

Electric Tricycle

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Abstract: In the modern day, transportation is the backbone of any civilization. In a country of 150 million people private transportation is given the utmost importance above all. Different modes of transportation are available for the people to move about anywhere in the country. Tricycle is considered as one of the easiest to access and user friendly mode of transportation.

Although considered important it faces some severe technological challenges which need to be overcome. In conventional tricycles driver needs to put some extra effort in order to achieve the desirable speed with carrying the sufficient amount of load.

By implementing motor, the driver effort was reduced although the problem of initial power output still persisted.

Index Terms Introduction, Objectives, Construction, Working principle, Research methodology, Results, References

I. INTRODUCTION

E bikes are the future of private transportation which could highly be preferred by metropolitan cities. E bikes is a mode of lavish transport which enhances the level of transportation by providing more comfort, door to door service while mitigating the problem of environmental pollution.

E bike are also known as Plug in vehicles as it consists of a battery which stores electricity on board while in motion.

Nowadays electric bikes are powered by rechargeable lithium ion batteries though some early models used hydride batteries.

This project will overcome the problem of low battery life, high energy conversion by reducing effort. It will mitigate the problem of less power at slopes by providing high torque at low speeds by using BLDC (Brushless DC Motor)

II. OBJECTIVES

Following are the objectives which we have considered while designing our project:-

To generate high torque at low speed, thus increasing the power output. To increase the output efficiency. To increase the load carrying capacity of tricycle. To increase the life of the battery by reducing the frequency of charging.

It can be used to carry different types of load from terminal to terminal, door to door and also for private transportation.

Average cost of a tricycle will be much less as compared to the existing E-bike. More energy conversion by using BLDC.

Wide scale application for labour commuters.

III. CONSTRUCTION

A second hand tricycle will be bought, and its wheels will be replaced with a hub motor and a custom wheel according to its specifications and dimensions. The next part would be fine tune the electrical system. Also to make mounts for batteries and other auxiliary circuits however required. Following are the specifications of the motor,

- 1) Output Power – 250W
- 2) Speed – 500 RPM
- 3) Voltage – 12V
- 4) Design – Brushless DC Motor

IV. WORKING PRINCIPLE

Following are the principle of operation of an electric Tricycle:

The entire basis of this project is Faraday's law of electromagnetism. The following Brushless DC Motor was used on the hub of the wheel. It is controlled by pulsing its three coils with the use of Hall Effect sensors for feedback of the rotor's position.

The Brushless DC motor will assist the motion thus reducing the human effort. The controller used for their model which was rated for a nominal 48V with a maximum current of 40A implying that the maximum power is 1,920 W is XCT4840D.

V. RESEARCH METHODOLOGY

To use BLDC motor on the hub of the front axle we first need to determine the dimensions of wheels, chassis and battery pack size. Battery pack size and type would be selected on the basis of single cell or multi cell connected in parallel. To achieve the desired power output, speed of the motor is calculated and motor is selected accordingly. Position of motor is decided according to the torque requirements. If necessary, a pair of battery packs is selected. According to the survey, the application of BLDC

motor was obtained and the desired advantages were matching with our requirements. Determination of battery pack size and type is done. We plan to procure a second hand tricycle for practical application purpose which could be useful for most of the people. By using light weight material for chassis weight reduction can be achieved.

Disassembling of old tricycle will be done and according to design, the parts will be fitted. Manufacturing of some parts if needed can also be done at workspace. The project which we are doing focuses on increasing torque so to achieve this the output power should be increased, hence power analysis to increase output power will be examined. After addition of all necessary parts the E-tricycle will be assembled and thoroughly inspected. Error analysis will be done to eliminate any error if present.

VI. RESULTS AND DISCUSSION

Applications.

1. LPG cylinder delivery in India.
2. Cheap Transportation.
3. Wide scale application for labor commuters.
4. Airport Maintenance.

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