

# Design & Fabrication of Two Wheeler Hybrid Vehicle

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**Abstract:** *The traditional internal combustion engine made economic sense when oil was cheap and plentiful and the effects of burning fossil fuels and pollution were not understood. The environmental damage from internal combustion engine is compounded by the problem of air pollution. As well as carbon dioxide emissions, cars also produce dangerous chemicals such as nitrogen oxides (NOX), sulphur oxide (SOX) and carbon monoxide emissions. The problem of lost energy, as well as the need to reduce carbon emissions and dangerous pollutants, has spawned the industry to attempt to meet these challenges, whilst sticking to the traditional petrol and diesel run engine. Indeed a lot of these technologies, whether it be turbo chargers to improve fuel efficiency, catalytic converters that can remove dangerous gases or drive train technologies that addresses problems of wasted energy.*

**Keywords:** TWHV, Hybrid, Engine, Sealing

## 1. Introduction

The invention of internal combustion engine is one of the greatest inventions of mankind. The conventional vehicles with ICE provide a good performance and long operating range. However they have caused and continue to cause serious problems for poor fuel economy, environment pollution and human life. Reducing fuel consumption and emissions is one of the most important goals of modern design. The hybridization of a conventional combustion engine vehicle with an advanced electric motor drive may greatly enhance the overall efficiency and achieve higher fuel with reduced emissions. Considering the urban status in India, a well-organized and fuel efficient scooter has to be designed and developed.

In HEV, the battery alone provides power for low-speed driving conditions. During long highways or hill climbing, the gasoline engine drives the vehicle solely. Hybrid electric vehicles comprise of an electric motor, inverter, battery as electric drive and an internal combustion engine with transmission connected as gasoline based drive. It is to achieve better fuel economy and reduce toxic emissions. The hybrid combination makes the vehicle dynamic in nature and provides its owner a better fuel economy and lesser environmental impact over conventional automobiles.

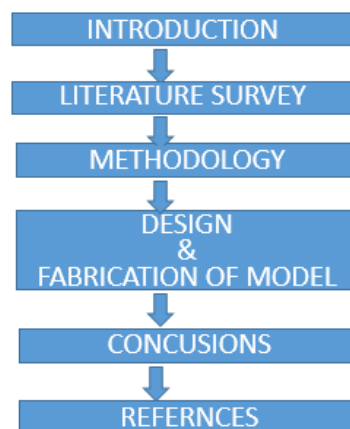
## 2. Literature Survey

A literature review is an evaluative report of studies found in the literature related to your selected area. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical basis for the research and help you determine the nature of your own research. Select a limited number of works that are central to your area rather than trying to collect a large number of works that are not as closely connected to your topic area.

In order to find out the possibility of our concept we made the following literature survey

- 1) Toshaly Mohanadi [1]: "Design Of Hybrid Electric Vehicle-In gear less vehicle" It gives twice the mileage given by a normal vehicle. As This Hybrid Vehicle Emits 50% Less Emission than Normal Vehicle
- 2) Sharada Prasad N & K R Nataraj [2]: "Development of Hybrid Electric Two Wheeler Suitable for Indian Road Conditions- In gear less vehicle" They enhance the overall efficiency and achieve higher fuel with
- 3) Sanjay Kumar Yadav [3]: "Hybrid Electric Vehicle-In gear less vehicle" Hybrid electric vehicles emits less pollutant compare to IC vehicle
- 4) From all this literature survey we found that all the research and experiments on two wheeler hybrid vehicle conducted in gear less vehicles so we decided to do the project in a gear vehicle.

