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A Case Study of Cement Manufacturing Process: A Review

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Abstract - *The cement is the basic material for construction, which is made from a mixture of elements that are found in natural material such as limestone, marl and clay. Cement manufacturing is an energy and resource intensive process with both local and global environmental, health and safety impact. In this project, study about cement manufacturing process and identification of hazards from limestone (loading to dispatch). Manufacturing process can be divided into ten stages, various risk or problems associated in each stages causes harm. The purpose of the project is to minimize the risk and risk assessment techniques and methods can be implemented for cement manufacturing process. Hazards was properly identify and qualitative and quantitative methods which can be used for risk assessment technique were assessed. In this project five steps to conduct risk assessment to minimize the risks such as list the work task, identify the risk, estimate the risk, evaluate the risk ,record your finding and provide safety measures to provide proper implementation and to minimize the risk. Proper review is necessary at particular time to time, proper documentation process well managed about this project.*

***Key Words*: Cement production, Minimizing the risk, Implementation of Cement manufacturing process.**

1. INTRODUCTION

Cement Industry play an important role in the rapid growth and development of a country day by day because cement is used all type of construction activities. Cement is the infrastructure development sector of the world. On the basic of construction industry cement is an important role in the development of a country. cement is used in industrial installations such as foundation and control room, it is used in housing such as single story to multi story building, Infrastructure work and other irrigation structure such as dams etc. so cement is the basic material which is used in all type of construction.

Cement is a binding substance it sets, hardens, adhering them to other material bind together used for construction activities, it is an inorganic, non-metallic substance and also its hydraulic binding properties and also a good bounding agent in building material[13]. Cement is a fine powder, it is usually gray in color. Cement is mixed with water it forms of paste.

Four types of cement, study for my project point of view are as follows —-

1. OPC (Ordinary Portland cement)
2. PSC (Portland slag cement)
3. PPC (Portland pozzolana cement)
4. COC (composite cement)

Percentage Composition of raw mix is as shown in table 1 below.

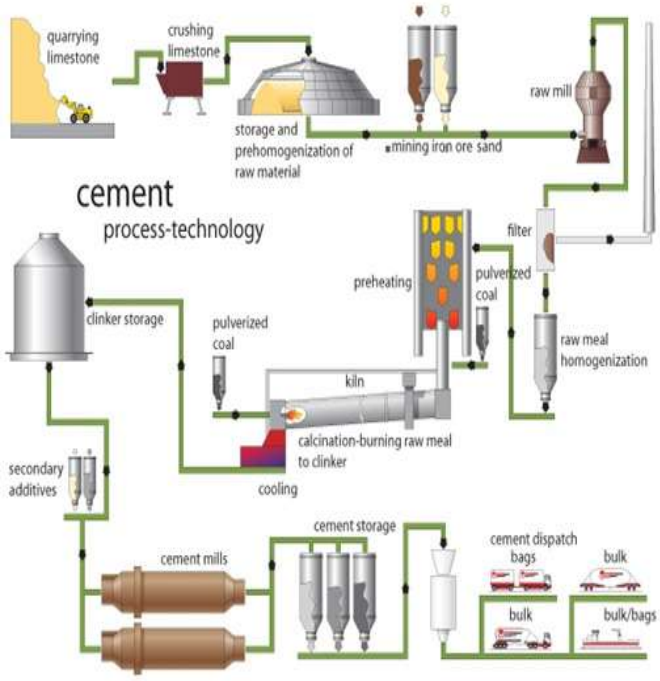
Table 1 : Cement Composition of raw mix

S. No.	Types of Cement	Mix Ingredient	% Composition
1.	OPC	Clinker + Gypsum	(95+5)%
2.	PSC	Clinker + Slag + Gypsum	(60+35+5)%
3.	PPC	Clinker + Fly ash + Gypsum	(60+30+10)%
4.	COC	Clinker + Fly ash + Slag + Gypsum	(60+20+15+5)%

Cement manufacturing Process divided in mainly in 10 stages:-

1. Mining.
2. Crushing.
3. Stacking and reclaiming.
4. Grinding in V.R.M.
5. Preheating in preheater.
6. Burning in kiln.
7. Cooling in cooler.
8. Grinding clinker with gypsum and fly ash.
9. Packing in packers.
10. Dispatch product.

The Layout of Cement manufacturing process is shown in figure1 below.



2. LITERATURE REVIEW

Cement play an important role in rapid growth and development of the country. Cement is very useful based on construction activities. Cement is a mixture of different element such as limestone, gypsum, clay silica. Gypsum control the setting time of cement.

Cox and Cheyenne formulated a safety assessment questionnaire for off shore environment, compare with instrumental devices in industrial sectors such as cement industry[1].

