

SEMI PNEUMATIC FOUR STROKE ENGINE

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ABSTRACT

In today's world fuel products are widely used everywhere in abundantly, due to this there will be a danger of reduction of fuel products, To avoid this scenario fuel can be used partially and remaining can be run using compressed air, in four stroke engine two cylinders can be run through fuels and another two engine can be run through compressed air. The compressed air is generated through a reciprocation compressor which runs through the shaft of the engine, some modifications are done in the engine to implement this. Reciprocating compressor was employed to maintain constant pressure in the compressed air storage tank. The semi pneumatic engine with high power fulfill the regulations of the environmental protection and saves fuel.

1. INTRODUCTION

Fuel is the most needful thing for day today life for our vehicles, to save fuel and use it in limited manner a combination of compressed air and fuel engine idea has been developed. Two cylinders runs through compressed air and remaining two runs through fuel .An Air Driven Engine makes use of Compressed Air Technology for its operation. Compressed Air Technology is now widely preferred for research by different industries for developing different drives for different purposes. The Compressed Air Technology is quite simple.

If we compress normal air into a cylinder the air would hold some energy within it. This energy can be utilized for useful purposes. When this compressed air expands, the energy is released to do work. This engine has to be modified accordingly two engine has to run with compressed air and remaining two with fuel

In the case of an Air Driven cylinders, there is no combustion taking place within the cylinders. So it is non-polluting and no exhaust. It requires lighter metal only since it does not have to withstand elevated temperatures. As there is no combustion taking place, there is no need for mixing fuel and air.so fuel is saved. Here compressed air is the fuel and it is directly fed into the piston cylinder arrangement. It simply expands inside the cylinder and does useful work on the piston. And remaining two cylinders are runs normally with the fuel. This work done on the piston provides sufficient power to the crankshaft with less fuel consumption.

2. COMPONENTS

- Cylinder
- Piston
- Combustion Chamber
- Connecting Rod
- Crankshaft
- Camshaft
- Cam
- Piston Rings
- Gudgeon Pin
- Inlet
- Exhaust Manifold
- Inlet And Exhaust Valve

- Flywheel
- Compressor

3. ENGINE SPECIFICATION

Type Of Engine: Four Stroke
 Type Of Cooling: Air Cooling
 No Of Cylinders: Four Cylinder

4. Working of four stroke SI Engine and compressed engine

In a four stroke engine the piston completes four strokes. A stroke is the complete travel of the piston along the cylinder, in both direction. The four stroke engines as follows.

4.1 Fuel cylinder stroke cycle

4.1.1 INTAKE:

This stroke of the piston begins at top dead center. The piston descends from the top of the cylinder to the bottom of the cylinder, increasing the volume of the cylinder. A mixture of fuel and air is forced by atmospheric (or greater) pressure into the cylinder through the intake port.

4.1.2 COMPRESSION:

With both intake and exhaust valves closed, the piston returns to the top of the cylinder compressing the air or fuel-air mixture into the cylinder head.

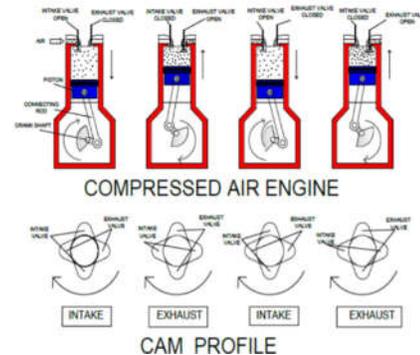
4.1.3 POWER:

This is the start of the second revolution of the cycle. While the piston is close to Top Dead Centre (TDC), the compressed air-fuel mixture in a gasoline engine is ignited, by a spark plug in gasoline engines, or which ignites due to the heat generated by compression in a diesel engine. The resulting pressure from the combustion of the compressed fuel-air mixture forces the

piston back down toward Bottom Dead Center (BDC).

4.1.4 EXHAUST:

During the *exhaust* stroke, the piston once again returns to top dead center while the exhaust valve is open. This action expels the spent fuel-air mixture through the exhaust valve(s).



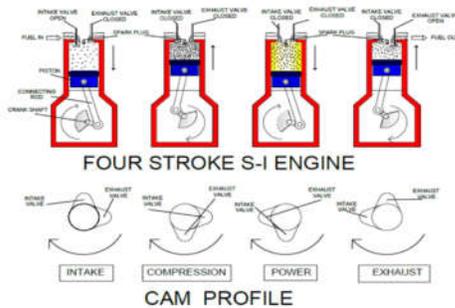
4.1 Compressed air cylinder stroke cycle

4.2.1 INTAKE

In this stroke inlet valve opens and exhaust valve closed. Compressed air enters in the cylinder air enters in the cylinder during this stroke pressurized air is injected. This stroke of the piston starts of the cylinder to the bottom of the cylinder by compressed air, increasing the volume of the cylinder.

4.2.2 EXHAUST

In this stroke inlet or the intake valve closed and exhaust valve open. The piston once again returns to top dead center and compressed air are pushed out to the cylinder into the atmosphere to the movement of piston through exhaust valve.



4.2 Compressed air cylinder stroke cycle

5. MODIFICATION IN CYLINDER FOR COMPRESSED AIR

5.1 Closing the Inlet and Transfer port

The transfer port and inlet port should be closed to provide maximum sealing of the piston- cylinder arrangement so that the chances of escape of air from the cylinder can be avoided. We made plate and with nut and bolt connection transfer and inlet ports are closed.

5.2 Removing the Spark Plug and Providing an Inlet at the Same Place

As the petrol is not the fuel for the engine so no combustion process inside the engine cylinder therefore the spark plug is removed from the cylinder and an inlet is provided in that place by the help of connector.

6. ADVANTAGES

Emission of hazards gas get reduced
 Fuel consumption is less and saved
 Heat dissipated is less
 No advanced cooling system is required

7. Conclusion

Nowadays the need for energy continuously increases and we are using the conventional resources at an alarming rate hence saving of fuel is much required and Compressed Air Technology can be one of the best alternatives. Also there was reduced in pollution. Hence it's a better and sustainable and eco-friendly than fuels such as petrol etc. by making small adjustment in the cylinders we can drive the engine with both the compressed air and as well as fuel.

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