

# Various Chemical Properties and Advantages of Green Cement Manufacturing

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## Abstract

It is an idea of using environmentally friendly materials in concrete, to make the system progressively supportable. These are referred to as the useless energy in their production and produces less CO<sub>2</sub> which causes Global Warming. Concrete wastes like slag, power plant wastes, recycled concrete, mining and quarrying wastes, waste glass, burnt clay, sawdust, combustor ash and foundry sand.

**Keywords:** Recycled concrete Lime, clay etc.

## I. INTRODUCTION

Green concrete is a eco-friendly because it is made by the concrete waste so it is also called eco-friendly concrete. Green cement is all the time and furthermore modest to create, in light of the fact that for instance, waste items are utilized as a partial substitute for concrete, charges for the removal of waste are avoided, and robustness is greater. Its making reduces cement intake, and its major raw materials include discarded industrial wastes like blast furnace slag and fly ash. Carbon dioxide emitted throughout the built-up process is considerably reduced. The cement has come up with certain formulas where Saltwater or even Wastewater can be effectively used at places where fresh water is not in abundance. Green cement will offer low cost and quality benefits in future.

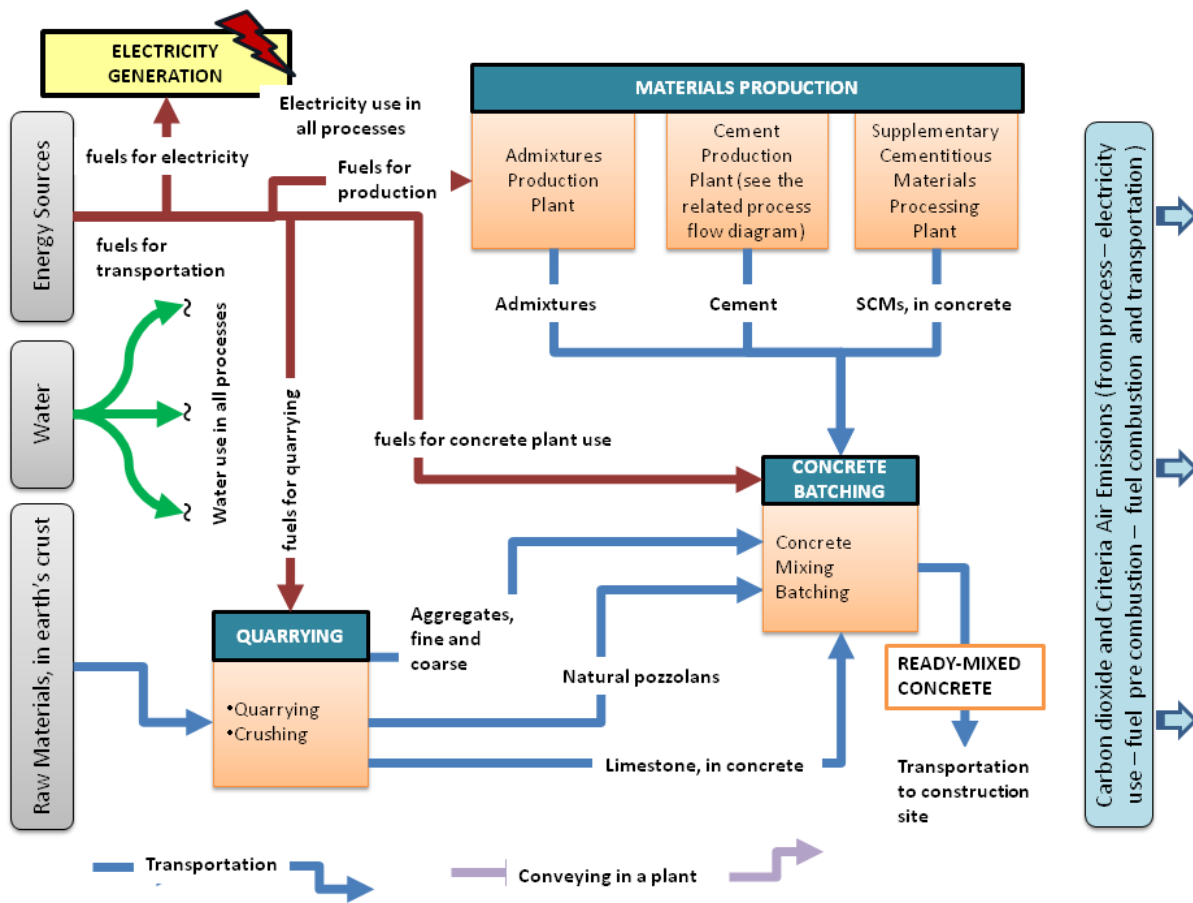


Fig 1: green cement manufacture process

Table 1

Physical Properties of Quarry Rock Dust

Property	Quarry Rock Dust
Specific gravity	2.54-2.60
Bulk relative density (kg/m <sup>3</sup> )	1720-1810
Absorption (%)	1.20-1.50
Moisture content (%)	Nil
Fine particles less than 0.075 mm (%)	12-15
Sieve analysis	Zone II

