A Study Report on Industrial Visit to

Anjani Portland Cement Limited

By


Introduction:

Anjani Cement is one of the most popular cement brands in southern India and has become a household name in Andhra Pradesh. The Company was started in the year 1999 and before completion of a decade; Anjani has been awarded the ‘Fastest Growing Cement Company’ at Construction World Annual Awards in 2009. Starting with initial production capacity of 3 lakh tonnes per annum in 1999, the Company, with added infrastructure and state of the art technology, has increased its production capacity to 12 lakh tonnes per annum.

Anjani cement plant and infrastructure:

The plant is set up at Chinatalapalem village, at Nalgonda district in Andhra Pradesh. The Company has abundant mining reserves and the quality of limestone at Anjani mines is proved to be ‘the best’ in the cement cluster of Nalgonda district. The cement production technology of M/S NIHON of Japan has been cloned with a five stage pre heater and pre calciner for consistent and superior quality of cement. The production process is ‘Green Technology’ adopting the everse Air Bag House (RABH) technology for reduced pollution and dust free environment at the cement plant.
Its vision and mission:

Vision
To evolve as market leader in south India and stand for customer delight with consistent quality and service standards.

Mission
To be a symbol of professionalism and transparent human resource management practices to work out an optimum balance between employee security and stake holder satisfaction.

Abstract:
This report outlines the results of our observation in various departments at Anjani Portland cements Ltd during our industrial visit.

We went through various departments, technical and non-technical, and have collected detailed information on their respective functions and their impact on the outcomes of the company.

We have made an attempt to describe some of the things we came across during the course of time.

Non-technical: We went to non-technical departments like P&A, Time office and Weigh Bridge, stores, A/C and sales.

In TO and WB, we understood the way the company keeps track of the in time and out-time of their employees. We also observed the different shifts the company follows and their respective timings.
During our visit to P&A office we learned that they are responsible for maintaining health and safety of employees, their recruitment and training for increasing their potential and safety. Environmental safety also comes under their supervision.

In stores they have the items that are constantly needed for the industry and other regular items like nuts and bolts, bulbs etc... They always use standard items so that they can have them for longer periods of time.

We also visited the accounts department which majorly deals with cash, banks, and journals. They coordinate with all other departments and have a detailed record of production parameters, number of workers, work completion, pay sheet by personnel. Though the budget is prepared by HOD’s, this department takes care of the effective implementation of the plans.

Sales department deals with orders of customers and supplies appropriate amount of material to them will be a sales representative of the company for each region.

Different stages involved in the process of cement manufacturing are also covered in our industrial visit. We also had a brief discussion on the different machines used in this process like crusher, raw mill, kiln etc.

We visited different technical departments like mechanical, electrical, and instrumentation and also workshop in mechanical engineering department and learnt different machines like lathe, shaper, grinding machine.

Manufacturing of cement-process description:

Mines: Anjani Portland cement took a land of 142.14 acres for lease from the government; there are four benches in mining area. Breadth of each bench is 15m and its height is 3m. As we go down that means as the depth increases the concentration of limestone increases. Mining area is at a distance of 8km from the plant.
**Lime Stone Crusher:**

The crusher is meant for crushing the limestone from one meter size to less than 10mm. Crushing process consists of primary crusher followed by secondary crusher. Primary crusher, secondary crusher consists of vibrating screens. They act as sieves. Primary crusher crushes the limestone from one meter size to 70mm. Secondary crusher is meant for further crushing of limestone from 70mm to less than 10mm.

The capacity of crusher is 40tph. The crushing unit consists of buildings, control room, feeding hoppers, feeding equipment, conveyors, galleries, platforms, hand raling, deducting equipment, foundation etc.,

**Lime stone stock pile and transportation:**

The crushed lime stone of size less than 10mm is transported through conveyor to the limestone stock pile to stack under covered shed through tipper conveyor. From the limestone stock pile material with uniform quality will be transported to hopper through belt conveyor.
This entire process consists of control room, feeding and transport conveyors, galleries, platforms, bag filters, at all transfer points to control dust emission etc.

**Additive Crusher and Transportation:**

The crusher is meant for crushing the laterite; an iron ore to less than 10mm size and it will be stored in additives stock pile under covered shed. From additive stock pile, material is conveyed to additive hoppers through belt conveyors.

