

# RESEARCH PAPER ON STUDY OF PTPS

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## Abstract:

Panipat Thermal Power Station was commissioned in 1979 and is situated at a distance of about 12 km. from Panipat. It is on Panipat- Jind Road near village Assan. This plant has been constructed in five stages as given below:

	Stage 1: Unit -1	
110 M.W.		
	Unit -	
2	117.8M.W.	
	Stage 2: Unit -3	
110 M.W.		
	Unit -	
4	110 M.W.	
	Stage 3: Unit -5	
210 M.W.		
	Stage 4: Unit -6	
210 M.W.		
	Stage 5: Unit -7	
250 M.W.		
	Unit -	
8	250 M.W.	
Total generation capacity		
1367.8M.W.		



I was assigned training in TG -II. I took training about Turbine & its auxiliaries, Water circulation system, & Hydrogen cooling system, Oil system, Condenser and Regenerative system.

## THREE MAJOR INPUTS TO POWER STATION

1) **Water:** Water has been taken from nearby Yamuna Canal. This water is lifted by raw water pumps and is sent to clarifier to remove turbidity of water. The clear water is sent to water treatment plant, cooling water system and service water system. The water is de-mineralized (DM) by water treatment plant. The DM water is stored in condensate storage tanks from where it is used in boiler.

2) **Fuel Oil:** The fuel oil used is of two types:

- Low Sulphur high stock oil (LSHS)
- High speed diesel oil (HSD)

The high speed diesel oil reaches the power station through the lorry tankers. The oil is stored in large tanks for the future use in the boiler.

Heavy oil is stored in storage tanks in oil storage yard and is conveyed to the front through a set of pumps and strainers. The whole length of piping from the boiler front in stream traced to maintain the temperature and hence its fluidity so that it can freely flow in the pipelines.

3) **COAL:** The coal reaches the plant in the railways wagons. The unloading of coal is done mechanically by tilting the wagons by tippler. The coal is sent to the coal storage yard through the conveyor belts. The crushed coal from store is sent to the mill bunkers through conveyor belts.

The air which takes away the coal dust passes upward into the classifier where the direction of flow is changed abruptly. This causes the coarse particle in the air coal stream to finer coal dust along with the primary air leaves the classifier onto the coal transport piping from where it goes to nozzle. Pulverized coal obtained from coal mill cannot be burnt directly.

## FAMILARIZATION WITH PLANT

### **BOILER:**

Boiler is a device used for producing steam. There are two types of boilers:

- Fire tube boiler
- Water tube boiler

Here, boiler used is of water tube type. In the boiler, heat energy transfer takes place through tube walls and drum. The gases lose their heat to water in the boiler or superheated. The escape heat is used to heat the water through economizer.

ID and FD fans are used to produce artificial draught. The fuel oil is used to ignite the boiler and pulverized coal is lifted from the coal mills by PA fans.

#### **TURBINE:**

Turbine is form of heat engine in which available heat energy in the form of steam is converted into kinetic energy to rotate the turbine by steam expansion in suitable shaped nozzles In Thermal Power Station there are reaction turbines.

The turbine consists of three stages: high pressure, intermediate pressure and low pressure. Steam enters the turbine at 350°C with maximum allowable temp. of 545°C.

Cold reheat steam goes to boiler, reheated at 540°C, then fed to medium pressure parts of the turbine. Then, after cooling it goes to hot well.

#### **GENERATOR:**

The shaft is coupled with generator. The generator converts the kinetic energy of the rotating shaft to electric energy. Field windings are excited by D.C. power using exciter. Shaft of generator rotates at 3000 rpm speed.

#### **CONDENSER:**

In condenser, the water passes through various tubes and steam passes through a chamber containing a large number of water tubes (about 20000).

The steam gets converted into water droplets, when steam comes in contact with water tubes. The condensate is used again in boiler as it is dematerialized water and 5-6 heats the water, which was in tubes, during the process of condensation. This water is sent to cooling tower.

#### **COOLING TOWER:**

It is a structure of height 110m designed to cool the water by natural draught. The cross sectional area is less at the center just to create low pressure so that the air can lift up due to natural draught and can carry heat from spherical drops. The upper portion is also diverging for increasing the

efficiency of cooling tower. Hence it is named as natural draught cooling tower.

#### **ELECTROSTATIC PRECIPITATOR:**

It is an electronic device, which removes the ash particles from the smoke through furnace of boiler. It helps in prevention of air pollution. It works on the principle that a charged particle is attracted towards opposite charge. When the fly ash comes between the opposites charged plates it gets charged and is attracted towards the plates and then collected from the plates by the discharging particles.

#### **ASH HANDLING PLANT:**

Ash is not discharged as such to pollute the land, air and water, but a slurry of ash is made in ash handling plant and this slurry is dumped in the wasteland, kept for the purpose.

#### **SWITCH YARD:**

Switchyard is the area, which feed the grid supply to the station transformer and feeds the grid by the power generator by the unit. The power supply control is administrated here and the units consumed and supplies are recorded in the control room. The connections of 220KV BUS to the station transformer is done by using the isolated and gas filled circuit breakers.