**Table 2**  
**Chemical Properties of Fly Ash**

Sl. No.	Test Conducted	Observed Values (%)	Requirement as per IS:1320-1981
1	Loss of Ignition	2.32	5.0(max)
2	Silica as SiO <sub>2</sub>	42.04	SiO <sub>2</sub> + Fe <sub>2</sub> O <sub>3</sub> + Al <sub>2</sub> O <sub>3</sub> =70
3	Iron as Fe <sub>2</sub> O <sub>3</sub>	4.40	-
4	Alumina as Al <sub>2</sub> O <sub>3</sub>	33.60	-
5	Calcium as CaO	12.73	-
6	Magnesium as MgO	0.00	5.0
7	Sulphate as SO <sub>3</sub>	0.40	3.0
8	Chloride	-	
9	Lime Reactivity	4 N/mm <sup>2</sup>	4.5

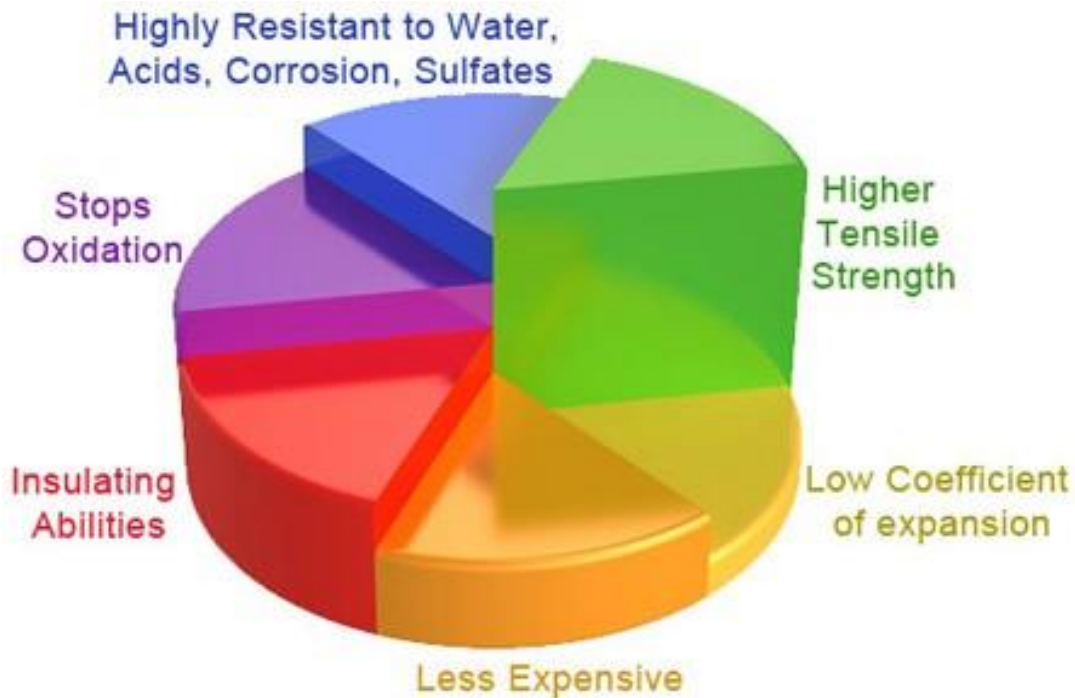
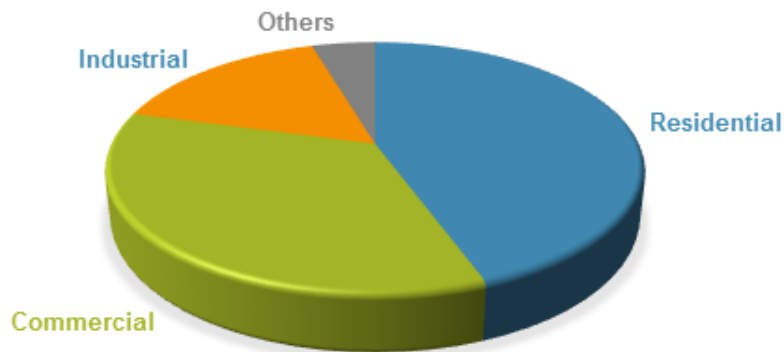


