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Gypsum Plaster

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Gypsum Plaster

Submitted in partial fulfilment of the requirements of the degree of

Bachelor of Technology

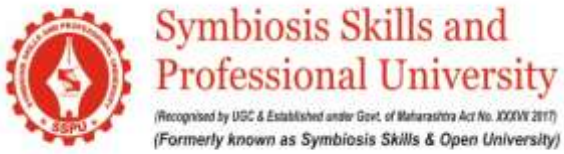
By

Shriyash Bhondve

(PRN. 1700401022**)**

Under the Supervision of

Dr. Anirudhe Dhubhal



Department of Construction Engineering & Management

School of Construction Engineering & Infrastructure Management

Symbiosis Skills and Professional University, Pune

2020

SYMBIOSIS SKILLS AND PROFESSIONAL UNIVERSITY
SCHOOL OF CONSTRUCTION ENGINEERING & INFRASTRUCTURE MANAGEMENT

Symbiosis Skills and Professional University
(Recognised by UGC & Established under Govt. of Maharashtra Act No. XXXVII 2017)
(Formerly known as Symbiosis Skills & Open University)

PUNE

DEPARTMENT OF CONSTRUCTION ENGINEERING & MANAGEMENT

CERTIFICATE

This is to certify that the following student has satisfactorily carried out the seminar report of B.Tech entitled **"Gypsum Plaster**" .This research seminar work is being submitted for the B.Tech Course Work of Construction Engineering. It is submitted in the partial fulfilment of the prescribed syllabus of Symbiosis skills & Professional University.

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Date-04/04/2021

Place-Symbiosis skills & Professional University Pune.

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ACCEPTANCE CERTIFICATE

The seminar entitled **"Gypsum Plaster"** submitted by **Mr. Shriyash Bhondve (PRN. 1700401022)** may be accepted for evaluation.

Dr. Anirudhe Dhubhal

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Date: 04/04/2021

DECLARATION

I declare that this written submission represents my ideas in my own words and where other's ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will cause for disciplinary action by the university and can also evoke penal action from the sources which have not been properly cited or from whom proper permission has not been taken when needed.

Shriyash Bhondve

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ABSTRACT

Alabaster is a form of gypsum used both in building and as a plaster material. Gypsum were discovered near Paris, and “Plaster of Paris” became a popular building material. Gypsum plaster are investigated experimentally at fire temperatures with respect to their thermo physical properties i.e., thermal conductivity, effective heat capacity and density. It is shown that depending on different ingredients (carbonates) different endothermic reactions occur between room temperature and 900°C. These reactions strongly influence the temperature dependence of the mentioned properties which in turn affect the response of the material to fire. Based on these experimental results the thermal reaction of a gypsum-protected steel column in fire is modelled for the four types of gypsum. The results of numerical simulations demonstrate clearly the advantages caused by certain ingredients of the chemical composition of gypsum plaster.

ACKNOWLEDGMENT

It gives pleasure to express my gratitude with sincere thanks and appreciation, to Dr. Anirudhe Dhubhal his kind suggestions and supporting us to carry out this seminar work. This seminar work has helped me to improve my technical knowledge as well as my performance.

Once again I wish my grateful thanks for encouraging me to take interest in this seminar. This has improved my technical knowledge along with software knowledge.

Lastly I express my heart full thanks to all my colleagues and all those who have directly or indirectly involved my project and supported me to complete this seminar successfully.

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CHAPTER 1
INTRODUCTION

1.1 Background

Gypsum demands for rapid construction of housing brought It led to sharp increase in the demand for gypsum After a barracks fire tragically took the lives of several servicemen, gypsum board's fire-resistant qualities made it the preferred choice in housing. Because gypsum offered significant advantages over traditional heavy masonry and concrete, the gypsum industry focused on expanding its use in commercial construction. To meet the demands of high-rise building, the industry developed gypsum board shaft wall systems and movable partitions systems as well as improved fire resistance. The tallest buildings in the world at that time the John Hancock Tower, at 100 stories, and the Sears Tower, at 110 stories used gypsum board in construction.

1.2 Objectives

1. To Study Uses of Gypsum Products in plaster of Internal walls.
2. To understand The Modern Use of Gypsum in Construction.
3. To Study Gypsum Products Unique Properties.
4. To suggest The Gypsum Products in construction.

1.3 Scope of work

1. Study Properties And Uses Of Gypsum Plaster.
2. Study Making Gypsum Board.
3. Study Rotary Kiln, Kettle Kilns.

1.4 Motivation of work

1. To maintain low water usage and saves construction time.

2. Gypsum plaster has lower impact on environment.
3. Desire to give Better heat insulation with Gypsum Plaster.
4. To make pollution free and healthy environment.

