

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

Fabrication and Analysis of Green Bicycle

K.Lifny¹, T.Mesvin Jyles¹, M.I.Mohamed Faizal¹, V.M.Mohamed Yakoob¹

K.Robinston Jeyasingh Swikker², I.Neethi Manickam², S.Sheik Sulaiman²

Final year students, Department of Mechanical Engineering, Francis Xavier Engineering College, Tirunelveli,
Tamil Nadu, India. ¹.

Professor, Department of Mechanical Engineering, Francis Xavier Engineering College, Tirunelveli,
Tamil Nadu, India. ².

ABSTRACT: The increased use of non-renewable fossil fuel brings green house effect. The aim of the project is to design simple, cost effective model of electrical bicycle with control system. This can be implemented by removing the internal combustion engine, the exhaust system and other unnecessary components from the motor cycle and they are replaced by the electrical motor (BLDC), controller system, battery pack(laptop batteries), and the wire cable.

KEYWORDS: cost effective model, removing IC engine and unnecessary components, electrical motor(BLDC) and laptop batteries

I. INTRODUCTION

The electric bicycle is an electrical-assisted device that is designed to deliver the electromagnetic momentums to a present bicycle therefore relieving the user of producing the energy essential to run the bicycle. It contains a strong motor and enough battery power that just needs charging to help in hill climbing, generate greater motoring speeds and provide completely free electric transportation. Electric vehicles price more and perform poorer than their gasoline counterparts. The aim is that mainly because gasoline cars have promoted from a century of intensive development; electric cars have been virtually overlooked for several years. Even today, gasoline cars profit from billions of dollars of research every year while electric vehicles receive a small fraction of that quantity of money. The primary principle for the Universities' support of the electricpowered over the petrol powered has been towards improving air quality, though air quality alone is not a satisfactory justification to mandate electricbicycles.

The single biggestadvantage of electric bicycle is that it is cost operative as it mainly only entails building cost as running cost would only require the charging of the battery. An Electric bicycle would, however offer other solid benefits that are overlooked by the marketplace. These include the intense reduction in oil consumption that its widespread use would bring about. Much less oil would be needed because only a tiny proportion of electricity is generated from oil. The further major non-market benefit would be lower greenhouse gas emissions.

II. EXPERIMENTAL SETUP

1.DC MOTOR

A brushless DC motor (also known as a BLDC motor or BL motor) is an electronically commuted DC motor which does not have brushes. The controller provides pulses of current to the motor windings which control the speed and torque of the synchronous motor. These types of motors are highly efficient in producing a large amount of torque over a vast speed range. In brushless motors, permanent magnets rotate around a fixed armature and overcome the problem of connecting current to the armature. Commutation with electronics has a large scope of capabilities and flexibility. They are known for smooth operation and holding torque when stationary.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

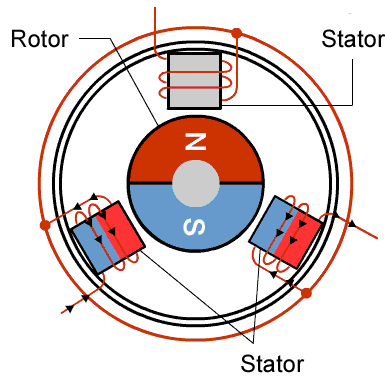


Fig 1 Dc motor

II. CONTROLLER

A motor controller is a device or group of devices that serves to govern in some predetermined manner the performance of an electric motor. A motor controller might include a manual or automatic means for starting and stopping the motor, selecting forward or reverse rotation, selecting and regulating the speed, regulating or limiting the torque, and protecting against overloads and electrical faults.



Fig 2 Controller

III. BATTERY

Laptop batteries commonly have four 3.6V Li-ion cells in series to achieve a nominal voltage 14.4V and two in parallel to boost the capacity from 2,400mAh to 4,800mAh. Such a configuration is called 4s2p, meaning four cells in series and two in parallel. In this way we have connected 120 cell to produce 50v and 20 amp current.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020



Fig 3 Battery

IV. MODEL



V. MATERIALS REQUIRED

S.NO	PARTS	QUANTITY
1	FREE WHEEL	2
2	CHAIN	2
3	HUB	1

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

4	DC MOTOR	1
5	BICYCLE FRAME	1
6	WIRE CONNECTION AND CONTROLLER	-

VI. DESIGN CALCULATION

Number of teeth on small sprocket(motor) $t_1=9$
 Number of teeth on large sprocket(bicycle) $t_2=18$
 Speed of small sprocket $N_1=3300\text{rpm}$
 To calculate the speed of the sprocket $N_2=?$

STEP-1:

Using speed ratio formulae, $N_1 t_1 = N_2 t_2$
 $N_2 = 169\text{rpm}$

STEP-2:

Diameter of the wheel = 650mm
 Circumference of the wheel = $3.14 * 650$
 = 2041mm

STEP-3:

Speed of the vehicle = speed of wheel * circumference of wheel
 = $169 * 2041$
 = 344418075mm/min
 = 20.66km/hr

Thus the speed obtained by the bicycle is app 21km/hr

VII. ADVANTAGES

- They are non- pollutants.
- Very less maintenance.
- Easy to construction.

VIII. CONCLUSION

Thus our battery(laptop cell) are taken from waste laptop batteries so they are eco- friendly to the environment This project is designed to improve the normal bicycle and make it extra efficient. The electric bicycle is a hybrid and so it can run electrically and can also be pedal thereby still retaining the exercise people drive from riding bicycle. The calculated speed of bicycle is = 21Km/hr . Required power is =391.69 watt.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

ACKNOWLEDGEMENT

I am thankful to and formulate enough to get constant encouragement , support and guidance from teaching staffs which helped us in successfully completing our project work also , I would like to extend our sincere esteems to all the staff in laboratory for their timely support

REFFERENCES

- 1.Chetan Mahadik, SumitMahindraka, Prof. Jayashree Deka , “An Improved & Efficient Electric Bicycle system with the Power of Real-time Information Sharing” ,2014.
- 2.Sousa, P. J. Costa Branco, J. A. Dente, Electric bicycle using batteries and Supercapacitors, 2007.
- 3.Arun Eldho Alias1, Geo Mathew2, Manu G3, Melvin Thomas4,Praveen V Paul5, Energy Efficient Hybrid Electric Bike with Multi -Transmission System, 2015.
- 4.Annette Mutze(Performance evaluation of electric bicycle) international research journal IEEE pg no 87-157 2016
- 5.Yu-lung ke(Energy recovery electric bicycle) IJMRMET,Issue1,vol7 :2017
- 6.Ventsislav Keseev(Meaningful education process and target in electric bicycle design) conference paper vol 1 :2014
- 7.D.M.Sousa, electric bicycle using batteries and super capacitors international research journal vol1 2015
- 8.Brucee Jang(Applying fuzzy logic control to electric bicycle)international research journal volume 2 pg no:99-152 :2017
- 9.Mehrdad Ehsani, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design”, CRC Press, 2004.
- 10.T.Bhavani, "Novel Design of Electric Bicycle with Pedal", International Journal & Magazine of Engineering, pp. 108, 2015
- 11.GOODMAN, J. D., "An Electric Boost for Bicyclists", The New York Times, 2010.