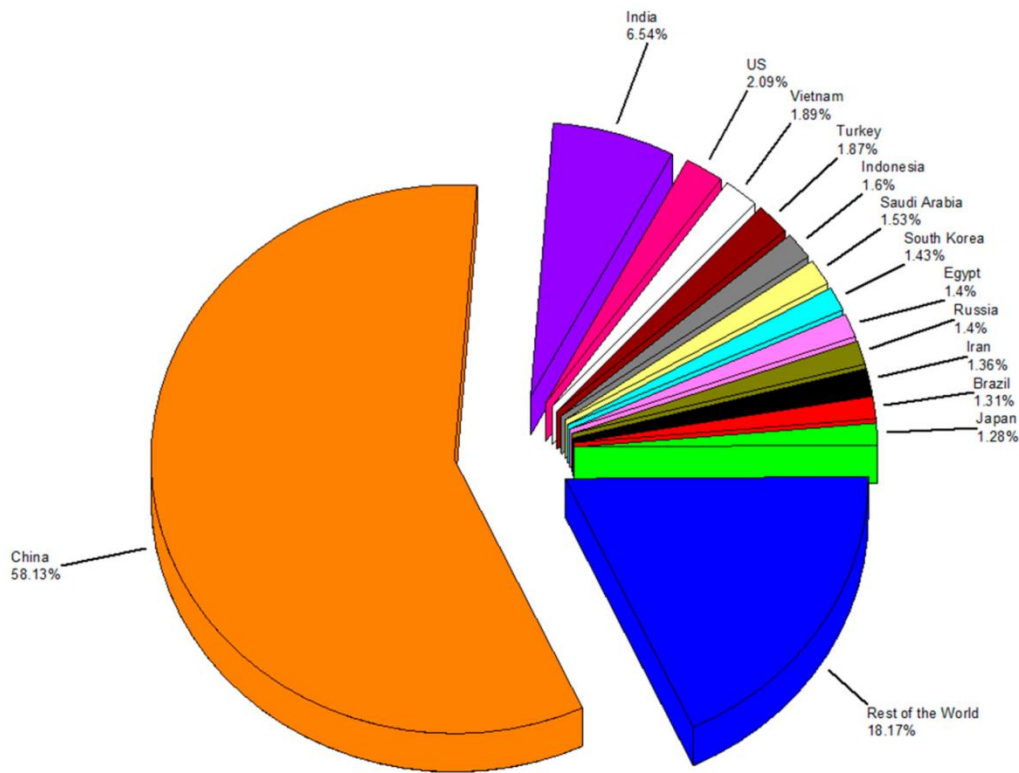
Fig2: benefits of green cement

## II. ADVANTAGES OF GREEN CEMENT

S.no.	concept	Advantages
1.	Workability	Green concrete having better workability than conventional concrete.
2.	CO <sub>2</sub> Emission	Reduction of the concrete industry's CO <sub>2</sub> -emmission by 30 %.
3.	Waste Product	Increased concrete industry's use of waste products by 20%.
4.	environmental pollution	NO environmental pollution and sustainable development.
5.	maintenance	Green concrete requires low maintenance and repairs.
6.	resistant	Good thermal resistant and fire resistant.
7.	Compressive strength behavior	Compressive strength behavior of concrete with water cement ratio is similar to conventional concrete.
8.	strength, durability, and elasticity	The product has higher strength, durability, and elasticity which makes the concrete everlasting and low maintenance.
9.	less energy	Green Cement requires significantly less energy to produce, thus leaving a substantially smaller carbon footprint.
10.	cost-effective	The manufacturing process of Green cement does not involve the use of large energy-intensive kilns which makes it cost-effective.

### GLOBAL GREEN CEMENT MARKET SHARE, BY APPLICATION 2025





**Fig 3.** Global cement production

### III. CONCLUSION

This paper shows that it will not only reduce the emission of CO<sub>2</sub> in environment and environmental impact but it is also cost-effective to produce in future. In this paper we have discussed the various chemical composition of green cement with benefits and limitations.

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