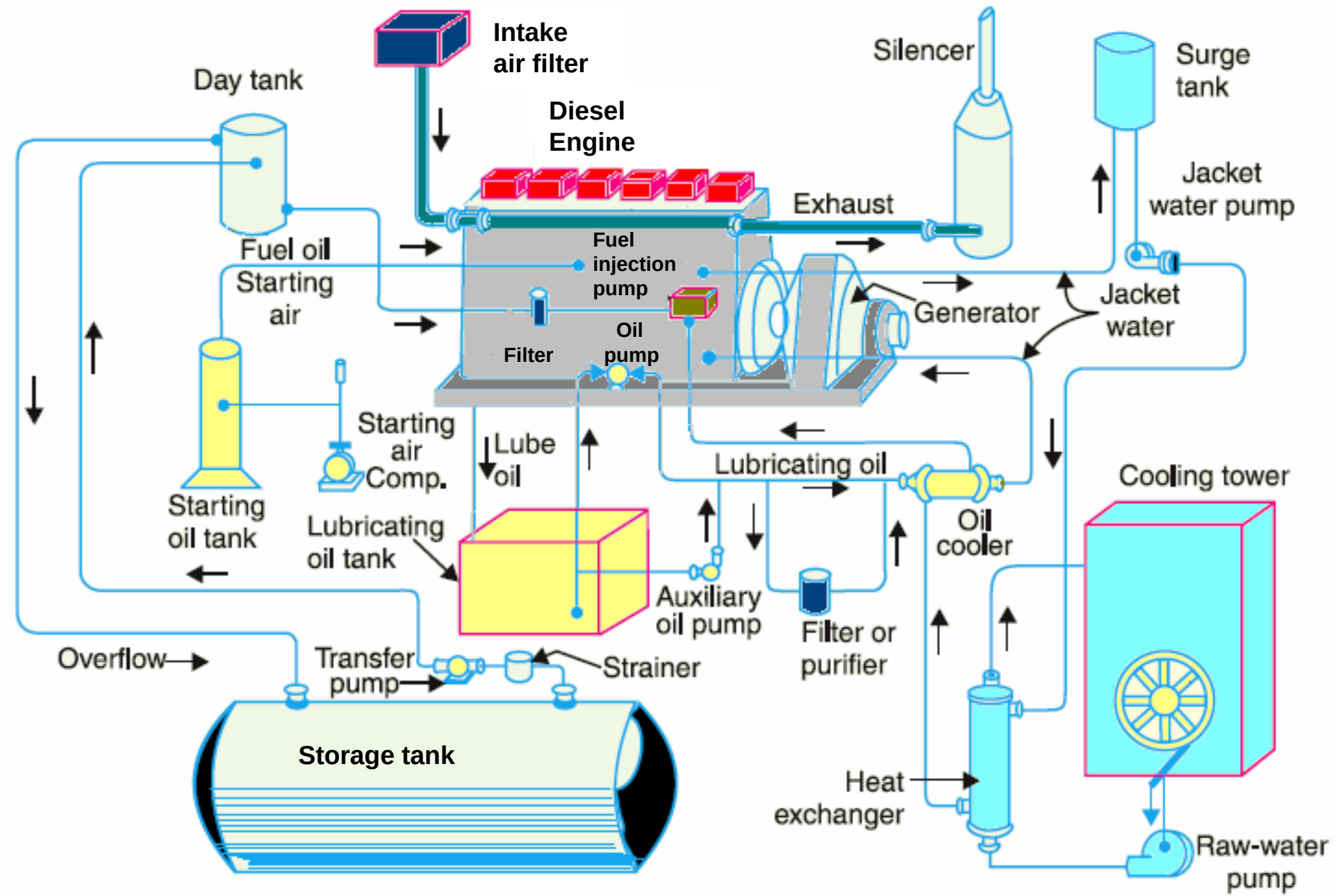
