IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

ELECTRIC BICYCLE BATTERY CHARGING ESTIMATION WHILE PEDALING

Jakka Sai Vinay, P Ananth Kumar, Chandra Rajput, Dr. Sobhit Saxena
Student, Student, Student, Professor
School of Electronics & Communication Engineering
Lovely Professional University, Jalandhar, India

Abstract:

Day through day human beings is the usage of their very own automobiles is growing maximum of them is the usage of IC Engines and whose performance is around 30-35%, due to the fact IC Engines emit carbon monoxide is a toxic fuel line, and carbon dioxide is a greenhouse fuel line which ends up in the surroundings pollution. Pollution is a critical problem to the world faces. Though Electric motors had been delivered into the marketplace with the concept of putting off the use of fossil fuels. Electric motors can't be claimed pollutions. They use an outside charger to price the battery of the vehicle. Although the strength vegetation generating power may also emit pollutants power from nuclear, hydro, sun, and wind strength reasons no air pollutants on the time of strength production. The idea of internally charging an E-motor motorcycle is to increase an E-motor motorcycle this is less costly to not unusual place human beings and to harness pedaling attempt of people to flee the battery of the motor motorcycle in preference to charging externally. The pedal of the motor motorcycle is hooked up to a Motor or sun panel to fee the batteries. The idea provides an advantage; the electricity used to pedal a bicycle is regained into beneficial energy. Pedaling a bicycle serves as an excellent exercise.

Keywords:

Battery (24v10ah), converter (12v to 220v), charger (29v 5ah), BLDC motor.

I. INTRODUCTION:

Pedal power is one of the cleanest and most suitable full-power alternatives that can power a variety of low-power devices. This strength distinction relates to the K.E. man-made treadle mechanism used since historical times to perform agricultural and ordinary jobs such as separating grains, grinding food, sewing, pumping, etc. [1], [2]. The advent of the electrical grid and also the planning of technologies on the market that would change the functions of corporal punishment faster, more effortlessly, more conveniently and at a reasonable price has reduced the need to use pedaling energy to accomplish these tasks. At present, pedaling energy is mainly used to power terrestrial [3], marine, and physical acquisition mechanisms such as stationary bikes, elliptical trainers, ergometers, steppers, etc. It has proved practicable to provide energy for an extension of low-power devices [4], such as laptops, digital cameras, tablets, radios, and backup batteries, etc., etc. In particular, using pedaling energy to induce electricity has been unattractive to society. The reasons for this rejection include, among others, the desired participation of humans in the production of energy, the cost advantage that the use of this technology in cities with access to the electricity grid implies, the efficiency of these systems, and mobility [5]. On the other hand, recent issues related to human development, weather changes, and idle mode have produced studies showing the feasibility of sacrificing pedaling energy to counteract these issues. Pedal power alone or in conjunction with various energy styles such as wind, biogas, solar, and biodiesel represents a proprietary energy solution for the development of communities. Likewise, it was undeniable that the pedaling energy collected in the instrumentation of exercises with an associated degree is able to provide energy for the proliferation of low-power devices and for the electronic system of the equipment itself, thus reducing the energy bill by feeding the energy of the Kicking to the grid Combining pedaling energy harvesters into exercise tools aims to create intelligent, proprietary devices, promoters of an inexperienced culture that encourages society to engage in physical activity, add value, such as B. Energy production and contribution to promoting a clean world. The benefits of sacrificing the energy of stepping into social impact applications and as a technique to develop autonomous smart devices provide an overview of these technologies and draw attention to look for gaps and potential areas of opportunity to develop designs with greater benefits and integration possibilities Market. The proposed unconventional power generation of can be improved by adding new energy storage and utilization techniques [8-11].

II.COMPONENT DESCRIPTION:

BLDC motor (24v 350w) gear DC Motor 324RPM

We are using this motor for 2 uses in this project when we want to charge with a pedal just, we need to disconnect the plug and connect to the converter then we can start pedaling after charge we need to connect again to the controller then it runs with the battery is produced almost 12v to 16v while pedaling. The engine used in the experiment is shown in Figure 1. maybe a magnet brushed DC motor. The motor is the one that drives the electrical bike. it's connected to the motor controller. The motor consists of permanent magnets settled among the machine and windings placed within the rotor. The motor is high-powered by a DC current. The motor is placed at the rear carrier and is fastened. The motor is connected to the rear wheel through a sequence and sprocket. The motor spins very clockwise, which drives the bike forward. Magnet DC motor is chosen therefore to reduce the worth with no compromise in power output. The specifications of the motor are shown in Table1.

