



Internal Combustion Engines

Lecture-2

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Professor

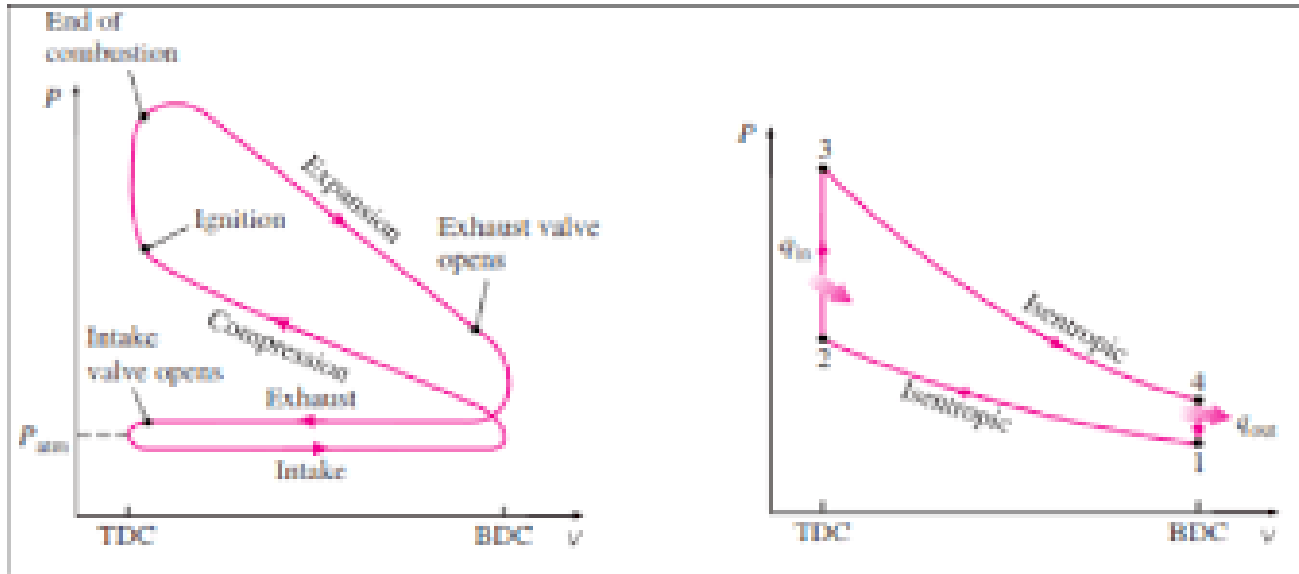
