NEW GENERATION HYBRID CAR

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Abstract— This paper introduce a new development in hybrid cars. In Hybrid car two fuels are used to move the car which generally gasoline and electricity. Major problem in this type of hybrid car is load of alternator which drive directly from the crank shaft by the way of belt drive for charging the batteries to run electric motor. To overcome this problem , new advance method have been proposed in which there is no physical contact between alternator and engine of the car, electricity is produce by the way of magnetic induction from permanent magnet rotation. In this car the energy which is waste in the form of heat to radiator and exhaust convert into electricity by the use of peltier plate based on see back effect ,as much as temperature difference between the two sides of peltier plate as much as electricity produce. One more extra technology that we provide in this hybrid car is that it is blast proof. Sodium polyacrylate is the key material used in this which absorb very high amount of external heat and save the fuel line and tank from blast during accident and when car stand in fire.

Keywords— permanent magnets, alternator, gasoline, electric motor.

I. INTRODUCTION TO HYBRID CARS

Hybrid cars are something that show up in news all the time. There are several reason for continuing interest in these vehicles. A hybrid vehicle is a vehicle that use two or more distinct power sources to move the vehicle. The term most commonly refers to the hybrid electric vehicles (HEV), which combine an internal combustion engine and electric motor. As we know that amount of fossil fuels decrease day by day and gasoline powered cars create more pollution , due to this electric motor is added in gasoline powered car which creates less pollution and environment friendly which is known as Hybrid car.

II. INSIDE AN HYBRID CAR

In an hybrid car front drive is given by internal combustion engine which is further connected to the clutch plates, gear box, differential and back drive is given by electric motor . A new AC electric motor was bolted to the transmission with an adapter plate. An electric controller was added to control the AC motor. A battery tray was installed in the floor of the car. Fifty 12-volt lead-acid batteries were placed in the battery tray (two sets of 25 to create 300 volts DC). Two charging systems provide inside this car, one by magnetic induction from the motion of the car and the second system is from external supply 240volt wall outlet.

III. WORKING MECHANISM

In an hybrid car the internal combustion engine is place at the front portion of car which gave the front drive to the car. Engine further attached with clutch plates, gear box and differential of the car. The major function of clutch plates are to disengage the engine drive from the gear box , so we can change the gears without breaking their teeth¡¦s and the function of fears are to transmit the power from engine to the differential and the work of differential is to distribute the power among the inside and outside tyres of the car during turning. When the car moves by internal combustion engine the permanent magnets of Rare earth type also rotates which are attach on the axle of the car. A coil winding is present on both the axles above the magnets at the gap of few mm, when the magnets rotate then due to change in the flux current induced in the coil which is Alternation current . To make it DC it further pass through the rectifier of diode type and than it stored in battery. The heart of an electric car is the combination of:

- The electric motor
- The motor's controller
- The batteries

The controller takes power from the batteries and delivers it to the motor. The accelerator pedal hooks to a pair of potentiometers (variable resistors), and these

potentiometers provide the signal that tells the controller how much power it is supposed to deliver. The controller can deliver zero power (when the car is stopped), full power (when the driver floors the accelerator pedal), or any power level in between. This electric system in the car is classified into two types:

A. DC System

B. AC System

A. Working Mechanism(DC System)

In DC System a simple DC controller connected to the batteries and the DC motor. If the driver floors the accelerator pedal, the controller delivers the full 96 volts from the batteries to the motor. If the driver take his/her foot off the accelerator, the controller delivers zero volts to the motor. Accelerating paddle is attach with the potentiometer which is a variable resistor and send signal to the controller, according to Which the controller send the battery voltage to the electric motor.