Table 1: Equipment specifications

Voltage	24 volts DC
Power	350 watts
Speed (after Reduction)	324 RPM
Torque	11 N.m (110 kg.cm)
Weight	55 N.m (550 kg.cm)
Current	19.2 amp

Figure1: BLDC motor (24v 350w) gear DC Motor 324RPM

Lithium-ion battery (25.9 10ah)

A Li-ion is a complicated battery technology that uses lithium ions as a key part of its electrochemistry. We can charge this battery through home power and to the converter it gives a full milage of up to 25kms. The battery used in the experiment is shown in Figure 2.

Figure 2: Lithium-ion battery (25.9 10ah)

Motor controller (35v 20ah)

The motor controller shown in figure three is the heart but the mind of the e-bike. This act is similar to a car EW (Electronic Control Module) that controls all of the obligatory operations of the car. The controller governs the deliberate overall performance of the electric motor. it is accustomed select and regulating the rate of the motor. The controller takes the throttle twist due to the fact the enter manages the motor speed. The brake mild is moreover well-lighted with the aid of using the controller as soon as it senses brake is applied. It can also display the battery fee level. This is the main part of the electric cycle it controls the complete parts of the cycle it was connected with the headlight, horn, charge indicator, breaks, indicators, accelerator, bldc motor, and battery input. This was called the brain of the electric cycle.

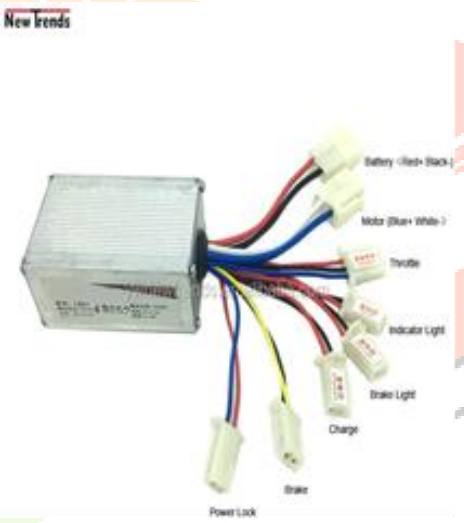

Figure 3: Motor controller (35v 20ah)

In this we are using this for generating sufficient power for the charger it will collect power from the bldc motor of 12v and then it converted to 220v then we can charge the battery in the socket of converter we can connect our daily life products like we can charge our mobile also while riding. The DC to AC converter used in the experiment is shown in Figure 3.

Inverters square measure usually required at places wherever it's impossible to urge AC provide from the Mains. An associate in nursing electrical converter circuit is employed to convert the DC power to AC power. Inverters are often of 2 varieties True/pure wave inverters and similar or changed inverters. These true /pure wave inverters square measure pricey, while changed or similar inverters square measure cheap. These changed inverters manufacture an sq. wave and these aren't won't to power delicate electronic equipment. Here, a straightforward voltage-driven electrical converter circuit exploitation power transistors as switch devices is built, that converts a 12V DC signal to a single section 220V AC. The converter used in the experiment is shown in Figure 4.

Figure 4: 12v DC to 220v AC converter

Charger of 29.4v 5ah

In this we are using this for charging the lithium-ion battery it required 220v (45W) and gives an output of 29.4v 5ah by this it will charge the battery very fastly in the time of 2hours.

Motor speed controller

It will control the speed of the cycle it was connected to the controller then the controller will pass according to the speed. The throttle twist controller is the only one that controls the velocity of the electric bike. The throttle controller looks much like the partner accelerator throughout a bike that controls the go with the drift of the fuel line to the IC Engine. Here the motor pace is managed through the motor controller in correspondence with the enter from the throttle twist. The throttle twist grip has three wires that square measure connected to the motor controller. The motor controller used in the experiment is shown in Figure 5

Figure 5: Motor speed controller

Charge indicator

It will show how much charge remained in the battery according to that we can charge the battery and manage the distance. The charge indicator used in the experiment is shown in Figure 6

Figure 6: Charge indicator

III Experimental Set-up

The block diagram representing the experimental setup is shown in Figure 7.

