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GREEN CONCRETE: NEED OF ENVIRONMENT

D.B. Desai[1], A.K. Gupta[1] and Pradeep Kumar[2]

Dr. J. J. Magdum College of Engineering, Jaysingpur[1]
Harcourt Butler Technological Institute, Kanpur[2]

ABSTRACT

In this review paper the need of the usage of Green concrete in construction industries has been made. Few researchers made an attempt to study durability of green concrete compared with the natural sand concrete. Green concrete has capable of application of industrial wastes to reduce consumption of natural resources and energy and pollution of the environment. Marble sludge powder can be used as filler and helps to reduce the total voids content in concrete. Natural sand in many parts of the country is not graded properly and has excessive silt on other hand quarry rock dust does not contain silt or organic impurities and can be produced to meet desired gradation and fineness as per requirement. Consequently, this contributes to improve the strength of concrete. Green concrete is an effective way to reduce environment pollution and improve durability of concrete under severe conditions

Keywords: Green concrete, to reduce consumption, reduce environment pollution, durability.

NEED OF GREEN CONCRETE:

Cement-based materials are the most abundant manufactured materials in the world. Today's exciting trend is the Green building is in our country. The potential environmental benefit to society of being able to build with green concrete is huge. Green Concrete as the name suggests is eco friendly and saves the environment by using waste products generated by industries in various forms like rice husk ash, micro silica, etc to make resource-saving concrete structures. [2, 6, 11] Use of green concrete helps in saving energy, emissions, waste water Green concrete is very often also cheap to produce as it uses waste products directly as a partial substitute for cement, thus saving energy consumption in production of per unit of cement. Over and above all green concrete has greater strength and durability than the normal concrete. It is realistic to assume that the technology can be developed, which can reduce the CO_2 emission related to concrete production. Generally the construction industry accounts for a massive environmental impact due to its high demand of energy. As a result of the awareness built during the past few years about green house effect and damage to the nature, more people and countries became conscious about their future. Traditional ready-mix concrete is a significant cause of production of Green House Gases, less in regards to GHG emissions per m3, but in particular in regards to the high quantity produced world-wide. [2, 4, 5, 12] New available technologies allow the use of different types of concrete and advanced ways of

production which represent a lesser hazard to the environment.

Green concrete capable for sustainable development is characterized by application of industrial wastes to reduce consumption of natural resources and energy and pollution of the environment. Marble sludge powder can be used as filler and helps to reduce the total voids content in concrete. Natural sand in many parts of the country is not graded properly and has excessive silt on other hand quarry rock dust does not contain silt or organic impurities and can be produced to meet desired gradation and fineness as per requirement. Consequently, this contributes to improve the strength of concrete. An attempt has been made to durability studies on green concrete compared with the natural sand concrete by usage of quarry rock dust and marble sludge powder as hundred percent substitutes for natural sand in concrete.[6, 8, 13]

Recent focus on climate change and the impact of greenhouse gas emissions on our environment has caused many to focus on CO_2 emissions as the most critical environmental impact indicator. This problem made researchers to put efforts to reduce greenhouse gas emissions [9, 14, 23]

Advantage of green concrete:

It is found that the compressive, split tensile strength and durability studies of concrete made of quarry rock dust are nearly 14 % more than the conventional concrete. The concrete resistance to sulphate attack was enhanced greatly. [9] Concrete remains less harmful than most other common building materials, but as the quantity of concrete used in construction is fairly higher than the quantity used of other building materials. [14, 23]

Application of green concrete is an effective way to reduce environment pollution and improve durability of concrete under severe conditions. Green concrete is very often also cheap to produce, as the waste products are used as a partial substitute for cement, charges for the disposal of waste are avoided, energy consumption in production is lower, and durability is greater. Waste can be used to produce new products or can be used as admixtures so that natural sources are used more efficiency and the environment is protected from waste deposits.