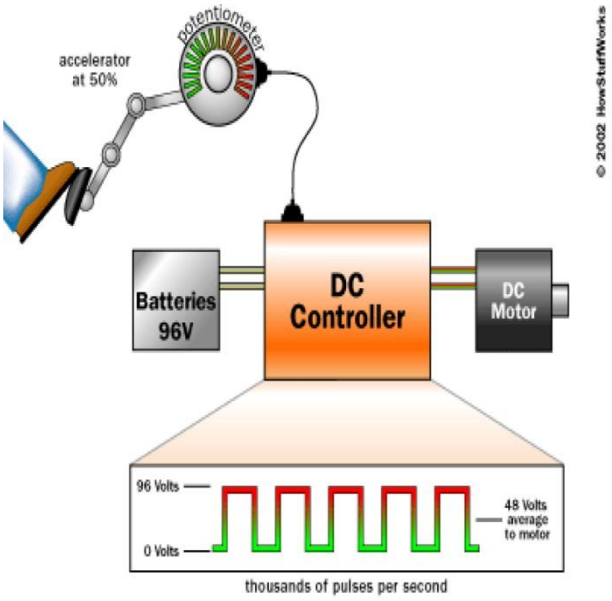


Figure 1 Working Mechanism of DC System

DC Controller

The controller's job in a DC electric car is easy to understand. Let's assume that the battery pack contains 12 12-volt batteries, wired in series to create 144 volts. The controller takes in 144 volts DC, and delivers it to the motor in a controlled way.

The very simplest DC controller would be a big on/off switch wired to the accelerator pedal. When you push the pedal, it would turn the switch on, and when you take your foot off the pedal, it would turn it off. As the driver, you would have to push and release the accelerator to pulse the motor on and off to maintain a given speed. One set of transistor used in DC controller to make the voltage pulsating.

B. Working Mechanism(Ac System)

In this system ac motor like three phase induction motor and ac controller is used ,this ac motor on applying the brakes convert into generator and charges. the batteries. Here array of batteries is used supplying 300v dc which is convert into 240v, three phase ac.

The controller additionally provides a charging system for the batteries, and a DC-to-DC converter to recharge the 12-volt accessory battery. This system is more expensive then dc but also provide more power and efficiency.

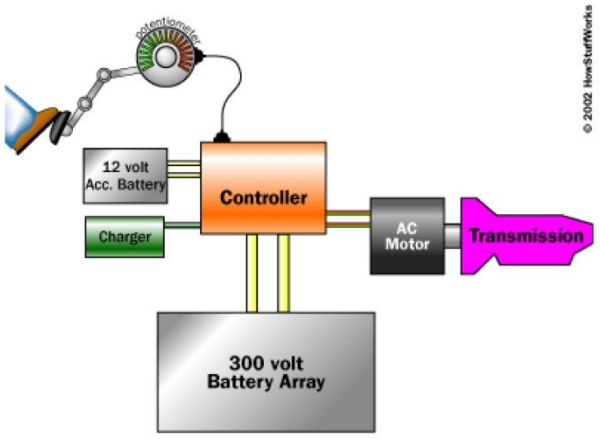


Figure 2 Working Mechanism Ac System

An AC controller hooks to an AC motor. Using six sets of power transistors, the controller takes in 300 volts DC and produces 240 volts AC, 3-phase**.**

AC Controller

In this car, the controller takes in 300 volts DC from the battery pack. It converts it into a maximum of 240 volts AC, three-phase, to send to the motor. It does this using very large transistors that rapidly turn the batteries' voltage on and off to create a sine wave.

In an AC controller, the job is a little more complicated, but it is the same idea. The controller creates three pseudo-sine waves. It does this by taking the DC voltage from the batteries and pulsing it on and off. Therefore, you actually need six sets of transistors in an AC controller, while you need only one set in a DC controller. In the AC controller, for each phase you need one set of transistors to pulse the voltage and another set to reverse the polarity.

IV. ELECTRIC MOTORS

Electric cars can use AC or DC motors:-

- If the motor is a **DC motor**, then it may run on anything from 96 to 192 volts. Many of the DC motors used in electric cars come from the electric forklift industry.
- If it is an AC motor, then it probably is a three-phase AC motor running at 240 volts AC with a 300 volt battery pack.

