



SIX STROKE ENGINE: A More Powerful and Efficient Future of IC Engines

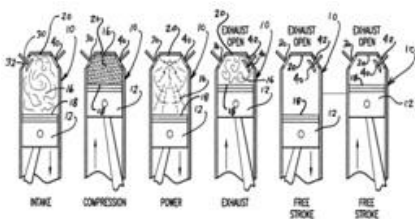
Aashish U. Lilhare¹, Swapnil S. Kharkar², Umakant S. Lohe³¹Student, Department of Mechanical Engineering, JDIET, Yavatmal, Maharashtra, India, aashishlilhare18@gmail.com²Student, Department of Mechanical Engineering, JDIET, Yavatmal, Maharashtra, India, swapnilkharkar111@gmail.com³Student, Department of Mechanical Engineering, JDIET Yavatmal, Maharashtra, India,**Abstract**

Engineering is all about engines. There are many kind of engine which are in use in present time. For instance heat engine, refrigerator, heat pump, IC Engine (Internal Combustion) etc. IC Engine are the most efficient and workable engines till now. Consumption of fuel which gives an output of a mechanical work. Uses in Almost every automobile running on the roads. Divisions are also there in IC engines like two strokes, four strokes and six strokes. In present time six stroke engine is not in use but still an hypothetical phenomenon which is used to study the working and development of the IC engine. Working is almost similar as that of the four stroke engine except two more stroke are added to them. More efficiency will be the greatest advantage of these kind of engine. But manufacturing these much complex and bulky engines components can be as a worst disadvantage. Engine of six strokes will generate more amount of torque as compare to the four stroke engines which in other words, can be produced a more powerful yet efficient machine. In reality these kind of engines are not installed in any kind mechanical output machines. As the world is focused on making small things. Or we can say development is in making something more compact than ever before not making heavy and bulky than the present design of a particular object or machine.

Index Term: Piston : A solid disk or cylinder that fits insides a hollow cylinder and moves under pressure, Stroke : A thrust of a piston, Valve : A device that control the flow of fuel and emitted gas from the piston

1. INTRODUCTION

As all the personnel present in, as a student or as professional in the science stream every one of them are aware of the most commonly used engines to produce mechanical work with the help of some kind of fuel. The Internal Combustion engines. Well known basic principle of these engines is, as we provide fuel and air to the piston chamber or cylinder. The mixture of air and fuel get compressed in the piston and with the help of igniter fuel is burn and extracts heat giving a movement to piston up and down. There are basically two types of IC engine in the market. One with the two strokes and another one with four strokes. Now there is one more kind of IC engine that we are not familiar with, The Six Stroke IC Engine. Generally produced by adding two more strokes to the four stroke engine. Mainly the four strokes of an engine are suction compression power and exhaust. Likely two more strokes are added air suction and air exhaust to these engine and a new six stroke

2. WORKING

Usually the working of the six stoke engine is similar to the four stroke engine instead two more strokes are added to it. Those strokes are air intake and air exhaust. The principle working of the four stroke engine is as follows, air and fuel mixture is inserted to the piston chamber also knows as cylinder. While at the rest, before intake of the fuel and air the piston is at TDC (top dead centre). As soon as the air fuel intake is initiated the piston moves to BDC (bottom dead centre). Now the piston goes up to the TDC while compressing the mixture of air and fuel. This is also known as compression stroke. Then with help of spark plug this compressed air fuel mixture is combust by producing a amount of heat and make the piston to move down to the BDC. This combustion of air fuel mixture is also knows as power stroke or expansion stroke. When the piston is at the BDS position it goes to TDS Position and the combusted fuel will be extracted from the piston chamber with the help of exhaust. While the suction stroke is in the action the valve or the entry gate for fuel and air is opened while in the compression and power stroke the valves are closed (isolated system). In the exhaust stoke the exhaust valve is opened to throw out the emission that is created in the cylinder. Now here comes the principal of sixth stroke. When the piston is at the TDC position after the exhaust stroke a new valve is introduced in the design of the engine the air intake or

the steam intake valve. Now the air or steam is inserted to the chamber with a high pressure which moves the piston in the downward direction. Now the intake valve is closed and the air exhaust valve is open to extract the pressurized air to the surrounding. As we can say, like in two stroke engine when these strokes are in action piston goes from TDC to BDC one time. Likewise in four stroke piston goes from TDC to BDC two times. Similarly in six stroke engine piston goes from TDC to BDC three times

