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Functions of Industrial Cement Components with their Benefits and Limitations

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Abstract

Solid industry expect a fundamental activity in the unforeseen development and improvement of India. It is limiting substance required while building something. In this paper we are looking at changed kinds of fixings and the extent of these fixings that are be used in Portland concrete. In this paper we moreover discussing the convenience of these fixing.

I. INTRODUCTION

Silicate concrete is a standard Portland concrete, in which the shade of concrete delivered utilizing it resembles trademark rocks on the British island of Portland. For the Portland concrete, the rough material contain 3 basic fragment that is calcium oxide(approx. 60%), silicon dioxide(22%) and alumina(10%). The calcium oxide starts from limestone, while silica and alumina begin from shale, mud and bauxite. The unrefined materials moreover contain iron oxide, magnesia, calcium sulfate, etc.

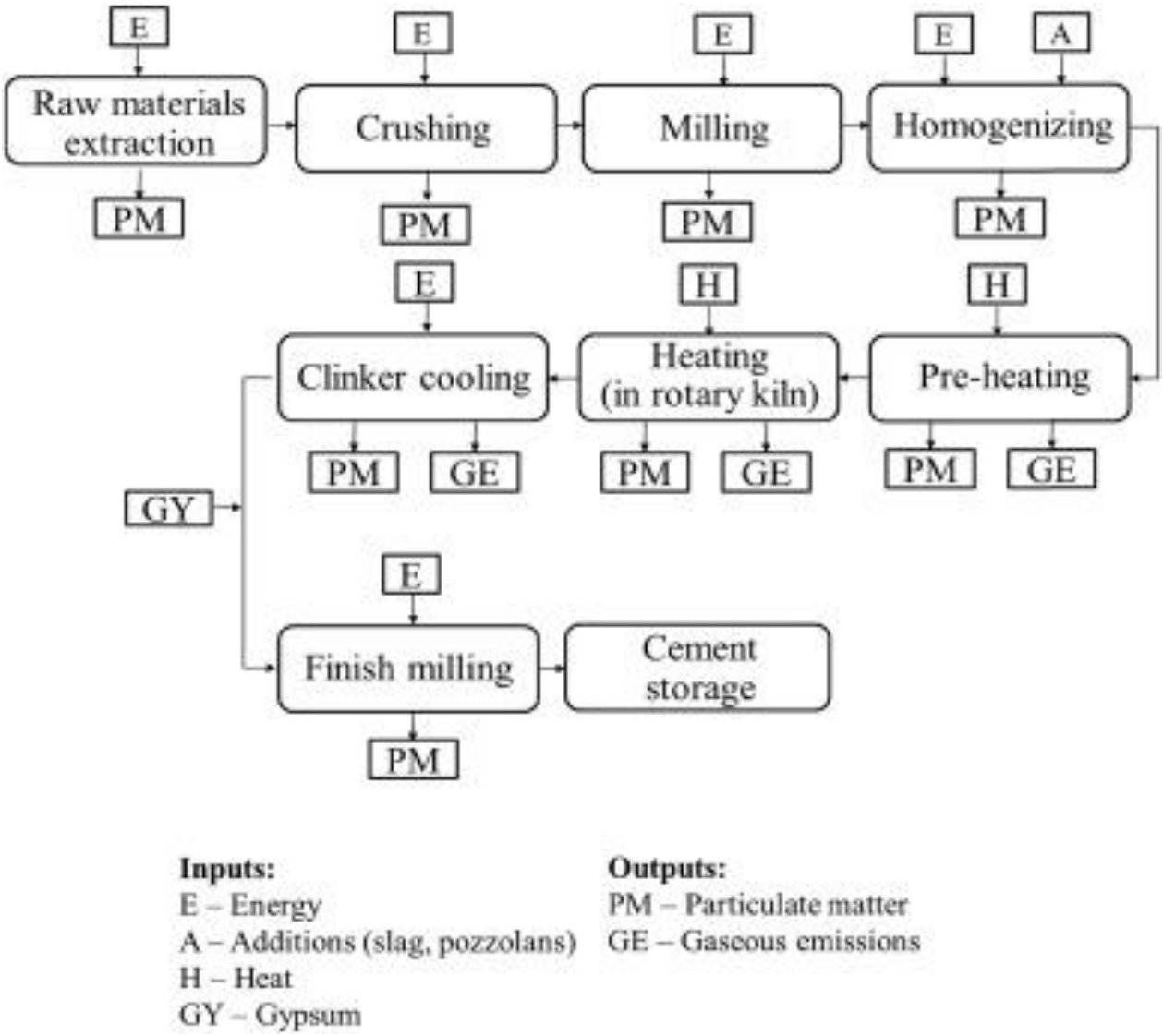

Fig 1: Portland cement

II. FUNCTIONS OF CEMENT INGREDIENTS

Every ingredient imparts various properties to the cement. The proper ratio of various ingredients of cement produces the good quality of cement

