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Sustainable Building by using Carrot Powder –A Step Towards Ecofriendly Tomorrow

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Abstract - *My study will help Indian villages and their residential buildings are developed during a sustainable and ecological way through easy, simple, and economic techniques by using carrot powder by replacing a particular amount of cement. the development industry and other production units are contributing 25% of the nation's total carbon emissions Therefore, there's a substantial possibility of using sustainable materials like carrot powder improve energy, and resource efficiency. it had been concluded that CP could be utilized in cement mortar to replace the cement during a certain ratio to form them profitable.*

Key Words: Construction Management, Eco Friendly, New Materials

1.INTRODUCTION

1. As the day-by-day pollution level of the country increases, also the level of carbon footprint increases the importance of working on different solutions also become necessary for different Industries to reduce their impact on Environment.

2. the development industry is one among the main contributors to produce a huge amount of carbon footprint on the environment.

3. As per the present scenario, a construction management engineer has to work very dynamically in different stages of construction to contribute to sustainable construction.

4. Because as per present scenario after few times it will possible that government makes some important guidelines to follow sustainably construction.

5. Carrot is rich in dietary fibre, antioxidants and minerals.

6. Carrot fibre provides high strength, stiffness, toughness and a really smooth finish.

7. The composite made up of carrot fibres features a lower density than carbon fibre.

8. The aim of the research utilized in cement mortar production to exchange the cement in certain ratios to form them profitable and lessen their adverse effects on the environment.

9. The entire production of vegetables was estimated as 268 million tonnes in the world during the year 2011). the entire production of carrot & turnips was estimated as 35.6 million tonnes within the world during the year 2011.

10. Vegetables are highly seasonal and available in plenty at a specific period of the year.

11. During the season, the worth decreases and this will cause heavy losses for the growers.

12. Also, thanks to the abundant supply during the season, a glut within the market may end in the spoilage of huge quantities.

13. Preservation of those vegetables can prevent huge wastage and make them available within the off-season at remunerative prices.

14. Carrot may be a vegetable, usually red, white or yellow in colour, with a crisp texture when fresh. Carrots have a moisture content of 80–90% at the time of harvest and are seasonal in nature and highly vulnerable to moisture loss resulting in wilting and loss of fresh appeal.

15. If this carrot used cement concrete during a specific amount to solves issues associated with energy expenditure, recycling, biodegradability, environment, and sustainability in reference to future demand must be addressed during the assembly and use of any new artifact by practicing increasing the efficiency with which buildings use energy, water, and material resources by reducing the impacts of construction on human health and therefore the environment, through the higher site, design, construction, operation, maintenance, and removal, i.e. the whole life the cycle of the building to realize sustainable building development or green building development.

16. Sustainability is nothing quite bringing citizenry to wish for an honest quality of life without degrading the environment or disturbing the well-being of people. Construction materials and technologies and construction practices have evolved over the centuries. the subsequent points require attention, regarding the use of recent building materials: energy consumed in production processes, problems of long-distance transport, natural resources, and raw materials consumed, recycling and safe disposal, impact on the environment, and sustainability future

1.1 Objectives

My study will help Indian villages and their residential buildings are developed in a sustainable and ecological way through easy, simple and economic techniques by using carrot powder by replacing certain amount of cement. The Construction industry and other production units are contributing 25% of the nation's total carbon emissions Therefore, there is a considerable possibility of using sustainable material like carrot powder improve energy, and resource efficiency. It was concluded that CP might be used in cement mortar to replace the cement in certain ratio to make them profitable.

1.2 Research Gap

Disadvantages of using Cement: -

1. Making cement results in high levels of CO2 output.
2. Cement production is the third-ranking producer of anthropogenic (man-made) CO2 within the world after transport and energy generation.
3.CO2 emissions are caused by cement 3. 20-25% of the worldwide total of production etc.

Alternative: -

Now in this research, trying to find a better alternative that contributes to the reduction of cement in concrete &sounds more eco-friendly by using carrot powder.

2. Methodology

- ***Materials used:***

a) Cement
b) Fine aggregate
c) Carrot powder

A. Cement- It is a binding material, is used in construction that sets and hardens and adheres to other materials to bind them together. The cement utilized in present work is OPC of 53 grades.

B. Fine Aggregate- Fine aggregate from a river bed, passing through 4.75mm and free from lumps were procured and therefore the crushed granite stone (coarse aggregate) passing through the 20mm and 12mm were chosen and used in the present work. The fine aggregate falls in zone-2 was used in present work.

