Green Building with Heat Absorption Material

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Abstract **- The green building can be named economical building which deals with ecological issues within or outside the building premises. These natural issues incorporate vitality effectiveness ventures to spare vitality, water protection and decrease in water utilization, indoor air quality, building air ventilation and light, diminishment of contaminations, better well-being, and reduction in heat absorption impacts. Among those natural issues heat absorption causes due to presents of pollution by fossil fuel. To reduce the heat absorption in green buildings heat absorption materials are necessary in conventional concrete.**

Myk lacticrete materials are widely used in many parts of the world and consequently, large quantities of wastes are produced simultaneously by brick and tile manufacturers and from construction industry. Myk laticrete hydro ban is a thin, load bearing waterproofing/cracks isolation membrane that does not require the use of fabric in the field, corners.it is a single component, self-curing liquid rubber polymer that form a flexible. Products are made from pastes which contain a high proportion of clay minerals. So, it is responsible for long term strength and good durability. In this project the OPC53 grade. Cement has replaced by Myk laticrete hydro ban accordingly in the range of 0, 5, 10, 15 20 % and so on respectively based on results.

Groundnut shell is one of the uses of organic waste in agriculture can reduce the need of chemical fertilizer and restore the organic carbon deficiency in the soil. As chemical fertilizers are causing ecological damage, an alternative method is required to replace the use of chemical fertilizers for the growth of vegetable plants. In this orientation, groundnut shells (230-300g/Kg) produced during processing is used as a natural fertilizer for the cultivation of vegetable plant, homemade plants, gardening of plants etc. , to increase their yield and to reduce the environmental pollution. So, we conducted a pot experiment to analyse the possibility of using groundnut shell compost as an alternative to chemical fertilizer in the cultivation of vegetable plants. In this experiment, I have planted a plant for that I did this experiment by groundnut shell compost. Among the different combinations tested, high yield was observed in 50 % groundnut shell compost treatment. Based on these results, groundnut shell compost can be used as an effective alternative to chemical fertilizer to enhance the growth and yield of vegetable plants and is also an appropriate method to manage environmental pollution

Index Terms **- Myk lacticrete powder, ground nutshell, OPC, compressive strength, tensile strength, split tensile, planting of plant in plot.**

1.INTRODUCTION

Construction industry has significant environmental, social, and economic impacts on the society. As one of key outputs of the construction industry, buildings largely reflect these impacts during its lifecycle. The positive impacts of construction activities include providing buildings and facilities to satisfying human being's requirements, providing employment opportunities directly or indirectly (through other industries related to the construction industry) and contributing toward the national economy. For instance, the construction industry in Australia contributes 7.5% to the Gross domestic product (GDP) and provides more than 1 million jobs. Similarly, buildings and construction activities play a crucial role in urbanization. The negative impacts of buildings and construction activities are also well recognized. These include the noise, dust, traffic congestion, water pollution and waste disposal during the construction stage. A large quantity of natural and human resources will be consumed. Once completed, buildings continue their impacts on the environment. According to the World Business Council for Sustainable Development, building block accounts for 40% of total energy consumption. Apart from energy consumption, buildings produce Greenhouse Gas emission (GHG) emission which is responsible for global warming. The carbon emission of buildings across the world will reach 42.4 billion tonnes in 2035, adding 43% on the level of 2007.In addition, the

renovation, refurbishment and retrofitting of building will involve the consumption of natural resources and energy; GHG emission; production of noise and other pollutants as well. At the end of life of buildings, the disposal of buildings is also associated with energy consumption and waste production. In 2007, the waste generated from the construction industry in Australia reached 16.6 million tonnes. This accounted for 38% of total waste, of which 43% was sent to landfill. The increasing demand of landfill presents a new challenge to all countries that have issues with limited land. This is compounded by the prediction made by the International Energy Agency that the commercial buildings and institutional buildings will raise two times by 2050.