(1) Lime (CaO):

It is most significant ingredient of cement and its ratio has to wisely maintain. The cement comprises 62 to 67% of lime in it. It is acquired by limestone, chalk, shale and so on. The suitable amount of lime in cement forms the silicates and aluminates of calcium. The deficiency

of lime decreases the strength of cement also decreases the setting time of cement and access quantity of lime in cement becomes unreliable as well as development and crumbling of cement.

TABLE 1:

RANGE OF CEMENT INGREDIENTS

Ingredient	Per cent	Range
Lime	(CaO)..... 62	62 to 67
Silica	(SiO_2)..... 22	17 to 25
Alumina	(Al_2O_3)..... 5	3 to 8
Calcium sulphate	($CaSO_4$)..... 4	3 to 4
Iron oxide	(Fe_2O_3)..... 3	3 to 4
Magnesia	(MgO)..... 2	1 to 3
Sulphur	(S)..... 1	1 to 3
Alkalies	 1	0.2 to 1
	Total..... 100	

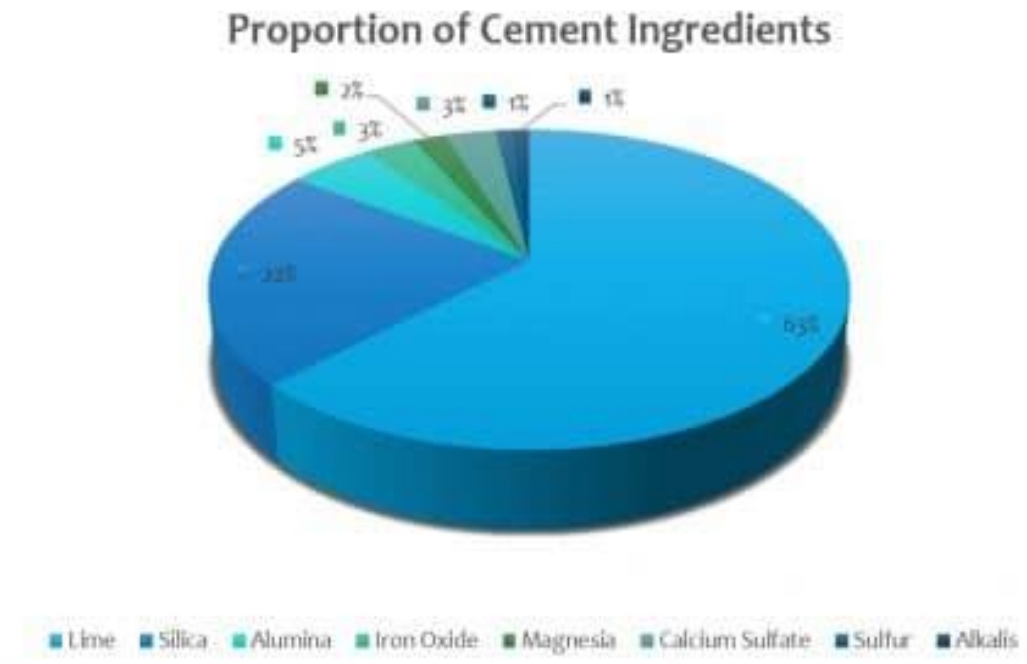

Fig 2: cement ingredients

(2) Silica (SiO_2):
It is also the main ingredient of cement which is about 17 to 25%.

(3) Alumina (Al_2O_3):
This ingredient imparts quick setting property to the cement.

(4) Calcium Sulphate ($CaSO_4$):
It is present in the form of gypsum in the cement and found composed with limestone.