**Raw Mill & Ball meal preparation:**

Raw mill is a ball mill meant for grinding the limestone, laterite and iron ore of size below 10mm to less than 212 micron size this powdered material is called “raw meal” and is transported to storage silo.

The raw material preparation process is consisting of feed hoppers, conveyers, support for conveyers, control room, bucket elevators, fine particle separation equipment, platforms, separators etc.

**Blending silo & kiln feed extraction system:**

Storage silo is of concrete construction meant for storage of the raw meal powder produced by raw mill and also facilitate blending through aeration system to homogenize and maintain consistent quality of raw meal. Homogenized raw mill from the silo transported to kiln feed bin. From kiln feed bin the raw mill conveyed to the top of pre heater through belt conveyor.

The entire process consists of kiln feed storage bin, silo, level indicators, bucket elevators, compressors, pollution control equipment, and foundations.

**Coal crushing & transportation:**

Coal is the main fuel for manufacturing the clinker from raw meal. The raw coal from the coal hopper is conveyed to coal crusher through a series of belt conveyors. The coal crusher is meant for crushing the raw coal of size is less than 200mm to less than 10mm.

The entire process consists of covered sheds, feeding hoppers, crusher, control room, platforms, pollution control equipment, foundation.

**Coal mill, fine coal preparation & fine coal transportation to kiln & calciner:**

Coal mill is meant for pulverizing the crushed coal of size is less than 10mm size to below 212 micron size. Pulverized coal is called fine coal, it is transported to fine coal bins.

Entire process consists of ball mill. Grit separator for separating fine and coarse material, building with control room, bins blower, pollution controls equipment etc.

**Pre- Heater:**

Pre heater is a 7 storey building with pre- calciner, cyclones, mixing chamber, feed pipes and ducts. Kiln feed enters at a duct connect between 2nd and twin cyclones. This kiln feed is heated
from 70 degrees to 1000 degrees in pre heater itself. Hot gases from the kiln and fine coal fired in pre calciner will be utilized to heat the kiln feed to 1000 degrees before it enters in to kiln. Calcination is the dissociation of lime stone in to lime and carbon dioxide.

The pre heater consists of 7 storey building, steel cyclones, steel ducts, gates doors bucket elevators refractory bricks, blowers, compressors fans.

**Rotary kiln:**

Kiln is a long, steel tubular structure with refractory lining and is placed on support rollers to rotate at required speed. The hot material is heated in pre heater up to 900 degrees enters in to kiln inlet. The kiln will be in rotating condition with controlled speed and with pumping of fine coal and air from outlet of kiln. The entered hot material is converted at 1350-1400 degrees to clinker after passing through various phases

**Grate Cooler and ESP:**

This process consists of steel shell, supporting rollers, and refractors bricks, and drive motors, gear boxes and burner pipes, shell cooling towers. The cooler is meant for cooling hot clinker which is discharged from with 1100 to 150 degree centigrade by centrifugal fans. Ambient air is pumped in to cooler through fans at bottom side of grate pass through hot clinker bed. During the process the ambient air gains heat because of heat exchange between hot clinker and ambient air. Part of air enters in to kiln as secondary air at 1000 degrees and tertiary air at 800 degrees in to pre calciner and remaining air passes through ESP to id fan. The clinker moves on grate plate mechanism and by the time it reaches the clinker discharge, the hot clinker cools down.

**Thermax India is a company which produces some of the important products to this Anjani Portland Cement Limited -**

Some of them are as described below which we have visualized there in the factory -

**Bag Filters:**

**Online Pulse Jet Bag Filters**

In an online bag filter, bags are cleaned row by row, even when the dust laden gas is filtered. The sequence of cleaning is controlled automatically by a sequence controller. This operates the assembly of solenoid and pulse valves which direct the air flow into the manifolds. The holes are
jig drilled for perfect alignment with the venturi centre for achieving maximum cleaning efficiency.

**Offline Pulse Jet Bag Filters**

This mode incorporates the advantages of pulse jet bag filters, as well as that of a reverse air bag house. Each compartment is similar to an online pulse jet bag filter. The cleaning process consists of sequentially isolating each compartment and cleaning it with compressed air. All compartments are then cleaned automatically. Offline cleaning is suitable for light and fine dust and for larger volumes where the occurrence of fluidization is a distinct possibility.

