

Direct Internal Combustion Engine Drive – It is very common in road transport vehicles like trucks, buses, cars etc. It is non – electric type of traction system. It is suitable for road and light railway work but is unsatisfactory for heavy works on railways. The fig.1 shows the example of a direct internal combustion engine drive for light railway work.

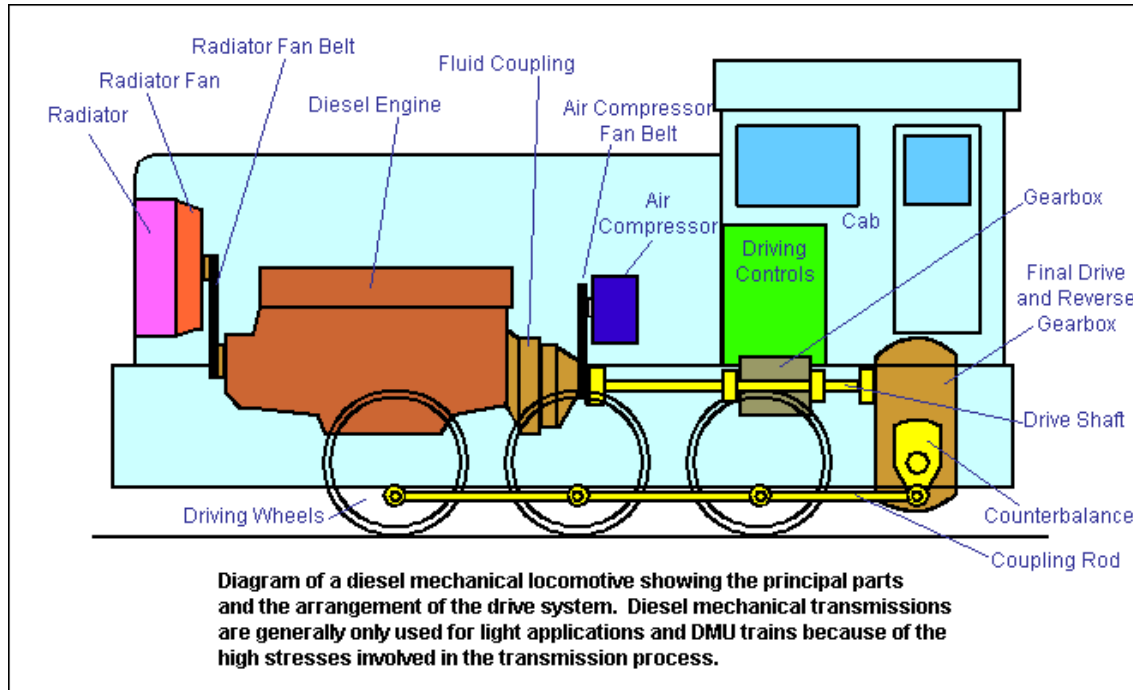


Fig.1

Advantages – The following are the main advantages of this type of drive:

1. It has low initial cost
2. It is a compact and self contained unit
3. The speed control with gear arrangement is quite simple
4. It has a great flexibility of routes.
5. Its efficiency is 25% which is much higher as compared to steam engine drive.
6. The braking arrangement is quite simple.

Disadvantages – The following are the main disadvantages of this type of drive:

1. The overload capacity is limited on account of its speed torque characteristics.
2. Its operation is uneconomical at speed other than the normal speed.
3. The speed control is possible only through gearbox which is required because an internal combustion engine has practically a constant torque at all speeds.
4. The life of the engine is comparatively shorter.
5. The maintenance and running costs are fairly high.

Steam Electric Traction – It is called turbine-electric, being one of the rarest types. The basic idea was to burn some kind of fuel to produce either steam or hot combustion gases, which were then passed through a turbine, which would spin at high speed. The turbine would drive an electric generator, which would provide electricity to traction motors on the wheels of the locomotive. Some turbines burned coal; others burned oil, and most were experimental in nature. The Union Pacific Railroad had a whole series of turbine-electrics that burned bunker C fuel. The last of their series were the most powerful locomotives ever

built, at 10,000 h.p. each. Although successful, they had high maintenance costs, and used almost as much fuel at idle as they did at full throttle. Due to some mechanical difficulties and complications these type of drives were not adopted for general use.

Battery Electric Drive – A bank of d.c. accumulators is carried on the vehicle itself and it supplies power to d.c. motors driving the vehicle. Such vehicles are not used on railways. They generally find applications in mines, ports and large factories. The major limitation is the small capacity of the batteries and the need to charge them frequently. These vehicles are started by series parallel grouping of batteries in order have economy of operation. For running the vehicle at half the maximum speed, batteries are put in parallel. For running the vehicle at full maximum speed, batteries are connected in series. The main advantages of this vehicle over internal combustion engine drive are low maintenance, long life of motor and control gear and no pollution.

Hybrid Drive – In hybrid drive, locomotive derives power for part of the journey from overhead d.c. system and for other part from batteries. This system proves economical where long tunnels have to be excavated so that neither end of journey is fixed point as cutting face of rock advances so does the dumping end. Locomotives takes power from overhead trolley wires for most of the journey but at either ends it is switched onto batteries. These are recharged from trolley wire on return journey. For long tunnels pure battery drive will require large and costly batteries. This system has been used with advantage in the excavation of Sutlej Beas link tunnels.

Flywheel Drive – In this drive, the kinetic energy of flywheel is used fro driving the vehicle. The vehicle is equipped with three phase induction motor which is coupled to the flywheel and d.c. generator. At each halting station, three phase induction motor is supplied with power for sufficient time to bring the flywheel to full speed. The kinetic energy of the flywheel on the way between two halting stations drives the d.c. generator which supplies the traction motors. The kinetic energy of the flywheel is sufficient to move the vehicle over longest distance between two adjacent halting stations. This system can be only employed in cities where distance between stations is not much. The main advantage of this drive is that no electric supply arrangements have to made in between halting stations.