 cm, material : stainless steel

4.1.4 Dynamo



Fig. 4: Pedal power generator

The word dynamo is taken from Greek words it means force or power and it also called as electrical generator. The word “dynamo” was coined by Michael Faraday who utilized for his inventions in electricity. Faraday discovers electrical induction and magnetism. The original principal of dynamo was explained by Wehrner von Siemens he referred only on dc generators which use exclusively self-introduction principal to generate a DC power. In the early years, dc generators which used permanent were not considered “dynamo electric machines”. This invention helps in the total industrial scale converts to electrical power generation in technically and also economically. After the invention of an alternator alternating current that can be used as power supply now a days, the dynamo was directly commutated with the dc electrical generator.

In this project, the dynamo is used to charge the batteries during the running of the vehicle.



5. CONCLUSION

It is clearly seen that the electrical bicycle gives a clean and more economical solution to the energy crisis. People use bikes and fuelled vehicles for even travelling short distances without making use of bicycles and other non – fuelled vehicles. Most numbers of people have been think riding a cycle is equivalent to providing extra effort for cycling. In order to avoid this situation, electric assistance has been provided to the cycle that will ease the user to ride the unit with the help of a motor. Even the hardship of climbing slopes and riding on rough terrains has been reduced. All these aspects are available keeping in mind the factor of pollution being affected at all. The factors that our prototype design of the bicycle provides to the raider are:

- Simplified riding with minimal effort on the flat as well as gradients.
- Easiness of riding on rough terrains.

6. ACKNOWLEDGEMENT

We are very grateful to our guide Mr. Rama Krishna Assistant Professor, Faculty of the Mechanical Department who spent a lot their precious time with us on our work always even though being very busy persons with academic works of the Department, for their background knowledge and patience in the competition of our project. We are very grateful to them for enlightening intellectually and spending a lot of their precious time with us even though they got a very hectic schedule. And also we extend our sincere thanks for their extreme guidance and support during the entire project. Their constant encouragement and suggestions helped us a lot

7. REFERENCES

- [1] Prof. S. H. Shete, Nitin Patil, Ganesh Khot, Kiran Kokitkar, Santosh Vardapgol, Jayashri Sawant “Self- Generated Electric Bicycle”, International Journal Of Innovative Research In Electrical, Electronics, Instrumentation And Control Engineering, Vol. 4, Issue 3, March 2016.
- [2] Rajneesh Suhalka, Mahesh Chand Khandelwal, Krishna Kant Sharma, Abhishek Sanghi “Generation of Electrical Power using Bicycle Pedal”, International Journal of Recent Research and Review, Vol. VII, Issue 2, June 2014.
- [3] A textbook on “Design of Machine Element By V. B. Bhandari.”, Tata Mc Graw Hill Publication.
- [4] A textbook on “Electrical technology By B. L. Thereja”, S. Chand Publication.
- [5] Suhas V, Sukeerth Calastawad, Phaneesh M, Swaraj S “Performance Of A Battery Electric Vehicle With Self Charging Capacity For Its Own Propulsion”, International Research Journal of Engineering and Technology (IRJET) Volume: 02 Issue: 03, June- 2015.

BIOGRAPHIES



P. Rama Krishna

Assistant Professor, Mechanical Engineering
Avanthi Institute of Engineering and Technology, Narsipatnam, Andhra Pradesh



K. Sai Chandu

B. Tech Student, Mechanical Engineering
Avanthi Institute of Engineering and Technology, Narsipatnam, Andhra Pradesh



G.M.V. Siva Kumar

B. Tech Student, Mechanical Engineering
Avanthi Institute of Engineering and Technology, Narsipatnam, Andhra Pradesh



G. Kannaji

B. Tech Student, Mechanical Engineering
Avanthi Institute of Engineering and Technology, Narsipatnam, Andhra Pradesh



B. Kiran Kishore

B. Tech Student, Mechanical Engineering
Avanthi Institute of Engineering and Technology, Narsipatnam, Andhra Pradesh