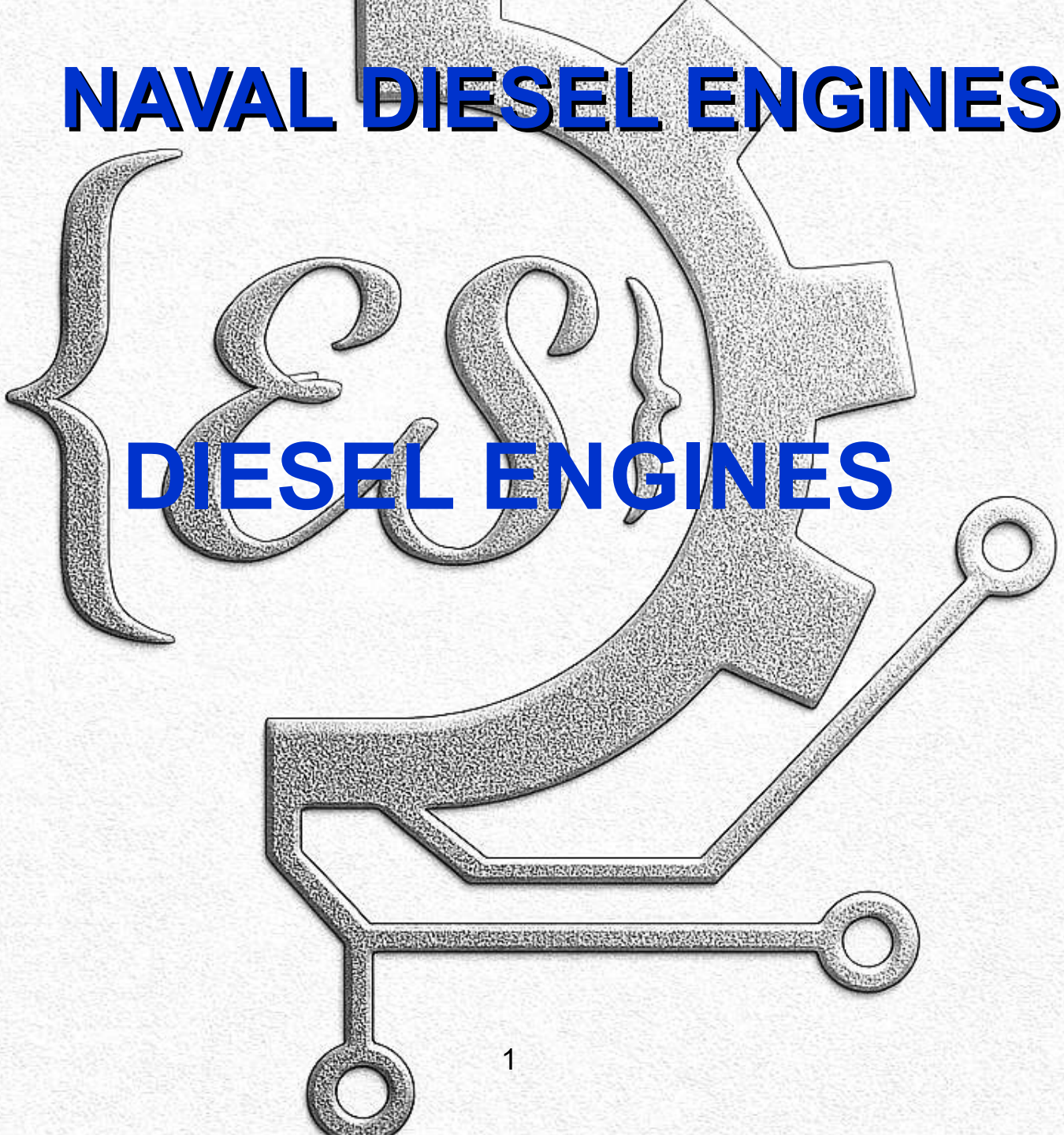
NAVAL DIESEL ENGINES



DIESEL ENGINES

1

Enabling Objectives

- Name four Diesel Engine applications in the Navy in accordance with NAVEDTRA 14331.
- Describe and label all major components of the Diesel Engine with the aid of illustration in accordance with NAVEDTRA 14331.
- Describe the major subsystems that make up the diesel engine in accordance with NAVEDTRA 14331.
- Describe and compare the engine cycle of a 2 stroke and a 4 stroke diesel engine in accordance with NAVEDTRA 14331.