## 3. Methodology



## 4. Design & Fabrication Of Models

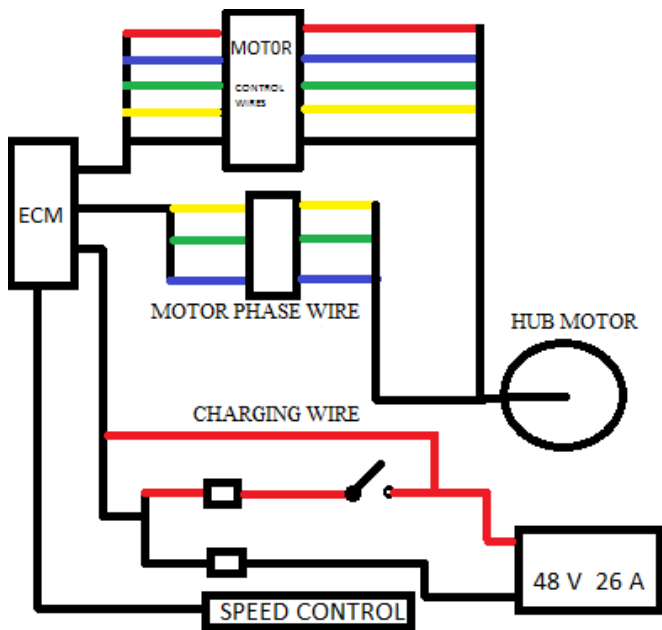
### 4.1 Design

Our Objective of work is to make two wheeler hybrid vehicles which will run by both gasoline and battery. The main objective of our project is to increase the mileage and

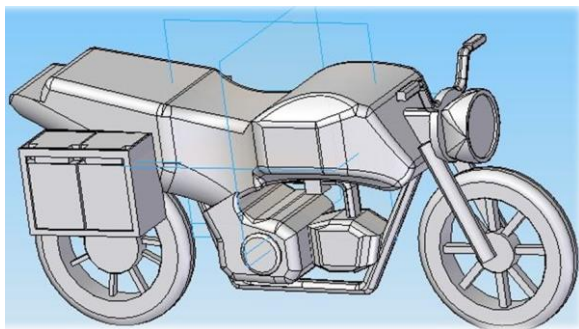
reduces the pollution. We are making out a gear hybrid two wheeler which is not available in the market till today .In our HEV, the battery alone provides power for low-speed driving conditions. During long highways or hill climbing, the gasoline engine drives the vehicle solely.

**Objectives**

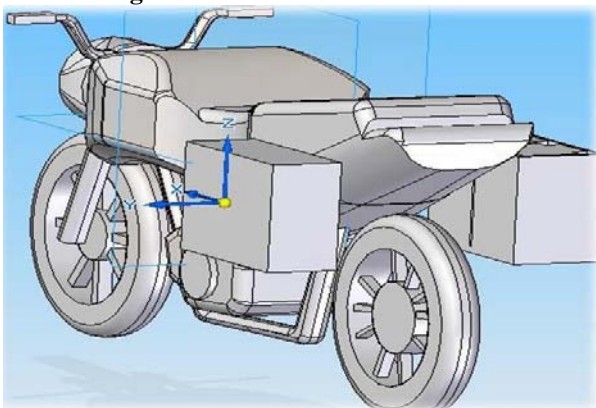
The main objectives of our work is to increase fuel efficiency & Durability. Also to design and development of both customer and eco-friendly scooter. Working circuit of TWHV is shown below



The design of prototype model is carried out using Catia V5 modelling Software.



**Figure 1 :** Side view of TWHV bike



**Figure 2:** Back view of TWHV bike

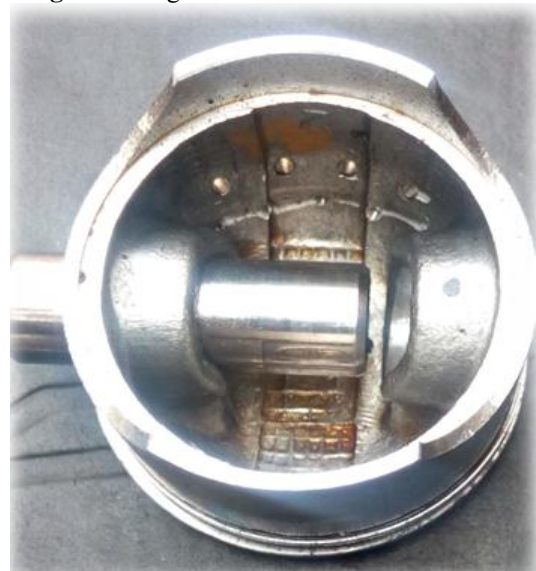
Two wheeler hybrid vehicle comprises of Cylinders, piston, Piston liners, connecting rods, Crankshafts, Cam shafts, Inlet-outlet Valves. We are considering 4 stroke engine with little modification in engine.

