A Review Paper on Green Concrete

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Abstract: The Green concrete is made with concrete wastages which are eco-friendly, uses less energy in its production and produces less carbon dioxide, this type of concrete is called as Green Concrete. It reduces emission of carbon dioxide and it also have greater resistance to corrosion. The main advantage of green concrete is to save energy. By using green concrete, there are some environmental benefits like reduces energy consumption, increases carbon dioxide emissions etc. Materials are used in green concrete like Recycled concrete aggregate, blast furnace slag, glass aggregate, fly ash, manufactured sand, etc. The main aim of green concrete reduces environmental impact with reduction of concrete industries, carbon dioxide emissions by 30%. It have good thermal and fire resistance, In this concrete recycling or re-use the waste material as a ceramic wastes and aggregate increase concrete industry waste products by 20%.

KEYWORDS: Green Concrete, Energy Consumption, Blast furnace slag, Recycled Aggregate Concrete

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INTRODUCTION

The size of construction industry all over the world is growing at faster rate. The huge construction growth boosts demand for construction materials. Aggregates are the main constituent of concrete. Due to continuously mining the availability of aggregates has emerged problems in recent times. To overcome this problem, there is need to find replacement to some extent.

Nowadays, there is a solution to some extent and the solution is known as "Green Concrete". GreenConcrete has nothing to do with colour. This is a concept of eco-friendly way in mass concreting. The constituent of this concrete doesn't correspond to carbon footprint and give healthy environment to all. Green concrete is also cheap to produce because, waste products are used as partial substitute for cement, charges for the disposal 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 resources are used more efficiently and the Environment is protected from waste deposits.

LITERATURE REVIEW:

Garg and Jain (2014), studied on green concrete and eco-friendly construction materials. It presents the feasibility of the usage of product materials like fly ash, quarry dust, marble sludge powder, plastic waste and recycled concrete and masonry as aggregates in concrete.

"Green Concrete: The concrete which is made with concrete wastages which are eco-friendly, uses less energy in its production and produces less carbon dioxide the ordinary concrete is known as green concrete.

RAW MATERIALS USED IN THE GREEN CONCRETE:

FLY ASH:-*Fly powder left over after burning is finely divided residue resulting from the burning in an explosion of powdered coal and moved by flue gases and collected. Fly powder left over after burning produced is about 75 million tons per year, the disposal of which has become a major concern. Only about 5% of the total fly powder left over after burning is used in India, the remaining of which has to dispose. Instead of doing so, it can be used in a major way. Portland cement concrete is the most popular and widely used building materials. Due to the restriction of the manufacturing process and raw materials, some built-in disadvantages of Portland cement are still very hard to overcome.*

About 1.5 tons of raw materials is needed in the production of every ton on Portland cement, at same time, about one ton of carbon dioxide is released into during the production.

MARBLE SLUDGE POWDER:-This demands / needs and old and worn rethinking on ways and means of providing shelter and basic equipment needed for a business or society to operate for the community. Green concrete is a capable of able to helping the planet development is seen as use of industrial waste such as marble powder, quarry dust , wood powder left over after burning , paper pulp, etc., to reduce consumption of valuable thing from nature and energy and pollution of the health of the earth/the surrounding conditions. Use of such waste materials saves 14-20% amount of

cement. The concrete resistance to sulphate attack and alkali-group reaction is greatly Improved.


Marble sludge waste

QUARRY ROCK DUST :- Quarry Rock Dust can be defined as residue, tailing or other non-valuable waste material after the extraction and processing of rocks to form fine particles, less than 4.75 mm. quarry dust is made while blasting, crushing, and rough group. Quarry Dust has rough, sharp and skinny having angles particles, and as such cause a gain in strength due to better interlocking. Quarry rock dust real, actual experiences better sulphate and acid resistance and it's a ability for liquids and gases to flow through is less , compared to that of ordinary concrete. However, the water mental concentration/picking up of a liquid of Quarry Rock dust concrete is a little higher than Ordinary concrete.

RECYCLE GROUP:-*Recycled rough groups showed that physical and mechanical properties are of inferior quality and improvement in properties was watched/followed after washing due to removal of old weak mortar stuck on its surface. The influence of natural rough groups replacement with recycled rough group on different mechanical and ability to last properties of hardened concrete were discussed and compared with controls at different ratio. Improvements in all the engineering properties of hardened concrete were watched or followed using washed recycled rough groups*

The press or force into a smaller spaceive strength of 28-day hardened concrete containing 100% washed recycled group was a little lower 7% than concrete prepared with natural groups.

GROUND GRANULATED BLAT FURANCE SLAG (GGBFS):-

It is an excellent cementations material. Slag is received by crushing hot liquid iron slag which is nothing but a something produced along with something else of iron and steel making from a structure that makes very hot fire in water or steam, to make a granular glassy product that is then dried and grounded into a fine powder. Almost the same as fly powder left over after burning, even GGBFS creates less heat of filling with water. GGBFS is also responsible for improving ability to last as well as mechanical properties of concrete.