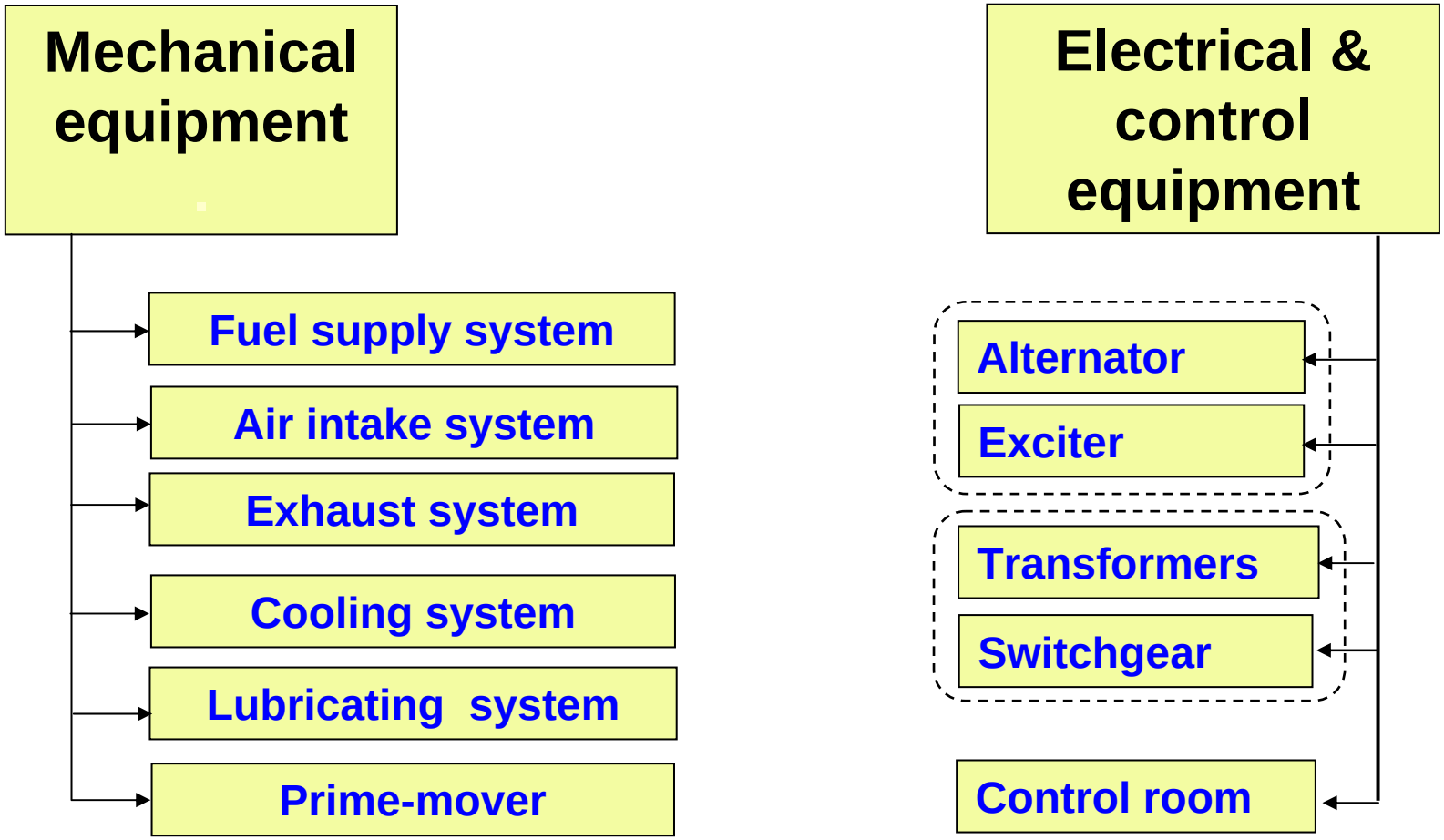
Diesel Power Plant

