

Ideation of Hybrid Engine

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Abstract – The automobile industries are up to a New reality where the core need to modify. In general, the automobiles carry engine, where the next level of engine are the Hybrid engines which are multifunctional. In hybrid engine the mechanical energy generated with different input sources. i.e., electrical, fuel source, gasoline. This paper deals with the advantages of preferring hybrid engines and also classification of various engines.

Key words: stroke, cylinder, piston, combustion, ignition, crankshaft.

1. INTRODUCTION

An engine is assembly of mechanical components. The engine can be considered as the power house of automobiles. The modification in Engines do carry with time, the Hybrid engine is a new phase to auto motives which may help in developing the work output. The adoption of hybrid engine may improve the relation between nature to automobiles. Hybrid engine can also be considering as the solution for extinguishing resources and reducing pollution. It also improves the flexibility of engine

2. HYBRID ENGINE

The hybrid engine is a machine designed to convert multiform of energies into mechanical energy in a single unit. It is the integration of different forms of energies. The hybrid engine can also be the termed as the future of the automotive.

2.1 WORKING OF ENGINE

The principle of engine is to convert one form of energy into mechanical energy. Based on that principle the hybrid engine converts multiple forms of energy into mechanical energy in a single unit. This help in enriching the new reality.

2.2 TYPES OF ENGINES

The Engines are classified into two types

i) Internal Combustion (I.C) Engine

It is a heat engine where the fuel combustion take place within the integral parts of engine. The combustion of fuel takes place internally. The internal combustion engine are widely used in automobiles so we can call them as Automobile engines.

CLASSIFICATIONS OF ENGINE

The classification of engine is carried based on several parameters. which are mentioned below

Based on stroke:

1. Two stroke engine

An internal combustion engine which complete its complete cycle with two strokes (one crankshaft revolution) known as two stroke engine. It has high torque than four stroke. This type of engines are generally used in pumps, scooters etc.

2. Four stroke engine

An internal combustion engine which complete its complete cycle with four strokes (Two crankshaft revolution) known as four stroke engine. This type of engines are generally used in Bikes, Cars, Trucks etc.

Based on Engine Design

1. Rotary engine (Wankel engine)

An IC engine in which a rotor pressure force generates mechanical motion known as the Rotary engine. This engine is used in olden days.

2. Reciprocating engine (Piston engine)

An IC engine in which pressure is exerted through piston (to and fro motion) is known as Reciprocating engine. The reciprocating motion converted into rotary motion through piston. Generally used in automobiles.

Based on fuel:

Table-1: engine classification based on fuel

FUEL	ENGINE NAME	APPLICATION
Diesel	Diesel engine	Trucks, Cars, Buses etc.
Petrol	Petrol engine	Bikes, sports cars etc.
CNG and LPG	Gas engine	Light motor vehicles
Battery	Electric engine	Electric cars

Based on ignition:**1. Spark ignition engine**

In spark ignition engine the ignition takes place through a spark generated inside the cylinder.

2. Compression ignition engine

In compression engine there is no need of external interference in burning the fuel. The ignition of fuel takes place through the pressure generated through compression.

Based on number of cylinder:**1. Single cylinder**

In this type of engine, the crankshaft is connected with only one cylinder and piston.

2. Multi-cylinder

In this type of engine, the crankshaft is connected with more than one cylinder and piston.

Based on cylinder arrangement:**1. In-line engine**

In this type of engine, the positioning of cylinders are one beyond other in a straight line along the shaft.

2. V-engine

In this type of engine two cylinders are placed inclined to each other with one crank shaft.

3. W-type engine

In this type of engine three cylinder are placed along crank shaft as V-engine

4. Opposed cylinder engine

In this type of engine two cylinders placed opposite to each other on a single crank shaft.

5. Opposite piston engine

In this type of engine, a combustion chamber is placed between two cylinders with two pistons each.

6. Radial engine

In this type of engine, the pistons are positioned around central crank shaft in a circular plane

Based on air intake:**1. Naturally aspirated**

The air intake occurs through the atmospheric pressure.

2. Turbocharged engine

A turbine compressor driven through combustion gases increase the air pressure.

3. supercharged engine

A compressor driven through engine crankshaft increase air pressure.

ii) External Combustion (E.C) Engine

It is a heat engine where the combustion takes place externally and the generated heat is transferred to fluid and the expanded fluid is used in the mechanism of the engine to generate work. The combustion is the primary source for the E.C engine. The working fluid is cooled and reused in case of closed cycle. In open cycle the working fluid is drummed.