The offline bag filter contains 4 to 6 bag filter compartments. Each compartment is similar to online bag filter. Gas flow through a compartment is stopped temporarily when the pulse cleaning of the bags is to be done. The dust dislodged from bags settles quickly in the hoppers because of absence of gas movement in the bag filter compartment. During this time the remaining compartments keep filtering the gases as usual. Each compartment is cleaned one after another in same manner.

The starting and stopping of gas flow through individual compartments is achieved through a compact pneumatic damper system. Generally the offline bag filter is employed for larger gas volumes.

**Reverse Air Bag House (RABH)**

Over the years Thermax has developed many fabric filtration systems, thereby achieving a number of significant breakthroughs and industrial application milestones on the way. On the Reverse Air Bag House front, these include the first installations for carbon black, cement kiln and sponge iron de-dusting applications built in India.

Other major applications handled, were for ferro-alloys and other metallurgical processes and lime kilns. These systems have been designed to clean emissions from various industrial processes and handle a wide range of gas volumes – from 60,000 m$^3$/hr to more than 10,80,000 m$^3$/hr. Depending upon the duct characteristics, Thermax offers the most economical and efficient cleaning method to minimize pressure drop across the bag house.

The Reverse Air Bag House (RABH) is a custom-built filter, designed for cleaning gases with typically high flow rates and high temperatures.

The typical Thermax RABH is modular in construction, with four or more independent modules – the modules being set in pairs, when the gas flows are on the higher side. The sealed air gap between the modules, adds to the insulation to increase operating economy. The extra space created by the hoppers provides a large passageway between rows down the middle of the system. This passageway is divided into three sections horizontally to make the inlet plenum, outlet plenum, and the reverse-air plenum.

This construction and operation of the units not only offers control on velocity profiles, but also facilitates on-line maintenance. Each module can be isolated for inspection or maintenance by closing the inlet, outlet and reverse air damper, while other modules are in operation. The units – being custom built and voluminous – are dispatched knocked down to structural’s and panels.
RABH and Bag filters used in Anjani Portland Cement Limited:

Reverse air bag housing is dusting equipment which separates the dust from pre heater exhaust gases. The kiln exhaust gas passes through pre heater and pre heater fan and then enters in to RABH.

The entire process consists of control room, building, steel, structure, bin, conveyors, fans, blowers and drag chain

Fly ash & gypsum storage and handling:

Fly ash is stored in a closed silo having MS hopper where as gypsum is stored in covered in a close shed to protect from rain. This material is added to clinker as per required percentage in the process of cement grinding.

Cement mill hoppers:

Cement mill hoppers is a concrete structures and is meant for storage and feeding for clinker and gypsum to facilitate consistent feeding to mills through conveyors.

Cement mills:

Cement mill is meant for grinding the clinker, fly ash and gypsum to a powder from around 320sq.mt/kg. The fine powder is called cement.

Cement silos:

Cement silo is a concrete structure and meant for storing the cement. The cement is transported from silo to packaging plant for bagging.

Packaging plant:

Packaging plant is meant for packing the cement in to bags and transports the bags in the trucks.

This completes our visit to the industry all over.

The next part of 2-3 hours deals with the theoretical session by Mr. Nagabhushan Rao Garu,project engineer where he dealt with the main concepts of designations of bearings, couplings, gears, etc. The hand calculations involved in knowing about the bag filters had also been dealt thereafter.
Conclusion:

If you are seeking a challenging career with a progressive company, consider Anjani Cement. They offer an unparalleled work environment in which we consider our employees to be our most valuable asset, seek to help them achieve their career goals and encourage creative thinking. Anjani Cement's focus on its employees results in a positive team environment and provides a superior opportunity for career advancement.

They have excellent opportunities for positive, results-oriented team players who are flexible thinkers, possess outstanding interpersonal skills, and enjoy an entrepreneurial environment. They offer career advancement and an outstanding benefits and compensation package.

So this tour made us to gain some knowledge relevant to subject as well as we had felt the essence of seeing and listening to the lecture at the ending!