Cement manufacturing process huge amount of dust particulates such as coarse and fine which deteriorate surrounding air quality by increasing gases in various metrological condition of atmosphere this kind of investigation studied the suspended particles matter concentration in ambient air of cement industry, and reported air pollution.

Pradosh nath and P.R Bose explained Liberalization the case of Indian cement industry suggest that when working in cement industry, industrial workers are prone from hazards. Various stages of manufacturing process every stages hazards related personal protective equipments, unsafe condition for doing work. Workers are exposed to hazards in their workplaces affects the health[2].

At each and every stage of production phases from limestone to dispatching of cement various types of hazard takes place which can damage human health and create many kinds of disease. High amount of hazards should be created during cement manufacturing process affects the productivity of cement industry an output is lost. Hazard faced in each and every stage mining, crushing, staking and reclaiming, grinding, calcination stage, cooling, material, storage and transportation system. In that production process high risk and hazard created affects industrial workers. Hazard faced in our working environment is noise dust, vibration and emergency response to highlight the impact of changing environment pattern on the level and growth of productivity and efficiency in the industry.

Carder and Ragan formulated management demonstration of commitment to safety, education and knowledge at the workplace, effectiveness of the supervisory process[3].

Evelyn, Florence and Adrian finding revealed accidents. More over health safety policy statement should contain its aim. These following points considered safety policy[4].

1. Safety precautions can be taken from time to time.
2. Personal protective equipment is necessary each and every stage at production process.
3. Standard operating procedure is maintained.
4. Health and safety program conducted.
5. Supervision, training program conducted, risk assessment, information gather these are the basic requirements of health and safety.
6. To use a safety committee.
7. Safety welfare program be conducted, the aims should cover health and safety and environmental issues.

Chung and wee explained research and development of cement manufacturing process, marketing, promotion, education and recycling activities[5].

Nuns and Bennett, preparing an investment decision making, Eco management combined, concept of multi criteria decisions[6].

Flanagan, as cited by Radinsky, Risk engineering is an important role in cement manufacturing process to eliminate the hazards, examine the performance, to analysis the losses, identify the hazards, providing recommendation, proper record keeping maintained (previous records), Risk engineering. Control all the tasks such as guarding information, behavior of works to mining the risk and provide safety measures[7].

Udai.singh chouhan - Continuous improvement day by day to increase the efficiency, In cement manufacturing process to eliminate all wastages. In cement manufacturing process raising etc. quality of product, the cost should be minimize, improving delivery of product, reducing wastages[8].

Implementation of cement industry day by day to increase the productivity beneficial for our future. New

technique be developed to proper control cement manufacturing process. To proper continuous improvement of production process. Input, output and process control management [9].

Aven T. suggest that to control risk in cement manufacturing plant our working operation should be safe and reliable without any disturbance. Risk evaluation is access any from time to time to provide safety and beneficial for future development our work should be safe and reliable and easily handling of manufacturing process by using simple techniques and easy procedure maintained to provide proper satisfaction[10].

Occupation health and safety point of view, in the cement plant health and safety environment created to provide proper satisfaction among the workers. Healthy and safe environment built up so our productivity is increased and also proper control of cement manufacturing process.

In cement industry pollution prevention is necessary to provide safe and healthy environment built up. To control cement manufacturing process pollution free system should be developed and various safety precautions and guidelines conducted[11].

Environmental impact is the major effect on human health as well as plant various types of unwanted substances and major prone areas they create unhealthy and unsafe environment and provide various kinds of diseases, injury problems and some times death related problems. So Environment protection is necessary to eliminate poor environment parameters safety devices should be used safe and reliable work practices.

Akosman , Cevdet and Vedat Karahan explained that proper guidelines and safety precautions can be development to assess the risk. Environment protection agency manage and control all the issues regarding unhealthy and offshore environment. So environment protection is necessary day by day activity performance[12].

Health and safety council suggests that our environment should be sage and proper working condition with our any disruption environment hazards proper control by simple and new techniques develop to control the environmental. Risk assessment techniques be developed which provide health and safety environment built up.

3. APPLICATION OF CEMENT

On the basis of construction activity, application of Cement are as follows:-

- Industrial installation foundation and control rooms.
- Housing single storey to multi storey building.
- Infrastructure highway, road, railway system.
- Irrigation structure dams.

4. CONCLUSION

In this project we study about cement manufacturing process and identification of hazards at each and every stages of cement manufacturing process. major prone areas working that part using risk assessment techniques and methods to minimize the risks and control measures. In the next semester six basic steps to conducting risk assessment to minimize the risks and control cement manufacturing process and the implementation of cement manufacturing process.

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