- Arrangement
- Equipment
- Advantages & disadvantages

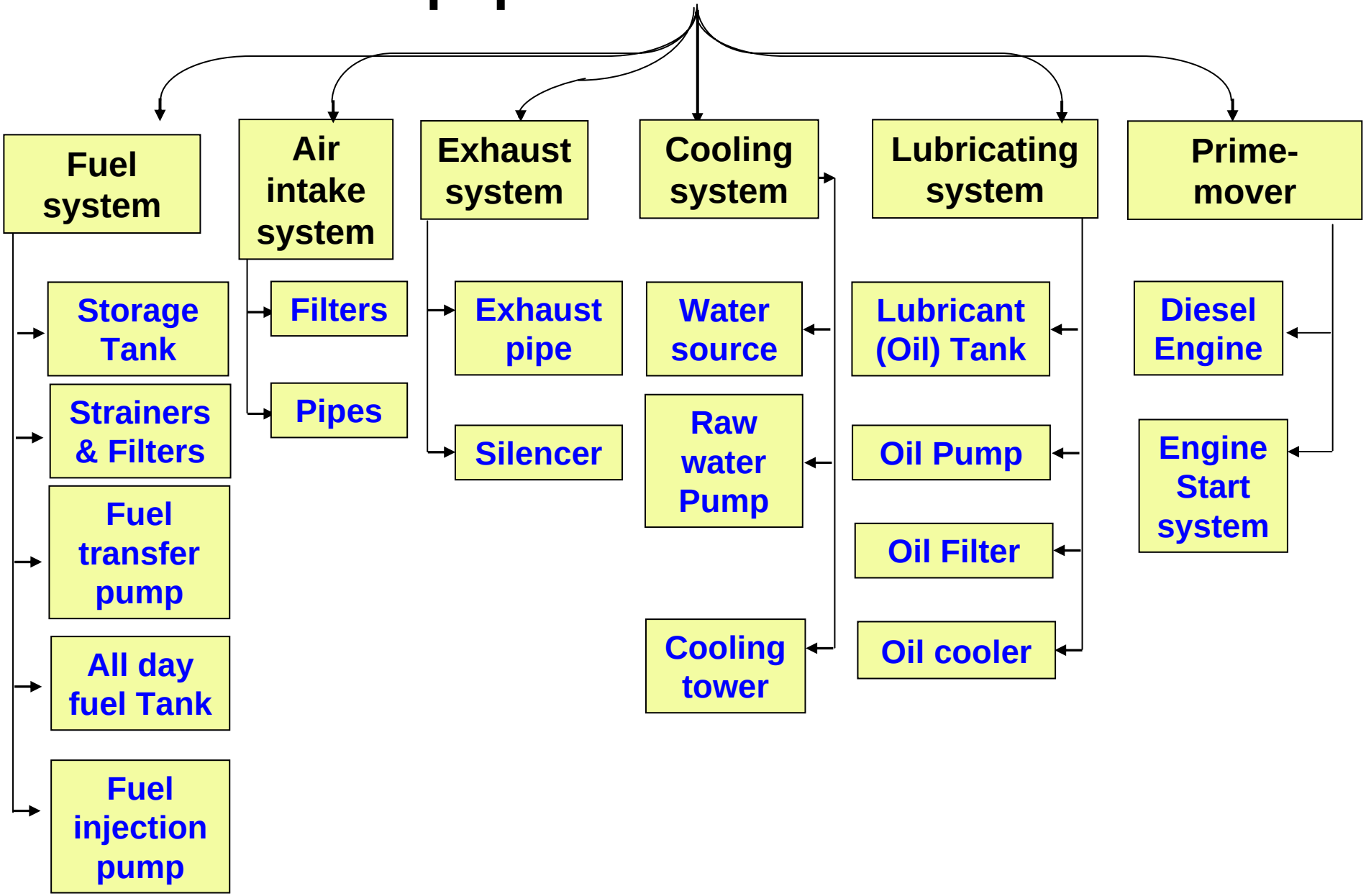


Schematic arrangement of Diesel Power Plant

Equipment of Diesel Power Station



Mechanical Equipment of Diesel Power Station

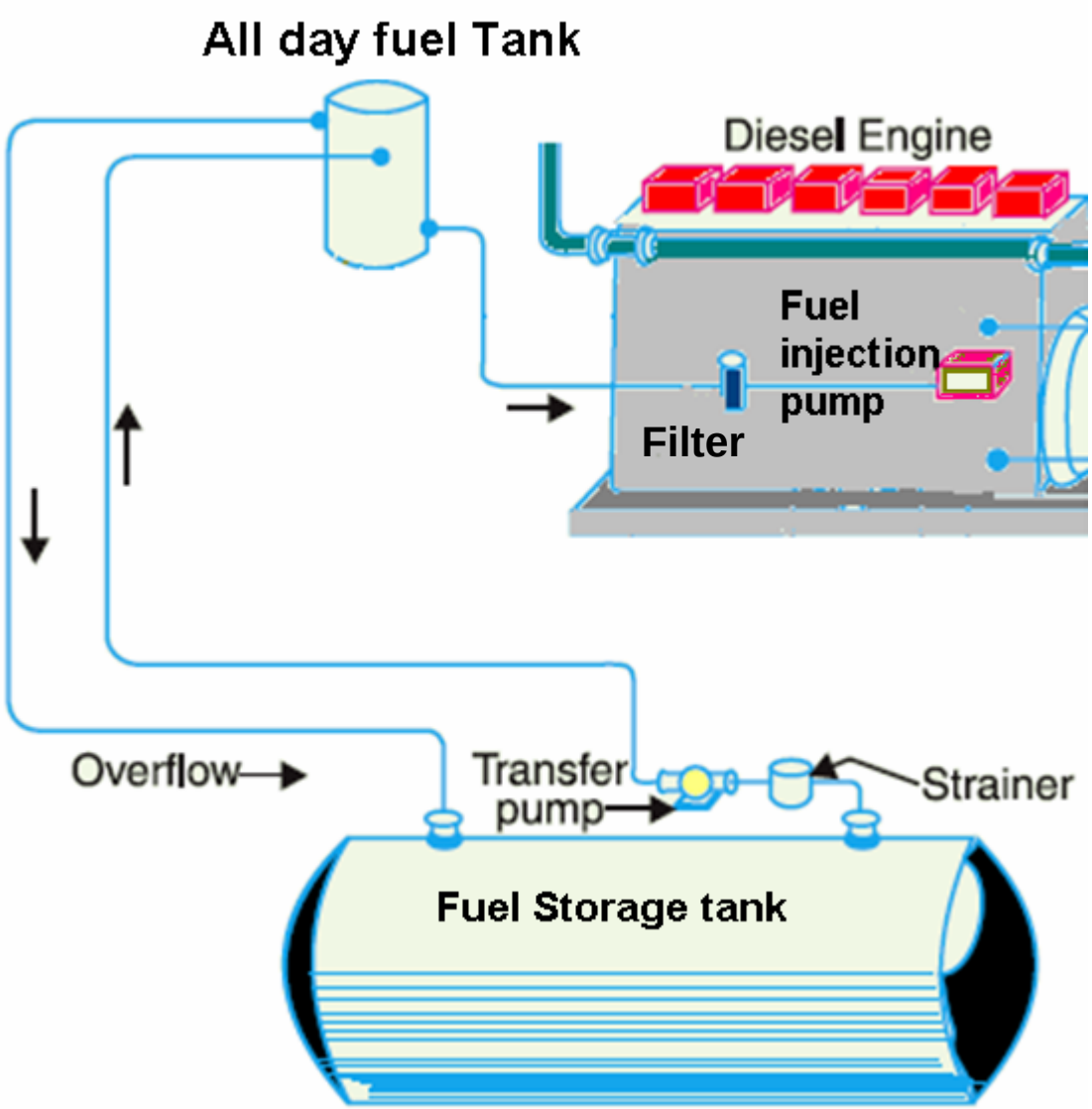


Fuel supply system

It consists of storage tank, strainers, fuel transfer pump, all day fuel tank, filters and fuel injection pump.

Fuel is stored in a *storage tank* from which it is pumped through *strainer* by a *transfer pump* to a smaller *all day tank* at daily or short intervals.

From this tank, fuel oil is passed through *filters* to further remove suspended impurities. The clean oil is injected into the engine by *fuel injection pump*.