Green urban area infrastructure leads to multi-dimensional and functional benefits in terms of ideal ecosystems and healthy environment along with providing wide range of environmental, social, climate change adaptation and mitigation, and biodiversity benefits. Some of the benefits are listed here under:

- Improved human physical, psychological
- and social health and wellbeing.
- Enhanced livability through improving amenity and air quality, and noise abatement
- Reduction of the urban heat island effect through shading and transpiration and providing protection from extreme weather events such as heat waves and storms.
- Better water management, through reduced storm water run- off and flooding, increased soil infiltration and groundwater recharge and improved water quality.
- Healthy urban ecology-conserving, creating, and linking, habitat for flora and fauna.
- Local food production e.g. private, school kitchen, verge and community gardens and urban orchards and farms.

1.1. CONCEPTUAL GREEN BUILDING

Green building may be conceptually defined as the tool of increasing efficiency of buildings resources in the form of energy, water and materials while reducing building impacts on human health and the environment. The Green Building idea is picking up significance in different nations, including India. These are structures which govern waste reduction, low cost, less energy consumption, cooling effect and environmental compatibility. Moreover, green building encourages saving in water consumption, recycling, waste minimization, social and economic benefits. The U.S. EPA define "Green building is the act of making structures and utilizing forms that are naturally dependable and asset effective all through a building's life-cycle from siting to plan, development, activity, support, remodel and deconstruction"[2]. A typical green building is shown in Figure 1.

Figure 1: Green building with green wall

1.2. BENEFITS OF GREEN BUILDING

The innovative and advance technologies with new approaches tend to supplement current practices in making greener structures, the advantages of which can extend from natural to financial and to social. By embracing greener practices, we can take most extreme preferred standpoint of ecological and monetary execution. Green development techniques when effectively coordinated and implemented at planning and development stage produce extensive benefits. The green buildings may have multidimensional benefits either directly or indirectly, some of which are reflected here under [3]:

- Improved indoor air quality,
- Energy efficiency,
- Water efficiency,
- Reducing waste, contamination, and environmental pollution,
- Protecting inhabitant wellbeing and enhancing efficiency,
- Waste reduction,
- Temperature moderation,
- Healthier lifestyles and recreation,
- Improved health.

1.3. DEMERITS OF GREEN BUILDING

Though there are significant benefits of green building, yet some disadvantages also observed which are listed as under:

- Initial cost is high.
- Lack of availability of materials.
- Need of more time to construct.
- Need skilled worker.

1.4. BUILDING WITH GREEN TECHNOLOGY

Construction and the environment are indivisibly linked. Construction consumes precious natural resources of land, water, and green cover. The overuses of these resources are slowly leading to an ecological imbalance which must be corrected with a move towards green construction. What is Green Construction? Green construction looks beyond the readily apparent aspects of a building, and creates a space that addresses the comfort, health, and broader environmental impacts of the construction/ remodelling process. What are these environmental impacts?

Construction waste often includes concrete, metals, glass, plastics, wood, asphalt, bricks and more. This waste is often disposed of in either landfills or incinerators. Not only does this pollute the land and the air through CO2 emissions, but the transportation required to remove such waste has a major impact on the environment as well. Green construction aims to create the balance between what we seek to build and what our environment can ultimately support. With the construction industry projected to grow to 25 to 30 thousand cores in another four to five years, carbon emissions must be countered by green technology.

As part of this Green Movement, MYK LATICRETE India has advocated and actively promotes an eco-friendly product range to ensure ecological responsibility and good health for all users of these products. These products will not only save natural resources like water (used for curing purposes in cement-based structures) but also ensure the good health of the occupants of the structure. Contributions from MYK LATICRETE India towards the green movement with regard to construction materials are considerable.

Figure 2: Elevating with plants

2.MATERIALS

2.1. CEMENT

The bond acquired was tried for physical prerequisites as per IS: 12269-1987. The subtle elements are given in Table. The bond affirms to OPC 53 Grade.

Table 1: Properties of cement

S. No	Property	Result
1	Specific Gravity	3.15
2	Soundness	2.5
3	Standard Consistency	31.5%
4	Setting Time	
	i) Initial Setting time	91 min
	ii) Final setting time	211 min
5	Compressive Strength	
	28 days	53Mpa

2.2. FINE AGGREGATE

The fine total utilized as a part of normal sand acquired from the waterway complying with reviewing zone – II of table 3 of IS 10262:2019.

