



Internal Combustion Engines

Lecture-10

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CI ENGINE INJECTION

OBJECTIVES:

1. Meter the appropriate quantity of fuel, as demanded by the speed of, and the load on, the engine at the given time.
2. Distribute the metered fuel equally among cylinders in a multi-cylinder engine.
3. Inject the fuel at the correct time (with respect to crank angle) in the cycle.
4. Inject the fuel at the correct rate (per unit time or crank angle degree).
5. Inject the fuel with the correct spray pattern and sufficient atomization as demanded by the design of the combustion chamber, to provide proper penetration also.
6. Begin and end injection sharply without dribbling or after injection.



Funcional Elements

1. **Pumping elements to transfer the fuel from the tank to the cylinder, along with the associate piping and hardware.**
2. **Metering elements to measure and supply the fuel at the rate as desired by the speed and load conditions prevailing.**
3. **Metering controls to adjust the rate of the metering elements for changes in load and speed of the engine.**
4. **Distributing elements to divide the metered fuel equally among the cylinders in a multi cylinder engine.**
5. **Timing controls to adjust the start and stop of injection.**
6. **Mixing elements to atomize and distribute the fuel within the combustion chamber**



Classification

- **Air injection system (which had become obsolete but now some interest has been shown by researchers; however very high pressure is required for air)**
- **Solid (or airless) injection systems.**



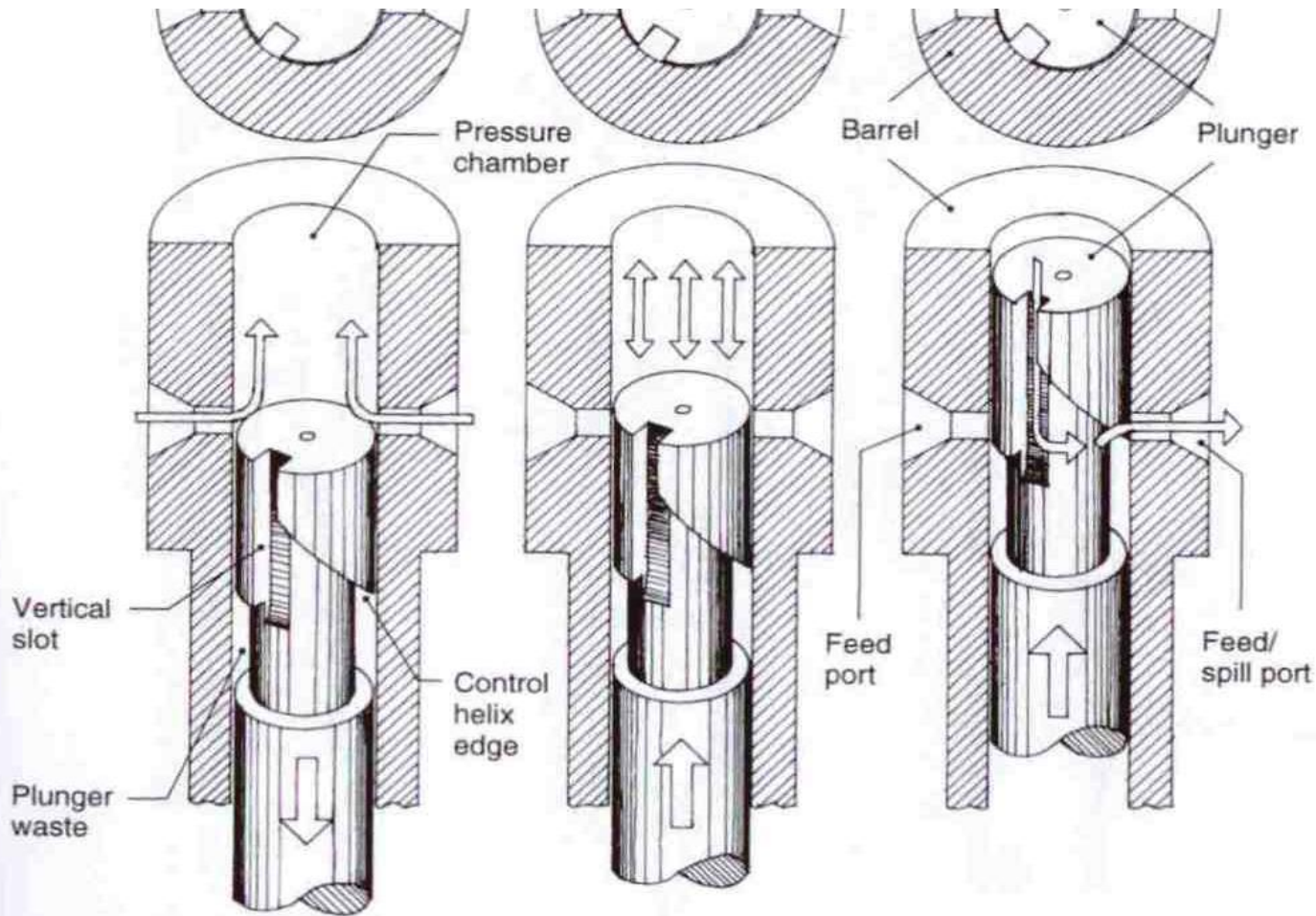
Types of Solid Injection

Individual pump system: This consists of a separate metering and compression pump for each cylinder.

Distribution system: This consists of a single pump for compressing the fuel (which may also meter), plus a delivery device for distributing the fuel to the cylinders (which may also meter).

Common rail system: A single pump for compressing the fuel, plus a metering element for each cylinder.

Injection Pump





Thank You