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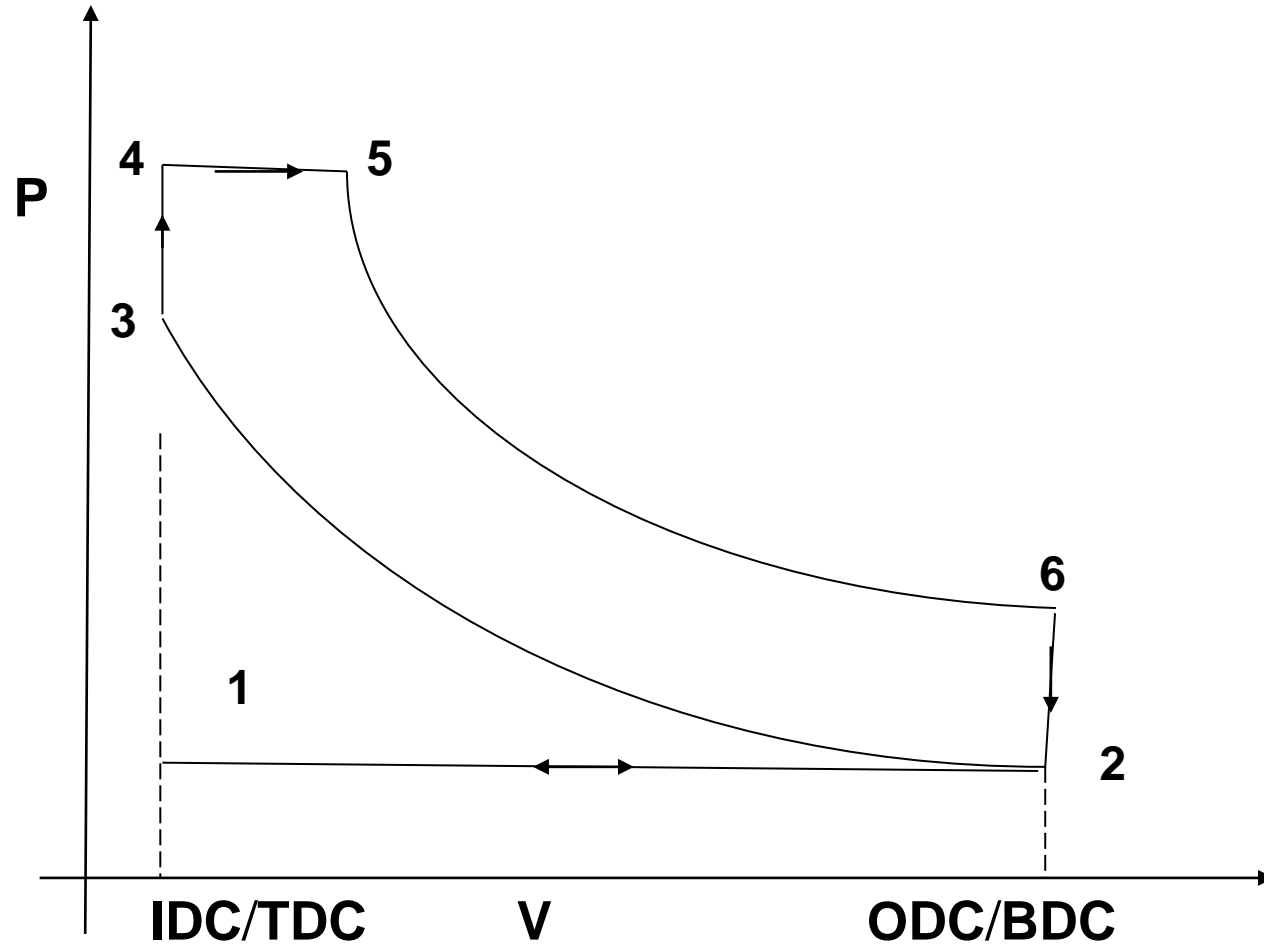
Ideal and Actual Cycle Diagram