Based on the composition the working fluid is classified into single phase and dual phase.

- a) In single phase there will be no phase change.
- b) In dual phase there exist phase change which take place through temperature difference.

The steam engine used in vehicles is an external combustion engine where the energy generated through coal boil the water into steam the phase change takes place. Through the steam power the mechanical motion is generated.

2.3 Engine selection

Through proper analysis the hybrid engine is been suggested due to the following reasons: -

- i) It improves the span of engine.
- ii) Reduce fuel consumption.
- iii) Emissions will be minimized.
- iv) Pollution will be reduced.
- v) To Increase the flexibility of engine.

A hybrid engine can be designed in many ways the design with magnetic interference can be considered as the optimum engine in our perception.

The basic hybrid engine consists of two cylinders with two pistons connected to a crankshaft in common. where the engine intake can be of different sources like petrol, diesel, electricity. In this case the electro magnets are used in one

cylinder and the fuel is used in another cylinder. The cylinder with fuel source complete the cycle with suction, compression, expansion, exhaust. In the second cylinder the electro magnets are placed at the top of the cylinder as shown in the figure(b). where the basic principle of attraction and repulsion of magnets is being applied here (opposite poles attract each other, same poles repel each other) .

By creating two same poles on the top of cylinder the motion in the piston is generated. The piston is magnified with the similar pole of electro magnet on top. The electro m is charged with the electricity which is being generated from the dynamo (DC generator connected to the wheels). The effect of magnets on the cylinder will be low as the magnets are in the fixed state do the engine. The surface inside the secondary cylinder should be in way a to minimize the friction so that the heat generation will be reduced.

In other case continuous flipping of electro magnet may even generate better result at the time the piston is near it act as same pole which generate repulsion and opposite pole at far generate attraction. The magnetic cylinder design cases are shown below.

case (1): The individual unit of the magnetic cylinder is shown in the fig-(a). The piston head is magnified were the electro magnet setup is placed on the top of the cylinder. When the piston moves to the top dead centre the electro magnet flip to similar pole and the repulsion force make the piston move down when the piston move to the bottom dead centre the electromagnet flip to opposite pole were the attraction takes place and the piston move top.

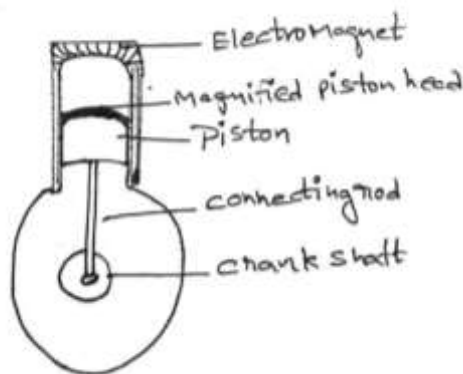


Fig-(a): cylinder with magnetic setup

Case (2): In this case the motion from both the cylinders is transmitted to the crankshaft. The motion of both the pistons are relative to each other.

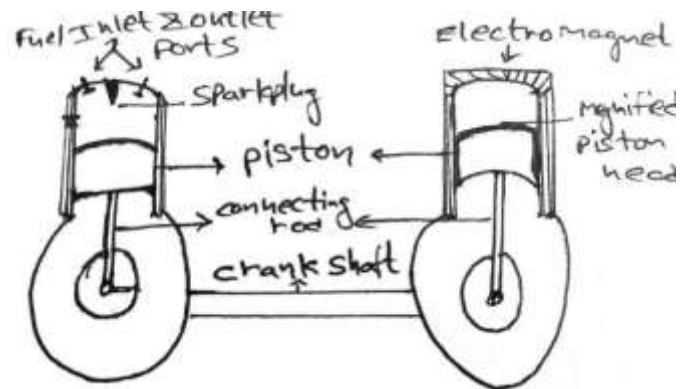


Fig -(b): Hybrid setup of engine

Through the setup we can decrease the specific fuel consumption(SFC). The optimization of this engine lies in relating the frequencies of both the piston.

CONCLUSION

This paper dealt with the different types of engines and the requirements of hybrid engine advantages of adopting it with a conventional model setup of magnetic and fuel cylinders inside an engine.

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