

Improvisation and fabrication of Hybrid Motorcycle

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ABSTRACT

As the use of fossil fuels is increasing day by day due to which the availability of fossil fuels is decreasing. Due to excessive use of fossil fuels the environment is getting more polluted. Hence our project is to focus on a two wheeler Vehicle which will be hybrid; there will be electric drive as well as I.C. Engine. Both the power source would be connected in such a way that they can easily transmit power to the driving wheel. By using such technology in a two wheeler motorcycle will help to reduce dependency on fossil fuel up to some extent and will also help to increase driving range of the vehicle as the driver will have option to choose either Electric mode or simple mode. Going through the sales graph we can calculate that the sales of motorcycles is increasing day by day , which results in more fossil fuel used. So in short in future the prices of the fuel would be increased. That is the reason why we are taking this project ahead. Hybrid concept seems quiet ideal as it not only decreases the per km cost of the consumer but also enhances the range of the drive.

Keyword : - hybrid

1. Introduction

This project outlines the design, construction and testing of a conceptual motorcycle which club the two technologies, of an internal combustion engine with electric main drive. Main aim of this project is to decrease the dependence on fossil fuels up to some extent. Also increase the running time of the vehicle. As self charging system will be provided there would no need of any plug-in charging system.

Hybrid technology

A hybrid vehicle is that vehicle that has two or more energy sources and energy convertors. It provides good performance and long operating range . Due to this dependence on fossil fuels gets reduced. And the energy used can be regenerated or reused. There are three types of hybrid drive trains :-

- 1) Full Hybrid System
- 2) Mild Hybrid System
- 3) Plug in Hybrid System

2. Selection of Component

Based on the literature survey and availability, we have listed the required components for the hybrid vehicle.

a) Petrol engine (110cc)

Engine cc	97.28cc
No of cylinder	1

Max power	8.31 bhp @ 7500rpm
Max torque	9.09 Nm @ 5000rpm
Valves per cylinder	2
Fuel delivery	Carburetor
Cooling system	Air cooled
Fuel consumption	Petrol
No. of gears	4
Clutch type	Wet, multiplate

Figure 1. Petrol Engine

b) Hub Motor

Hub motor electromagnetic fields are supplied to the stationary windings of the motor. It is an electric motor that is incorporated into the hub of a wheel and drives it directly. Hub motor electromagnetic fields are supplied to the stationary windings of the motor. The outer part of the motor follows, or tries to follow, those fields turning the attached wheels. In brush motor energy is transferred by the brushes contacting the rotating shaft of the motor which results in loss of power in the form of heat. In brushless energy is transferred electronically by eliminating physical contact between stationary and moving parts. A hub motor typically is designed in one of three configurations. Considered least practical is an axial-flux motor, where the stator windings are typically sandwiched between sets of magnets. The other two configurations are both radial designs with the motor magnets bonded to the rotor; in one, the inner rotation motor, the rotor sits inside the stator, as in a conventional motor. In the other, the outer-rotation motor, the rotor sits outside the stator and rotates around it. The application of hub motors in vehicular uses is still evolving, and neither configuration has become standard.

c) Controller

Controller is another important device used in Hybrid Electrical Vehicles. It is used to control the amount of current to be supplied to the motor plus it also helps to control the speed of the electric motor. The controller to be used in the vehicle always depends upon the electric motor selection.

d) Alternator

An alternator is an electrical generator that converts mechanical energy to electrical energy. Alternator is the device which is used to charge the battery and to power the electrical system when engine is running condition.

e) Battery

Batteries are the storage unit of electricity. They play a very important role in hybrid vehicle when our secondary power source is electric source. The mostly used batteries in such vehicles are lead acid batteries and lithium ion batteries. Lead acid batteries are cheap but they are not capable of storing electricity in huge amount as compared to lithium ion battery but lithium ion battery is costlier.

