

# Reduced of Exhaust Gases of Two Wheeler Vehicle and Increasing Average with Decreasing of Fuel Supply by Arrangement of Dual Spark Plug or Magnet Inside the Piston Design

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**Abstract-** It is very interesting to know about complete combustion of fuel in automobile engineering. Because in actual practice perfect combustion is not at all possible due to various losses in the combustion chamber as well as design of internal combustion engine. Moreover to it by making the combustion of fuel as fast as possible. This can be done by using two spark plugs which spark alternatively at a certain time interval so as increasing the diameter of the flame & burn the fuel instantaneously will be complete. One more addition of arrangement in piston we used to magnet inside the design of piston by which when piston goes down to BDC at a time EMF force is generated, it attract the piston towards to TDC very rapidly as compare to normally process due to this piston rpm get increased 2 to 3 time more. The main work of this research paper is to provide a vehicle which gives less exhaust gases during burning of fuels as well as high efficiency with less used of fuel during combustion.

**Keywords:-** Introduction, Methodology, Advantages.

## I. INTRODUCTION

The ignition system supplies properly timed high voltage surge to spark plugs. These voltage surges cause combustion inside the cylinder. The ignition system must create a spark or current flow across the each pair of spark plug electrodes at the proper instant, under all engine-operating conditions. Rapid combustion is the basic requirement for knock free operation of an S.I engine. Multiple ignition system is one of the techniques to achieve rapid combustion. Multiple spark plug engines often use the initiation of flame propagation at two or more number of points in the combustion chamber depending on the number of spark plugs employed. If two plugs are employed the flame front travels from two points in the cylinder and the effective distance to be traveled by each flame is reduced. The concept of dual plug spark ignition is under consideration for more than last three decades. Several experimental studies were made in the area of dual ignition engines regarding optimization of spark plug location and to prove their efficient

operation at part loads, extended EGR tolerance, extended lean misfire limit and relatively clean burning compared with single spark ignition systems. They also found power enhancement and higher thermal efficiency with dual ignition especially at part loads.

## II. PURPOSE OF DUAL SPARK IGNITION SYSTEM

1. It must generate an electric spark they has enough heat to ignite the air/fuel mixture in the combustion chamber.
2. It must maintain the spark long enough to allow for the combustion of all the air and fuel in the cylinder.

## III. ENGINE MODIFICATION

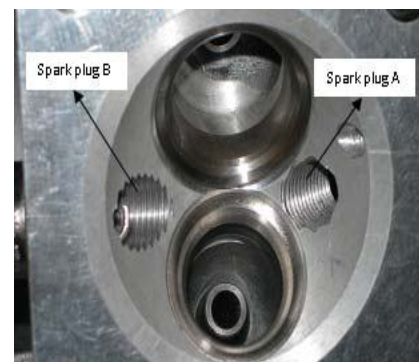


Fig: View of cylinder head with provision for twin plug

The arrangements of spark plug were conducted on a four-stroke air cooled petrol engine with necessary modifications to accommodate dual plugs. The fins over the engine dissipate heat to the surrounding air, thus preventing the overheating of the engine. A fan is provided to blow air over the engine fins for effective cooling. The inlet and exhaust valves are operated by cam shaft driven by crank shaft. The engine specifications apart from the original spark plug 'A', whose diameter is 14mm, one more 14mm hole is threaded in the engine cylinder head diametrically opposite to it, to fit the second spark plug 'B'.

#### IV. FIRING ORDER

The function of ignition system extends beyond timing the arrival of spark to a single cylinder. It must perform this task for each cylinder of the engine in specific sequence. The cylinder of an engine must power once in every 720 degrees of crankshaft rotation. The cylinder must have power stroke at its own appropriate timing during its rotation. To make this possible the piston and rod are arranged in precise fashion. This is called as engine's firing order. The firing order is arranged to reduce knocking and imbalance problem. Because potential for this knocking is determine by the design and construction of the engine, the firing order varies from engine to engine regardless the number of cylinder used.

#### V. DIGITAL IGNITION SYSTEM

Digital ignition system is an electronic ignition system in which spark timing is controlled by a computer that continuously adjusts ignition timing to obtain optimum combustion. The basic principal is same as that of electronic ignition system.