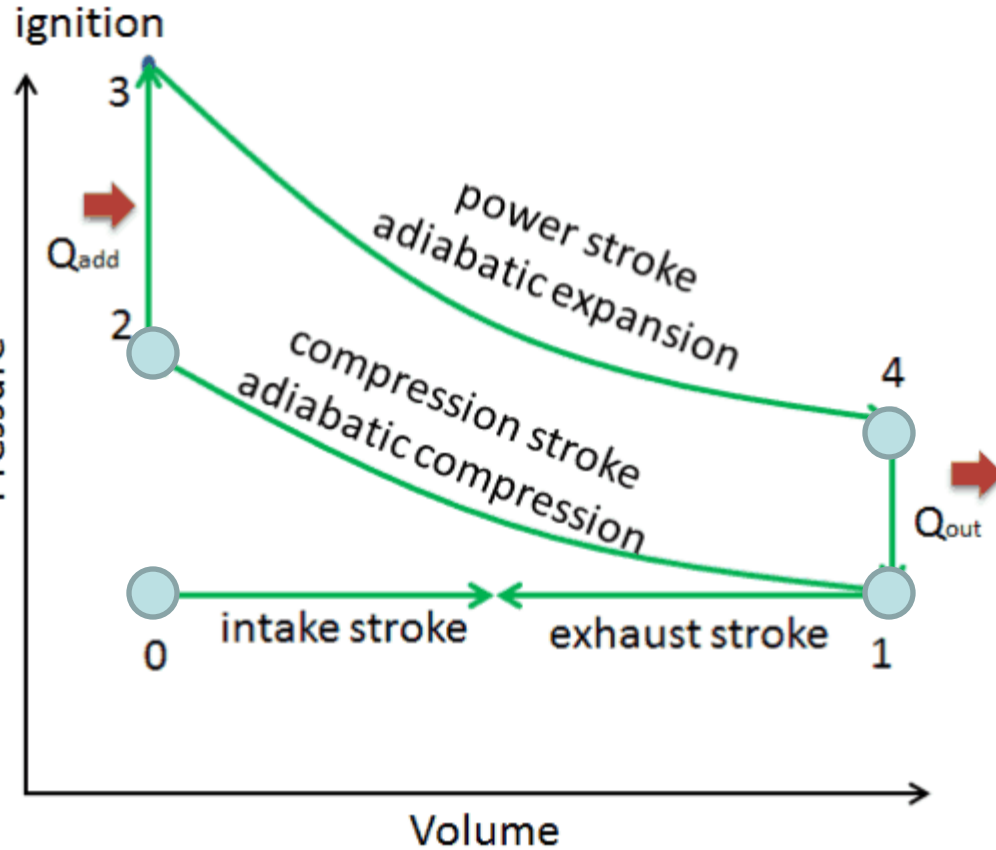
- Why are those different ?



