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Fabrication of Electric Two Wheeler

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ABSTRACT

The percentage of pollutants in the air from vehicular emission has increased as market constitutes of more fossil fuel powered vehicles than new green technology. Now days demand of the fossil fuel is reduced in the market we are encourage the new technology and green technology (that convent electrical energy to mechanical energy) with eco-friendly. In this project all conventional parts (engine, petrol tank) of two wheeler replaced with electrical components (motor, battery and controller). This project electric drive is given to back wheel same like the IC engine powers the back wheel drive. Thus the project prototype can drive on rechargeable battery as a fuel with the help of the controller and throttle. When throttle is raised according to that motor shaft runs similarly with chain drive and speed varies. As the IC Engine is least efficient at low speed (traffic condition), electrical vehicle can give more efficient in this case. The electric drive is not only silent but also low heat dissipation compared to petrol powered two wheeler. The electric vehicle can't travel a long distance, but it can carry heavy loads. Due to these reasons, Electric vehicles are coming into the market with more benefits.

KEYWORDS: *Electric Vehicle, Controller, IC Engine*

1. INTRODUCTION

An electric vehicle, also called as electric drive vehicle, uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels or an electric generator to convert fuel to electricity. E V including the road and railway vehicles, top and underwater vessels, electric aircraft. Air pollutants, including particulate matter (PM), sulphur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), and ozone (O3) often exceed the National Ambient Air Quality Standards (NAAQS) in Indian cities. The World Health Organization (WHO) has listed New Delhi amongst top 10 world cities with the worst PM10 pollution in its 2014 assessment. Vehicles, manufacturing and industry, construction activities, road dust, and solid biomass combustion are the most commonly identified sources of air pollution. Vehicular. Emissions from internal combustion engine vehicle are one of the major contributors of air pollutants.

Vehicular emission can be from running exhaust emissions, running loss evaporative emissions, or non-exhaust emissions. These emission types have been described in more detail later in the article. The emission type determines the type of gaseous and particulate matter (PM) suspended into the atmosphere. The particulate matter and gaseous suspensions in the atmosphere cause various health hazards. Mobile Source Air Toxics (MSAT) released during running exhaust emission can cause a wide range of health hazards including birth defects and negative effects on kidney, lungs and nervous system. PM10 emission from running exhaust emission and non-exhaust emissions is a major cause of breathing and respiratory diseases, lung tissue related issues, cancer and premature death. [1]

2. LITERATURE SURVEY

From the 5th International Conference on Advances in Energy Research, ICAER 2015, 15-17 December 2015, Mumbai, India. The rapid economic development of India has been accompanied with increase in the road transportation Activities in urban and rural areas of the country. About 80% of the total passenger transportation has been reported to be shared by road transport sector. The major transportation activities have been reported in the urban and adjoining areas. Along with the economic progress, privatized mode of transport has experienced much preference among the commuters. The maximum share among the privatized mode of transport has been marked by the two wheeled vehicles, which consist of mopeds, motorcycles, and scooters, playing the most important role in this sector. The low energy consumption compared to other forms of heavier vehicles, smaller size, and easy manoeuvrability in the heavy traffic conditions

have been the major advantages of two-wheelers for the transportation of one or two passengers at a time.

Kusekar S. K., Bandgar P. M, Andhale P. S, Adlinge G. H, Gaikawad V. V, Dhekale S. P. (2015) has conducted an experiment in Design and development of electrical car to illustrate an implementation of electric vehicle technology on a small scale. Here we observed how to design an electric car with less cost and have studied about various components that is required to design an electric car. It shows that electrical battery operated vehicle is more suitable than other vehicle because the cost of the electricity is low and also maintenance cost is less. Also we got an idea about how to calculate the torque required to move the vehicle. In this study we understand the basic principles of chassis designing, steering system, caster, camber, drift, acceleration, top speed and performance tuning of the vehicle.

Awash Tekle (2014) performed an experiment on the topic Renewable Energy Use for Continuous electric vehicles Battery charging capacity in mobile. This paper presents and studies on renewable energy use, by integrating solar and wind energy for continuous electric vehicle battery charging capacity in mobility. Here, the power for electric vehicle is generated from solar cells and wind turbine and it is fed to the battery for charging the inverter. This is fed to the electric motor for rotational power development to the differential shaft. Here we mainly observed the charging and discharging rate of the battery and we came to know that it fully depends on the battery design. In this paper we studied about how to calculate the power generated by the wind turbine and the blade tip ratio for the various speeds

Patel Vijaykumar, R. I. Patel (2012) conducted an experiment on the topic Structural Analysis of Automotive Chassis frame Design Modification for Weight Reduction for the work performed towards the optimization of the automotive chassis with constraints of maximum shear stress, equivalent stress and deflection of chassis under maximum load. Here we observed that how the chassis serve as a frame work for supporting the body and different parts of the automobiles. Here we analysed how to design a chassis, its load withstanding capability and the calculations required for the chassis frame. This paper also gives idea about, how to modify the design for the required weight of vehicle. [2]

3. FABRICATION

3.1 Process Involved In Fabrication

3.1.1 Basic structure chassis

The chassis of an automobile consists if following components suitably mounted, motor, controller, batteries, rear wheel set up, handle, hand throttle, suspension. The conventional construction in which a separate frame is used and the frameless or unitary construction in which no separate frame is employed. Out of these, the un-conventional type of construction is being used presently only for heavy vehicles whereas for the bike the same has been replaced by the frameless type. 42 The battery power of electrical energy is converting into the mechanical energy with the assist of chain and sprocket, and sue to this however, it is eco-friendly, low maintenance and low initial cost and the big advantage is that it is light in weight. [3]

3.2 Chassis used in fabrication Backbone frame

These are specialty frames that are used rarely. It is simple and inexpensive frame with a distinctive look, but other designs are better in terms of strength and rigidity.