C. Carrot Powder- Carrot is a biomaterial that are rich in dietary fiber, that is carbohydrates that cannot be digested by our bodies enzymes, the carrot fiber extracted from carrot provides high strength, stiffness and smooth surface.

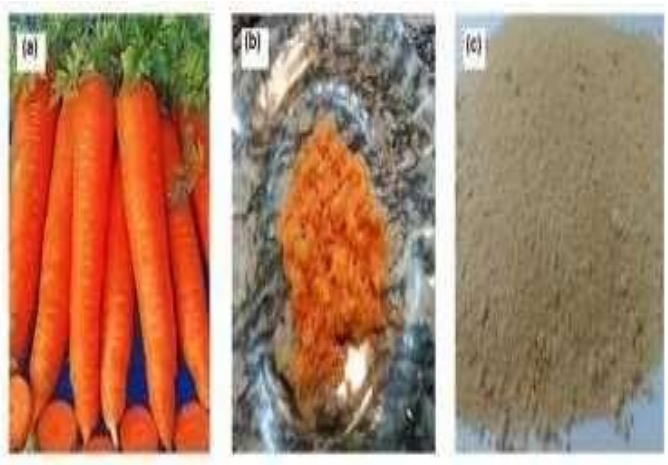
- ***PROPERTIES OF CARROT POWDER-***

1. Carrot powder is very rich in vitamins A, B12, therefore the powder also provides various minerals, including Ca (33 mg) Na (69 mg) K (32 mg), Mg (12 mg).

2. Carrots are rich in cellulose and other biologically active substances. materials that lead to higher adhesion properties, higher superior heat resistance and toughness, and also improves the adhesion strength of the material.

- Carrot Powder Perpetration (CP) - Carrot seeds were sourced locally from vegetable suppliers. they were Clean to remove all foreign bodies such as dust, dirt, and stones. The juice was away from carrot seeds using machine vegetables; the solid waste juice is rich in fiber. The percentage limit of fiber content is 30% fiber which is considered a functional fiber source. The carrot fiber was ground for 15 minutes. Carrot powder (CP) was not tested for particle size and area analysis to highlight the effect of grinding time on the typical particle size and specific area. X-ray diffraction analysis (XRD) was performed to determine the phases of PC dust samples produced, the particle size does not measure the particle size distribution of the powder used in this study.

Figure -1: ***(a) Carrot roots (b) Carrot fibres from processed roots (c) Carrot powder after being processed by ball milling.***



2. Relevance of Theory

1. Carrot powder waste cost are the main key for decision and choices for management and practices.

2. This suggest that practices which induced reduction of carrot waste from beginning through proper planning and designing thereby we can reduce cost implication with waste management.

- ***LIST OF TESTS REQUIRED IN THIS PROCEDURE-***

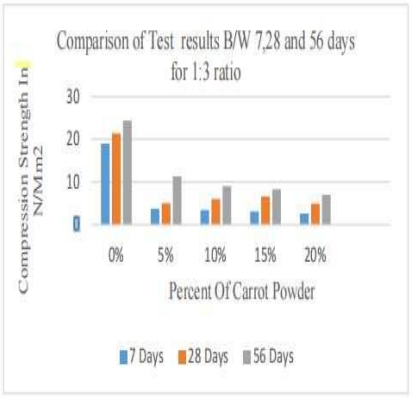
1. COMPRESSION RESISTANCE OF CEMENT: -

The compressive strength of the hardened concrete is the most important of all properties. It is therefore not surprising that concrete is always tested for strength in the laboratory before the concrete is used in important works.

2. CONCRETE FLEXURAL STRENGTH TEST: -

To determine the flexural strength of the concrete, which it enters play when a road slab with inadequate underground support is submitted wheel loads and/or volume changes due to temperature /contraction.

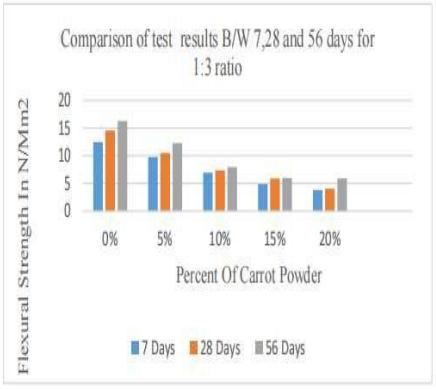
3. Mix of cement mortar - A sample of mortar of approx. 7.1cm * 7.1cm * 7.1cm for the compression test and 160cm * 40cm * 40cm for bending test, it is cast for 5%, 10%, 15% and 20% of powdered core cement replacement. The samples were left for adjustment three different durations (7.28 and 56 days).