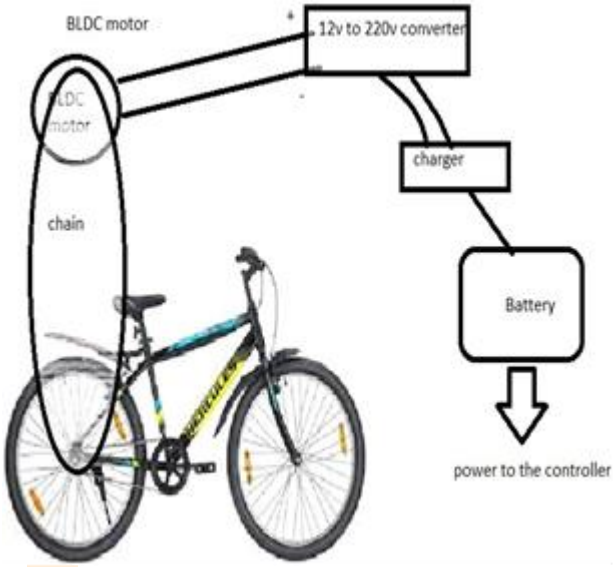

Figure 7: Block Diagram indicating experimental set-up

IV Experiment Results

Figure 8: Output from the BLDC Motor

In this system when the charge of the battery is completely got discharged just, we need to plug out the bldc motor wire from the controller and we need to connect the output of the bldc motor wires to the converter. The minimum power needed for the converter is 12v to 16v in the normal speed of the bldc motor it will give around 12v to 14v It was sufficient to charge the battery from the charger. Table 2 represents the obtained traveling range by a battery charged by pedaling.

Rotations/ pedaling Time	**Range obtained**
1000 rotations/ 20mins	5kms
30mins of pedaling	6kms
2000 rotations/40mins	10kms
1hr	12kms
2hr	25 to 30kms
Generated Voltage	**16.44 V**

Table 2: Obtained traveling range by a battery charged by pedaling

CONCLUSION

At a time when the energy crisis casts its shadow over the world, it is necessary to master alternative renewable energies. The self-charging E-Bike exploitation pedaling may be a complete 'eco-friendly' to the environment. whereas movement of the tire's energy will turn out to the bicycle, generated by pedaling may be accustomed operate little battery-powered devices. It can be used widely for short-distance travel and is best suited to each town and country road. Pedaling the bike to charge the battery can be a decent exercise to keep up good health. it's terribly economical for the poor class of society as a result it is often run throughout the year freed from cost. At a time when global warming and climate change are toes on mankind. one has to look into the alternative energy resource for daily usage purposes. on such way is presented in this paper which will not only save the environment but also it will reduce the burden economically for the purpose we are using it and keep them healthy.

REFERENCES: -

[1] Tiwari PS, Gite LP, Pandey MM, Shrivastava. "Pedal power for occupational activities: Effect of power output and pedaling rate on physiological responses" Int J
Ind Ergon 2011; 41:261–7.
https://doi.org/10.1016/j.ergon.2011.02.011.
[2] Weir A. "The dynamo: a pedal power unit" Maryland 20822, USA: Volunteers in technical assistance; 1980.
[3] Hung NB, Lim O. "A review of history, development, design and research of electric bicycles" 114323 Appl Energy 2020;260.
https://doi.org/10.1016/j.apenergy.2019.114323.
[4] Jansen AJ, Stevens ALN "Human power, a sustainable option for electronics" IEEE Int Sump Electron Environ 1999:215–8.
https://doi.org/10.1109/isee.1999.765878.
[5] Gibson T. "Turning sweat into watts" IEEE Spectra 2011;48:50–5. https://doi.org/10.1109/MSPEC.2011.5910449.
[6] Mechtenberg AR, Borchers K, Maying EW Hormasji F, Hariharan A, Makanda JV, et al. "Human power (HP) as a viable electricity portfolio option below 20W/Capita" Energy Sustain Dev 2012;16:125–45.
https://doi.org/10.1016/j.esd.2011.12.006.
[7] Podmore R, Larsen R, Louie H, Dauenbauer P, Gutschow W, Lacourciere P, et al "Affordable energy solutions for developing communities" IEEE Power Energy Mag 2012;10:89–98.
https://doi.org/10.1109/MPE.2014.2322296
[8] Tripathi S L, Padmanabhan S "Green Energy: Fundamentals, Concepts, and Applications" Edited book, Scrivener Publishing, Wiley 2020. DOI:10.1002/9781119760801
[9] Tripathi, S.L., Alvi, P.A., & Subramaniam, U. (2021). Electrical and Electronic Devices, Circuits and Materials: Design and Applications (1st ed.), CRC Press. https://doi.org/10.1201/9781003097723
[10] Tripathi S L, Padmanabhan S, Kumar D, Raja P "Design and Development of Energy Efficient Systems" Edited book (In Press) Scrivener Publishing, Wiley 2021. DOI:10.1002/9781119761785
[11] Tripathi S L, Dubey M K, Rishiwal V, Padmanabhan S (2021) "Introduction to AI techniques for Renewable Energy System" Taylor & Francis, ISBN 9780367610920 https://doi.org/10.1201/9781003104445