UNIT-2

COAL, ASH HANDLING AND DIFFERENT TYPES OF BOILERS

FUEL HANDLING

Three types of fuels can be burnt in any type of steam generating plant:
1. Solid fuel such as coal;
2. Liquid fuel as oil and
3. Gaseous fuel as gas.

Supply of these fuels to the power plants from various sources is one of the important considerations for a power plant engineer. The handling of these fuels is an important aspect. The following factors should be considered in selecting the fuel handling system:

1. Plant fuel rate.
2. Plant location in respect of fuel shipping.
3. Storage area available.

Fuel handling plant needs extra attention, while designing a thermal power station, as almost 50 to 60 percent of the total operating cost consists of fuel purchasing and handling. Fuel system is designed in accordance with the type and nature of fuel.

Continuously increasing demand for power at lower cost calls for setting up of higher capacity power stations. Rise in capacity of the plant poses a problem in coal supply system from coal mines to the power stations. The coal from coal mines may be transported by the following means:

1. Transportation by sea or river,
2. Transportation by rail,
3. Transportation by ropeways,
4. Transportation by road, and
5. Transportation of coal by pipeline.

The pipeline coal transport system offers the following advantages:

1. It provides simplicity in installation and increased safety in operation.
2. More economical than other modes of transport when dealing with large volume of coal over long distances.
3. This system is continuous as it remains unaffected by the vagaries of climate and weather.
4. High degree of reliability.
5. Loss of coal during transport due to theft and pilferage is totally eliminated.
6. Manpower requirement is low.

Requirements of Good Coal Handling Plant

1. It should need minimum maintenance.
2. It should be reliable.
3. It should be simple and sound.
4. It should require a minimum of operatives.
5. It should be able to deliver requisite quantity of coal at the destination during peak periods.
6. There should be minimum wear in running the equipment due to abrasive action of coal particles.
Coal Handling Systems

"Mechanical handling" of coal is preferred over "manual handling" due to the following reasons:

1. Higher reliability.
2. Less labour required.
3. Economical for medium and large capacity plants.
4. Operation is easy and smooth.
5. Can be easily started and can be economically adjusted according to the need.
6. With reduced labour, management and control of the plant becomes easy and smooth.
7. Minimum labour is put to unhealthy condition.
8. Losses in transport are minimised.

Disadvantages:

1. Needs continuous maintenance and repair.
2. Capital cost of the plant is increased.
3. In mechanical handling some power generated is usually consumed, resulting in less net power available for supply to consumers.

Coal Handling

Cola Transfer equipments

'Transfer' means the handling of coal between the unloading point and the final storage point from here it is discharged to the firing equipment. The following equipment may be used for transfer of coal:

1. Belt conveyors
2. Screw conveyors
3. Bucket elevator and conveyor
4. Pivoted bucket conveyor
5. Grab bucket conveyor
6. Flight conveyors (or scrapers)
7. Skip hoists
8. Mass flow conveyor
9. Chutes.