HYBRID ELECTRIC VEHICLE POWERED BY AN INTERNAL COMBUSTION ENGINE AND AN ELECTRIC MOTOR

Manoj Singh¹, Gopal Sahu², Prakash Kumar Sen³, Ritesh Sharma⁴, Shailendra Bohidar⁵
¹Student, Mechanical Engineering, Kirodimal Institute of Technology, Raigarh (C.G.)
²,³,⁴,⁵Lecturer, Mechanical Engineering, Kirodimal Institute of Technology, Raigarh (C.G.)

ABSTRACT

Vehicle have been around for more than 100 year they have changed a lot in that time today's care are faster and more reliable than those of long ago. They are also safer and more comfortable one thing has not change the most car of the past ran on fuel made from oil. That still true today usually the fuel is gasoline sometime it is diesel fuel both. Both come from oil. The trouble with oil is a very good source of energy but using it has problem. One problem is that oil is not a renewable source once it is used it's gone. If people keep on using it eventually the world will runout of oil another problem is that using fuel made from oil release certain gases into the air some of these gases can be bed for people health

Keyword: hybrid, hev, gasoline, engine, gearbox

1. INTRODUCTION

A hybrid vehicle is a vehicle that use two or more distinct power source to move the vehicle. The term most commonly refer to the hybrid vehicle. Which combine an internal combustion engine and one or more electric motor. However other mechanism to capture and use energy are included. A hybrid car get power from both gasoline engine and an electric motor. The engine and motor can work together in different way. In some hybrid there are time when only one of them operate. In hybrid car the engine can automatically shut off when it is not needed for example at a red light or in stop and go traffic. This is one reason why hybrid usually use less gasoline than traditional car. The motor as in electric car get power from large batteries, unlike ordinary electric car, most of today's hybrid don't need to be pluged in to get reached while the car is being used.

2. HISTORY OF HYBRID

It hard to say who made the first hybrid having the two power source is actually and old idea. The first important hybrid that is know of today was made around 1900 by the famous austria car designer Ferdinand porches. The car had a gasoline engine, and there were electric motor in the wheel hubs. It was a series hybrid. The engine ran a generator that made a electricity. Other people also made hybrid in the early 20th century but the internal combustion car become very popular. It was power full and fuel was cheap and easy to get. Also hybrid car cost more to make for decades few people bothered to even experiment with them.

3. TYPES OF HYBRID SYSTEM

Generally they are two types of hybrid technology
1 Series hybrid
2 Parallel hybrid

In a parallel hybrid both the engine and electric motor make the wheel turn. In a series hybrid. The motor turn the wheel while the engine run a generator to make electric.
4. ADVANTAGE & DISADVANTAGE OF HYBRID VEHICLE

Hybrid cars have been hailed as an exciting green advancement for the vehicle and transport industry. Using dual electric and petrol engines module such as the prius and the civic hybrid work are more fuel efficient and produce less co2 emissions than regular engine cars. But the market has been slower to take off than was hoped by environmentalists mainly due to a lack of knowledge about how the vehicle work and confusion over whether they are as good as regular vehicle for everyday driving.

4.1 Advantage of Hybrid vehicle:
1. Good for the environment
   Probably most documented about hybrid cars is their green credentials and if more of us drove hybrid vehicle, it would ultimately significantly reduce co2 emissions. A hybrid car produce 25 to 35 percent less in co2 emissions than regular cars, because it is has a second electric. Battery powered engine, which recharge via the petrol engine. This is a much more energy efficient. Engine for town and city driving in traffic. Then when driving at higher speed the power of the petrol engine kick in.

2. Fuel efficient
   The dual engine help to maintain the most efficient energy consumption during all driving condition which mean you will need to fill your car with petrol far less often than with a regular car. Because the car is able to utilize the battery powered engine when driving at lower speed or in traffic little or no fuel is needed during these driving condition.

3. Financial benefit
   Because hybrid vehicle are better for environment the government keep to be seen to be Embracing green policy offer incentive for driving them. Expect to have much lower annual car tax bill, and exemption from congestion charge or low emission zone. Hybrid car can travel through london's congestion charge zone free of charge of example.

4.2 Disadvantage of hybrid vehicle
1. Hybrid car can be expensive
   One drawback of hybrid vehicle is the cost and yes you should expect to pay more for a hybrid model than a regular petrol car. But you can at least offset this with the lower running cost of hybrid vehicle and the car tax exemption.

2. Different driving experience
   Some driver are put off from due to the difference they feel when they are driving them. For example when stationary or travelling at low speed the batteries engine is virtually silent which can be disconnected for drivers who may think the car sound like it's cut out.

3. Less power
   Hybrid car are less powerful in general, than regular cars of similar size because the petrol part of the engine is smaller than single engine petrol car.

5. CONCEPT OF HEV
   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.

6. BASIC DESIGN OF HEV
   The basic design consists of a dc power source battery. The battery is connected to inverter that is fed to a BLDC motor that works on AC. The motor is attached to the front wheel of the two wheeler vehicle. As the motor rotates the attached wheel rotates too, thus, leading to vehicle motion. At low speeds this mode of propulsion is used. The next phase consists of an IC engine that moves the piston continuously. This is connected to the transmission and thus, the vehicle moves.

7. WORKING OF HEV
   In HEV, the battery alone provides power for low-speed driving conditions where internal

Fig 3 Block diagram of HEV
combustion engines are least efficient. In accelerating, passing, or hill climbing where high power is required battery provides power to electric motor as an additional power to assist the engine. This allows a smaller, more efficient engine to be used. A throttle position sensor (TPS) is a sensor used to monitor the position of the throttle in an internal combustion engine. It consists of a hall sensor. When the accelerator throttle angle changes magnetic field is created and it creates voltage across position sensor terminal. Thus for various angles, various voltages are obtained.

HEV consists of a throttle position sensor, i.e, hall sensor. It gives voltage as output with respect to the angle displacement in the accelerator. The analog voltage generated is converted to digital through ADC and is given to microcontroller. If the speed corresponding to the angle deviation in accelerator is less than 30km/hr then the relay is switched on. The relay switching completes the circuit of the battery, inverter and hub motor; and vehicle is motioned by electric power. If the speed directed by accelerator is greater than 30km/hr, then the engine is started by closing the circuit of starting motor through a relay. The starting motor circuit is activated for five hundred milliseconds such that the vehicle is started. Once the vehicle starts the valve of engine for gasoline intake opens by servo motor. The amount of opening is controlled by the PWM generated by the microcontroller as directed by the accelerator.

8. CONCLUSION
1. Due to the proliferation of hybrid vehicles on the road today, responders must be familiar with how these vehicles operate, and how to handle an emergency which involves one of these vehicles.
2. Additionally, responders must stay up-to-date with current vehicle technology, as it is continuously changing.
3. And my personal view is we must should use hev as at least personal transport, for day to day life, short distances and should save something for tomorrow.
4. Let us make a beautiful world!
5. In future we can have hev with pneumatic and hydraulic sources as well and I am sure there is a much more chances towards better.

REFERENCES