#### VI. REQUIREMENT OF AN IDEAL GASOLINE FOR PROPER BURING OF FUEL AND LESS EXHAUST GAESE EMMITED

1. It should mix readily with air and affort uniform manifold distribution that means it should be easily vaporise.
2. It must be knock resistant.
3. It should be not pre- ignite easily.
4. It should increasing the volumetric efficiency of engine suction stroke.
5. It must burn clean and produce no corrosion

#### VII. METHODOLOGY

1. The rate of fuel supply is low but increased inlet pressure due to more break down of fuel droplets its easily for proper burning of fuel.
2. Spark plug electrode gap increased due to high amount of electricity passes during sparking timing.
3. Octane number of fuel is increased by using of Anti-Knocking chemicals by which no chances to pre-ignition, more vibration and unpleasant sound occurs.
4. For increasing the rpm of engine we take a ideal concept in which if in piston design a magnet is arrange inside it, due to when piston goes down to BDC and again come

towards to TDC then at a time some EMF force generated upward direction which attract the piston faster rapidly, for that the engine speed increased more 2 time either than normally condition.

#### VIII. AIR-FUEL RATIO TO IMPROVE FUEL BURING CAPACITY

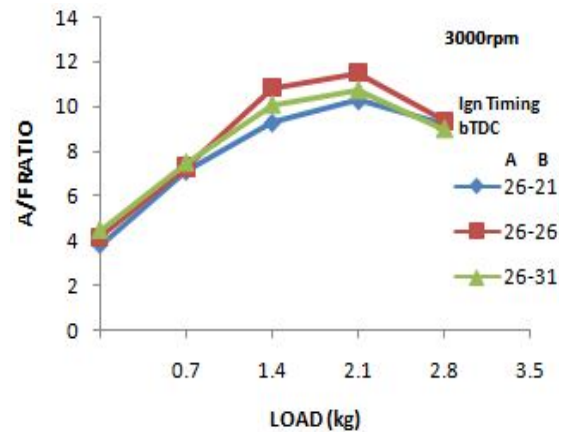


Fig: Dual spark plug under different ignition timings

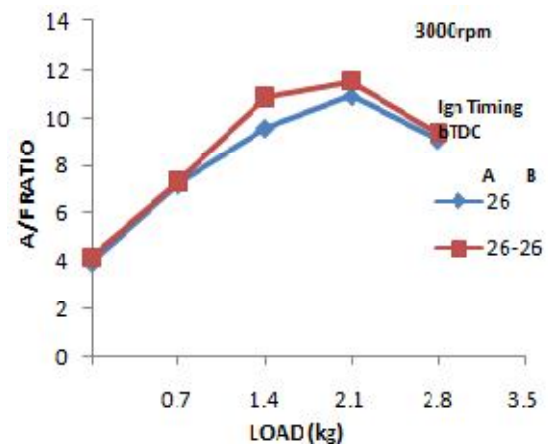


Fig: Comparison with Single spark plug

#### IX. ADVANTAGES OF DUAL SPARK PLUG OVER SINGLE SPARK PLUG

The Advantage of DSI over Mechanical Method Fewer moving parts, therefore less friction and wear. Flexible in moving location. This is important because of today's smaller engine compartment. Less required maintenance: there is no rotor or distributor cap to service. Reduction ratio frequency interference because there is no rotor to cap gap. Elimination of common causes of ignition misfire, the buildup of water and ozone/nitrite acid in the distributor cap. Elimination of mechanical timing adjustments. Places no mechanical load on the engine in order to operate. Less required maintenance; there is no rotor or distributor cap to service.

## X. DIS-ADVANTAGES OF DUAL SPARK PLUG OVER SINGLE SPARK PLUG

1. The engine tends to overheat and loose power at higher speeds as compared to a single plug engine.
2. There may be a kind of knocking sound on the machine.

## XI. CONCLUSION

The improved engine efficiency modes have also resulted in lowered fuel consumption. In the world of new high-speed cars and bikes to achieve maximum engine power, top fuel efficiency and minimum emission levels during all type of operating condition. The digital spark ignition is the best alternative for conventional ignition control. Computerized control gives accurate timing for all operating condition. At the same time use of two spark plug improves thermodynamic efficiency and power available. Due to magnetic arrangement inside the piston designs is ideal but if work on it gives to high speed because EMF induced by which extra effort apply without any extra fuel used.

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