Graph 1: Comparison of compressive strength Test Results B/W 7,28 and 56 days for 1:3 ratio

Discussion: It has been observed from the graph that the compressive strength of the 0% carrot powder based mortar cube is more, compared to CP replaced mortar cube.

Chart -1: Comparative Studies (CS)



Graph 4: Comparison of flexural strength Test Results B/W 7,28 and 56 days for 1:3

Discussion: The flexural strength of the prism was found to be high for 1:3 mix proportion prisms and the strength achieved by those are comparatively higher than that of 1:5 and 1:6.

Chart -1: Comparative Studies (FS)

3. Economic Feasibility in terms of Cost Saving

1.Net benefits =total benefits –total cost
therefore NB= TB- TC
2.TB= Psc+Rsm+SCcr+CSlc+A
here, Pcs= purchasing cost saving by reusing carrot powder
Rsm =revenue from selling of construction carrot powder
SCcr= carrot powder collection and transportation cost saving from
disposing less material to landfill
CSlc= cost saving by reusing and recycling
A =Intangible benefits
3.TC= CSc+Sc+Tc+A
here, CSc= collection and separation cost of construction carrot powder
Sc = Storage cost carrot powder
Tc=transportation cost disposing to landfill
A =Intangible benefits

- Reduce raw material cost.
- Reduce health, safety and environment (HSE) damage cost.
- Reduce disposal of material cost
- Improve company's performance.
- Improve local and international market competitiveness.
- Help comply with environmental protection regulations.

4. Impact of Construction Industry on Environment

1.CO2
2. NITROGEN OXIDES
3. CARBON MONOXIDE
4. AMMONIA

These gases are produced by the construction industry and what is most measurable on the environment. The physical environment and the construction sector are mainly linked to the demand made by the latter to the world population, in particular to housing infrastructure. The easiest place to start assessing the construction sector's impact is to look at its energy and greenhouse gas consumption. Cement accounts for 12 to 14% CO2 program.

CO2 emissions - the construction sector contributes 25% - 40% of global carbon emissions. Pollution - Construction causes both air and water pollution. Harmful chemicals used during construction can be harmful both for workers and therefore for the environment.

Waste: the method of building new infrastructure produces a lot of waste that ends up in landfills. Burning fossil fuels: the development process requires burning fossil fuels which produces greenhouse gases and harms the environment. Energy Consumption - Newly constructed buildings use energy which can increase the negative impact on the environment.

Wildlife damage - During construction, cleaning and excavations can destroy wildlife and habitats.

5. CONCLUSIONS

There are many things that will be done to assist reduce the environmental impact of construction. Some of these things include:

1. Designing sustainable construction projects.
2. Increasing the energy efficiency of buildings.
3.Using sustainable building materials such as carrot powder.
4. Setting emission reduction targets therefore we use carrot powder it can be reduced CO2 emission.
5. Minimizing the discharge of pollutants.
6. It was concluded that Carrot Powder might be used in mortar cement production replaced the cement in a certain ratio to make them successful and minimize their bad effects on the environment.
7. Carrot powder is a better alternative that contributes to the reduction of cement in concrete & sounds more eco-friendly.

FACTORS	REPLCAED CONCRETE WITH CARROT POWDER	CEMENT CONCRETE
TIME AND SPEED OF EXECUTION	PEQUIRED MORE TIME FOR PREPARETION OF CARROT POWDER	LESS TIME
MATERIAL COST	SAVING COST AS REPLACEMENT OF CEMENT	MORE COST
CO_2 EMISSION	REDUCING CO_2 EMISSION AND SUBSTANTIAL EFFECT ON SAVING ENERGY	INCREASING CO_2 EMISSION
STRENGTH AND LOAD CAPCITY	10 TIMES MORE	LESS
CLEANNESS AND BEAUTY OF WORK	VERY CLEAN BEACAUSE OF FINE PARTICLES IN CARROT POWDER AND	LESS CLEANNESS

Table -1: Conclusion Table

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