Fabrication and Analysis of Green Bicycle

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ABSTRACT: The increased use of non-renewable fossil fuel brings greenhouse 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 biggest advantage 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 motoror 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.
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.

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.
IV. MODEL

V. MATERIALS REQUIRED

<table>
<thead>
<tr>
<th>S.NO</th>
<th>PARTS</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>FREE WHEEL</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>CHAIN</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>HUB</td>
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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 $N_1 = 3300$ rpm

To calculate the speed of the sprocket $N_2 = ?$

STEP-1:
Using speed ratio formulae, $N_1t_1 = N_2t_2$
$N_2 = \frac{N_1t_1}{t_2}$
$N_2 = 169$ rpm

STEP-2:
Diameter of the wheel = 650 mm
Circumference of the wheel = $3.14 \times 650 = 2041$ mm

STEP-3:
Speed of the vehicle = speed of wheel $\times$ circumference of wheel

$= 169 \times 2041$
$= 344418075$ mm/min
$= 20.66$ km/hr

Thus the speed obtained by the bicycle is app 21 km/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 $= 21$ Km/hr. Required power is $= 391.69$ watt.
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.

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