ERECTION MANAGEMENT SYSTEM FOR ELECTROSTATIC PRECIPITATOR (ESP) – WRITE UP

Author

Krishna K. Ayappa

(Research Associate/Department of Mechanical Engineering/Rani Channama University, Karnataka/India)

Abstract

BHEL a navaratna Public Sector Enterprise in India is involved in the Supply, erection and commissioning of equipments of Thermal power plants predominantly in the country and abroad. The current demand o the market is to install and commission power plans in the minimum possible period. Towards this the Erection methods and latest Erection techniques are applied with latest project management systems for quick erection

Introduction

BHEL a navaratna Public Sector Enterprise in India is involved in the Supply, erection and commissioning of equipments of Thermal power plants predominantly in the country and abroad. The current demand o the market is to install and commission power plans in the minimum possible period. Towards this the Erection methods and latest Erection techniques are applied with latest project management systems for quick erection.

Across the country the equipments are manufactured in 15 manufacturing centers of BHEL. These are getting installed in various places in the country.

60- 70% of the power in the country is through the 210/200MW power plants supplied during the late 80's. All these plants are due for up gradation as part of Life Enhancement activity as per Central Electricity Authority (CEA) of India.

This modification / retrofit of the old plans has to be done in the minimum possible time as long shut of units will affect generation. One equipment of the power plant is Electrostatic Precipitator (ESP). This contributes to the ash collection and letting pure gas out to the atmosphere. The earlier power plants were designed for higher emission levels. To meet the current emission norms of the pollution control boards the ESP retrofit in a plant is picking with utmost priority.

BAP is manufacturing he boiler auxiliaries namely ESP, Fans, Air Preheater. Currently BAP is involved in retrofitting of ESPs in various places in the country. The retrofit has to be done in short time to meet the market demand.

One of the approach towards this is to develop an Erection Management System. This system will be used to monitor the suppliers of the various parts as required sequentially at site.

- The development involves
- study of the equipments involved
- understand the nature of its location at site
- Learn the critical process involved in the supply of the equipments
- develop a software for sequential supplies
- Integrate with the available system in the unit.
- The developed system will be used for other BAP products namely Fans & Air Preheater.

The system will also trigger the associated agencies to take appropriate actions to take care of the supply pitfalls. This will help the Erection series to do the Erection in time and complete projects as per customer commitments. The parts of the ESP in general is as below.

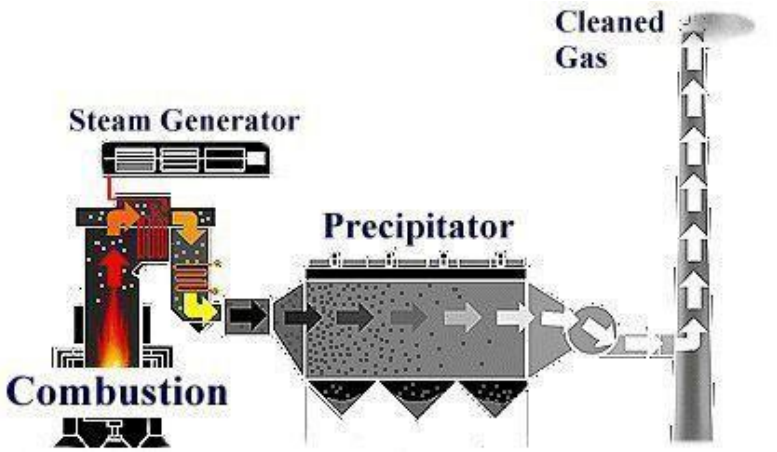
4. ESP

Electrostatic Precipitator (ESP) is one of the Boiler Auxiliaries in a Thermal Power Plant. The ESP equipment is a Pollution control equipment. The dust particles which is the waste output of the Thermal power plant will be allowed to pass through a number of pair of Negative and Positively Charged plates by means of feeding high voltage DC in between the plates. While the particles pass through these plates they get charged and get attracted to the opposite plates by means of the principle of Corona Discharge. The accumulated dust over a period of time is brought down by means of agitating the Plates. The ash from the down part of the ESP will be taken out of the plant through conveyors and the clean gas out of the ESP will be let out to the atmosphere through a Chimney. The ESP is picked up wide importance in the Steel, Cement & Sugar Industries apart from thermal power plants.