3. ADVANTAGES

- The output power and efficiency of the six stroke engines is greater than four stroke engines because we get two power strokes in total six strokes
- It gives greater work output
- It also provides a greater torque
- The fuel consumption of the six stroke engine is less as compare to the four stroke engines
- It has also benefits of multiple fuel as it is known as multi fuel system.

4. DISADVANTAGES

- Engine size increases due to many numbers of cylinders and additional components
- Break power and indicated power per cycle per cylinder is comparatively lesser.
- The manufacturing cost is higher than four stroke engine.
- Low mechanical efficiency due to large number of mechanical parts
- The engine would be very bulky and effect the overall performance, if installed in a vehicle engines. Besides, as the peak pressure in six strokes engine is higher than four stroke one, the average temperature at which heat addition occurs also increases. Thus the overall efficiency of six stroke engine becomes higher than four stroke engine.

5. GRAPH

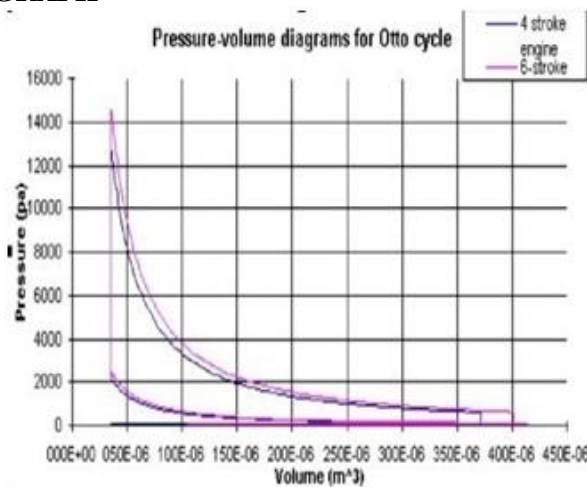


Fig-1: Pressure vs. Volume Graph of Otto cycle for four stroke and six stroke engine

The area enclosed in PV (Pressure vs. Volume) of six stroke engine is more than four stroke engines based on both otto cycle and dual cycle as shown in the figure. So obviously the work output of six strokes engines is much more than four strokes engines. Besides, as the peak pressure in six strokes engine is higher than four stroke one, the average temperature at which heat addition occurs also increases. Thus the overall efficiency of six stroke engine becomes higher than four stroke engine.

6. CONCLUSION

The summary up on the short explanation on six stroke engine was to try and understand the benefits and the disadvantages of the particular phenomenon. This kind of engine can be roll out in the market by minimizing the scientific disadvantages, but minimizing only scientific factors is just not the solution of the quest. Introducing a new kind of engine should also satisfy the economical, social and environmental conditions

ACKNOWLEDGEMENT

Literally the situation of the society and the environment is in such a way that the need of six stroke engine isn't necessary for the development of the IC Engines. Engineers should focus on the four stroke engine and its development rather than six strokes engines and make a powerful yet efficient four stroke engines in the future

REFERENCES

[1] Single Piston Design

- *Griffin six stroke engine*
- *Dyer six stroke engine*
- *Bajulaz six stroke engine*
- *Velozeta six stroke engine*
- *NIYKADO six stroke engine*

[2] Dual Piston Design

- *Piston charger design*
- *Ilmor/Schmitz five stroke design*
- *Revetec engine*