DC installations tend to be simpler and less expensive. A typical motor will be in the 20,000-watt to 30,000-watt range. A typical controller will be in the 40,000-watt to 60,000-watt range (for example, a 96-volt controller will deliver a maximum of 400 or 600 amps). DC motors have the nice feature that you can overdrive them (up to a factor of 10-to-1) for short periods of time. That is, a 20,000-watt motor will accept 100,000 watts for a short period of time and deliver 5 times its rated horsepower. This is great for short bursts of acceleration. The only limitation is heat build-up in the motor. Too much overdriving and the motor heats up to the point where it self-destructs.

AC installations allow the use of almost any industrial three-phase AC motor, and that can make finding a motor with a specific size, shape or power rating easier. AC motors and controllers often have a regen feature. During braking, the motor turns into a generator and delivers power back to the batteries

V. CHARGING OF HYBRID CAR

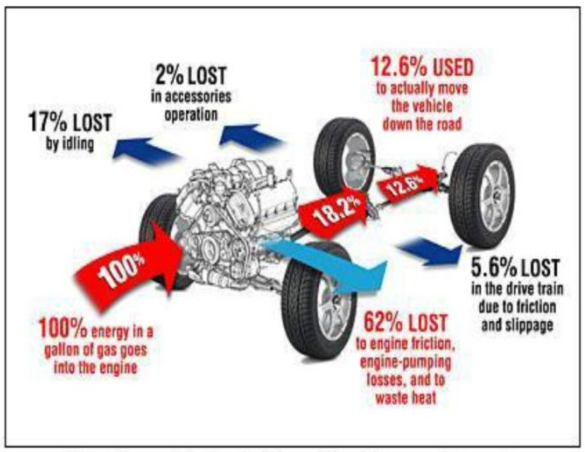
Any hybrid car that uses batteries needs a charging system to recharge the batteries. The charging system has two goals:

- To pump electricity into the batteries as quickly as the batteries will allow.
- To monitor the batteries and avoid damaging them during the charging process.
- There are two ways available to recharge the batteries which are as follow:
- First way to recharge the batteries is from the motion of the car by the way of magnetic induction i.e. you travel 50km from home to any particular place by the use of internal combustion engine, during this travelling the batteries of your car charge by magnetic induction and you can travel back from that place to home by using electric motor.
- Second way to recharge the batteries is from external 240 volt wall outlet.

VI. PRODUCING ELECTRICITY FROM HEAT ENERGY

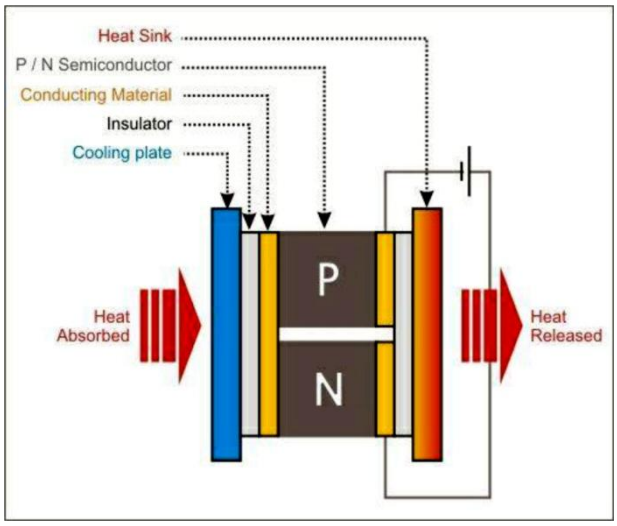
An automotive thermoelectric generator (ATEG) is a device that converts waste heat in an internal combustion engine (IC) into electricity using the Seebeck Effect. A typical ATEG consists of three main elements: A hot-side heat exchanger, a cold-side heat exchanger, thermoelectric materials. ATEGs can convert waste heat from an engine's coolant or exhaust into electricity. By reclaiming this otherwise lost energy, ATEGs decrease fuel consumed by the electric generator load on the engine.