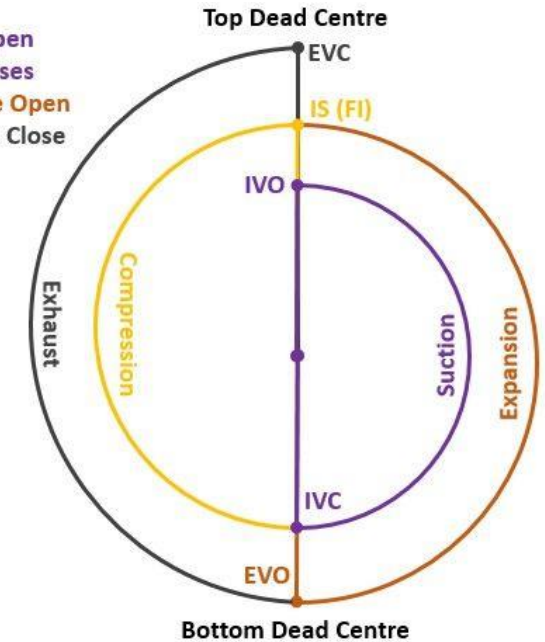
Dual Combustion Cycle



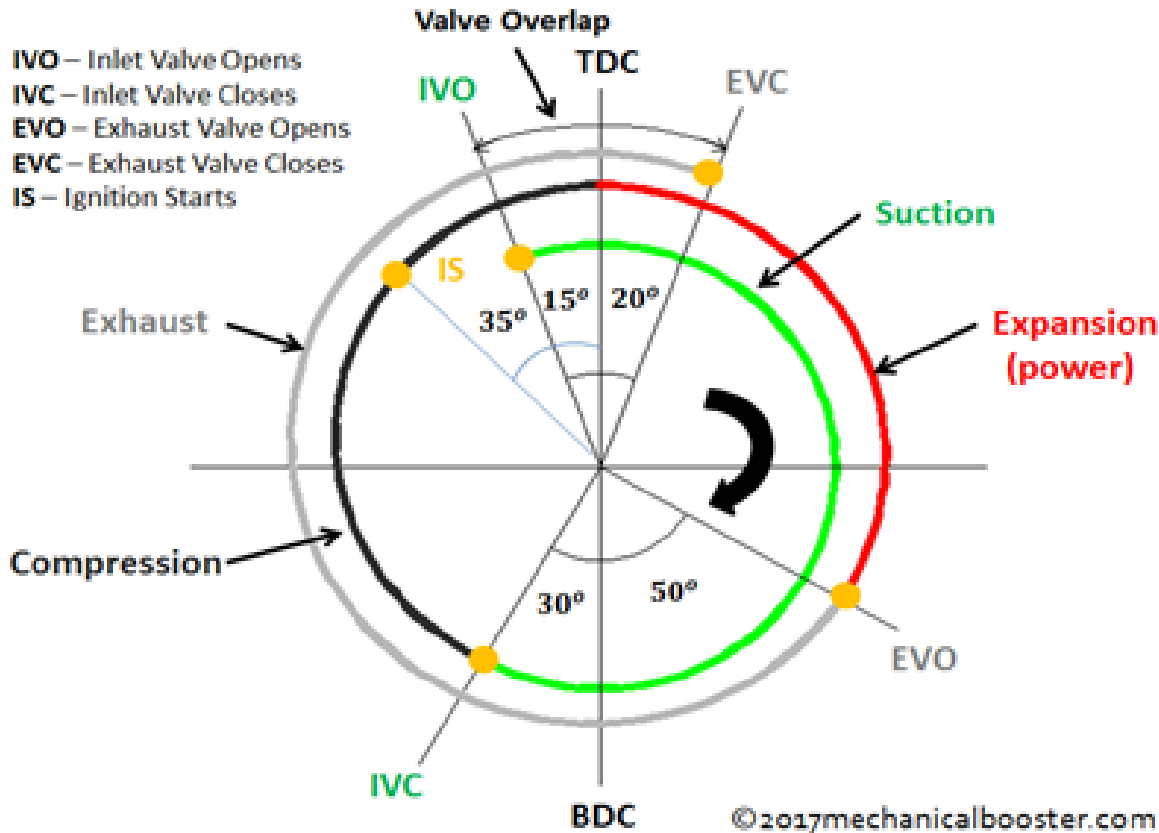
Ideal Valve Timing



IVO - Inlet Valve Open
 IVC - Inlet Valve Closes
 EVO - Exhaust Valve Open
 EVC - Exhaust Valve Close
 IS - Ignition Start
 FI - Fuel Injection