CHAPTER 2
LITERATURE REVIEW

2.0 Introduction

Uses of gypsum is one of new way for plastering. we are slowly adopting this method it provide speed, quality, cost saving and smooth finish. This method previously was used only in big projects or commercial projects but now this method is used in residential too it saves time money and also provide a good surfaces for painting. It is easy to apply and maintenance of this material required after 7 to 8 years in some places it's also go to 10 years. So overall view for use of gypsum for plaster and gypsum board for walls is a good idea.

Gypsum is a rock like mineral commonly found in the earth's crust, extracted, processed and used by Man in construction or decoration in the form of plaster and alabaster. During the time of the Pharaohs, Gypsum was used as mortar in the construction of the Cheops Pyramid (3000 B.C.) Colour- transparent to white and can be of grey, green ,pink, blue and red because of impurities

2.0.1 **PRODUCTION STEPS**

1. Excavating
2. Crushing (25 mm diameter)
3. Grinding
4. Heating
5. Cooling and Pulverizing
6. Marketing in Bags.

CALCINATION (Heating)

Gypsum rock when heated to 100-190°C looses ¾ of its water.

$$CaSO4 .2H2O \rightarrow CaSO4 .½H2O + 3/2\ H2O$$

Plaster of Paris This is low burning process and named as INCOMPLETE CALCINATION.

When calcination is carried out at temperatures above 190°C all water is removed.

$CaSO_4 .2H_2O \rightarrow CaSO_4 + 2H_2O$

gypsum anhydrite This is high-burning process & COMPLETE CALCINATION.

Both of these products form gypsum rock by recombining with water.

Calcination process is carried out in two types of kilns.