In ATEGs, thermoelectric materials are packed between the hot-side and the cold-side heat exchangers. The thermoelectric materials are made up of p-type and n-type semiconductors, while the heat exchangers are metal plates with high thermal conductivity.

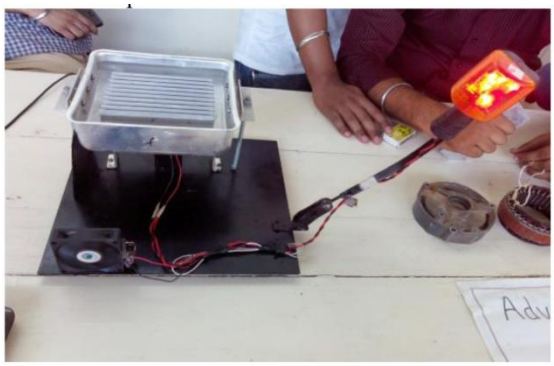


This diagram illustrates the paths of energy through a typical gas-powered vehicle in city driving.

The peltier plate which is used to convert heat energy or temperature difference into electricity available in different sizes and capacities. Mechanism of conversion heat this heat energy into electricity or inner view of peltier plate describe in picture as below:

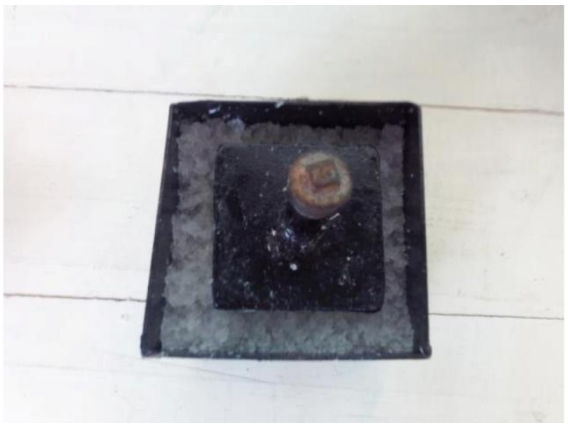


The proto type model which is made by me during the research of this operation is as shown :



VII. BLAST PROTECTOR

In this technology the sodium polyacrylate Is coated around the fuel tank and fuel supply line with thickness of 1 inch approximate. This material has great property of absorption of heat . It keeps the petrol inside the tank safe due to its property of absorption of heat even when our vehicle is stand in fire and when the vehicle meet with any accident.



Trucks which carry liquid nitrogen and oxygen are very dangerous ,so we can use this technology their to make transportation safe. It is very economical, eco-friendly and used again &again.

VIII. LIMITATIONS

There are few limitation found in this advanced hybrid car which are as following :

- Right now weak link in hybrid car is lead acid batteries. There are at least six significant problems with current lead-acid battery technology. They are heavy(a typical lead-acid battery pack weighs 1,000 pounds or more), bulky, have limited capacity , slow to charge and have short life(three to four years, perhaps 200 full charge/discharge cycles).
- Stress induced in the axle of the car.
- Repairing of whole car and axle is little difficult.

IX. METHOD TO REMOVE THESE LIMITATIONS:-

- You can replace lead-acid batteries with NiMH batteries. The range of the car will double and the batteries will last 10 years (thousands of charge/discharge cycles).
- Magna charge method.
- The material used for making the axle of car should have high strength.

X. INCREASING EFFICIENCY

In this present time in hybrid cars alternator is used to recharge the batteries which drives by the crank shaft of internal combustion engine through the belt drive which will increase the load on the engine of the car. But in this new technology hybrid car we remove the direct physical contact, electricity is produce by permanent magnets rotation through magnetic induction ,which will decrease the load much as compare to load in the previous existing hybrid cars. This show that it will increase the efficiency of hybrid car.

XI. ACKNOWLEDGMENT

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