

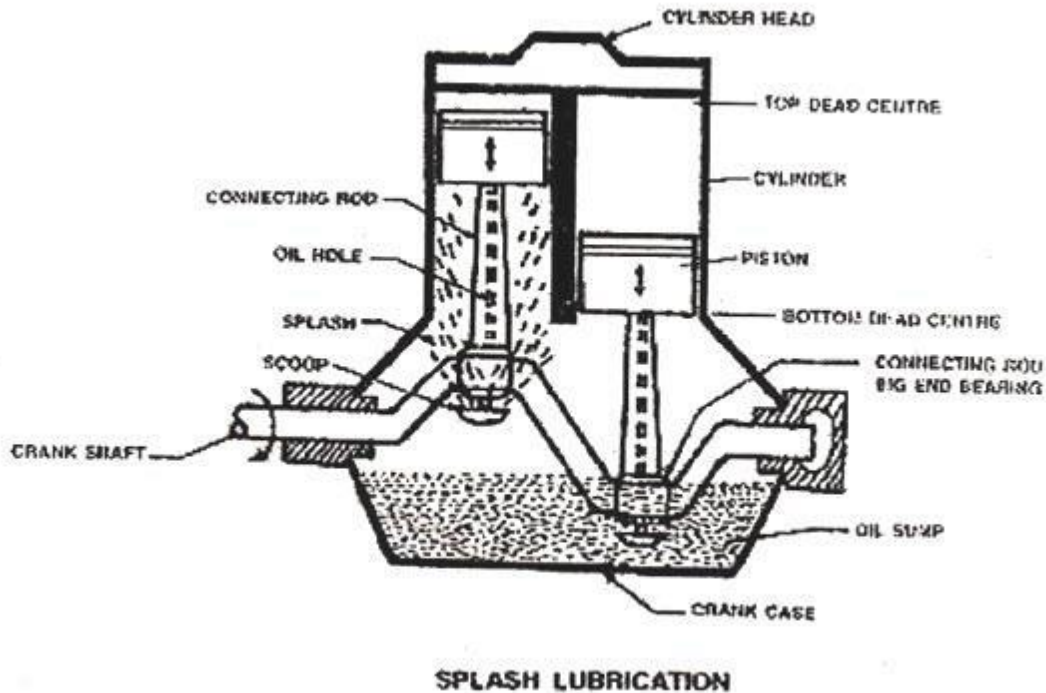
**AI 3401 TRACTORS AND ENGINE SYSTEMS**

**UNIT II NOTES**



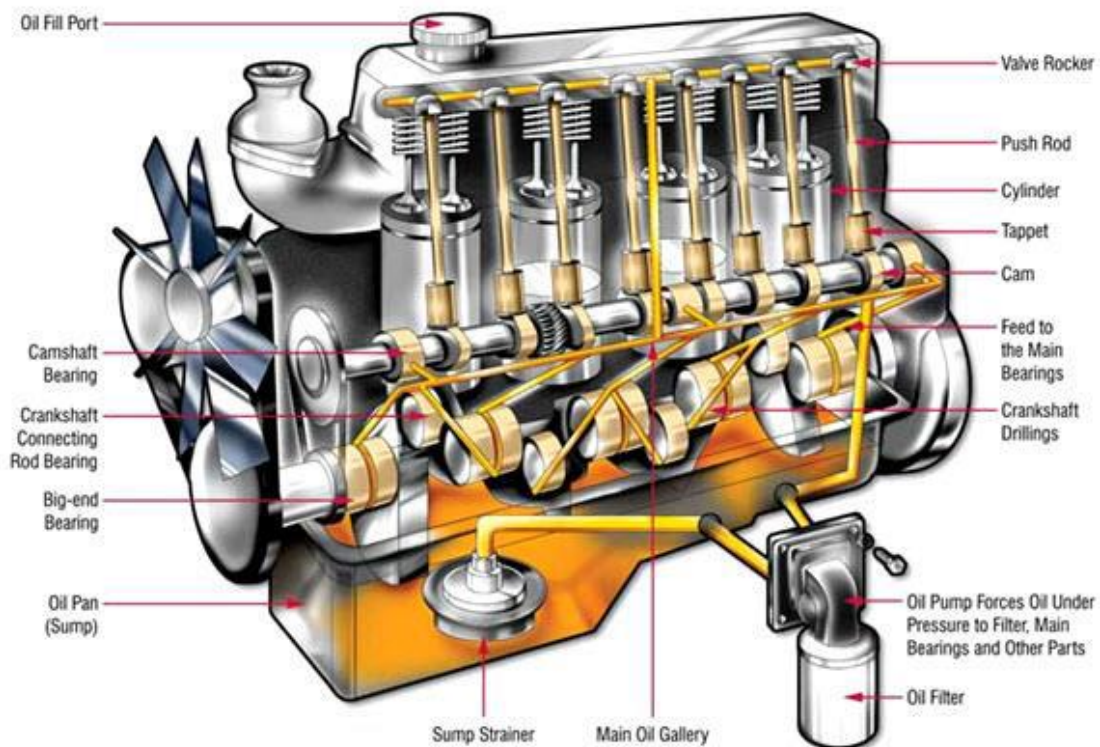
### **Splash lubrication system**

In splash lubrication system the lubrication oil is picked from the oil sump or a pan by a dipper provided at the bottom of the connecting rod for piston in each cylinder. The connecting rod picks the oil from the bottom and moves upward to the engine components. Some oils is also reached to different components like bearings, connecting rod through splash as mechanical turbulence is generated in the crankcase by the moving components which further makes the oil spread in the form of mist in the crankcase. This mist further reaches to other engine components like piston, piston pin and cylinder walls. The camshaft and valve mechanism is also lubricated by the oil. Although the splash type lubrication system is still being used in the engines these days but its usage has been found to be limited to small or single cylinder engines as the splash only is not sufficient to make oil to reach all critical components of the engine.



### **Force feed lubrication system**

As splash system has limitations to lubricate all the critical components in an engine, force feed system is used to generate additional pressure to ensure oil reaching to all essential and desired components for lubrication purposes. Generally, a gear type pump driven by the camshaft generates the pressure in oil to move from the crankcase to crankshaft, connecting rod, bearings pistons and valves. So the lubricating oil is supplied to the engine components under pressure, hence the reach of oil is enhanced to lubricate the remote and farthest points. This helps in efficient lubrication of engine components and hence in achieving better engine performance.



### Properties of lubricant:

For smooth functioning of engine components, the efficient function of engine lubrication is must and for efficient functioning of lubrication system, the lubricants should also have the following properties.

- Viscosity
- Clean and stable
- Pour point
- Flashpoint
- Corrosion resistant