3. Setup

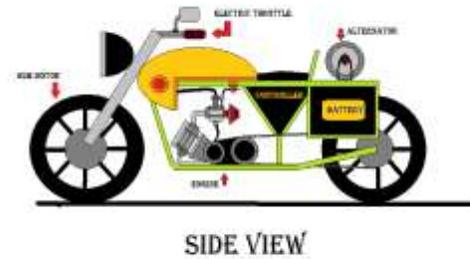


Fig. 2 Side View of Setup

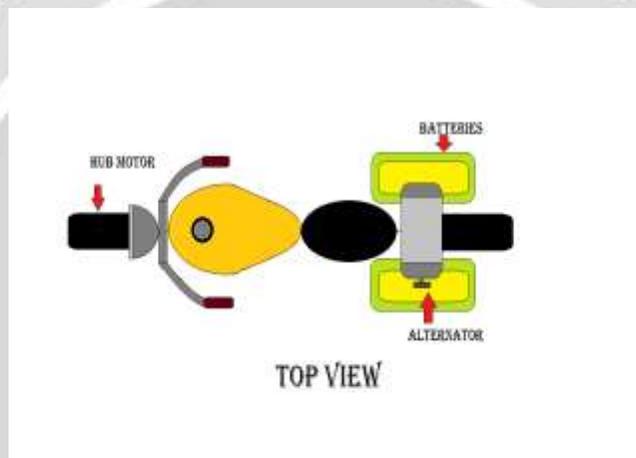


Fig. 3 Top View of Setup

From fig. 1 and 2 we can see the component arrangement on the two wheeler motorcycle to make it hybrid from a normal type of motorcycle.

4. ADVANTAGES

- Lower cost per kilometers
- Higher mileage
- Ease of recharging
- Very less maintenance cost
- Reduces dependence on fossil fuels up to some extent.
- It will reduce the environmental pollution.
- Storage of energy into rechargeable battery.
- Stored energy is used for running hub motor.

5. DISADVANTAGES

- More weight compare to normal motorcycle.
- Centre of gravity shifted.
- Speed limitation
- Periodic Monitoring and Maintenance is required.

6. CONCLUSIONS

At last we would like to conclude that by making use of such vehicle we will help to reduce dependency on fossil fuel up to some extent. Such vehicles would be expensive in price but still it will be much benefited for the people. Hybrid cars are definitely more environmentally friendly than internal-combustion vehicles. Batteries are being engineered to have a long life. When the hybrid cars become more widespread, battery recycling will become economically possible. Research into other energy sources such as fuel cells and renewable fuels make the future look brighter for hybrid cars. In future we can also work on below mentioned point for more making more useful Hybrid Electrical Vehicles:

- Dynamo recharging capability
- IC engine cutoff threshold valve
- Battery cutoff circuit (generally used when the battery is fully recharged, this circuit helps to cutoff recharging system by helping battery from overloading.)

7. REFERENCES

- [1]. “ Designing and Fabrication of Hybrid Bicycle” by RajanVerma, Tapas Sharma, AishwaryaVardhan, Pravin Kumar Singh at International Journal of Engineering Science and Computing, May 2016
- [2]. “Hybrid Two Wheeler” by S. Vanangamudi, S. Prabhakar, C. Thamocharan and R. Anbazhagan at Middle-East Journal of Scientific Research, 2014
- [3]. “DESIGN AND FABIRCATION OF HYBRID TWO WHEELER” by N.Boopalan, Marlon Jones Louis 2, A.K.Nachimuthu at International Journal of Research and Innovation in Engineering Technology, June 2014
- [4]. “ Design & Fabrication of Two Wheeler Hybrid Vehicle” by Kishore H1, Sanketh S at International Journal of Science and Research (IJSR), March 2017
- [5]. “Fabrication and Development of Hybrid Vehicle (scooter)” by Dr. Nataraju S N, Premsingh, Raghavendra Prasad C ,Somashakar G, Manoj N at National Conference on Advances in Mechanical Engineering Science (NCAMES-2016).