Applications


Ship Propulsion


Small Boats

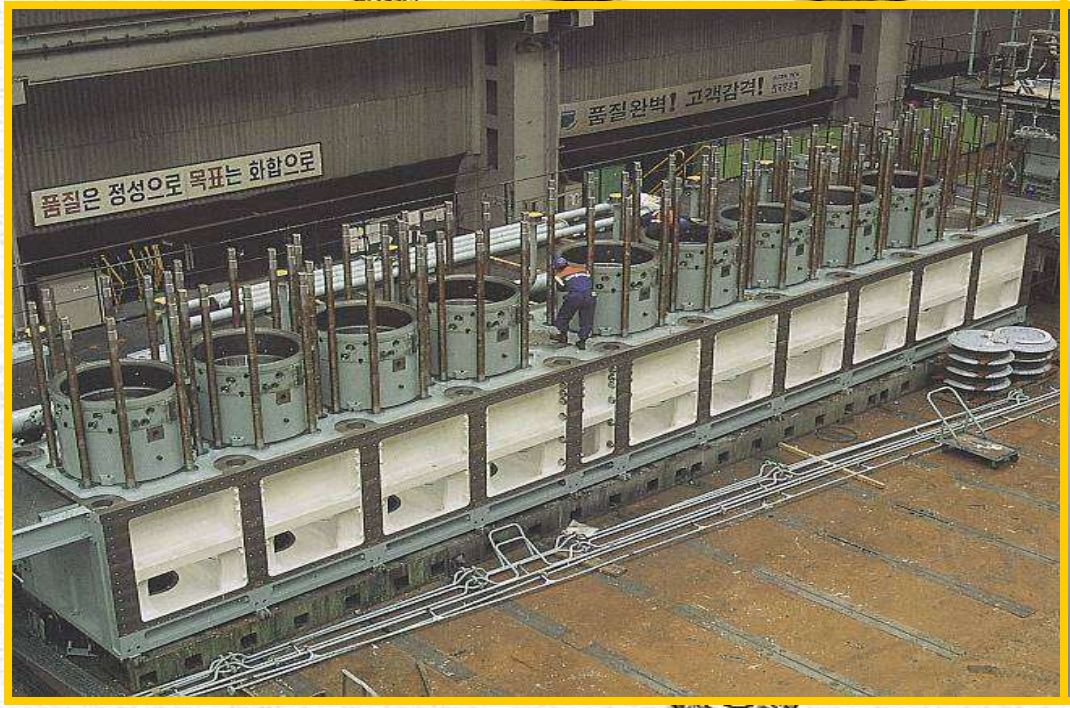

Aircraft Tow Tractors

Fire Pumps

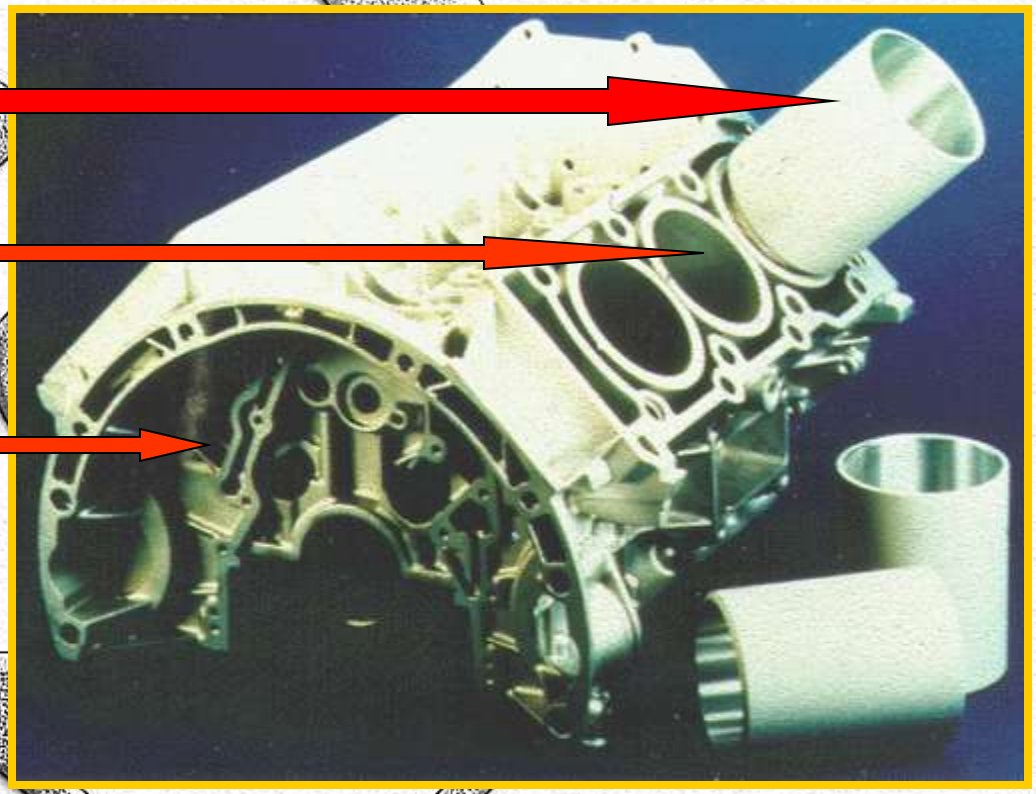
Non-moving parts

Cylinder block

- Largest non-moving component
- Houses all the moving parts of the diesel engine



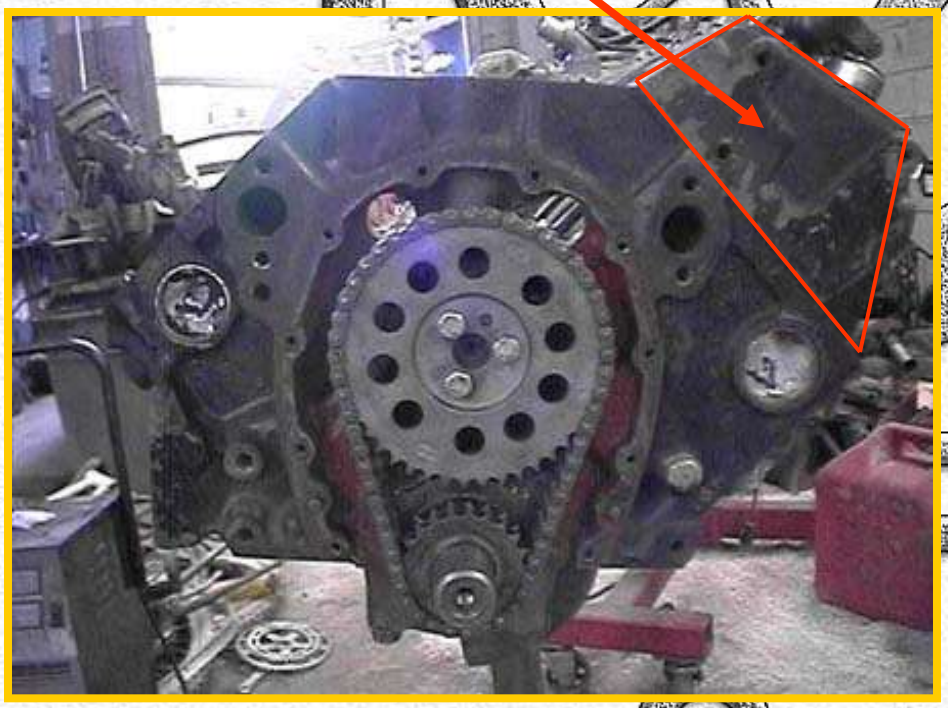
Non-moving parts



Cylinder liner

- Barrel or Bore that the piston travels in
- May be integral part of the cylinder block or a separate sleeve or liner

