Reduction of Carbon Monoxide in 2stroke Petrol Engine Using Thermal Reactor

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***Abstract*: -** Generally 2Stroke petrol engine is a type of internal combustion engine. The 2-stroke cycle of an internal combustion engine has only two strokes (linear movements of the piston). It is usually found in low power applications like lawn mowers, mopeds, small outboard motors, etc. There is no dedicated lubricat -ion system in 2stroke engines, the lubricant is mixed with fuel. 2-stroke engines do not use fuel efficiently. Each time a new charge of air-fuel is loaded into the combusting chamber, a part of it leaks out through the exhaust port. The burning of lubricating oil and the exhaust of un-burnt fuel makes them more polluting causing emission of carbon monoxide. This paper explains the reduction of carbon monoxide(co) emitting form 2stroke petrol engines using THERMAL REACTORS.

Keywords: 2Stoke petrol engine, combustion, lubricants, exhaust ports, carbonmonoxide,Thermal Reactors..

I.INTRODUCTION :

Two-stroke, Two-cycle, or Two-cycle engine is a type of internal combustion engine which completes a power cycle in only one crankshaft revolution and with two strokes, or up and down movements, of the piston in comparison to a “four stoke engine”, which uses four strokes to do so. This is accomplished by the end of the combustion stroke and the beginning of the compression stroke happening simultaneously and performing the intake and exhaust functions at the same time.

Two-stroke engines often provide high power to weight ratio usually in a narrow range of rotational speeds called the "power band", and, compared to 4-stroke engines, have a greatly reduced number moving parts, are more compact and significantly lighter.

The first commercial two-stroke engine involving in-cylinder compression is attributed to Scottish engineer Dugald clerk, who in 1881 patented his design, his engine having a separate charging cylinder. The crankcase-scavenged engine, employing the area below the piston as a charging pump, is generally credited to Englishman Joseph Day.

Gasoline (spark ignition) versions are particularly useful in lightweight (portable) applications such as chainsaws and small, lightweight and racing motorcycles, and the concept is also used in diesel compression ignition engines in large and weight insensitive applications, such as ships, locomotives and electricity generation. The heat transfer from the engine to the cooling system is less in a two-stroke engine than in a traditional four-stroke, a fact that adds to the overall engine efficiency; however, traditional 2-strokes have a poor exhaust emissions feature.

II. WORKING OF 2STROKE PETROL ENGINE :

Two stroke and four stroke engines are different in the method of filling the cylinder with fresh charge and also in the removal of burnt gases from the cylinder. In a four stroke engine these processes are performed by the movement of piston during suction and exhaust stroke. In four stroke engines these are suction and exhaust valves where as suction (inlet) and exhaust (outlet) ports are cut in the walls of cylinder.The Figure 1.0 shows a three channel system in which the fresh charge is compressed in the crank case of the engine. This is also called crank are compression system. Figure shows all working of two stroke petrol engine in three stages.

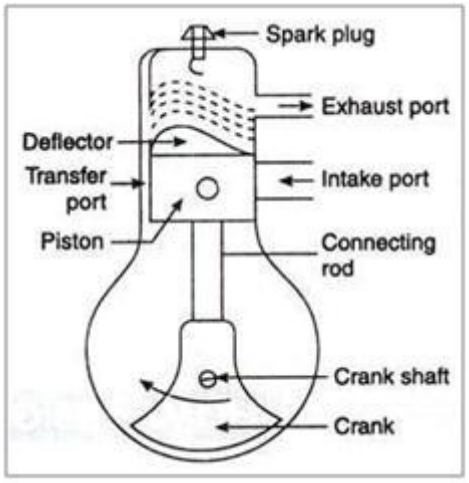

Figure:1.0

Exhaust and Transference:

Above figure shows the exhaust and transfer process. When the piston moves from TDC to BDC, i.e. downwards after expansion of gases, the piston uncovers the exhaust port. The burnt gases start going out of the cylinder. Simultaneously the slightly compressed charge in the crank case is forced into the cylinder through transfer port. The deflector on the piston crown deflects this charge and the fresh charge moves in the upward direction. This fresh charge pushes the burnt gases out of cylinder. During this process, some fresh charge may also leave the cylinder through exhaust port.

Compression :

When the piston moves upwards from BDC to TDC, transfer port and exhaust ports are closed. Compression of charge, present in the cylinder takes place. During this motion the inlet valve open and fresh charge enters the crank case. When the piston reaches TDC, compression process is completed.

Ignition And Expansion :

After compression, spark plug generates spark and ignition of fuel takes place. Rapid rise in pressure and temperature takes place at constant volume. At this stage both transfer port and exhaust port are closed. Expansion of burnt gases takes place at the piston moves downward from TDC to BDC. The gases push the piston with great force and power is obtained during this process. Simultaneously, slight compression of fresh charge, present in crank case takes place.

After this process i.e. exhaust and transfer of charge takes place and cycle is repeated again. Thus, the cycle is completed in two strokes of piston and one revolution of crank shaft. In case of petrol engines, fresh charge consists of air petrol mixture which comes from carburetor after mixing.

III.Drawbacks of 2Stroke Petrol Engines:

- There is nodedicated lubrication system, the lubricant is mixed with fuel. 2-stroke engines therefore do not last as long as 4-stroke as their parts wear out faster.
- 2-stroke engines do not use fuelefficiently. Each time a new charge of air-fuel is loaded into the combusting chamber, a part of it leaks out through the exhaust port.
- The burning of lubricating oil and the exhaust of un-burnt fuel makes them more polluting causing emission of carbonmonoxide (C0).

IV.Thermal Reactors :

The emission of carbonmonoxide from engines can be controlled by using THRMAL REACTORS.
Thermal reactor system may reduce the harmful constituents to the required amount without providing an exhaust gas purification system in the exhaust system.

In the conventional exhaust thermal reactor system, the thermal reactor is positioned in the exhaust passage after the outlet of cylinder head. In order to maintain the exhaust gases at a high temperature in such a system, the exahust passage and thermal reactor are coated with insulation material. Sufficient oxidation cannot be expected in the thermal reactor provided in the exhaust passage, because of the exhaust gas temperature drop in the exhaust passage.

In order to elevate the exhaust gas temperature , the lower than that of conventional engine.

spark timing is retarded and in order to maintain the temperature at a high level sufficient to induce the oxidation, a large scale insulation must be provided on a great part of the exhaust system which will increase the cost of the system.

The exhaust gas temperature drop may be prevented because the reaction chamber is provided closely adjacent to the exhaust valve.

Further it is possible to greatly reduce the harmful constituents of the exhaust gases even if the the exhaust gas temperature at the exhaust port

V. CONCLUSION : This paper gives the clear idea about how the thermal reactors are used in the 2stroke engines for reducing the emission of carbon monoxide emitting from engines.

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