DESIGN AND FABRICATION OF DUAL FUEL MODE (PETROL & BATTERY)

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ABSTRACT

Dual fuel mode is a vehicle which relies not only on batteries but also on an internal combustion engine The objective is to design and fabricate a two wheeler to run the vehicle after the completion fuel. So that the electric motor, battery and power systems are used. This allows a smaller, more efficient engine to be used .Besides it also utilizes the concept of regenerative braking for optimized utilization of battery power. This method when the fuel is complete stage at the time the battery mode will be used to run the vehicle.

Keyword: *fuel mode, completion, utilization, battery*

I.INTRODUCTION

In automobile sector, the need for alternative fuel as a replacement of conventional fossil fuel, due to its depletion and amount of emission has given way for new technologies like Fuel cells vehicles; Electric vehicles. This technology maximizes the advantages of the two fuels and minimizes the disadvantages of the same. The best preferred hybrid pair is electric and fossil fuel.

This increases the mileage of the vehicle twice the existing and also reduces the emission to half. At present, we like to explore the hybrid technology in the two wheeler sector and its feasibility on road. This paper deals with an attempt to make a hybrid with electric start and petrol run. Further a design of basic hybrid elements like motor, battery, and engine. As on today, hybrid products are one of the best solutions for all pollution hazards at a fairly nominal price. An investment within the means of a common man that guarantees a better environment to live in. alternative fuel, emissions, hybrid, dual fuel and pollution hazards. Vehicle manufactures have been hence obliged to meet these standards by designing cleaner and fuel efficiently engines and through provision for treatment of exhaust gases to satisfy the specified limits. So to satisfy and over-come these two problems namely.

•Pollution

•Efficiency

Today, usage of vehicle has increased erratically so that usage of fuel also increases that leads to increased emission of vehicle, which causes the ozone layer depletion, dwindle in source of fuel. In order to overcome all these troubles, we have designed a vehicle which is able to work in both gasoline and electrical supply.

Initially the vehicle is run by using gasoline supply, which drives the internal combustion engine and the dynamo is connected to the vehicle chain drive which is used to convert mechanical energy into electrical energy and the energy is being stored in the battery. After the battery is fully charged, the energy stored in the battery drives the electric motor connected to the back wheel and fuel supply is stopped. Whenever the battery is drained, again the fuel is supplied to the engine and the process is continued. The usage of electric drive reduces the emission and the running cost of the vehicle also decreases.

Existing Technology There is only hybrid and petrol engine two-wheeler commercially existing, But they exist separately as fuel powered or electric power vehicle separately. In fuel based two-wheeler, internal combustion engine is used to drive the vehicle, and in electrical based vehicle, electric motor is used to drive the vehicle which gets energy from rechargeable battery. Electric based vehicles have zero emission but have low torque and power compared to fuel based vehicles which produce more power and torque but also more emission. In order to

overcome this issue, we go for hybrid two-wheeler which is able to produce good power and torque with low emission.

A research work in this field is that, which uses an ECM board to switch between fuel based system and electrical system, based upon the speed conditions . Another technology utilizes the use of a hub motor , which can be fitted directly on the hub of the bike. In relation to the above mentioned technology, one such work uses a permanent magnet brushless DC motor, which is also fitted directly to the hub of the vehicle . Demerits of Prevailing Technology According to Sankey diagram, for gasoline engines only 25% of fuel energy is converted to useful work and rest is rejected into the atmosphere . Nearly 40% energy is wasted in exhaust and 30% as coolant. Burning of fuel also leads to expulsion of gases which may further lead to increase in global warming.

II.DESCRIPTION OF EQUIPMENT

For the motion of a vehicle on a road can have resistance by aerodynamic forces like air resistance and rolling resistance. In addition there are two other resistances to be overcome by vehicle is grade resistance when vehicle motion at gradient. Therefore the total power to propel the vehicle is the sum of all the resistance called total resistance, The power that overcomes the total resistance propels the vehicle, more power increases the velocity of the vehicle.

AIR RESISTANCE

The resistance occurred by air velocity against the motion of the vehicle. The air resistance depends on size and shape of the vehicle body. This resistance is very small when vehicle moves at slow speed and thereby can be neglected, But at high speeds it is very important to be considered.

ROLLING RESISTANCE

The resistance due to the deformation of road and tyre and dissipation of energy through impact. The factor of rolling resistance in vehicle occurs with constant speed.

GRADE RESISTANCE

The weight of the vehicle motion in parallel to the gradient, Then the force due to the weight of the vehicle is neutralized by the additional force of the vehicle called grade resistance.

TRACTIVE EFFORT

The force produced at the point of contact of the wheel on the road. The torque available at the wheels from the engine produces a driving force parallel to the road. This force is known as the Tractive effort.

CONSTRUCTIONAL SET UP

IC Engine

An 80 cc two stroke engine reciprocates inside the cylinder. It is connected to the crank shaft by means of a connecting rod and crank. There are no values in two stroke engines. Instead of values, ports are cut in the cylinder walls.

Fig.No.1- IC Engine

There are three ports namely inlet, exhaust and transfer ports. The closing and opening of the port is obtained by the movement of the piston. The crown of the piston is made of a particular shape. This is to deflect the fresh charge upwards in the cylinder. A spark plug is also provided in the cylinder to start up ignition.

DC motors

It is a permanent magnet DC motor that serves as both motor as well as generator that will runs at 1500 rpm of 12V and 28A. The motor drives the wheel though the transmission unit.

Fig.No.2 – DC Motor

The permanent magnet of the PMDC motor are supported by a cylindrical steel Stator, which also serves as a return path for the Magnet flux. The rotor has winding slots. Commutate segments and brushes are as in conventional dc machines.

