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Fabrication and analysis of hybrid two wheeler

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ABSTRACT

All automobile two wheeler engines consume the fossil fuel. Consider the demand of fuel and cost of fuel, other resources of energy is required to operate the vehicle. So that we go for other type of energy like electric power, solar power etc. In order to overcome that issue we have remodeled a two wheeler as a hybrid two wheeler which means the vehicle can use solar power additionally for its working .In hybrid two-wheeler , they are three modes such as fuel mode, electric mode and dual mode. The aim is to fabricate and optimize the two stroke engine vehicle powered by both battery and gasoline. Hybrid two wheelers have a great potential with lower emissions and reducing fuel demand as the ever growing problems of air pollution and global warming reached its critical stage. Along with solar panel that had been mounted on the body of the two wheeler which is connected to the battery and further connected to the hub motor.

Keywords: Hybrid two-wheeler, Solar Panel, Solar Energy

INTRODUCTION

A huge number of today's automobile run on petroleum based products, and petroleum production is constantly decreasing and estimated to be depleted in near future. Vehicles are equipped with conventional internal combustion engines (ICE) have been in existence for over 100 years. For preservation of petrol for future and increasing the efficiency of vehicle an electric vehicle can be a major breakthrough. An electric vehicle is pollution free and is efficient at low speed conditions which are conditions which are prevalent in high traffic areas. Scooters are originally intended for low-power personal transportation with engines between 50 and 250 cc. The popular two wheelers from the personal motor transport is partly based on their low cost of purchase and operation and their convenience in parking and storage. Licensing, registration, and insurance requirements for two wheelers are made easier and less expensive than those for cars in many parts of the world.

LITERATURE SURVEY

- Ramesh Babu et al. investigated the Fabrication of Dual Powered Vechicle. The mileage of the bike is increased from 68 for 1 liter of gasoline with additional of hybrid solar energy.
- Kishore.H et al. investigated the Design and Fabrication of two wheeler Hybrid vechicle. It gives the more mileage other than normal vechicle.
- Harish.N et.alinvestigated the Hybrid two wheelers. The power train efficiency of the range-extended electric vehicle is compared in different driving cycles;energy management;range extended control method.
- Rushi Kesh et al. investigated the Hybrid Electric Vehicle. The transmission of power

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using flywheel and chain wheel is very cheap and reliable. Though this combined power train system can become much useful in more stop and go traffic situations.

- S. Vanangamudi et al .investigated the Hybrid two Wheeler .It strike a right balance between fuel consumption and pollution control and hybrid motorcycle capable of mounting there a hybrid type drive unit .
- A. K. Nachimuthu et al. investigated the Design and Fabrication of Hybrid Two Wheelers. In future implement this idea in the Bajaj spirit and planned to conduct performance test.
- Ruthik Sankar et al. investigated the Design and Development of Smart Hybrid Two Wheeler . The vechicle is equipped with three mode,as battery only mode,engine only mode and an automatic mode .
- K. Kandarel et al. investigated the Design and Fabrication of Hybrid Half Bike . In 1941 during Second World War office called for a machine that weighed less than 23lbs.Foldable half bike which runs on battery takes only few minutes for charging and its capable of holding charge for prolong time.
- Prashanna Rangan. R et al. investigated the Design and Fabrication of Hybrid Two Wheedler.The usage of electric drive reduces the emission and running cost of the vechicle also decreases. Whenever the battery is drained again the fuel is supplied to the engine and proved to be continued.
- Balasubramani. M et al. investigated the Fabrication and Performance Analysis of Hybrid two wheeler. The execution includes improvement HEV that uses battery as well as gasoline control for drive of vehicle.

HUB MOTOR

A hub motor is an electric motor built directly into the hub wheel. In brushed motor, the energy is transferred by brushes which are in direct contact with the rotating shaft of the motor. In brushless motor, the energy is transferred electronically with no physical contact between the stationary and moving parts. Although the brushless motor technology are more expensive most are more efficient and longer lasting than brushed motor system [1-3].

Fig. 1 Wheel with Hub motor

SOLAR PANEL

The term solar panel is best applied to a flat solar thermal collector, such as a solar hot water or air panel used to heat water, air, or other wise collect solar thermal energy. However solar panel may also refer to a photovoltaic module, which is an assembly of solar cells used to generate electricity. In all cases, the panels are typically flat, and are available in various height and widths.The array had assembly of solar-thermal panels or photovoltaic (PV) modules; the panels can be connected either in parallel or series depending upon the design objective. Solar panels are typically use in residential, commercial, institutional, and light industrial applications [4].