Non-moving parts



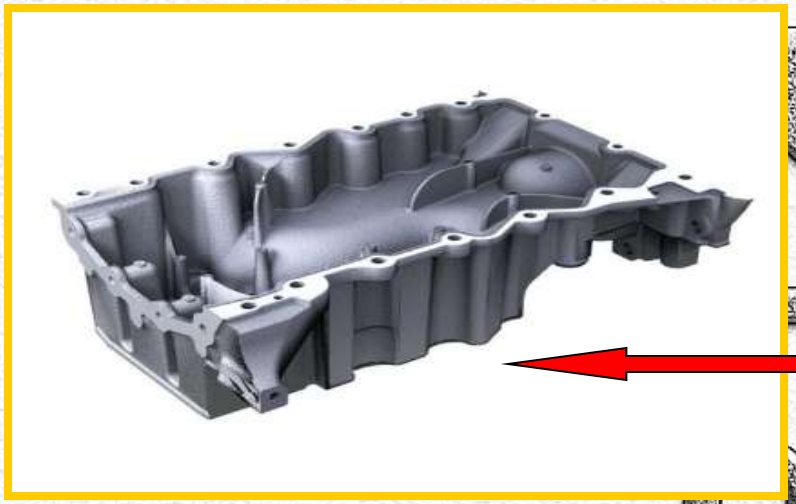
Cylinder head

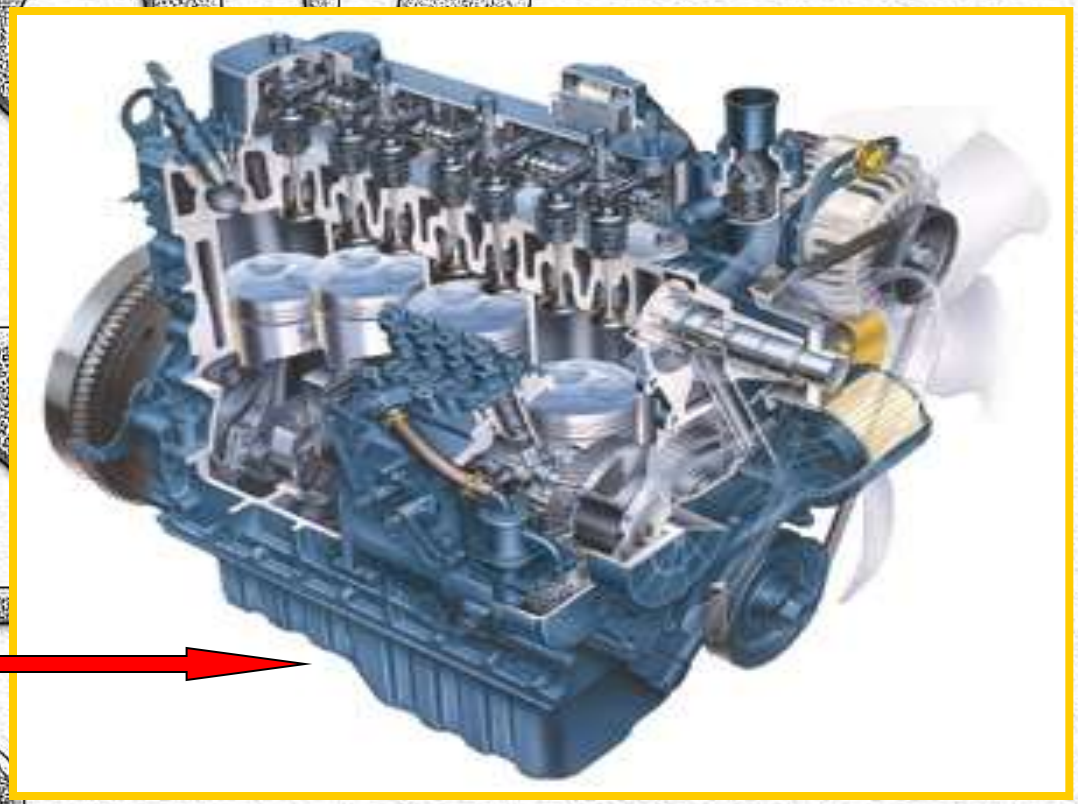
- Seals the combustion end of the combustion chamber
- Houses the push rods, rocker arms, valve springs and fuel injector