III.LIST OF MATERIALS

Sl. No	**Parts**	**Qty.**	**Material**
i.	Frame Stand	1	Mild Steel
ii.	Battery	1	Lead Acid
iii.	Electromagnetic solenoid	3	Coil
iv.	Clutch plate	1	M.S
v.	Spring	2	M.S
vi.	Gear plate	1	M.S
viii.	Button	2	-
ix.	Bolt and Nut	-	M.S
x.	Connecting wires	-	-

FACTORS DETERMINING THE CHOICE OF MATERIALS

The various factors which determine the choice of material are
Discussed below.

Properties

The material selected must possess the necessary properties for the
Proposed application. The various requirements to be satisfied can be
Weight, surface finish, rigidity, ability to withstand environmental attack from chemicals, service life, reliability etc. The following four types of principle properties of materials decisively affect their selection.

i. Physical
ii. Mechanical
iii. From manufacturing point of view
iv. Chemical

The various physical properties concerned are melting point, thermal Conductivity, specific heat, coefficient of thermal expansion, specific gravity, electrical conductivity, magnetic purposes etc. The various Mechanical properties Concerned are strength in tensile, Compressive shear, bending, torsion load and buckling load, fatigue resistance, impact resistance, elastic limit, endurance limit, and modulus of elasticity, hardness, wear resistance and sliding properties. The various properties concerned from the manufacturing point of view are,

a) Cast ability
b) Weld ability
c) Forge ability
d) Surface properties
e) Shrinkage
f) Deep drawing etc.

Manufacturing case

Sometimes the demand for lowest possible manufacturing cost or surface qualities obtainable by the application of suitable coating substances may demand the use of special materials.

Quality Required

This generally affects the manufacturing process and ultimately the material. For example, it would never be desirable to go casting of a less number of components which can be fabricated much more economically by welding or hand forging the steel.

Availability of Material

Some materials may be scarce or in short supply, it then becomes obligatory for the designer to use some other material which though may not be a perfect substitute for the material designed. The delivery of materials and the delivery date of product should also be kept in mind.

Space consideration

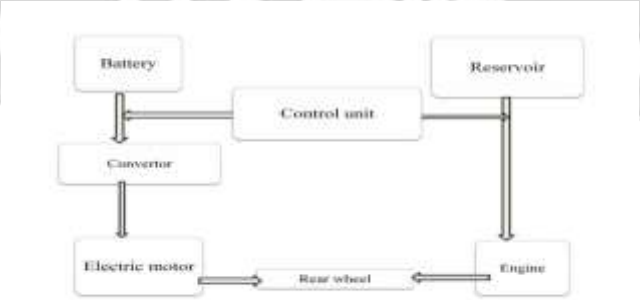
Sometimes high strength materials have to be selected because the forces involved are high and space limitations are there.

Cost

As in any other problem, in selection of material the cost of material plays an important part and should not be ignored. Sometimes factors like scrap utilization, appearance, and no maintenance of the designed part are involved in the selection of proper materials.

IV.BLOCK DIAGRAM

Block diagram based on the working design , that the electric motor, battery and power systems are used, Besides it also utilizes the concept of regenerative braking for optimized utilization of battery power



WORKING PRINCIPLE

Fig.No.4- Block diagram

The Dual operated two wheeler has two mode of operation. The mode-1 is the conventional 2 stroke IC engine which is controlled by carbureted throttles. The mode-2 is the PMDC of 12v with 1 kw power is used, and controlled by a rheostat controller. When the fuel of petrol are completed the tank that time the electric motor will be started during run of the vehicle.

Initial stage the vehicle are run with help of petrol engine .Then the fuel completed means the control lever can be operate the another alternative way to run the vehicle with the help of electric motor .

This electric motor are power getting from the battery and then " Electrical energy is converted into the mechanical energy "Also these entire system are controlled be one control unit.

Fig.No.5- Experimental Diagram

A 'gasoline-electric hybrid vehicle' is an automobile which relies not only on gasoline but also on electric power source. 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.

MERITS& DEMERIT

ADVANTAGES

1. Regenerative breaking capability helps minimize energy loss and recover the energy used to slow down or step a vehicle.
2. Engines can be sized to accommodate average load, not peak load, which reduces the engine's weight.
3. Fuel efficiency is greatly increased (Hybrids consume significantly less fuel than vehicles powered by gasoline alone).
4. Emissions are greatly decreased.
5. It can reduce dependency on fossil fuels because they can run on alternative fuels.
6. Special lightweight materials are used to reduce the overall vehicle weight of HEVs. The HEVs available for sale are very cost competitive with similar conventional vehicles. Any cost premium that may be associated with HEVs of the future can be offset by overall fuel savings and possible incentives.

DISADVANTAGES

1. High initial cost.
2. Overall weight of the bike increases.
3. Different Driving Experience.
4. New parts and servicing can be inconvenient and ex-pensive.
5. There may be a short circuit problem in the electric components.

6.3 APPLICATION AREAS

1. Intra – City commuter service
2. Bird sanctuaries, zoological parks.
3. Airport shuttle service
4. Government departments.
5. Industrial establishments, townships / satellite colonies.
6. Postal service
7. Golf clubs, schools, colleges / institutes welfare centers.
8. Courier service and mobile kitchen services

CONCLUSION

The technology of dual powered bikes is an emerging field in now a days and the total turn one on these types of vehicles very profitable for the future and also solves the issue of natural resources scarcity and is an eco friendly bike. This type of vehicle is very cost effective for middle-class families. The mileage of the bike is increased from 60 to 90 km for 1 liter of gasoline.

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