Scientific Journal of Impact Factor(SJIF): 3.134

e-ISSN(O): 2348-4470
p-ISSN(P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 2,Issue 2, February -2015

THE PROVISION OF AIR INDUCTION VALVE IN SINGLE CYLINDER TWO STROKE PETROL ENGINE TO REDUCE EMISSION-A CASE STUDY

CHIRAG D SINGAL[1] (B.E. Mechanical) DURGESHCHANDRASINH I RATHOD[2] (B.E. Automobile) BHARAT C DADHI[3] (B.E. Automobile) PARESH K PATEL[4] (B.E. Automobile) RONAK V PATEL[5] (B.E. Automobile)

Abstract: *The two stroke petrol engines are generally used in small two-wheeler like scooter and motorcycle. Two stroke engines are most powerful engines than the same capacity of four stroke engine but it also faces the emission problem. Due to the design of engine and operation is little bit different two stroke engine produced more emission and smoke which limits the use of two stroke engine for two-wheeler. In two stroke engine ports are provided instead of valves, inlet port for inlet the fuel and exhaust port the removal of exhaust gases. If we arrange the air induction valve in this with overhead camshaft which is operated by crankshaft of engine. Than we can provide fresh air to combustion chamber for complete combustion of fuel and minimize the exhaust emission and achieved efficient scavenging of combustion chamber.*

Keyword: *Two stroke engine, ports, air induction valve, overhead camshaft, emission*

I. INTRODUCTION

The conventional two stroke single cylinder engine is provided with ports instead of valves. Inlet port for fuel injection into crank case and exhaust port for removal of exhaust gases after the combustion and one more port named as transfer port which helps to transfer the charge from crank case to combustion chamber. In air induction valve two stroke single cylinder engine, mono valve mechanism is provided on cylinder head of engine. The camshaft is operated by crankshaft of engine with connection of chain drive. When in engine fuel is burned by providing spark the fuel starts to burn and pressure increases in combustion chamber and piston starts to move in backward direction at same time air induction valve start to open and providing the fresh air into combustion chamber. Due to this, effective burning of fuel is achieved. Because excess quantity air provide efficient combustion for charge. As the piston opens the exhaust port the exhaust gases of combustion chamber throw out by the force of fresh charge. When piston closes the exhaust port the air induction valve is also gets closed and cut the supply of fresh air. The main advantage of using the air induction valve is to reduce the emission and provide effective scavenging of combustion chamber and maintain the temperature of combustion chamber.