The only mechanical alteration we did on the engine was reduced its bore diameter. Before alteration engine had bore diameter of 53 mm, and reduces the bore diameter in to 47 mm by sitting cast iron sealing of 6mm diameter as shown in below figure.

The main reason for taking cast iron as sealing material is because cylinder is also made up from cast iron. It is also better to withstanding higher temperature.



**Figure 3:** Engine diameter before alterations



**Figure 4:** Engine diameter after alterations

Engine specifications

Type	- Air cooled engine
Stroke (2/4)	- 4 strokes
No. Of cylinders	- single cylinder
Bore*stroke	- 57.0mm*48.0mm
Electrical	- 12 volt, 2.5 Ah

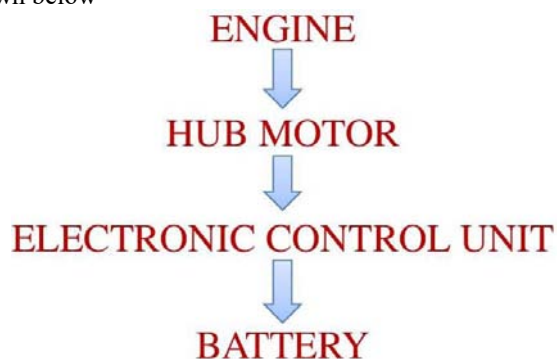
#### 4.2 Fabrication of Models

Fabrication is the process of building up of components in to complete or sub-assembly.



Figure 5: Two wheeler bike before fabrication

The charging process of battery is modelled as flow chart as shown below



Here we are using four lead-acid battery each have 12 V 26 A together constitutes 48 V and which can be used from the hub motor.



Figure 6: Lead acid Battery

#### Bike: Kinetic Velocity

It's powerful 110cc. Four stroke engines deliver maximum power 8.5 BHP and maximum torque of 9Nm. This fuel efficient bike is available with a mileage 70 KMPL and maximum speed of 90KMPH.

Its smart body line, aerodynamic front fairing, well contoured petrol tank with capacity of 14 litres etc. are not only highlighting its beauty but also featuring its performance too.



Figure 7: Two wheeler bike after fabrication

#### 5. Conclusions

TWHV is a vehicle that uses two sources of power- gasoline and battery. For low power application battery drive is used whereas for high power application where power requirement is very high gasoline engine is used. Gasoline drive is most efficient at high speed drive. Thus TWHV's both mode of operation occurs at their maximum efficiency. But in gasoline engine low speed operation is not efficient. Its high speed mode is only efficient.

Therefore, it gives twice the mileage given by a normal vehicle. As this hybrid vehicle emits 50% less emission than normal vehicle it plays an important role for reducing pollution to certain extent without compromising with efficiency. Thus it is most efficient in urban areas mainly in high traffic where gasoline engines are least efficient as the energy from gasoline is being wasted away and creates pollution.

#### 6. Future Works

The concept of TWHV can be utilized in building 4 wheeler electric vehicle. Also, This concept can also use to build the passenger vehicles.

#### References

- [1] "Design of Hybrid Electric Vehicle" -TOSHALY MOHANADI, Department of Electrical Engineering National Institute Of Technology Rourkela-769008 (Odisha) May-2013
- [2] "Design And Development Of Hybrid Electric Two Wheeler Suitable For Indian Road Conditions"- SHARADA PRASAD N, Asst. Prof. Jain University Research Scholar, Rnsit, Bangalore, India ,K R NATARAJ Prof. & Head Electronics And Communication Engineering Department Sjbbit, Bangalore
- [3] "Hybrid Electric Vehicle" – SANJAY KUMAR YADAV, Department Of Electrical Engineering , Madan Mohan Malaviya University Of Technology Gorakhpur

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