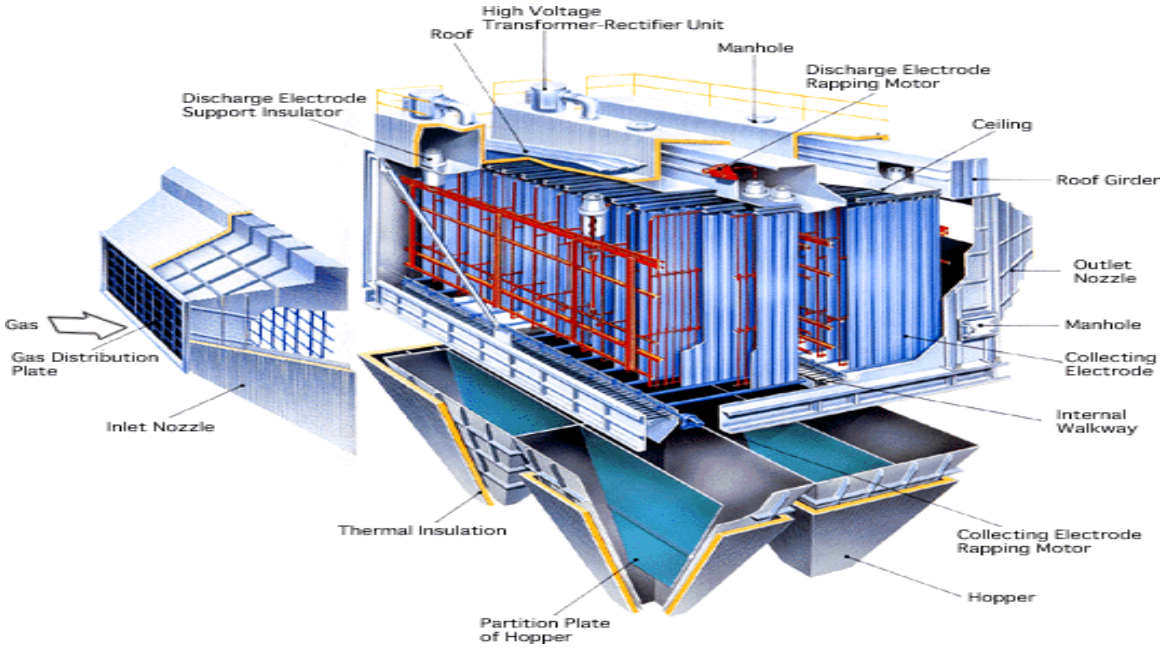
5. Electrics of ESP

ESP Charging is being done by means of High Voltage Transformers which are usually kept on the roof of the ESP. The High Voltage transformers houses High Voltage Rectifier, Diode Stack and the associated Electrical equipment like power disconnect switches and the necessary indicating instruments of any Transformer. The controls of the Transformer will be done by means of a thyristor control panel which will be housed in a AC control room. This technology is being followed by various manufactures all round the globe. Presently cost economics is playing its part in all walks of life including the technical products irrespective of its efficiency and social benefits.

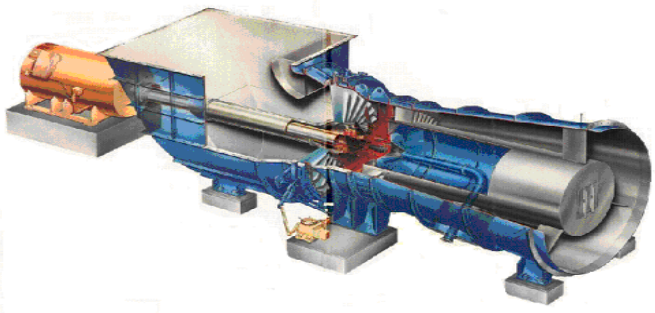
Power Plant General Layout



ESP Parts



Fan general arrangement



Platform

The EMS will be developed based on the available data of the material manufacturing at BHEL production shops, BHEL Anicllary works, BHEL sub vendor works. These data are captured from the respective agencies and made available in the company wide through a Oracle based RDMS System. All the items are dispatched to projects through road and rail which is executed by a separate shipping department. The existing data available has to be modified to the Erection department through a separate portal which can be monitored by all agencies. This involves writing coding / making necessary changes in the oracle data base in association with BHEL Ranipet Informatics centre.

Existing Practice

Erection department BHEL ranipet is involved in project execution of separate orders executed by BHEL Ranipet. The work commences when all the materials are made available at projects through the Commercial department. The Erection works are executed through mechanical and electrical contracts separately. The materials receipt at site are captured from the data base of the commercial department, shipping and engineering departments separately. The data of the different agencies are available in the oracle data base of the respective departments in separate portals. The cumulative despatches, pending manufacturing status, production status, ordering status etc., are viewed in the respective portal. Based on the reports cumulative dispatch and material receipt at site is made by Erection department to take stock of the material receipt at site to suitably commence erection works.

New Methods

Project execution in the current scenario warrants quick completion as time is the essence of any business. If projects are not executed in time then business will not come again. In particular BGEL is involved in project execution of thermal power plants in the country. Presently more than 60% of thermal power plants in the country are with equipments of BHEL. In Power business where power is very essential to common man, power projects are upcoming and demand of the market is to ultimately make power available to common man in the minimum possible time. In this venture Erection Management System has been conceived applying latest project management tools in the market. The EMS is to basically to use the available knowledge of the technocrats through an effective data management system. While doing the data management wherever activities can be automaised, simplified , eliminated, use of alternate technology/methods will be adopted.

Presently Materials manufactured and materials under manufacture and procurement initiation status envisaged for projects are required to be made available in single window. This is required to take appropriate action on Erection works commencement. Once this is available the erection works will be pictorial represented. The pictorial representation will represent the erection of various activities of the project which will be marked in the form of milestone activities. The milestone acivities of the project will be identified in the representation as dates which is normally mentioned as Zero date which is the date of receipt of clear PO and initial advance and commissioning date. Both these dates are as per the contract document of the customer. Any delay in the completion of milestones against target dates will be indicated in the representation. The related activities for the respective delays will also be indicted in the screen. This is to generate alerts to the respective agencies to take appropriate actions. This is presently not available online. The available data is captured and given to agencies offline. This offline arrangement is prone for mistakes and wrong communication. By making all the information related to projects online to the related agencies due attention will be given to project execution thereby enabling project completion in time. This will form the basis for development of Project Management System (PMS). The PMS will identify the spill overs, extra activities that can be avoided, adoption of latest tools for project activities etc., The PMS will also indicate the pitfalls in supply chain, logistics and production activities.