(5) Iron Oxide (Fe_2O_3):
The property of this ingredient imparts colour, hardness and strength to the cement.

(6) Magnesia (MgO):
Excess quantity makes the cement unsound and also reduces the strength of the cement .

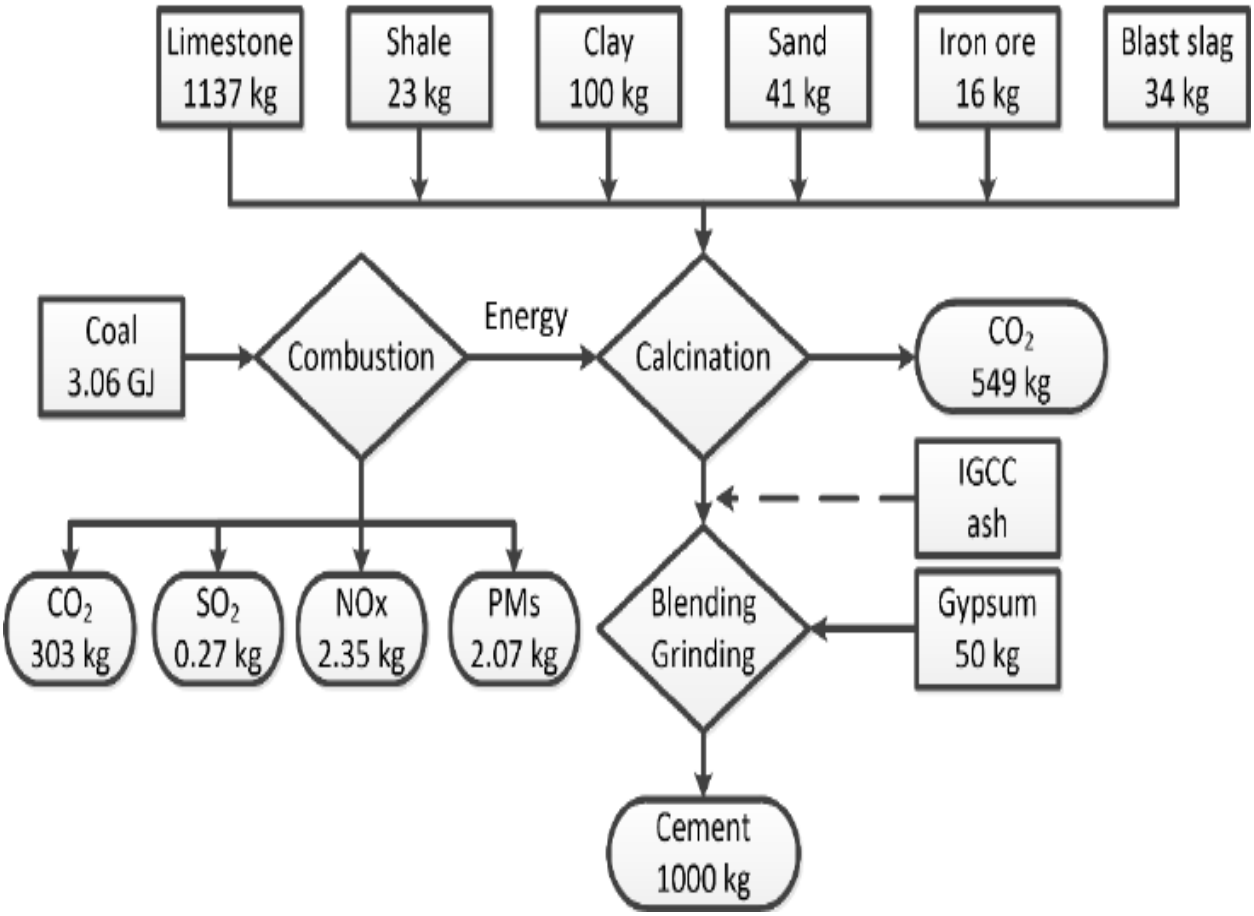

Fig 3: Conventional Portland cement production

III. CONCLUSION

In this paper, we have discussed about the Portland cement and function of ingredients used in manufacturing the Portland cement. In this paper we have also calculated the ratio of various cement ingredients with its properties. The possible reasons for variation in chemical compositions and their consequences have been discussed.

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