### Viscosity

Viscosity is the property of the oil which refers to the resistance it has to flow due which two surfaces are kept apart from each other. The viscosity of the lubricants oil should be

sufficient to ensure hydrodynamic lubrication. Higher viscosity is also not desirable as it increases the friction and power loss. The oil viscosity decreases

at higher temperature and loses its efficacy, so the lubricants should have resistance against the temperature. High viscosity lubricating oils also hamper the initial starting of the engine. Viscosity Index (VI) is a measure of the change of viscosity of oil with temperature. A high viscosity index means less change of oil viscosity with temperature rise. Petroleum lubricating oils generally have viscosity index from 100 to 110, which may be increased to 120 to 130 by means of additives.

### **Clean and stable**

The lubricating oils should be sufficiently clean and stable for the smooth and prolonged trouble free operation of the engine. Lubricating oils should be stable at lowest and highest temperature as the oil particles should not get separated at low temperature and get vaporised at high temperature. Generally, it is observed that at high temperature oils get oxidized which become sticky and damages the engine components, sometimes form carbon, which damages the piston rings causing compression loss. So the lubricating oils should be chemically stable also which do not change their properties at high temperature.

### **Pour Point**

It is the minimum temperature at which the fluid/oil pours and the liquid/oil below this temperature will not be able to flow. Hence the lubricants below this temperature can not be used and function for its desired purpose. Thus, the lubricating oil with pour point less than the lowest temperature encountered in the engine is selected.

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### **Flash Point**

The flash point of the fluid/oil refers to the temperature at which it gets sparked and it should be sufficiently high so as to avoid flashing of oil vapours.

### **Corrosion Resistance**

The lubricating oil used in the automobile engines should have sufficient resistance to corrosion of the engine components like pipe lines, crank case etc. which are in regular contact with each other.