Actual Valve Timing Diagram

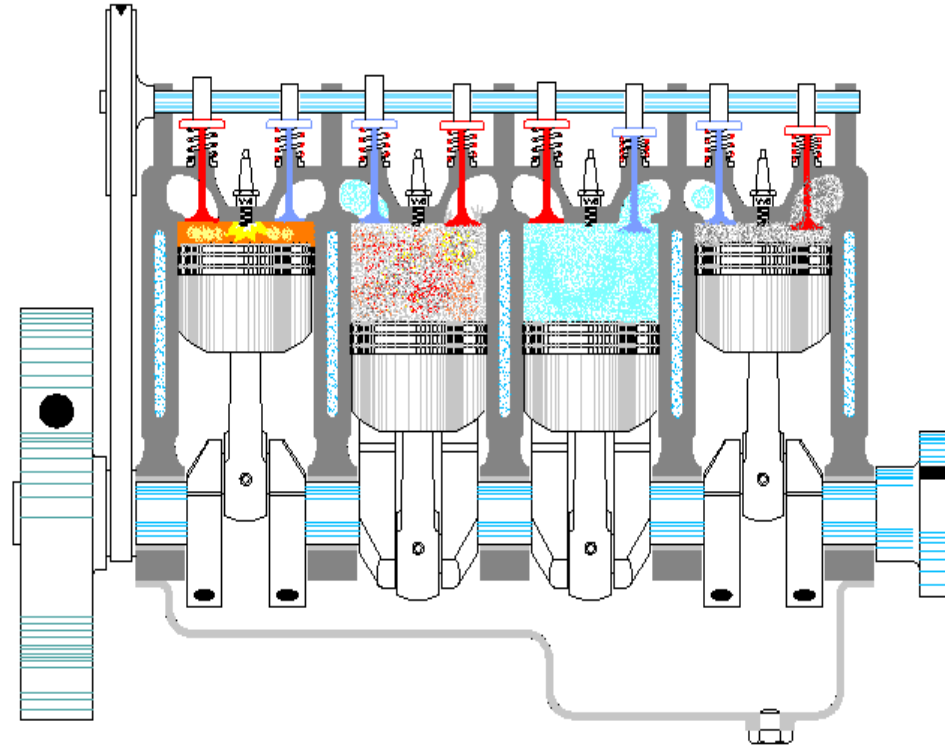


Valve Timing Diagram of 4 Stroke Petrol Engine

- IVO
- IVC – Ram Effect
- Ignition – Ignition Delay
- EVO
- EVC – Valve Overlap - Scavenging

Speed Fluctuation

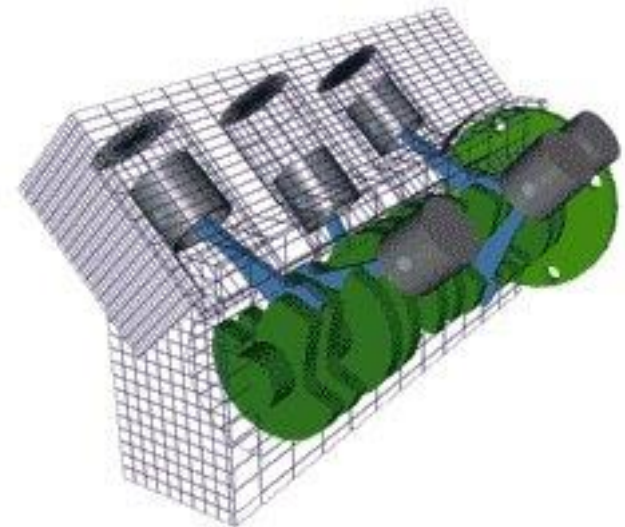
- One stroke is producing power and the rest are consuming
- In power stroke the shaft accelerates and retards in others
- This gives rise to speed fluctuation
- Can be reduced using flywheel in a single cylinder engine. But it would be massive
- Multi-cylinder engine reduces the fluctuation with a small flywheel



