

POWER PLANT PRODUCTIVITY ENHANCEMENT VIS-À-VIS COAL STACK MANAGEMENT AT TTPS.

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BRIEF DESCRIPTION OF TTPS:

Talcher Thermal Power Station is one of the oldest power station in India with its capacity of 460 MW(4x 60 MW & 2x110 MW) situated in Talcher, Odisha. The station has set up high standards in power scenario despite crossing 49 years and become a benchmarking Station in the country. The project was embraced by the NTPC family on June 3, 1995, when it was taken over from the erstwhile Orissa State Electricity Board. The main raw material i.e. Coal is being received from MCL through Conveyor belt & Rail rake system. Coal Handling Plant consists of Mine end CHP, 08 km long single stream Cross country Conveyor and Plant end CHP including track-hopper with BOBR rake unloading system. Long term partnerships have been established with M/s MCL one of the subsidiary of Coal India Ltd for Coal Supply Agreement and agreement with Indian Railways for coal transportation from Talcher coalfield.

CHALLENGES IN COAL STOCK PILE MANAGEMENT:

Many industrialized countries are planning long-term exit strategies for coal-fired power generation in order to meet the challenges posed by greenhouse gas (GHG) emissions, coal will remain one of the most important sources of energy for the foreseeable future to meet peak load demand in addition to renewable & other sources of energy. The development of new technologies for the handling of coal can thus contribute to making the use of coal more efficient and sustainable.

Coal handling systems are an integral & most important part of a complete material flow and quality management system. In recent years, the main focus was on the optimization of single parts of this system, such as state of art technology. Now, however, complete system optimization, including the integration of all subsystems, is required to deal with the increased efficiency of modern coal-fired power plants and secure the coal supply in sufficient quantity and quality.

Some challenges on coal yard management are;

1. Spontaneous combustion
2. Sliding of coal on to stacker reclaimer rails
3. First in First out
4. Keeping the coal always available in reclaimable area.
5. Keeping space ready always for stacking coal.
6. Water drainage system
7. Fire protection
8. Monsoon preparation
9. Height and orientation of stock pile
10. Selective Bunkering

Spontaneous Ignition is due to low temperature atmospheric oxidation due to the presence of methane and exothermic oxidation causes the rise in temperature. Spontaneous oxidation causes decrease in Calorific value i.e. decrease in Carbon & Hydrogen content and increase of Oxygen % resulting coal burning on its own.

Selective Bunkering:

Feeding of coal to bunkers of different units should be done selectively as per quality requirement of individual unit such as TTPS, Stage-2 units require better quality coal, Stage -1 units can be fed next lower quality coal for optimum generation.

GUIDELINES FOR STOCK YARD MANAGEMENT:

Pile Orientation:

The Orientation of the Pile is made such that air should strike the width and not the length. Freshly mined coal is not being stacked over old coal, and old coal is used within 7 days of stacking.

- Capacity of coal stock yard is 0.3 MMT i.e. 32 day's consumption.
- Boundary wall with proper drains around the periphery of Coal stock yard have been constructed.



Stacking:

It is done layer by layer (each of 1-1.5M height) with compaction of each layer. Stacking in small heaps & compacted in trapezoidal shape. Height of stockpile should not be more than 9-10M. Before stacking, the coal should be visibly wet. Each stockpile should be segregated into various segments for first IN, first OUT practice.



Stacking good quality and bad quality coals separately and use the stocks judiciously to achieve maximum generation.

The coal can be stacked and reclaimed by various methods in order to provide an adequate treatment of the material and perform the mixing and blending process.

Predefined stacking and reclaiming methods include the following:

- Windrow stacking.
- Chevron stacking.
- Cone shell stacking.
- Strata stacking.
- Block stacking.
- Long travel reclaiming.
- Block (bench) reclaiming.
- Pilgrim step reclaiming.

PRACTICES BEING FOLLOWED AT TTPS:

Allocating fixed locations in stack yard for different qualities of coal Stacking small heaps of 1 to 1.5 mtrs. Height effective compaction during simultaneous operation of Reclaiming through long travel reclaiming method and stacking through chevron stacking method. Stacking layer by layer of 1 -1.5mtrs. and compaction with sufficient spray of water Top surface stacked coal was sloped out ward for rain water / spray water draining. New dust suppression system installed in Stacker reclaimer.



- New wireless control system for stacker reclaimer has been installed in TTPS recently. Yard machines are running without any intervention of local operator and are only supervised by one operator in the S/R control room. These methods are used for trial basis.

This operation mode has the following advantages:

1. Constant and optimized belt load, and consequently optimized material throughput.
2. Less equipment wear due to fewer stress factors (no system overload).
3. Less faults and damages triggered by operator failures.
4. Energy savings by smooth and continuous operation.

PRE-SUMMER PREPAREDNESS:

- As March-June period is the critical period for spontaneous fires, regular inspection & temperature of coal stock pile are being monitored.
- Stacking of coal is being done layer by layer (each of 1 to 1.5M height) and compaction through dozer being done to lessen the chances of sliding down during heavy rains and of spontaneous ignition of coal.
- Water spraying from fire hydrant & high pressure water system being carried out on coal piles round the clock basis. In addition , mobile water spray system is being operated over the stock pile.
- The core temperature of the pile is being monitored through Thermo-vision camera.
- Fire quenching is done at the initial stage itself by piercing long fire quenching water pipe into the pile at valley portions.
- Carrying out fire quenching operations frequently during March to June
- MVW System was installed in stacker reclaimer for fire detection and protection.



PRE-MONSOON ACTIVITIES:

- Top surface of stacked coal is being sloped outward for ease of water draining. Coal stockpiles are being covered by polythene sheets before start of rainy season. Empty cement bags filled up with coal are being kept on the sheet to keep it intact against the wind (as shown in the picture).



- Maintaining 2 to 3 STEP shaped coal pile throughout the length. Covering of 1.5 steps of piles just before rainy season by LDPE (low density polythene sheet) with coal filled cement bags kept above to keep the LDPE sheets in position against wind..
- Completely exposing the big and small drains (Inter connected through holes) and maintaining them dry always .



(R-2 LOCAL FEEDING POINT)

- Availability of dozers ensured through proper servicing for coal feeding through R-1/ R-2 hoppers.
- Availability of all dewatering pumps are kept at various identified locations.
- Servicing of Stacker reclaimers is done for ensuring 100% availability.

CONCLUSION

All these methods ensure the required quality and quantity of coal fed to bunkers. These methods are selected as per the requirement.