GREEN CONCRETE TECHNOLOGIES

It is a concept of thinking environment into concrete considering every aspect from raw materials manufacture over mixture design to structural design, construction, and service life. Traditionally the Concrete industry has been considered a major producer of GHG emissions, mainly due to the high environmental footprint of cement. The carbon footprint is a measure of the quantity of carbon dioxide emitted through fossil fuel combustion. It is often expressed as tons of carbon emitted per annum. [12, 22, 24]

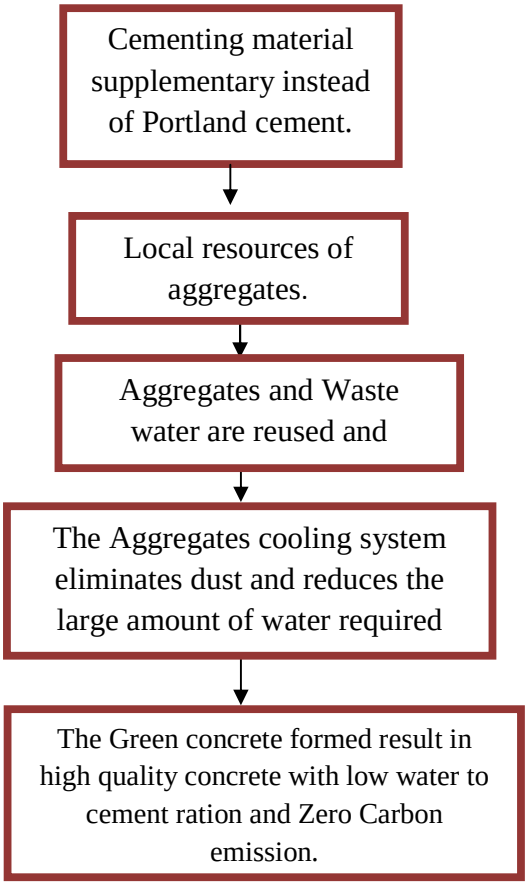

Fig 1: Green concrete concept. [15]

In India the extractive activity of decorative sedimentary carbonate rocks, commercially indicated as Marbles and "Granites", is one of the most thriving industry. Marble sludge powder is an industrial waste containing heavy metals in its constitutes. Stone slurry generated during processing corresponds to around 40%of the dimension stone industry final product. This is relevant because dimension stone industry presents an annual output of 68 million tons of processed product. [2] Pravin Kumar et al [22] used quarry rock dust along with fly ash and micro silica in self compacting concrete (SCC) and reported satisfactory strength gain. A. E. Ahmed et al. [2] Studied the influence of natural and crushed stone very fine sand (finer than 75 micron) on the performance of fresh and hardened concrete. The ordinary stone dust obtained from crushers does not comply with IS: 383-1979. The presence of flaky, badly graded and rough textured particles result in hash concrete for given design parameters.[12, 13, 14, 15] Use of quarry rock dust as a fine aggregate in concrete draws serious attention of investigators. Marble powder has a very high Blaine fineness value of about 1.5 m2/g with 90% of particles passing 50 µm sieves and 50% under 7 µm. [19, 22] The maximum compressive and flexural strengths were observed for specimens containing a 6% waste sludge when compared with control and it was also found that waste sludge up to 9% could effectively be used as an additive material in cement. [2, 14, 15, 18, 19]

M shahul hameed et al [14] shows that the addition of the industrial wastes improves the physical and mechanical properties. These results are of great importance because this kind of innovative concrete requires large amounts of fine particles. Due to its high fineness of the marble sludge powder it provided to be very effective in assuring very good cohesiveness of concrete. From the above study, it is concluded that the quarry rock dust and marble sludge powder may be used as a replacement material for fine aggregate.[19, 21]

Overall Green building material selection criteria depends upon Resource efficiency, Indoor air quality, Energy efficiency, Water conservation, Affordability. The sustainable development of green concrete and its manufacturing will be a landmark for the construction industry as concrete besides steel is the most common construction material in the world and counts for a significant part of environmental damage. This Technology is developing the way for concrete to leave behind its image of being a polluting material to become an indispensable element in sustainable construction projects.

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