Fig.2 Solar Panel

METHODS OF FABRICATION

Cutting

The are many ways to cut nowadays .The old standby is the saw. Others now include plasma torches, water jets and lasers .There is a wide range of complexity and price, with some machines costing in the millions [5].

Folding

Some parts need are bent .The most common method are press brake. It have a set of dies that pinches the metal to form a crease. This operation can be performed in very specific cases due to the movement of the part and the possible shape of the dies. Design for lean manufacturing, though, can help prevent complex shapes that slow down production. Sometimes we usingtwo different types of fabrication processes or two different pieces fastened together work better than one complicated piece.

Machining

The process of removing the metal from a piece of the material. It must done on a lathe , where the material rotates against a cutting tool or in some other cutting machine where a rotating tool is moved in a variety of ways against a stationery piece . Drills fall into this latter category.

Punching

Punching has the act of a punch and a die forming a 'scissor' effect on a piece of metal to make a hole in it. Absolutely the punch and die must be the same shape and size of the desired hole. In some cases , the main piece of the material is kept ,as in when holes are added for fasteners . In other cases , the piece that is removed to desire product this is called 'blanking'.

Shearing

Shearing is very similar to punching except the material is not cut .It is , in effect , just like the action of one of those paper cutter with the ling chop-handle . This is done on sheet metal.

Stamping

Stamping are very similar to punching , except the material is not cut . The die shape to make a raised portion of material rather than penetrating .

Welding

Welding has the act of joining two pieces of metal together . A variety of types welding exist for use in different applications and for the range of metals used in manufacturing [6].

EXPERIMENTAL SETUP

An experimental set up is established as shown in figure. It has a simple mechanism, operated with hub motor in front wheel drive with the help of lead acid-battery. This battery will charged by solar panel. Battery is used to supply the power to electric motor to start and to drive the vehicle up to the speed limit of 30km/hr. When speed limit is exceeded 30kmelectric motor will disengage from the wheel and IC engine will get started to run the

vehicle with the help of sensor. Whenever the speed gets down to 30km/hr electric motor will engage automatically to run the wheel. Run the wheel. In both case alternator which is connected to the wheel will re-generate the power ceaselessly so that power will transmitted to battery to maintain the constant power.

Fig.3 Fabricated Model

WORKING PRINCIPLE

In this project we have using the BLDC motor to run the vehicle also we have another setup to generate the electric power from the vehicle. The BLDC motor is fixed on the front wheel of the cycle. The BLDC motor is mainly used for two purposes for power generation and also to run the vehicle. The power supply is given to the BLDC motor to run the vehicle. After the charge has been over the motor will acts as a generator and the generated output will be stored in the batteries through the charging circuit. The BLDC motor provides power varies depending upon the rotation speed of the bike wheel. The right side of the bike is accelerator and it is coupled with the control unit and the BLDC motor also connected to the control unit. The power is stored initially to the battery. Then we are using this power to run the bike. From the rotation we get power through BLDC motor this power is stored to the battery and the power is used for driving against the front wheel having the BLDC motor.

SPECIFICATIONS

Battery	=	36 v 7 amp
Bike cc	=	100 cc
Motor speed	=	40 km
With stand vehicle load	=	50 kg
Panel voltage	=	12 v 5 w
Rpm	=	360

ADVANTAGES

- ✓ Maximum output can be obtained.
- ✓ It does not cause any environmental pollution like the fossil fuels and nuclear power.
- ✓ Solar cells last a longer time and have low running cost.
- ✓ Low power consumption.
- ✓ Conservation of energy.
- ✓ Utilization of free available source of energy from sun.
- ✓ Storage energy is used for running hub motor.
- ✓ High efficiency can be achieved using inverter.

DISADVANTAGES.

The battery is charged only on when the wheel rotates at high speed.

PERFORMANCE DETAILS OF IC ENGINE

Table. 1 Represents the IC engine

Type category	IC Engine
Speed of the vehicle	45
Vehicle cost (Rupees)	32000
Mileage (1 Litre)	40
Fuel cost 1Litre	75
Running cost of the vehicle per kilometre	1.6

In this table, the data represents the performance details of IC engines. Further these data have to be compared with the performance analysis of pv-electric system in single and hybrid mode.

CONCLUSION

Our project hybrid two-wheeler is mainly intended to fabricate a scooter which runs with renewable energy and non renewable i.e, the solar energy and gasoline. The main advantage is that it can be directly charged by solar panel instead of using electric power and saves the energy and reduces pollution. It is very useful for having the two wheeler, because they need not spend the lot of money for the fuel.

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