Non-moving parts

Oil sump

- Used as an oil reservoir for lube oil on large diesel engines

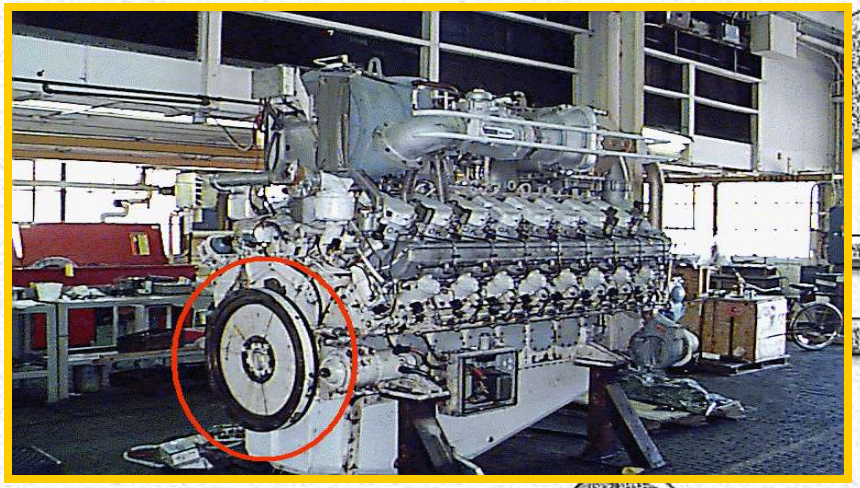


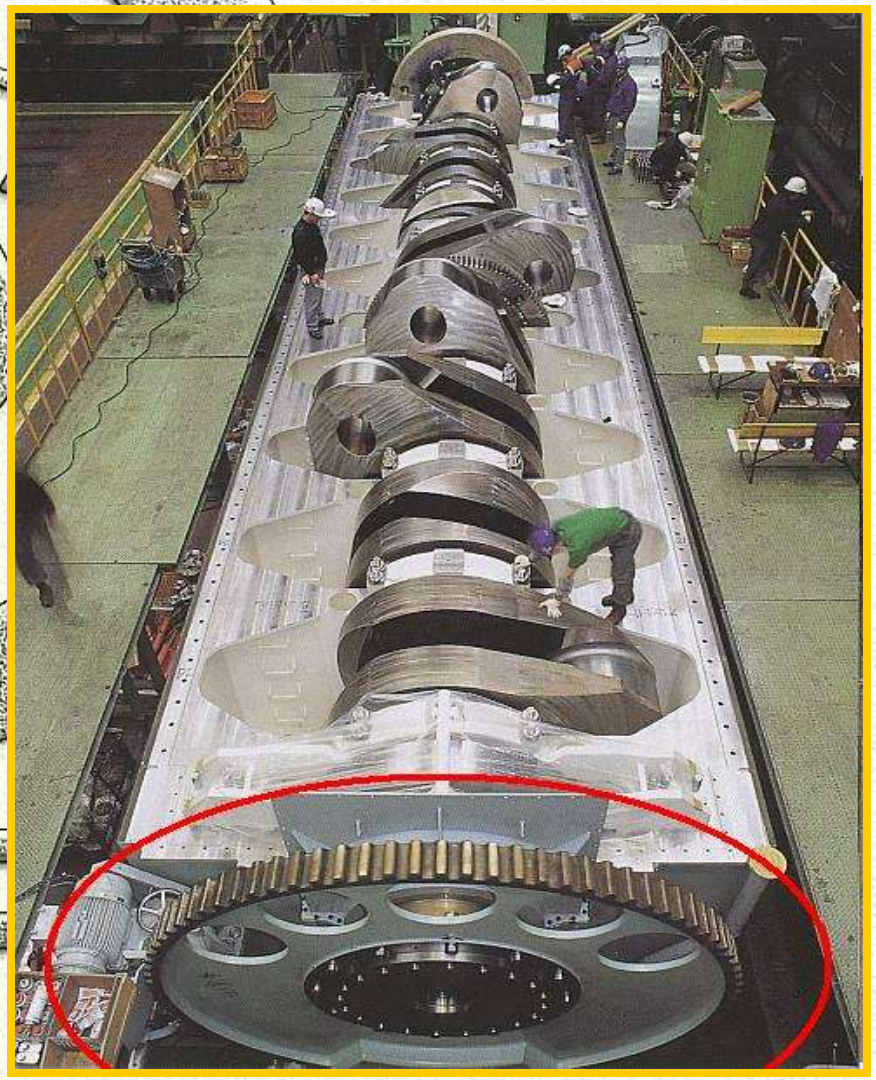


Moving Components

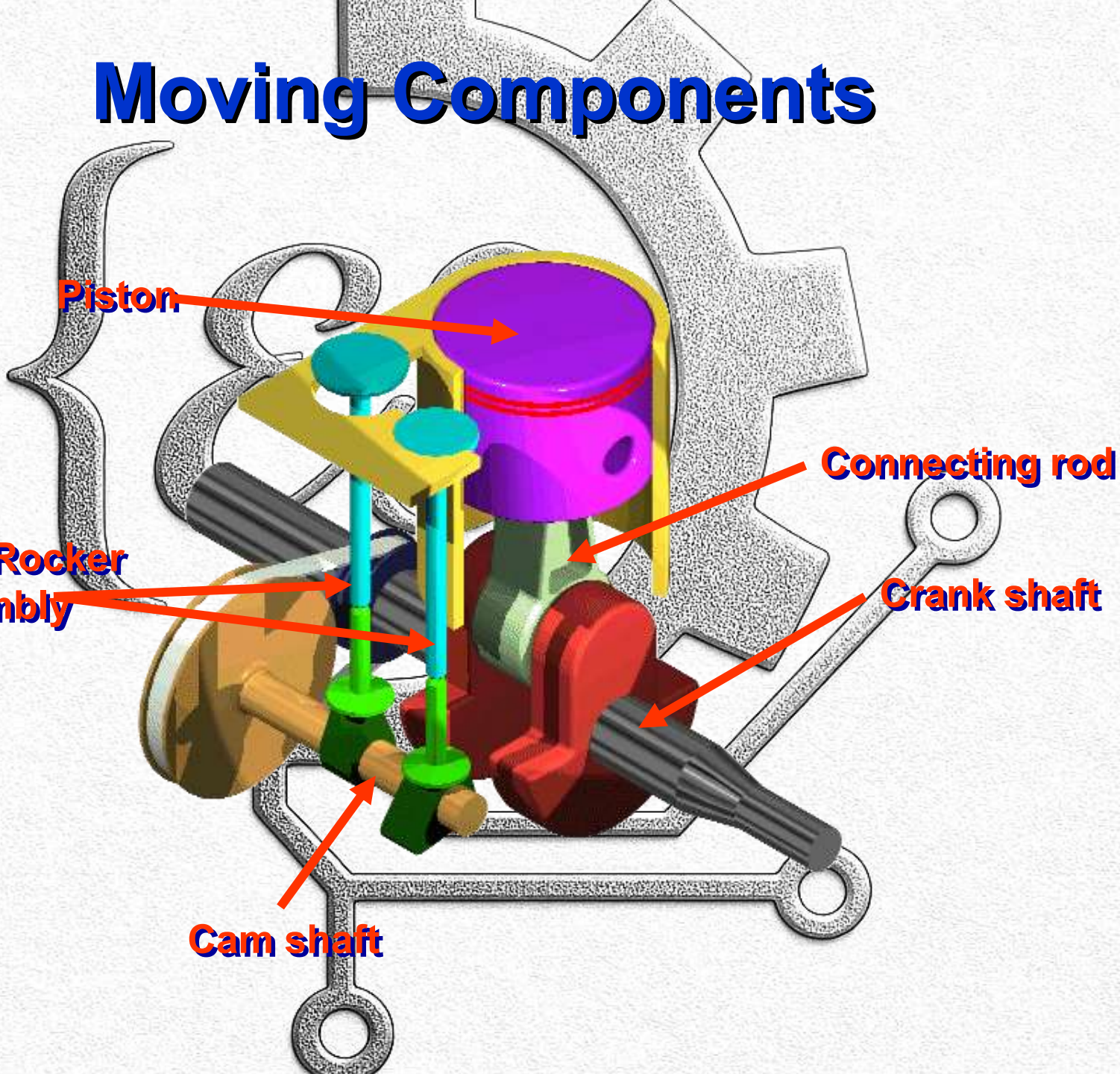
Fly wheel

- Aids in forcing the piston through the compression event