2.3. COARSE AGGREGATE

Aggregates of size 20 mm and 10 mm which are obtained by crushing, angular in shape are prescribed in this regard. A well sieved sample free from dust has to be used.

Table 2: Properties of fine and coarse aggregate

S. No	Properties	Fine	Coarse
1	Specific gravity	2.64	2.84
2	Fineness modulus	3.97	8.64
3	Water absorption	0.806%	0.814%
4	Bulk density	0.27%	2.63%

2.4.WATER

This is the slightest costly and imperative element of concrete. The water, which is utilized for making

arrangement, should be perfect and free from harmful polluting influences. A well-known popular yard stick about water usage in concrete is if the water is drinkable the water is usable for making concrete.

Table 3: Properties of Water

S. No	Properties	Result
1	pH	7.1
2	Taste	Agreeable
3	Appearance	Clear
4	Turbidity	1.75

2.5.MYK LATICRETE

MYK LATICRETE has innovated in this critical area to bring you a game-changing product. The advanced single component water proofing membrane has the unique ability to bridge cracks in the substrate (up to 3 mm) and requires no other additional accessories for exceptional performance. The under-tile waterproofing membranes are especially recommended for tiled wet areas, washrooms, kitchens, swimming pools and other water bodies.

Figure 3: MYK LATICRETE

S. No	Description	Company result
1	Specific gravity	1.28

Working properties 70of (21oc):

LATAFIX 305 floor and wall thin set adhesive when mixed with water.

Open time approx.	20 minutes
Pot life approx.	4hours
Time of heavy traffic	16-24 hours

Ground nutshell powder:

Ground nutshell can be used in two ways:

- In replacement of concrete.
- In replacement of plant stream in mixing of soil.

Groundnut shell can be found in large quantities as agricultural farm waste in Nigeria, producing up to 2.699 million metric tons per year (Sada et al., 2013). Groundnut shell was first planted in South Africa mainly Brazil and later spread to other part of America, Asia, and north western Argentina (Tata et al., 2015). The outer part of groundnut is called groundnut shell. Over a period of years, it is treated as a solid waste. Utilization of groundnut shell in the construction industry is expected to solve the pollution problem and increase the economic base of farmers, which encourage them to increase the production (Sada et al., 2013). Groundnut shell is already used for developing root stream to gain a longer protein and also it controls water disposal of plant.

Figure 4: Groundnut shell powder

Peanuts shell used for plant in 4 ways:

Peanuts shells up the soil allowing roots to breathe better and penetrate quickly leading to vigorous growth.

Reduce the weight/load of soil:

For hanging planters or those cannot have very heavy soil, adding peanut shells in a good ratio (approx. 30%) lighten the load.

Retain moisture in small pots:

For places with long dry summers, water retention is a boon, especially for small or terracotta planters. Peanut shells do not interfere with proper drainage yet help keep the soil moist longer.

Improve soil texture:

If you are tired of hard clayey soil, adding ground peanut shells breaks down the hard clumps and helps the texture immensely.

Nutrients in peanut shells for plants:

Peanut shells contain only a tiny amount of NPK i.e. nitrogen, phosphorous and potassium. They do not contribute significantly to plant health directly, but

indirectly but helping improve the soil texture and dampness.

3.MIX DESIGN

Bureau of Indian Standards has recommended step by step procedure for mix design. Here the mix design procedure as per IS: 10262:2019. The variation of strength of hardened concrete using Myk laticrete powder as partial replacement of cement is studied by casting 3 cubes and cylinders for each and every replacement The specimens were tested for compression, split tensile and flexural strengths by using Compression Testing Machine after curing period of 7days, 28 days.

Table 4: Mix proportion of M30 grade concrete

Materials	Nominal Mix (M0)	Myk laticrete			
		5% (M1)	10% (M2)	15% (M3)	20% (M4)
Cement (kg/m^3)	27.701	26.319	24.933	23.548	22.162
Fine aggregate (kg/m^3)	44.383	44.383	44.383	44.383	44.383
Coarse aggregate(kg/m^3)	60.383	60.383	60.383	60.383	60.383
Myk laticrete (kg/m^3)	0	1.383	2.769	4.154	5.544

4.RESULTS & DISCUSSIONS

Effect of replacement of Myk laticrete as a partial replacement of cement the results of compression test and Split tensile Strength results are shown above. It is noticed that the compressive strength and Split tensile Strength of concrete increases for 15%, replacement with Myk laticrete and the compressive strength, Split tensile Strength and flexural decreases for 15% and above replacement from the above figures.