Figure 2.1 Kettle Kilns

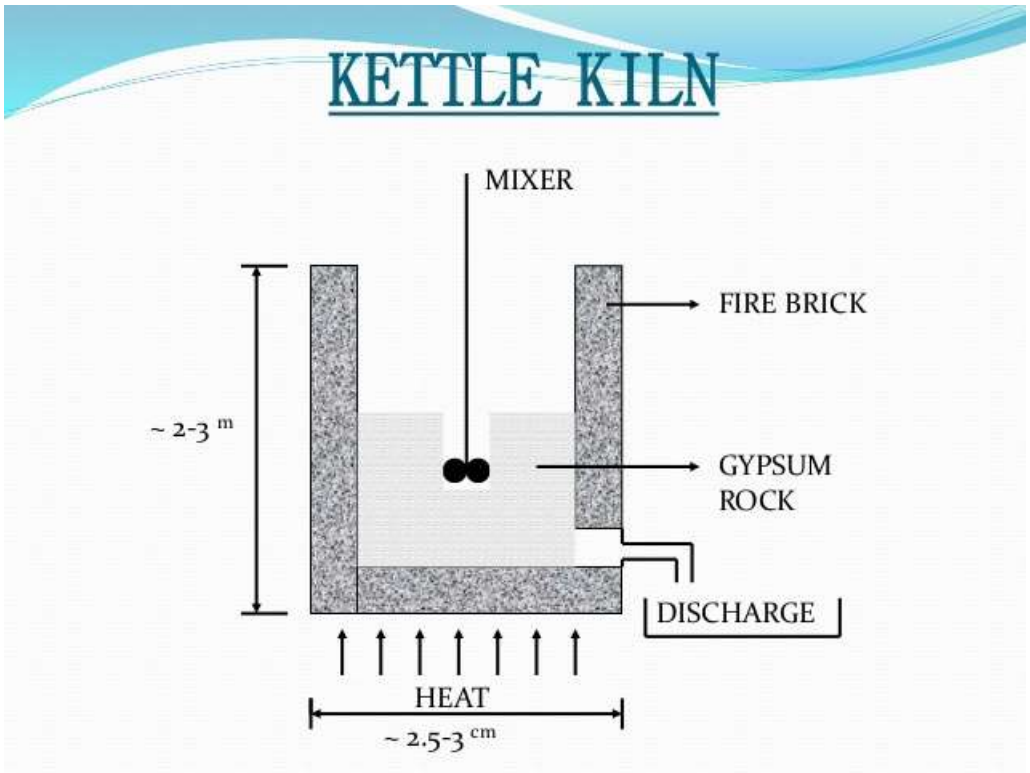

Figure 2.2 Rotary Kilns

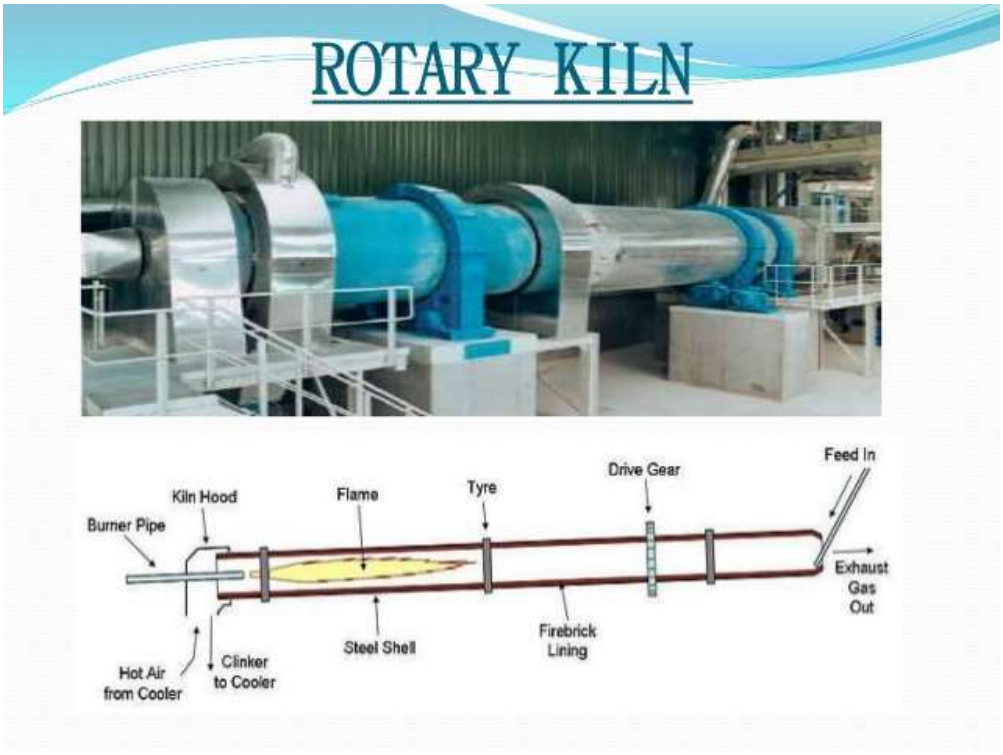

Table 2.1 MARKET STUDY

•THE COMPANIES THAT MARKET GYPSUM PRODUCTS ARE:-

AEROSTONE, VANS GYPSUM, SAINT GOBAIN GYPROC, INFINITE IMPEX, ETC. • GYPSUM IN MARKET IS AVAILABLE IN BOARD FROMS OR SQUARE TILE FORMS

• THE AVERAGE GUARANTEE GIVEN TO THESE PRODUCTS IS NEARLY 30 YRS.

Table 2.1 MARKET STUDY OF GYPSUM AND SAND MATARIAL.

TYPE	INTERNAL PLATER	SIZE IN FT	PRICE SQFT	PRICE INR/BOX
GYPSUM	POP	10’ X 10’X 0’1”	18.12	1812
SAND	M. SAND	10’ X 10’X 0’1”	21.64	2164

Table 2.2 MARKET STUDY OF GRG TILES MATARIAL.

TYPE	RANGE	SIZE IN MM	PRICE INR/TILE	PRICE INR/BOX
GRG TILES	REGULAR	595 X 595 X 7	99.62	796.94
	MEDIUM	595 X 595 X 15	156.21	937.27
	HIGH	595 X 595 X 29	382.38	1147.43

Table 2.3 MARKET STUDY OF GRG BOARD MATARIAL.

TYPE	RANGE	SIZE IN MM	PRICE INR/TILE	PRICE INR/BOX
GRG BOARD	REGULAR	1830 X 1220 X 9	16.82	403.62
	HIGH	1830 X 1220 X 12.5	20.64	495.30

CHAPTER 3
CONCLUSION

- The modern use of Gypsum as a building material was discovered in 1888 when the American Augustine Sackett invented a machine for producing plaster boards (also known as wallboards and dry walls) composed of several layers of paper with Gypsum in-between.
- Due to the natural composition of Gypsum, gypsum plasterboards are inherently fire resistant and easy to apply so can be use for plaster
- Cost of Gypsum as compared to sand is less and also greet speed of work is achieve
- Cost of Gypsum For 100SQFT is 2100 and M. sand 2600 over all 500rs difference.
- Over all Gypsum is a better option for plaster in all type of works.

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