- Provides mechanical advantage for a starting motor





Moving Components



Diesel sub systems

Air system

- Intake supplies air for combustion and aids in cleaning the air through filters prior to entry to the engine

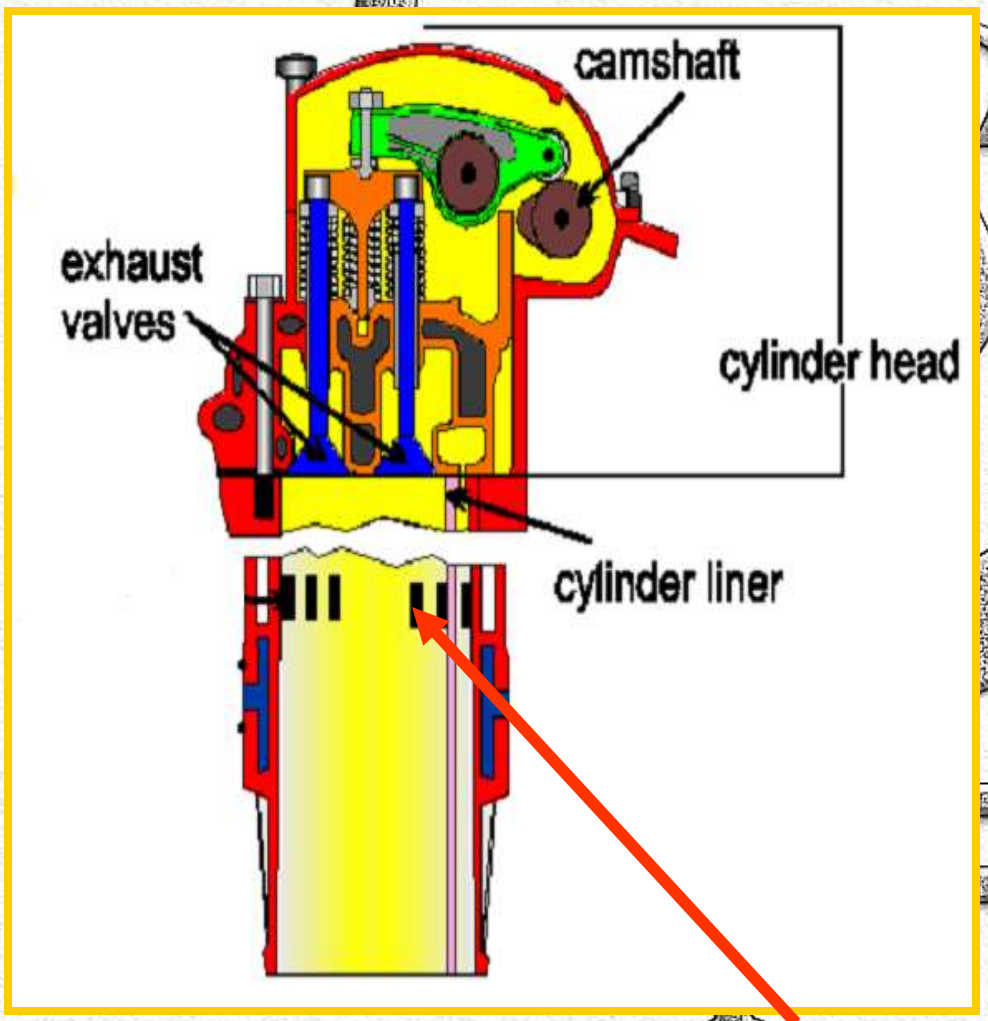
- Exhaust aids in carrying gases away from the engine and reduction in noise pollution