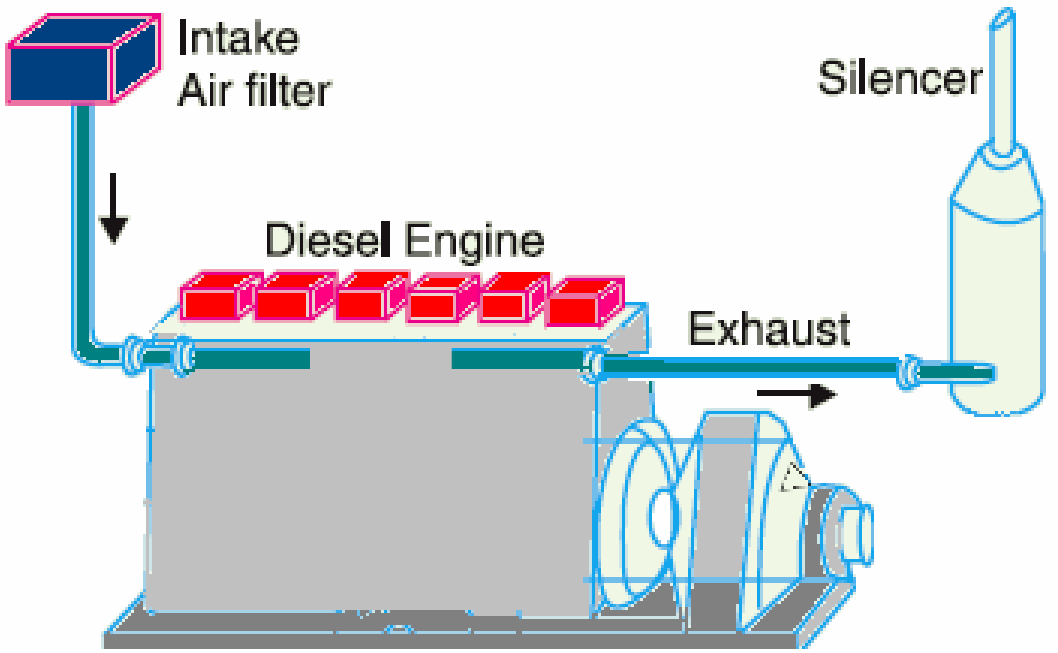


Air intake & Exhaust systems

Air intake system:

-Supplies necessary air to the engine for fuel combustion. It consists of pipes for the supply of fresh air to the engine manifold.

-Filters are provided to remove dust particles from air which may act as abrasive in the engine cylinder.



Exhaust system:

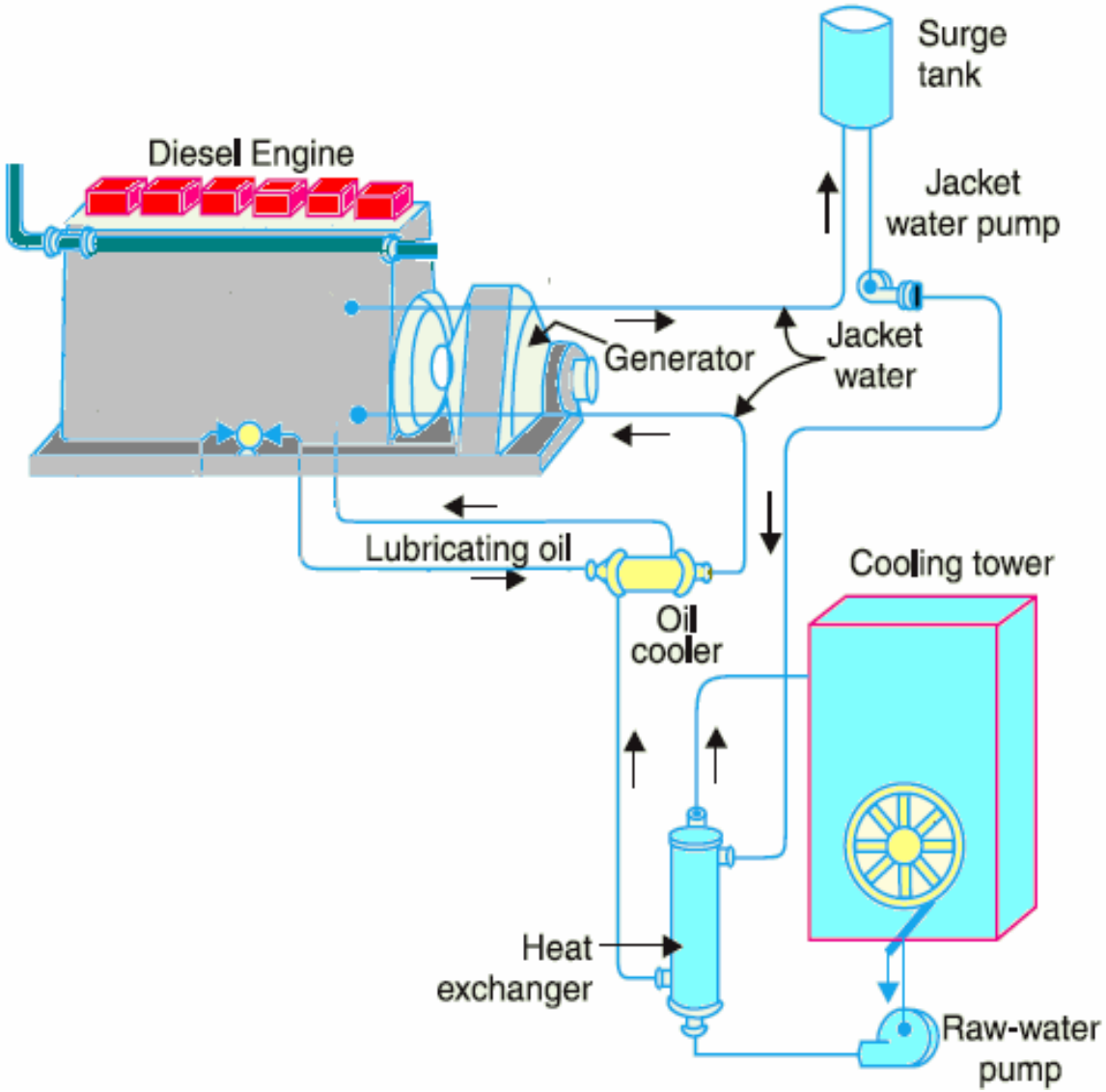
-Leads the engine exhaust gas outside the building and discharges it into atmosphere.