II. MAJOR ELEMENT RESPONSIBLE FOR EXHAUST EMISSION.

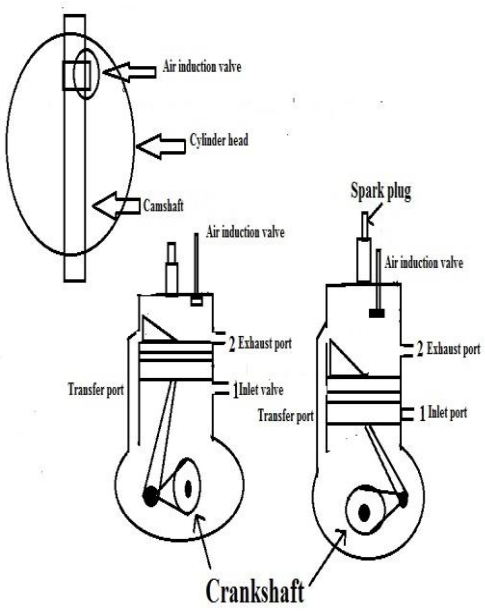
1) Hydrocarbon **(HC)**

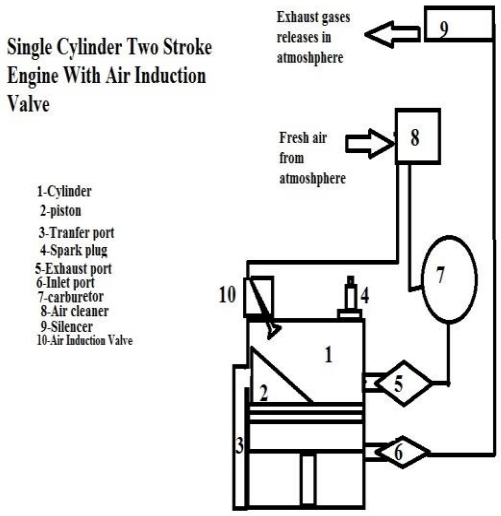
2) Carbon monoxide **(CO)**

3) Oxides of nitrogen **(NOx)**

Effect of using air induction valve

1) Provide fresh and cool air which pushes out the exhaust gases from the combustion chamber so better scavenging of combustion chamber is achieved.
2) Provide extra air in combustion chamber to burn the unburned atoms of fuel. So maximum power is achieved and complete combustion of fuel particle which reduces the emission of HC and CO. And much higher quantity of fresh air reduced the temperature of combustion chamber and byproducts cause the reduction in NOx.
3) It Keeps combustion chamber temperature lower.
4) Experimental setup:





Working of Air-induction valve engine is similar to conventional single cylinder two stroke engines except the additional operation performed to operate the Air-induction valve.

Upward stroke: During the upward stroke of piston, the gases in combustion chamber compressed and at the same time fresh air and fuel mixture enters the crank chamber through the inlet port. The piston is moving upwards and is compressing an explosive charge which has previously been supplied to combustion chamber. Ignition takes place at the end of this stroke.

Downward stroke: In this stroke piston starts to travel downward due to expansion of the gases at same time air induction valve starts to open and inject the fresh air for proper combustion and near the end of this stroke the piston uncover theexhaust port and removal of exhaust gases by the force of fresh air injected by air induction valve and it will be closed immediately before the transfer port uncovered. The transfer port then uncovered immediately, and the compressed charge from the crank chamber flows into the cylinder. and is deflected upwards by the hump provided on the head of the piston. The piston then again starts moving from BDC to TDC and the charge gets compressed when exhaust port and transfer port are cover by the piston; thus the cycle is repeated.

III. CONCLUSION

In the two stroke single cylinder petrol engine equipped with air induction valve provision of extra fresh air is achieved easily, so effective combustion of fuel is happen which helps to reduce the amount of HC and CO in the exhaust gases and helps to reduced atmosphere pollution .Effective scavenging of combustion chamber is achieved for the smooth operation and maintain the engine working temperature also.

REFERENCES

[1]. Norihiko Nakamura, Toyokazu Baika and Yoshiaki Shibata, (1986), “Multipoint spark ignition for lean combustion”, SAE paper no. 852092.
[2]. Ajay K.Singh , A.Rehman, The Effect of Dual Spark Plug on Engine Performance Parameter in Two Stroke Gasoline Engine International Journal of Applied Research and Studies (IJARS) ISSN: 2278-9480 Volume 2, Issue 7 (July- 2013) www.ijars.in
[3]. Imran G. Qureshi, Prof. R. J. Jani Performance and emission analysis of four stroke twin spark single cylinder SI engine fuelled with gasoline and CNG IJSRD - International Journal for Scientific Research & Development| Vol. 1, Issue 4, 2013 |ISSN (online): 2321-0613.

[4]. N.R. Banapurmath, "Performance and emission characteristics of a DI compression ignition engine operated on Honge, Jetropha and sesame oil methyl esters", Renewable Energy 33 (2008)1982–1988
[5]. M.M.Z. Shahadat, M.N. Nabi, M.S. Akhter, M.S.H.K. Tushar, Combined Effect of EGR and Inlet Air Preheating on EnginePerformance in Diesel Engine International Energy Journal, Volume 9, Issue 2, June 2008
[6]. Mustafa Canakci, An experimental study for the effects of boost pressure on the performance and exhaust emissions of a DI-HCCI gasoline engine. Fuel 87 (2008) 1503–1514
[7]. Manoj Kumar Sharma, K. P. Chandraiah & Gohil Priyank In recognition of the publication of the paper entitled Using Blends of Jatropha Methyl Easter as Alternative Fuel: An Experimental Investigation for a Diesel Engine Published in 'The IJST' Journal Volume III, Issue I, January, 2015

