

CHAPTER : II

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* WORKING OF A 4-STROKE PETROL ENGINE :-

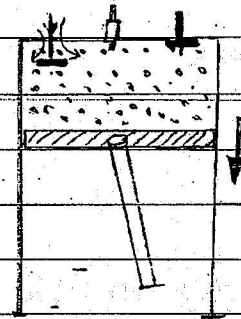


Fig:1

Suction stroke

Fig:1) $\rightarrow$ piston is at TDC (Inlet Valve) IV

is open and the outlet valve (OV) is closed. Once the engine starts, the shaft rotates & piston moves down. The mixture of AF at the atm press. is sucked into the engine cyl. The motion of the piston is thus known as the suction stroke (TDC to BDC).

The exhaust valve remains closed throughout. At the end of the suction stroke the IV gets completely closed.

Fig:2

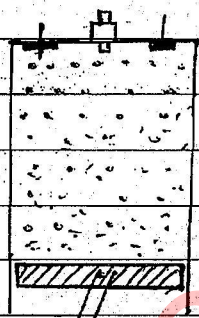


Fig:2

compression stroke

$\rightarrow$ Fig 2 Give the continuous rotation of the shaft. The piston after completing the suction stroke move up. Both the valve are closed. Thus compression takes place during the upward motion of the piston. This motion is called the compression stroke

Fig:3

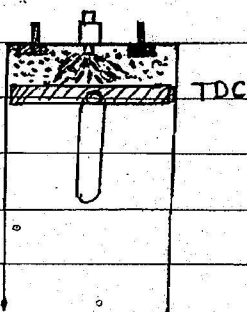


Fig:3

HA at const vol.

- At the end of comp. stroke, the piston is at TDC. Current is supplied to this spark plug. A spark is generated at the other end of the spark plug which is inside the cylinder. This spark ignites the fuel in the AF mixture & heat is flow from the fuel to the air. This HA takes place when the piston is at TDC ($V=C$). In actual practice the piston undergoes change in dir at TDC during HA. The voltage available is about 10,000V.

and known as Breakdown voltage. Voltage is supply to break the air-fuel mixture blow the two terminal of the spark plug.

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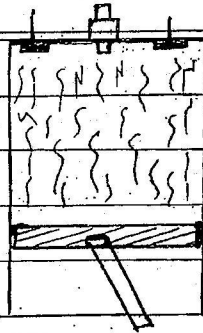


Fig: 4

EXPANSION OR
POWER stroke

At the end of HA, the Hot gases expand & push up the piston down from TDC to BDC useful power is obtain thus the downward motion of piston is known as expansion of power stroke.

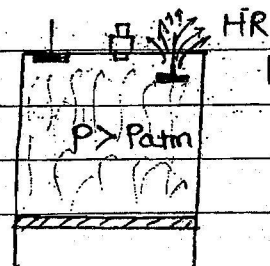


Fig: 5

HR at const vol

It is noted that both valve remain closed during HA & expansion. The exhaust valve (EV) is open at the end of the expansion stroke & the expanded gases flow out from the engine cylinder through EV due to difference in press.

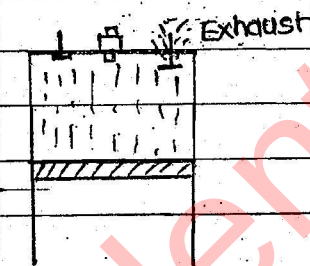


Fig: 6

Exhaust

The gases leaving the cylinder is also carry out some Heat thus HR takes place when the piston at BDC. ($-V=c$). In practice, the piston under goes charge the dir² during HR. about 90 to 95% of the gases leaves the cylinder during HR.

No entry

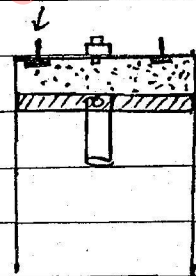


Fig: 7

about Fig 6

As the piston is moving up from BDC after HR, the left over gases are pushed out. this process is known as exhaust. The upward motion of the piston at BDC to TPC during exhaust is called the exhaust stroke.

Fig 7

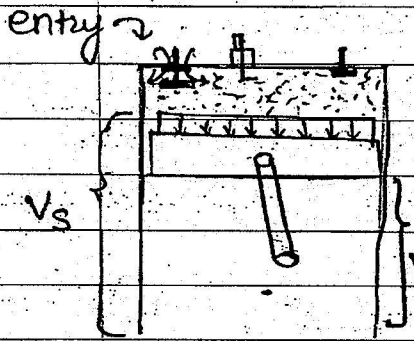


Fig: 8

→ At the end of the exhaust stroke the cycle is completed (4-stroke are over). The EV closes & IV open. But there is no entry of fresh AFM. ~~At~~ At the start of the suction stroke of the next cycle. The region is some exhaust gas will remain. At the end of exhaust stroke and a press is about 1.2 bar (more than the press of the AFM at entry)

Fig 8

→ The exhaust gas in the clearance vol^m will expand to fill the stroke space created by the downward motion of the piston during the start of next cycle. When the press inside become equal to the atm press, the fresh AFM then enters in on the remaining of the suction stroke. It is thus clear the actual vol^m of air (V_a) entry the cylinder the suction stroke is less than the stroke vol^m V_s .

- inlet stroke open only at one time
- outlet stroke ^{valve} open two times

a) at HR

b) at Exhaust stroke

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Volumetric eff:-

- The Ratio of actual vol^m of gas taken in to the stroke vol^m is defined as the volumetric eff. of the engine & is given by.

$$\eta_v = \frac{V_a}{V_s} \quad ***$$

*# WORKING OF TWO STROKE PETROL ENGINE:

- Scooty : 2 Stroke
- Otto Rickshaw : 2 stroke (about 40% otto)

→ counter wt. is available in both 2- & 4-Stroke.

FIG: 1

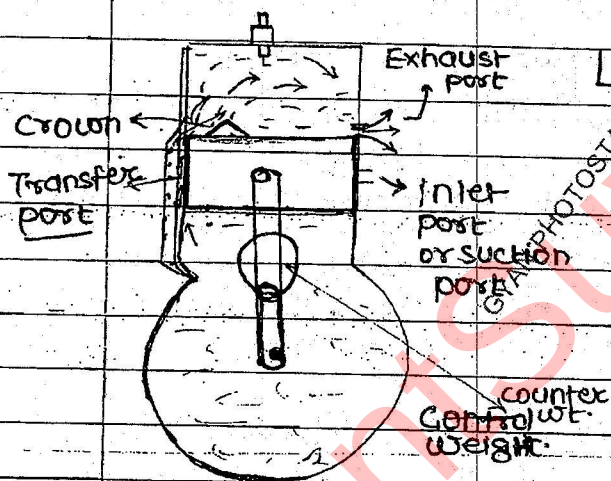


Fig: 1

-(piston at BDC)

The piston is at BDC, the fresh AFM (Air Fuel mixture) below the piston flow through the transfer port to the space above the piston. It may be same that the transfer port & exhaust port both open at the same time. Hence some AFM directed towards exhaust port is escape out the space about the piston.

- To prevent it, a projection is introduced at the top of the piston known as the crown. The fresh AFM flowing towards the exhaust port will collide with the crown & rise to the top. In the mean time the fresh AFM above the piston pushes out the left over exhaust gases of the previous cycle through the exhaust port. this motion is known as