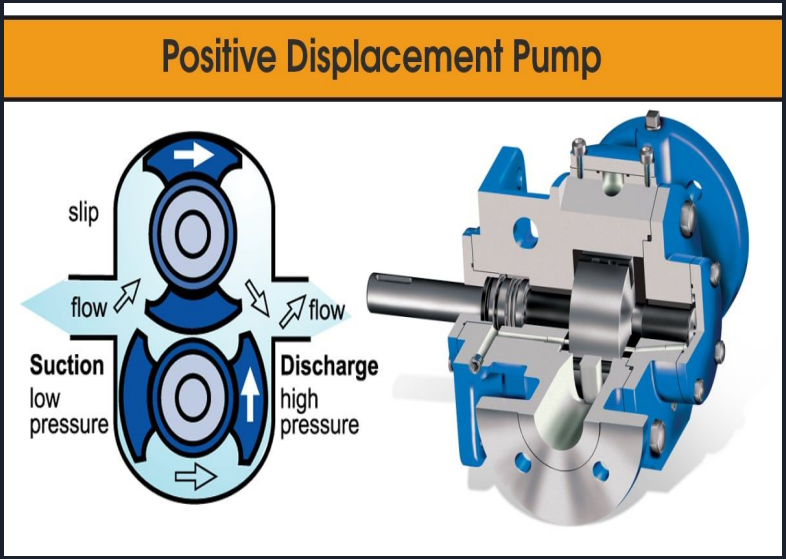
"Pumping system operation"

Shcherbakov Daniil

Plan:

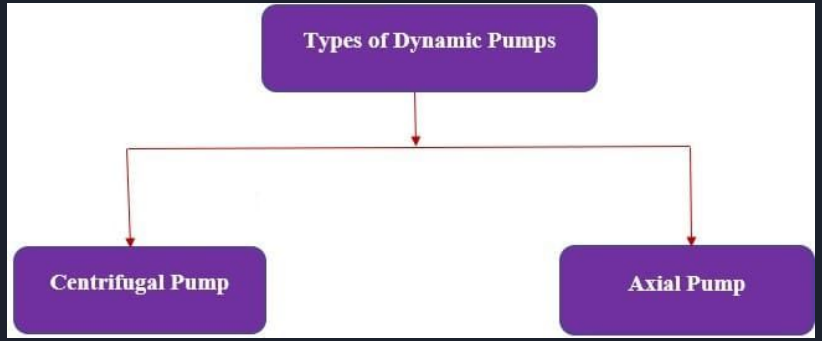
1. Positive displacement pumps
2. Dynamic pressure pumps
3. Application of each type of pumps
4. Advantages and disadvantages of each type of pumps
5. Maintenance and troubleshooting of pumps

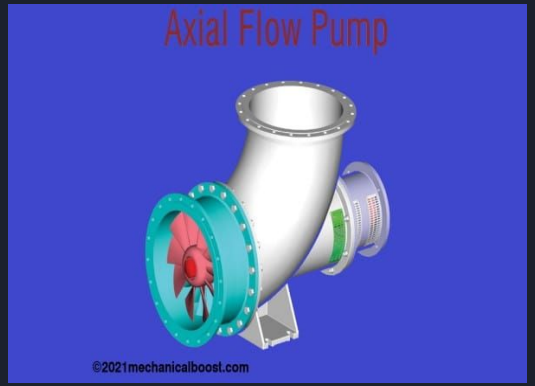
1. Positive displacement pumps



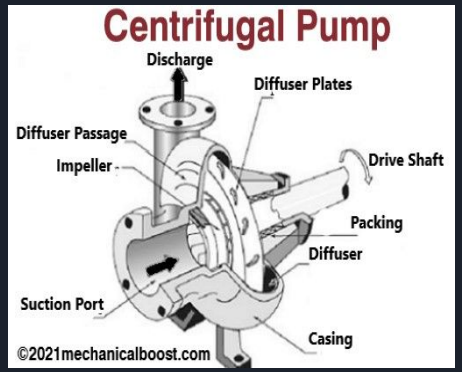
A positive displacement (PD) pump moves a fluid by repeatedly enclosing a fixed volume and moving it mechanically through the system. The pumping action is cyclic and can be driven by pistons, screws, gears, rollers, diaphragms or vanes.

2. Dynamic pressure pumps





The axial pump includes in the most famous types of dynamic pump. These pumps use for pumping incompressible liquids and for high flow rates at the comparatively short delivery head. So, the energy transfer from the axial pump takes place only through the flow-related process.



This type of dynamic pump is commonly used in a variety of applications. These types of dynamic pumps are inexpensive to manufacture, robust, and more efficient compared to positive displacement pumps. After the pump has been operated, the fluid pressure increases from the inlet to the outlet of the pump. Changes in the fluid pressure push fluid into the storage tank.

3.Application of each type of pumps

Common submersible pump applications include pumping stormwater, sewage, well water, bore water, chemicals, and waste products. Fire pumps, also known as fire hydrant systems, hydrant boosters, or fire water pumps, are high-force pumps used to provide pressurized water for fire fighting and fire sprinkler systems.

4. Advantages and disadvantages of each type of pumps

	Rotary pump	Centrifugal pump
Advantages	Small primary tumor; low cost; no backflow; frivolous sinusoidal pulse	Secure positive and negative pressures; adaptation to venous return; higher bypass for right or left ventricular; preferable for prolonged extracorporeal; protection from massive air embolism
Disadvantages	Excessive positive and negative pressures; destruction of tubes; requires adjustment to close the tubes; potentially massive air embolism; close supervision is necessary	Large primary volume; you need a flow meter; potential flow backwards; high cost

5.Maintenance and troubleshooting of pumps

1. Improper pump installation. For example, leakage from the column pipe and power losses due to crooked shafts and improper tightening.
2. Changes in system conditions that force the pump to operate inefficiently.
3. Insufficient line-shaft lubrication that causes power loss and premature wear of line-shaft bearings.
4. Motor overloading and/or overheating that decreases efficiency and breakdown insulation.
5. Improper pump adjustment causing increased wear and power losses.
6. Cavitation either from entrapped air or from insufficient NPSH.
7. Abrasion from sand and/or silt produced from the well.
8. Wear from rubbing mechanical parts. This can be normal wear expected over time or abnormal wear caused by deformed or bent parts.
9. Corrosion and incrustation of pump components.
10. Mechanical plugging of the impellers or the pump suction.