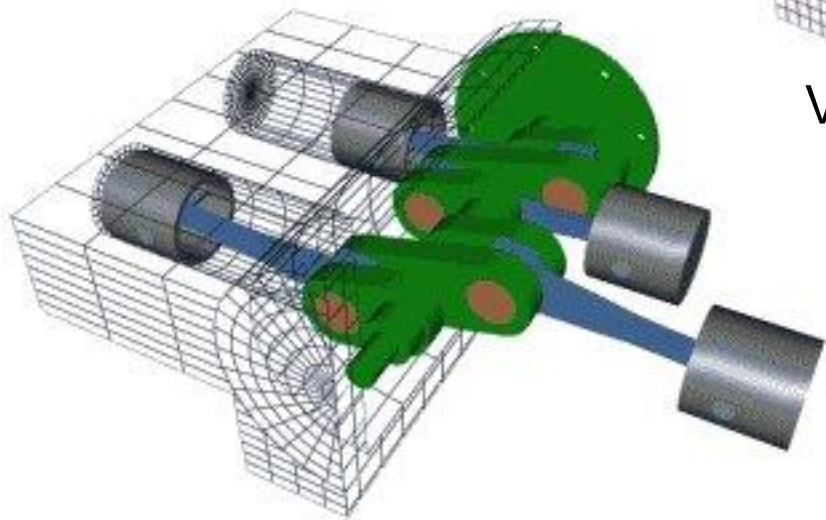
Cylinder Arrangements



In line Arrangement

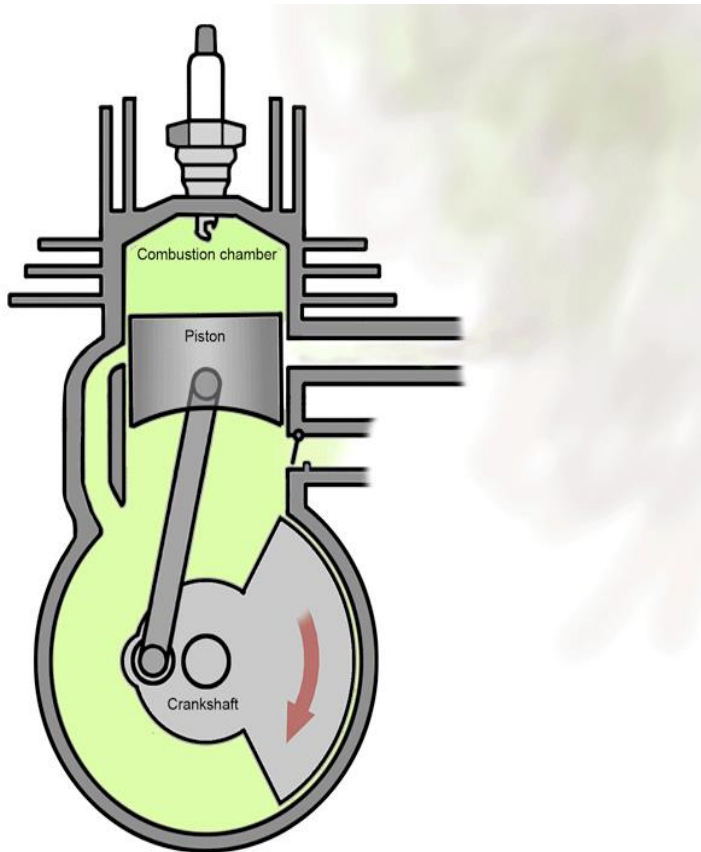


V Arrangement



Opposed Cylinder Arrangement

Two Stroke Engine



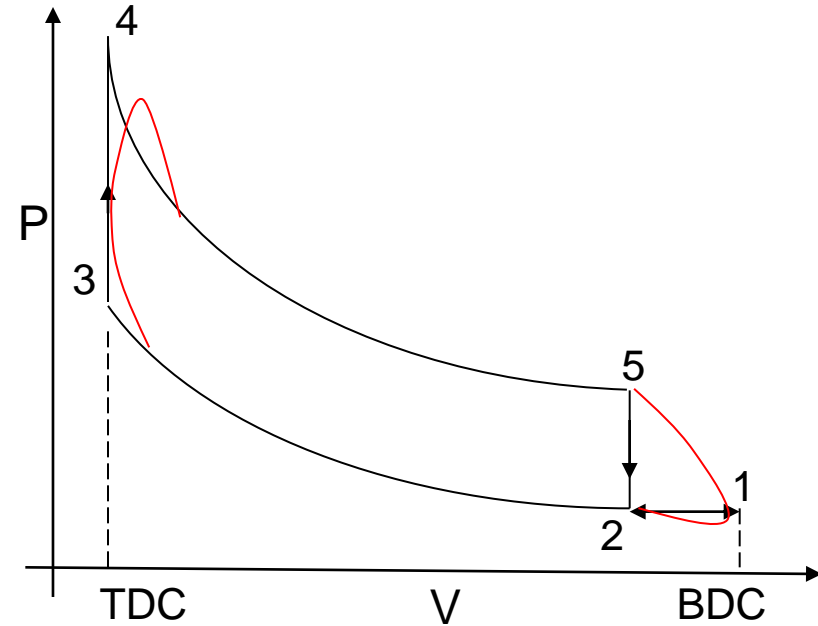
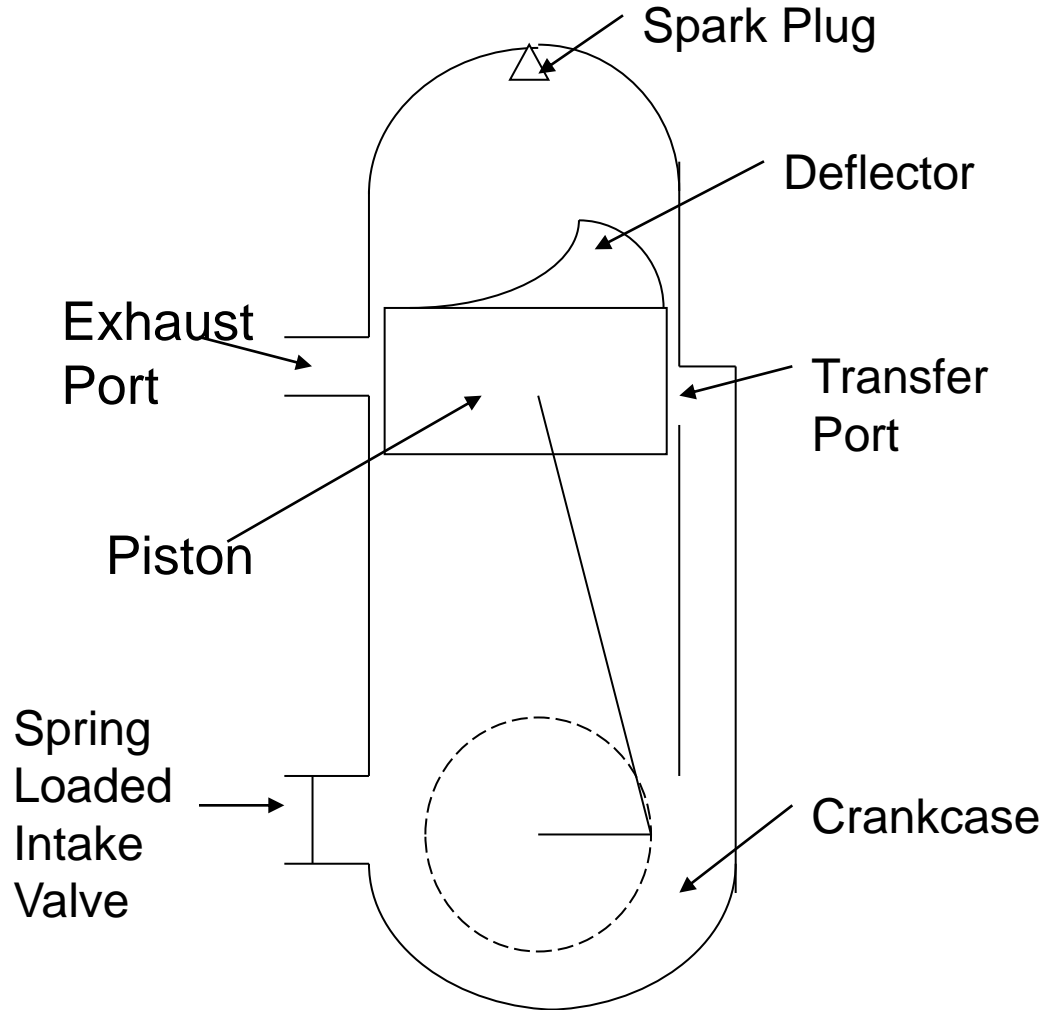
Advantages

- They do not have valves, which simplifies their construction and lowers their weight.
- They fire once every revolution, while 4-stroke engine fires once every other revolution. This gives them better power to weight ratio.

Disadvantages

- There is no dedicated lubrication system, the lubricant is mixed with fuel. Emission is toxic due to improper combustion. 2-stroke engines therefore do not last as long as 4-stroke as their parts wear out faster.
- Each time a new charge of air-fuel is loaded into the combusting chamber, a part of it leaks out through the exhaust port.

Two Stroke Engine





Thank You