FOR M30 GRADE CONCRETE

Table 5: Strength results of M30 grade concrete

Mix Designation	Compressive strength in N/mm^2	
	7 days	28 days
M0	25.94	32.04
M1	29.14	35.49
M2	29.64	37.09
M3	32.52	39.34
M4	20.92	36.61
Mix Designation	Split Tensile Strength in N/mm^2	
	7 days	28 days
M0	5.17	5.23
M1	5.25	5.54
M2	5.43	5.78
M3	7.13	7.68
M4	6.35	5.92
Mix Designation	Flexural Strength in N/mm^2	
	7 days	28 days
M0	7.13	7.73
M1	7.50	8.72
M2	7.62	9.43
M3	8.37	10.87
M4	7.92	9.62

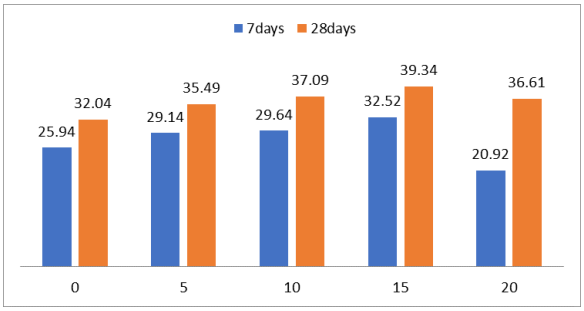

Figure 5: Compressive strength of M30 grade of concrete

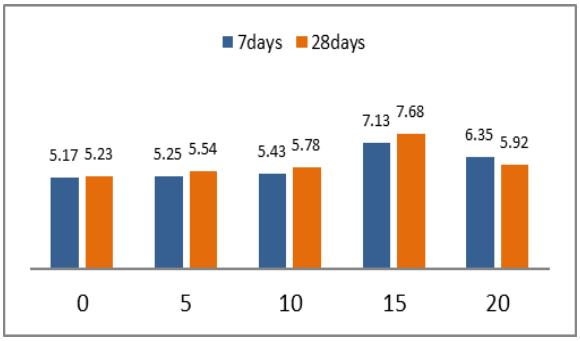

Figure 6: Split Tensile strength of M30 grade of concrete

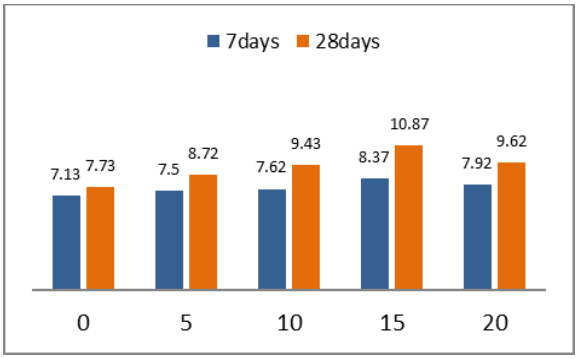

Figure 7: Flexural strength of M30 grade of concrete

From the above results the percentage replacement of Myk laticrete the compressive strength and Split tensile Strength of concrete value will not be obtained

in early age, it will be obtained in the lateral age. The above results 0%, 5%, 10%, 15%, and 20%, replacement of Myk laticrete 7 days compressive strength value is low compared to 28 days compressive strength.

It is noticed that the compressive strength of 15% replacement of Myk laticrete powder at 28 days strength will be higher than 0% replacement. Concrete on 15% replacement of cement with Myk laticrete powder for M30 Grade, compressive strength obtained is 38.98 N/mm2 and Split tensile strength obtained is 3.42 N/mm2. As per my calculation M30 target strength for the compressive strength of 7days, 28days concrete is 32.52, 39.34 at 15 %.

As per the calculation M30 target strength for the split tensile strength of 7days, 28days concrete is 7.13, 7.68 at 15 %., flexural strength of 7days, 28days concrete is 8.37, 10.87 at 15%. future to increase percentage and modeling design.

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