Fig 1: Backbone frame

3.3 Lead Acid Battery

Flooded lead-acid batteries are the cheapest and in past most common traction batteries available. There are two main types of lead-acid batteries: automobile engine starter batteries, and deep cycle batteries. Automobile alternators are designed to provide starter batteries high charge rates for fast charges, while deep cycle batteries used for electric vehicles like forklifts or golf carts, and as the auxiliary house batteries in RV's, require different multi-stage charging. No lead acid battery should be discharged below 50% of its capacity, as it shortens the battery's life. Flooded batteries require inspection of electrolyte level and occasional replacement of water which gases away during the normal charging cycle. Traditionally, most electric vehicles have used lead-acid batteries due to their mature technology, high availability, and low cost on the upside, vehicle battery recycling rates top 95% in the United States. Deep-cycle lead batteries are expensive and have a shorter life than the vehicle itself, typically needing replacement every 3 years. Lead-acid batteries in EV applications end up being a significant (25–50%) portion of the final vehicle mass. While the difference isn't as extreme as it first appears due to the lighter drive-train in an EV, even the best batteries tend to lead to higher masses when applied to vehicles with a normal range. The efficiency (70–75%) and storage capacity of the current generation of common deep cycle lead acid batteries decreases with lower temperatures, and diverting power to run a heating coil reduces efficiency and range by up to 40%. Recent advances in battery efficiency, capacity, materials, safety, toxicity and durability are likely to allow these superior characteristics to be applied in car-sized EVs.

Fig 2: Lead acid battery

3.4 Motor

The brushless DC (BLDC) motor is becoming increasingly popular in sectors such as automotive (particularly electric vehicles (EV)), HVAC, white goods and industrial because it does away with the mechanical commentator used in traditional motors, replacing it with an electronic device that improves the reliability and durability of the unit.

Another advantage of a BLDC motor is that it can be made smaller and lighter than a brush type with the same power output.

The downside is that BLDC motors do need electronic management to run. For example, a microcontroller – using input from sensors indicating the position of the rotor – is needed to energize the stator coils at the correct moment. Precise timing allows for accurate speed and torque control, as well as ensuring the motor runs at peak efficiency.

The rotor is constructed from permanent magnets with two- to eight N-S pole pairs. More magnet pairs increase torque and smooth out so-called torque ripple, evening the power delivery from the motor. The downside is a more complex control system, speed. Traditionally, ferrite magnets were used to make the permanent magnets, but contemporary units tend to use rare earth magnets. While these magnets are more expensive, they generate greater flux density, allowing the rotor to be made smaller for a given torque. The use of these powerful magnets is a key reason why BLDC motors deliver higher power than a brush-type dc motor of the same type. These motor more advantages detailed information about the construction and operation of BLDC motors can be found in an interesting. [4]

Fig 3: BLDC Motor

3.5 Chain and Sprocket

Chain and sprocket: Sprocket and chain are used where a definite velocity ratio is to be required belt drive is a negative drives and chain drive are the positives drives. The chain drive consists of an endless chain running over two sprockets keyed the shaft. Chain drives transmit motion between parallel shaft only, and at shortly distance of 5-8 than a belt drive.

We choose chain drive it is left side of the vehicle but motor is rotating in anti-clock at that moment bike move in backward direction .so we has to change in the direction to right. Then motor rotate in clockwise now the bike can move in the forward direction. We did modification of the petrol bike to electrical bike. [5]

Fig 4: Chain and Sprocket

4. CONTROLLER

The speed control of D.C. series motors can be obtained by throttle hand with the help of controller.

The mechanism of an electric speed controller varies depending on whether you own an adaptive or purpose-build electric bike. An adaptive bike includes an electric drive system installed on an ordinary bicycle. A purpose-built bike, more expensive than an adaptive bike, provides easier acceleration and affords more features. The mechanism of electric bike speed controller varies in these two types.

The speed controller of an electric bike is an electronic circuit that not only controls the speed of an electric motor but also serves as a dynamic brake. This controller unit uses power from the battery pack and drives it to the hub motor. Different types of controllers are used for brushed and brushless motors. For adaptive e-bikes, a conversion kit is used and the controller is the main component of that kit.
The electric bike speed controller sends signals to the bike's motor hub in various voltages. These signals detect the direction of a rotor relative to the starter coil. The proper function of a speed control depends on the employment of various mechanisms. In a purpose-built electric bike, Hall Effect sensors help detects the orientation of the rotor. If your speed controller does not include such sensors -- and the speed controller on an adaptive bike may not -- the electromotive force of the un driven coil is calculated to get the rotor orientation.

Fig 5: Controller

5. TESTING

Fig 6: Testing of E bike

6. RESULTS AND DISCUSSIONS

Fabrication of the light weight electric powered vehicle is successfully completed.

The Electric vehicle is comparatively better than Petrol and Diesel vehicles in all aspects. But the lagging of charging infrastructure makes the customers to pushes back. So it has to be developed. The public cognizance by publicity, Contributing subsidies and warranty can be offered to attract the customers. Encouraging local based Original Equipment Manufacturer (OEM) companies and foreign investments can make a faster, better service and green environment.

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