2-stroke Air system

Blower

- Compresses air for combustion and expels exhaust gasses during scavenging

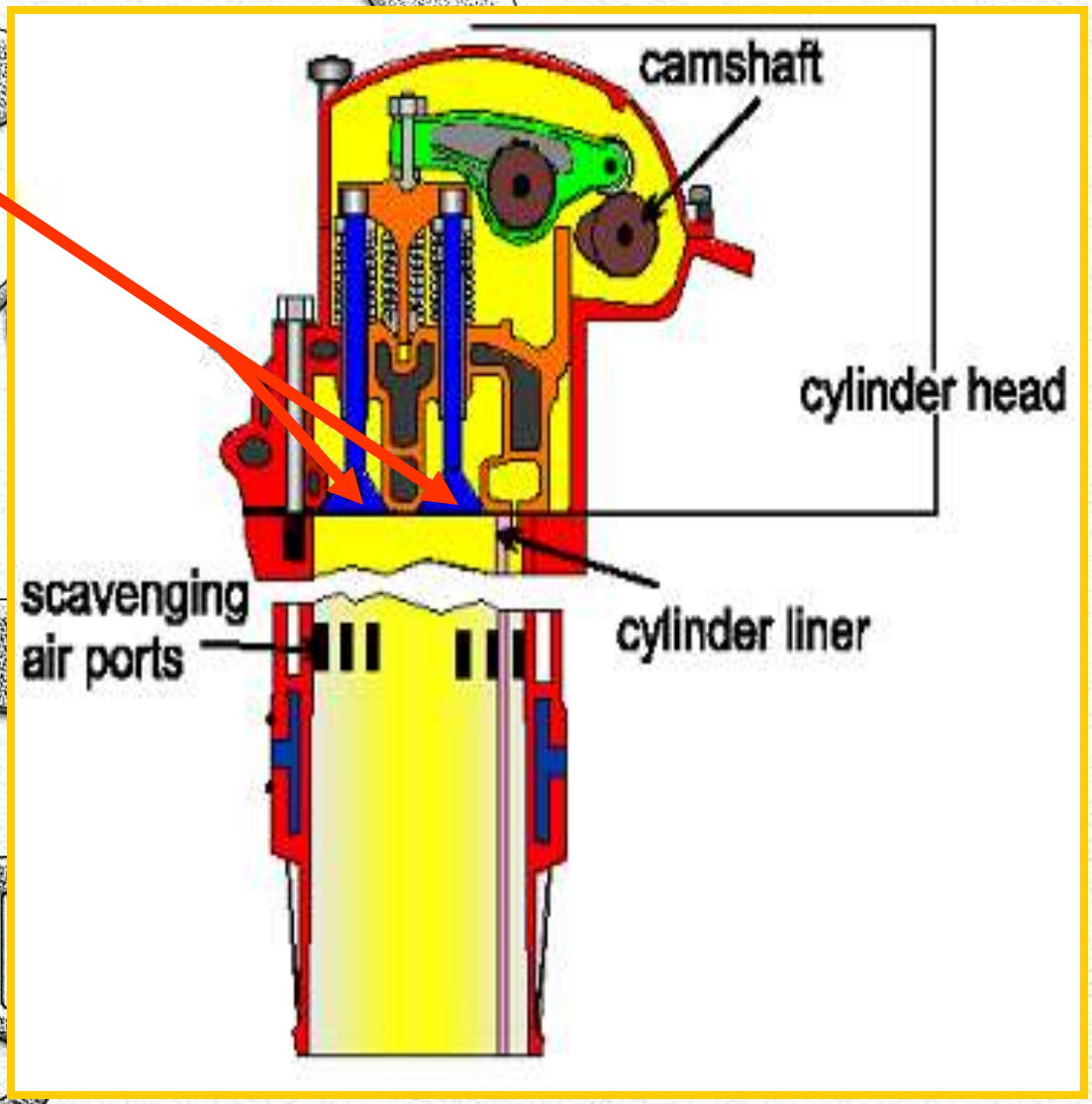
2-stroke Air system



Scavenging air ports

- Entry way for intake air to enter cylinder during scavenging

2-stroke Air system



Exhaust valves

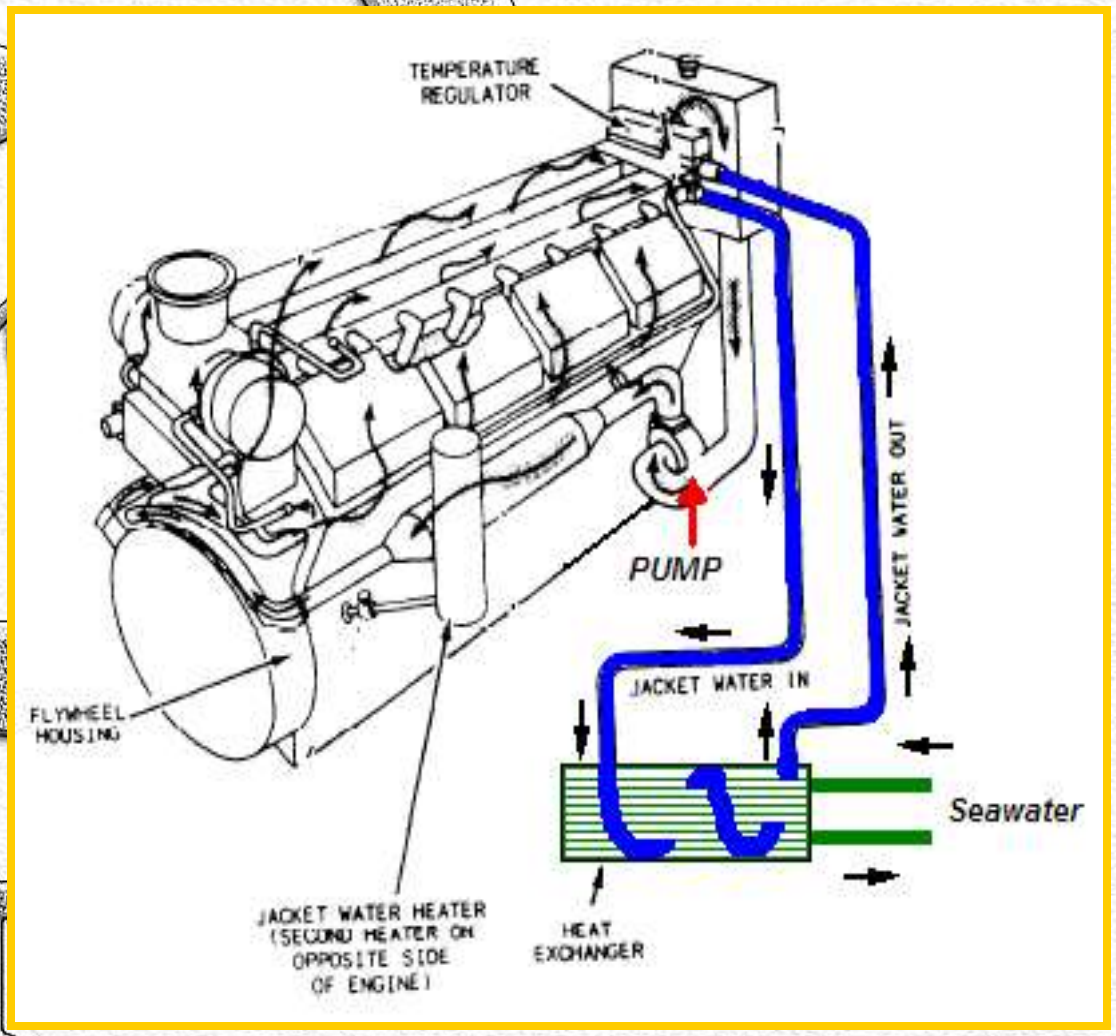
- Allows for exhaust gasses to exit the cylinder