IMPACT ON ENVIRONMENT DUETO CONCRETE:-

About 0.9 tons of carbon dioxide is produced for every 1 ton of cement produced. Carbon dioxide is one of the greenhouse gases which are responsible for world-wide warning. Major ingredient in the production of concrete is aggregate without aggregate it is impossible to produce concrete. Aggregates are mined from the rock mines and the rate with which concrete is produced there will be big reduction in naturally happening materials. Disposal of construction and destruction waste has become a major problem these days, according to the report of technology, information forecasting of people who advise or govern the total amount of waste from construction industry is guessed to be 12 to 14.7 million tons per year. Out of which 7.8 million tons are concrete and brick waste. Because of increasing problems of these wastes many countries have started researches to use these Materials as source.

TABLE1:- REPLACEMENT MATERIAlS FOR GREEN CONCRETE

S.No.	Traditional Ingredients	Replacement Materials for Green Concrete
1.	Cement	Sludge ash, fly ash, etc.
2.	Coarse aggregates	Silica fume, waste glass, etc.
3.	Fine aggregates	Fine recycled aggregate, demolished brick waste, quarry dust, waste glass powder, marble sludge powder, rock dust and pebbles, artificial sand, waste glass, fly ash and micro silica,bottom ash of municipal solid waste.

USE OF RECYCLED AGGREGATES

Recycled aggregate concrete will have slightly higher drying shrinkage; this is mainly because of increase in water/cement ratio. Recycled aggregate concrete has better resistance to carbonation it is mainly due to porous recycled aggregates and presence of old mortar attached to crushed stone aggregate. Recycled aggregate concrete provides better resistance to freezing and thawing than concrete produced by mixing natural aggregates. For concrete producers, the use of coarse RCA is unlikely to pose any problem in the production of concrete that is stable in the fresh state and able to develop properties comparable to the corresponding Normal Aggregate Concrete in hardened state. This is of great importance to reduce inhibition of concrete specifies and producers towards using RCA. The key engineering and durability properties of RCA concrete are similar to corresponding Normal Aggregate Concrete, providing the mixes are of equivalent strength achieved through adjustments in the w/c ratio. Overall, the practical benefits resulting from the current work are not only on environmental and economic fronts, but they could also provide the construction industry with technical information on a marketable product, which is presently under-utilized.

USE OF QUARRY DUST

This type of dust is getting popular in construction projects such as road construction, building houses and making bricks and tiles. Especially in the manufacture of slabs, and making retaining walls. It is also used filling roads before asphalting. It is believed that quarry dust makes stronger slabs and walls at construction site. Quarry dust is ideal for these jobs and is expected to be the future and likely replacement for sand in construction project, since river sand is fast becoming scarce and very expensive. The durability of quarry dust concrete under acid action is also better than conventional concrete. The effects of quarry dust on the elastic modulus property are good with conventional concrete containing natural sand. The fine quarry dust tends to increase the amount of super plasticizers needed for the quarry mixes in order to achieve the rheological properties. Replacement of natural sand with Quarry Rock Dust, as full replacement in concrete is possible. However, it is advisable to carry out trial casting with Quarry Rock Dust proposed to be used, in order to arrive at the water content and mix proportion to suit the required workability levels and strength requirement. However, more research studies are being made on Quarry Rock Dust concrete necessary for the practical application of Quarry Rock Dust as Fine Aggregate. This material degrades the quality of neighborhood due to landfill requirements, and causes air pollution. An investigation suggests that replacement of fine aggregates by 40% quarry dust result in strength higher than conventional concrete.

ADVANTAGES OF GREEN CONCRETE

- Much change is not required for the preparation of green concrete compared to conventional concrete.
- Reduces environmental pollution.
- Have good thermal and acid resistance.
- Compressive and split tensile strength is better with some materials compared to conventional concrete.
- Reduces the overall cement consumption.
- It reduces the effect of creep and shrinkage in concrete.
- It requires less maintenance.

- Reduces the dead load at structure.
- Eco friendly.

CONCLUSIONS

- There is significant potential in waste materials to produce green concrete.
- The replacement of traditional ingredients of concrete by waste materials and by products gives an opportunity to manufacture Economical and environment friendly concrete.
- Partial replacement of ingredients by using waste materials and admixtures shows better compressive and tensile strength, improved sulphate resistance, decreased permeability and improved workability.
- The cost per unit volume of concrete with waste materials like quarry dust is lower than the corresponding control concrete mixes.
- A detail life cycle analysis of green concrete by considering various parameters is very much necessary to understand the resultant concrete properties.

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