# SNS COLLEGE OF TECHNOLOGY

**(An Autonomous Institution)**

**COIMBATORE-35.**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.

## DEPARTMENT OF AUTOMOBILE ENGINEERING

## COURSE NAME : 19AUB301 – AUTOMOTIVE FUELS AND LUBRICANTS

III YEAR / V SEMESTER

Unit 2- Theory of Lubrication

Topic : Engine Friction

# VARIOUS POWER IN ENGINE

**Indicated Power -** The power developed in an engine cylinder

**Brake Power -** The power available at the crankshaft

**Friction Power –** Difference between Indicated and Brake power

**FP = IP - BP**

# TOTAL ENGINE FRICTION

- Total engine friction, defined as the difference between indicated horse power and brake horse power.
- Total engine friction can be divided into five main components. They are
  - Crankcase mechanical friction.
  - Blow by losses (compression-expansion pumping loss).
  - Exhaust and inlet system throttling losses.
  - Combustion chamber pumping loop losses.
  - Piston mechanical friction.

# CRANKCASE MECHANICAL FRICTION

- Crankcase mechanical friction can further be sub-divided into three types
  - Bearing friction
  - Valve gear friction
  - Pump and miscellaneous friction.
- Crankcase mechanical friction is about 15 to 20 percent of total engine friction.

# BLOW BY LOSS

- Blow by is the phenomenon of leakage of combustion products past the piston and piston rings from the cylinder to the crankcase.
- These losses depend upon the inlet pressure and compression ratio.
- Blow by losses are reduced as the engine speed is increased.

# EXHAUST AND INLET THROTTLING LOSS

- The standard practice for sizing the exhaust valve is to make them a certain percentage smaller than inlet valves.
- This usually results in an insufficiently sized exhaust valve and hence, results in exhaust pumping loss.

# COMBUSTION CHAMBER PUMPING LOOP LOSSES

- In the case of pre-combustion chamber engines an additional loss occurs.
- This is the loss occurring due to the pumping work required to pump gases into and out of the pre-combustion chamber.
- The exact value of this would depend upon the orifice size connecting the pre-combustion chamber and the main chamber, and the speed.
- Higher the speed greater is the loss and smaller the orifice size greater is the loss

# PISTON MECHANICAL FRICTION

- Piston Mechanical Friction sub-divided into two types.
  - Viscous friction
  - Non-viscous friction
- The viscous friction depends upon the viscosity of the oil and the temperature of the various parts of the piston.
- Non-viscous friction further divided into
  - Friction due to ring tension
  - Friction due to gas pressure forces behind the ring.

# REFERENCE


- https://en.wikipedia.org/wiki/Engine_efficiency

# THANK YOU !!!