4-stroke air system

- Air filter
- Intake valves
- Exhaust valves

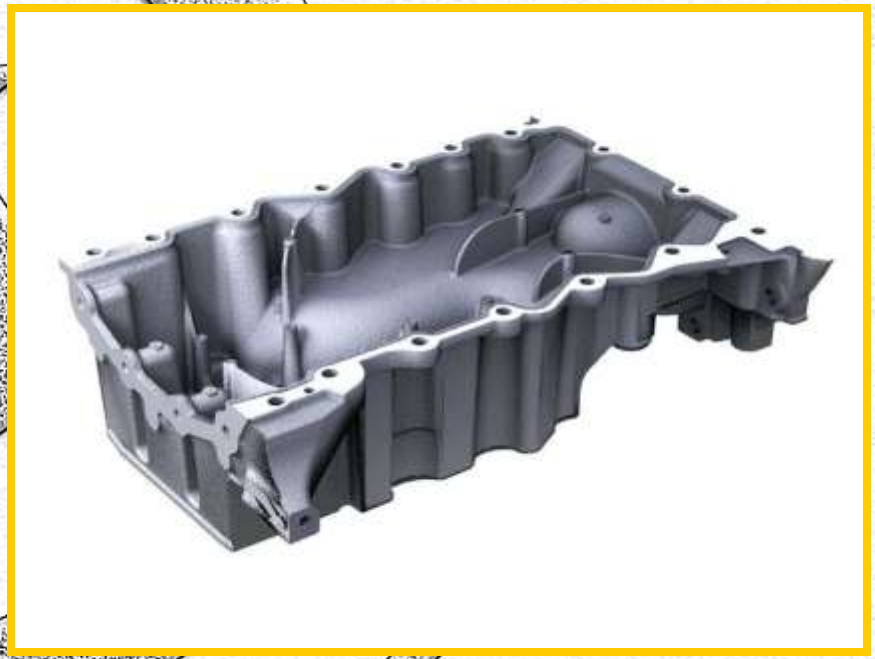
Water cooling system

- Pump
- Heat exchanger



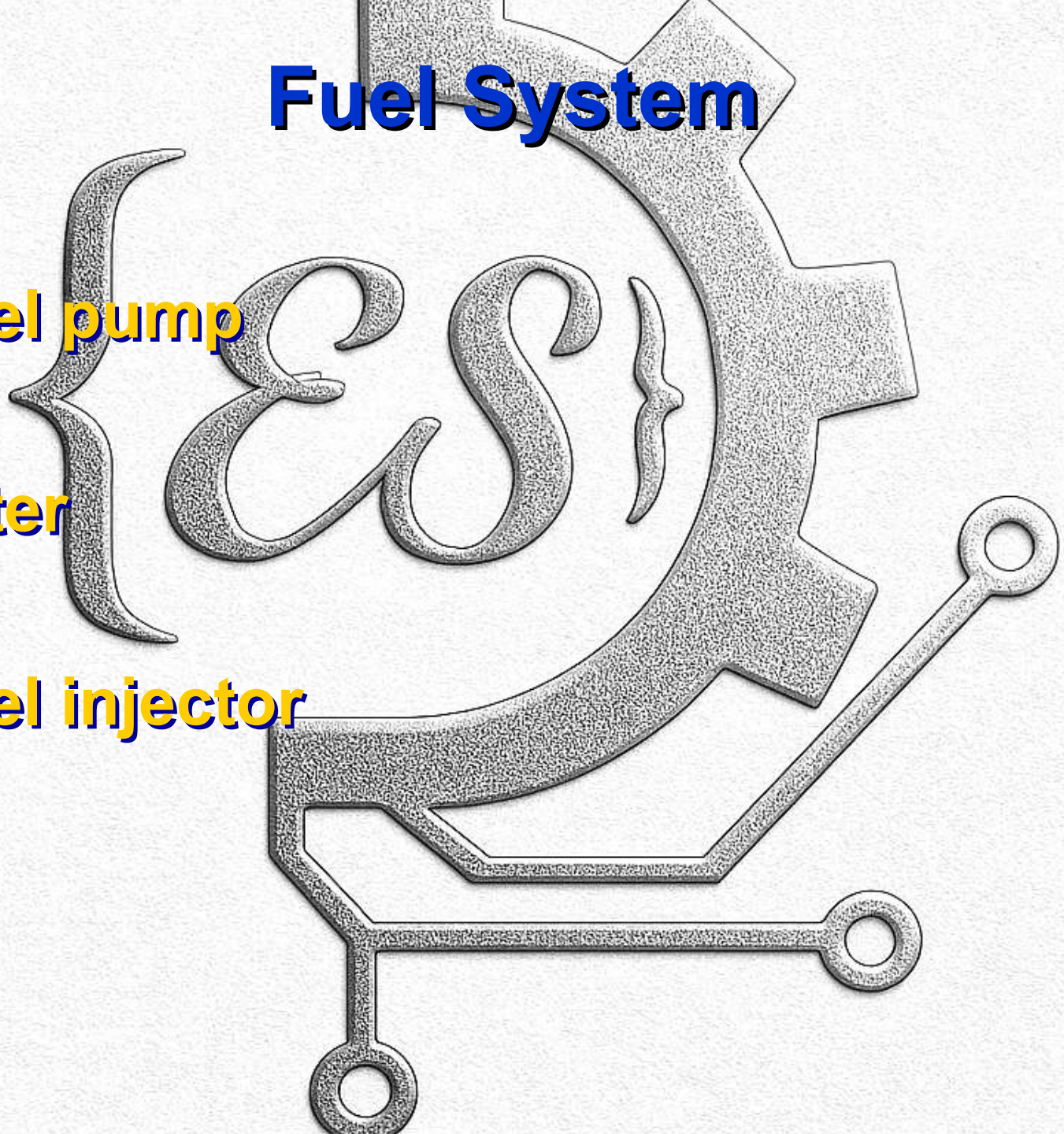
Lubricating oil system

- Tank (sump)
- Pump
- Filters and Strainers

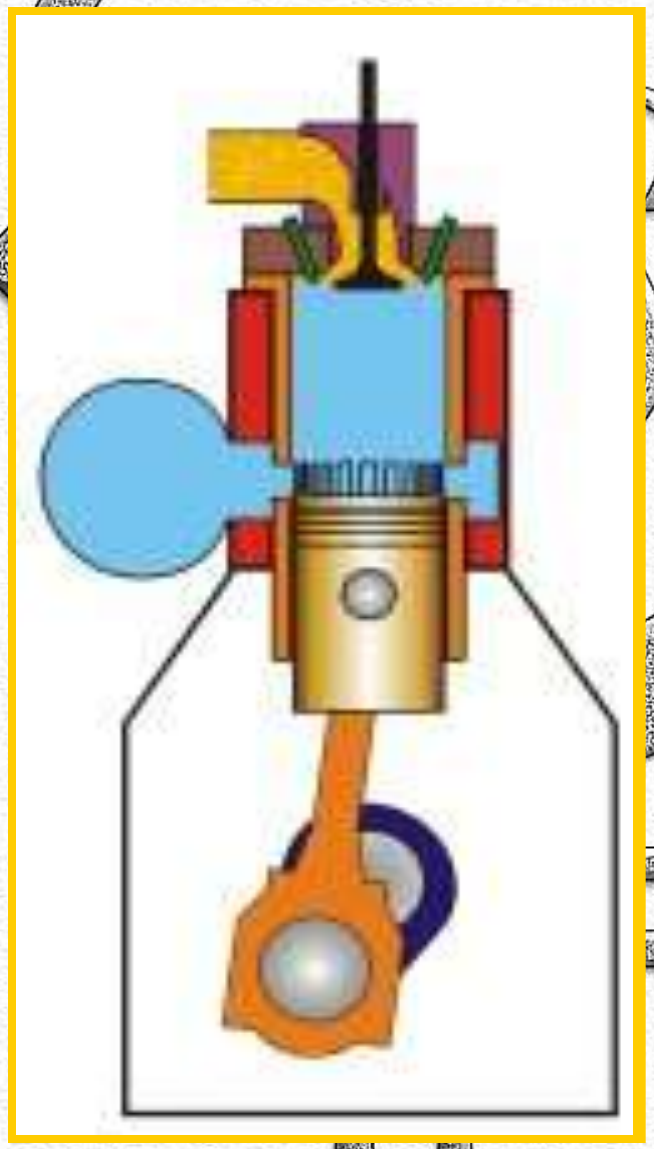


Fuel System

- Fuel pump
- Filter
- Fuel injector



2-Stroke Operation



EXPANSION

Cycle starts over as piston travels upwards

Piston travels upwards through scavenging air ports

Scavenging air ports and Exhaust valves begin to open

Exhaust gases pass through the open exhaust valves.

Work Output Stage

Compression begins

4-Stroke Operation