-A silencer is incorporated to reduce the noise level.

Cooling system

Part of heat released by fuel burning in the engine cylinder passes through the cylinder walls, piston, rings, … etc. and may cause damage to the system. To keep the temperature of engine parts within safe operating limits, cooling is provided.

The cooling system consists of a *water source, pump and cooling towers*. The pump circulates water through cylinder and head jacket. The water takes away heat form engine and itself becomes hot. The hot water is cooled by cooling towers and is re-circulated for cooling.

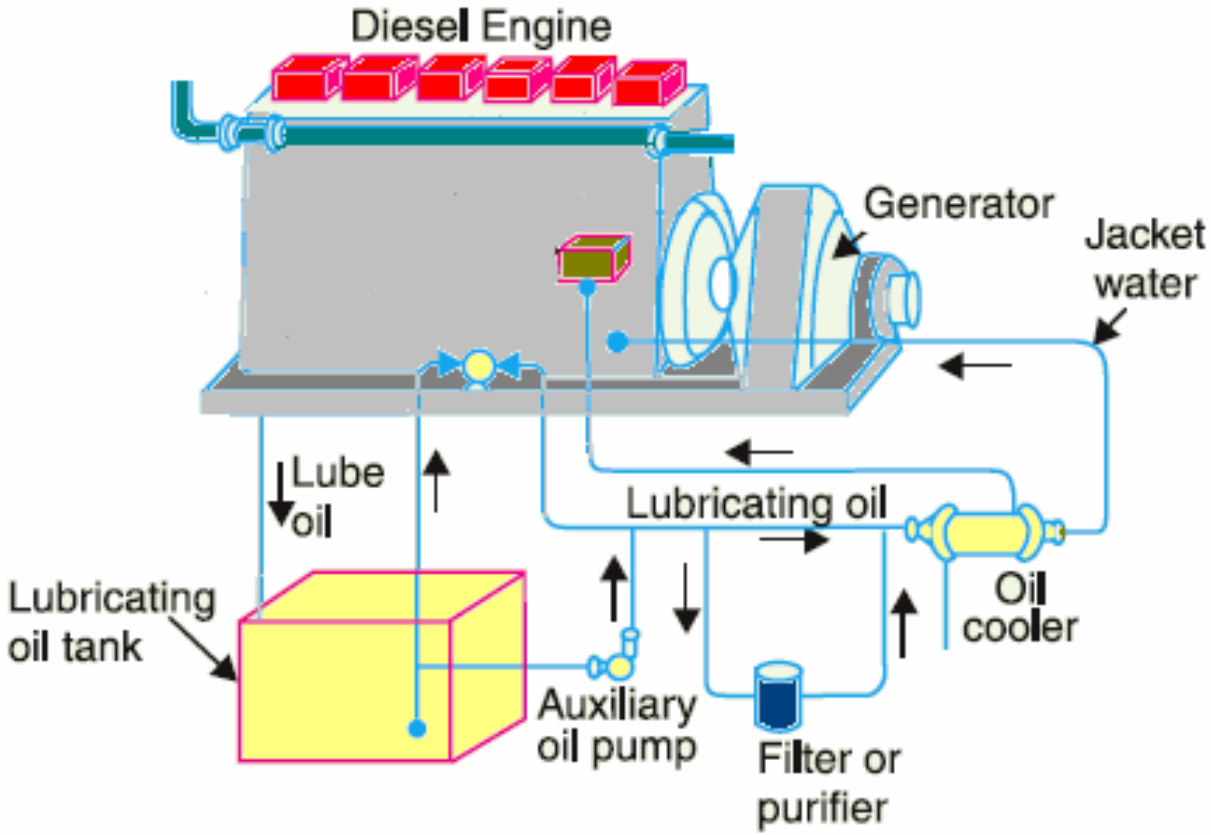


Lubricating system

- **Comprises of *lubricating oil tank, pump, filter and oil cooler.***

- **Minimizes wear of rubbing surfaces of the engine.**

- **Lubricating oil is drawn from the lubricating oil tank by the pump and is passed through filters to remove impurities.**
- **Oil coolers keep the temperature of the oil low.**

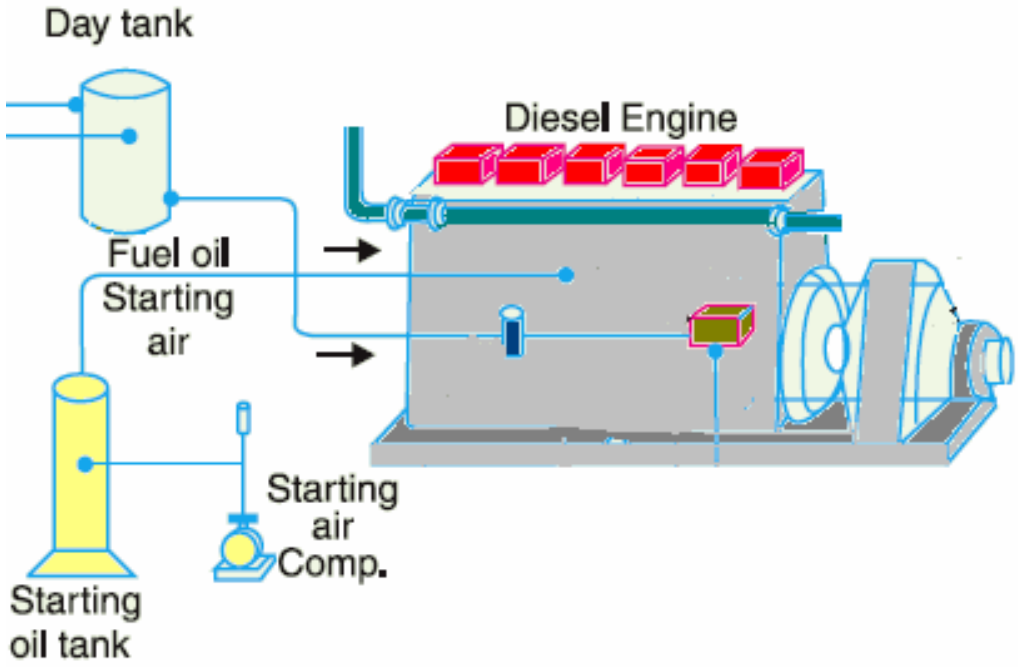


Engine start system

- An arrangement to rotate the engine initially while starting, until firing starts and the unit runs with its own power.

- Small sets are started manually by handles.

In larger units, *compressed air* is used for starting; air at high pressure is admitted to a few of the cylinders, causing them to act as reciprocating air motors to turn over the engine shaft. Fuel is admitted to the remaining cylinders which start the engine under its own power.



Advantages & disadvantages

Advantages:

- Both of design and layout of the plant are quite simple.
- Occupies less space as the number and size of the auxiliaries is small.
- Can be located at any place.
- Can be started quickly and can pick up load in a short time.
- No standby losses.
- Requires less quantity of water for cooling.
- Overall cost is much less than that of steam power station of same capacity.
- Thermal efficiency of the plant is higher than that of a steam power station.
- Requires less operating staff.

Disadvantages:

- High running charges as the fuel (diesel) used is costly.
- Does not work satisfactorily under overload conditions for a long period.
- Generates small amount of power.
- Cost of lubrication is high.
- Maintenance charges are high.