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A Review in Green Concrete

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Abstract—*Green Concrete is a term given to concrete that has had extra steps in the mix design and placement to insure a sustainable structure and a long life cycle with a low maintenance surface e.g. energy saving, CO2 emissions, water waste. Concrete made from concrete waste and is eco-friendly to the environment is called green concrete. The other given to green concrete is resource solving structures with reduced environmental impact. Waste like slag, power plant waste, recycled concrete, mining and quarrying wastes is used in the manufacturing of green concrete. The goal of green concrete is to reduce the environmental impact of concrete. To enable this new technology is developed. This technology considers all the phases of concrete construction's lifecycle i.e. structural design, specification, manufacturing and maintenance. It also includes all the aspects of performance i.e. manufacturing properties, fire resistance, workability, durability, thermal properties and environmental aspects.*

WHAT IS GREEN CONCRETE ?

It is defined as the concrete which uses concrete waste and useless energy for its production and produces less carbon dioxide. Green Concrete is known as eco friendly concrete because of the following:

(i) it produces less CO2 emissions
(ii) energy saving
(iii) helps in reducing impacts on environment.

WHY GREEN CONCRETE ?

(i) As manufacturing of green concrete mainly involves cement and limestone (CaCo3) as its main ingredients.
(ii) These ingredients are hared to about 800-10000 degree during its manufacturing process due to which carbon dioxide is driven off.
(iii) Due to which green concrete came into existence as mainIy it helps in reducing emissions of CO2 into the atmosphere.

MATERIAL FOR GREEN CONCRETE

Green construction materials are composed of renewable, rather than non-renewable resources. Green materials are environmentally responsible because impacts are considered over life of the product. Depending upon project specific goals, green materials may involve an evaluation of one or more following criteria.

1) Locally available
2) Salvaged
3) Reusable or Recyclable

Materials used for green concrete :

(i) Recycled Demolition Waste Aggregate
(ii) Recycled Concrete Aggregate
(iii) Blast Furnace Slag (BFS)
(iv) Manufactured sand
(v) Glass Aggregate
(vi) Fly Ash

BONDING BETWEEN STEEL BARS AND LIGHT WEIGHT

	Specification	Facade Quality
Unit weight	2275 kg (normal concrete)	1590 kg
1-day strength	15 MPa	14.5 MPa
28 days	30 MPa	34 MPa
Slump	75 mm	50 mm
Density	2400 kg/m3	1750 kg/m3

CEMENTITIOUS MATERIALS 'FLY ASH'

When coal is fired in power plants the ash which is produced as a by-product is known as Fly Ash.
From the exhaust gases the finely divided particles are collected in electrostatic precipitators, these particles are known as 'FLY ASH'.

Advantages of using fly ash in concrete -

(i) when fly ash is used in the formation of green concrete then it acts as a part of replacement of cement and hence reduces the emission of CO2 into the atmosphere.

(ii) Utilization of good quality of sky ash in concrete helps in improving its durability of concrete.

Some of the technical benefits of the use of fly ash in green concrete are:

(i) Higher ultimate strength
(ii) Increased durability
(iii) Improved workability
(iv) Reduced bleeding
(v) Increased resistance to alkali-silica reactivity
(vi) Reduced shrinkage.

There are various factors which helps in enhancing the sustainability of green concrete which includes -

(i) It reduces the dead weight of the structure from 5 tons to 3.5 tons.
(ii) Reduces crane age load hence allowing easy handling, lifting, and flexibility with lighter weight.
(iii) Provides good thermal, fire resistance and sound insulation.
(iv) Increases concrete industry's use of waste produces by 20%.
(v) Reduces CO2 emissions by 30%.
(vi) Requires less maintenance and repairs.

APPLICATIONS OF GREEN CONCRETE

(i) Green Concrete columns
(ii) Green Concrete Bridges
(iii) Green Concrete Dams
(iv) Green Concrete Buildings

ADVANTAGES OF GREEN CONCRETE

(i) Optimised mix designs mean easier handling, better consistency and easier finishing.
(ii) Reduction in shrinkage and creep.
(iii) Green concrete uses local and recycled material in concrete.
(iv) The heat of hydration of green concrete is significantly lower than tradition concrete.
(v) This result is a lower temperature rise in large concrete pours which is a distinct advantage for green concrete.

DISADVANTAGES OF GREEN CONCRETE

(i) LOCATION

Since these builders depend on sun for energy, they need to be located in the position that will have the best sun exposure which may demand placing them opposite to other neighbourhood homes.

(ii) AVAILABILTY

The material to build such buildings can be hard to find especially in urban areas where preserving the environment is not the people first option. Shipping these materials can then cost a lot than standard building.

(iii) NO AIR COOLING FEATURES

These buildings run on heat to generate power, so they are not designed for hot areas as they do not have any ventilation systems, so air conditioners will be required which will make these buildings anything but eco friendly.

SOME ENVIRONMENTAL BENEFITS OF GREEN CONCRETE

(i) Concrete is produced locally from abundant natural resources.
(ii) Concrete can be made with reclaimed industrial material that would otherwise burden landfills.
(iii) Recycled materials in concrete reduce CO2 emissions.
(iv) Concrete structures are durable.
(v) Concrete helps achieve LEED certification.
(vi) Concrete's light colour reduces the heat island effect, lowering urban energy use.
(vii) At the end of a concrete building or pavements usable life, concrete can be recycled.
(viii) Concrete's thermal mass reduces temperature swings in buildings and conserves energy.

SCOPE IN INDIA

Green concrete is a revolutionary topic in the history of concrete industry. As green concrete is made with concrete waste it does take more time to come in India because of industries having problem to dispose waste and it also reduces environmental impact with reduction in CO2 emission. Use of green concrete can help us in reducing a lot of wastage of several products.

CONCLUSION

As, green concrete helps in reducing the emissions of C02 by 30% into the atmosphere and hence reduced the impact on environment.
Green Concrete have good thermal and fire resistance.
Increased concrete industry's use of waste product by 20%.
Hence, green concrete consumes less energy and becomes economical.
So, definitely use of concrete like green concrete in future will not only help in reducing the emissions of CO2 into the atmosphere and environmental impact but also it will become economical to produce.

REFERENCES

[1] Green Concrete using industrial wastes. Proceedings, National conferences on advances in building materials.
[2] Galvind, Munch Petersen, green concrete structural concrete.

Websites:

[3] http://www.greenconcrete.dk/
[4] http://www.diamondbidewarehouse.com/green concrete .html