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REVIEW ON LOW COST ROOFING TILES USING AGRICULTURAL WASTES

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Abstract: Roof tiles are designed mainly to stay out rain, and are traditionally made up of locally available materials such as terracotta or slate. Modern materials like concrete and plastic are also used and some clay tiles have a waterproof glaze. On the opposite side, proper and efficient disposal of agricultural wastes is being the key think about solid waste management in most of the Indian States. Replacing the standard huts and conventional poor class roofs with much efficient alternate roof cover is being the most required. The paper suggest that we will efficiently replace significant quantity of river sand in making roofing tiles with the corn cob powder and rice husk powder in appropriate propositions was as similar as before replacement which gave compressive strength. The reviewed literature highlight about green roof, benefits and low cost roofing tiles using agricultural wastes as staple .

Keywords – Agriculture, Sustainable Design, Roofing Tiles, Low Cost, Design.

I. INTRODUCTION

Building materials have undergone plenty of modification from ancient times till this present technology era. With everyone seeking for affordable and cozy houses to live in, every scientist and engineer is functioning hard to develop and optimize new building materials that would be durable and cost effective. Materials are evolved over the time which was used for roof cladding in building. Cement is extremely expensive as it is the major binder in the construction industry. The demand of replacing cement has increased because it is used for several construction purpose to meet up the need of expand infrastructures.

II. LITERATURE REVIEW

1. One effective method used today to rid the earth of rice husk is to use it to fuel kilns. These kilns help to supply bricks and other clay products that are used in daily life and are also useful in parboiling units that use RH as their fuel (Nnamdi, 2011).
2. Burning the rice husk is an efficient thanks to dispose of the rice cultivation by product while producing other useful goods. After the kilns are fired using rice husk, the ash still remains. This ash still has very significant application within the construction industry, because the production rate of rice husk ash is about 20 % of the dried

rice husk, the quantity of RHA generated yearly is about 20 million tons worldwide (Hwang, 1985).
3. If the rice husk is burnt at too high a temperature or for too long the silica content will become a crystalline 7 structure. If the rice husk is burnt at too low a temperature or for too short a period of your time the rice husk ash will contain too large an amount of un-burnt carbon (Zemke and Woods2009).
4. Benue, Abakaliki, Afikpo, Ogoja, Ikepe, Lafiagi, Badeji, Pategi, Sokoto, BirninKebi, Abeokuta, Benin and Delta region (Opara, 2011). Rice husk is that the waste product generated.
5. The agro-ecological zones in Nigeria and therefore the most important region for rice production being River Niger basin (Nnamdi, 2011).
6. consistent with Hegazy, et al (2012), materials like lime, pozzolana, fly ash, limestone dust, furnace slag, rice husk ash, corn cob ash, incinerator ash, billet scales, siliceous and ionic materials have generally being adapted to be used in construction works because of their known cementing properties.

III. AGRICULTURE ROOFING

Urban agriculture may be a growing movement which aims to address the diverse goals of urban sustainability, including food security, food equity, efficient food supply chains, stormwater management, mitigation of urban heat island effects, and waste management using compostable waste Food production also can be included in the benefits that green roofs provide, and it can expand when incorporated into town agriculture. There are various additional benefits to agriculture roofing like mitigating poverty, unemployment, food insecurity, income diversification and human health. In economically developed countries, urban planning practices treated agriculture as a short lived activity for vacant lots before conversion to more profitable residential, commercial, and industrial land uses.

IV. THE OBJECTIVES

Determine the physical properties of rice husk ash and cocopeat. These include relative density and particle size distribution of the RHA ,Cocopeat, M-sand, 5 red soil and clay. Produce concrete roof tile using Rice Husk Ash and cocopeat with replacement of M- sand at (7%, 14%, 21%, 28%, 35%, and 42%) and red soil at (23%) with replacement of clay at(27%) .To test the produced sample for physical variations from the control sample produced. (compressive strength). Compare the obtained result with standards for low cost rooftiles.

V. SORTS OF ROOFING TILES

A large number of types of roof tiles have evolved. These include:

A. Flat Tiles: It's the simplest type, which are laid in regular overlapping rows. Flat roof tiles are usually made from clay but also be made of stone, wood, plastic, concrete or solar cells.

Fig 1. Flat tiles.

B. Imbrex and Tegula: It's an ancient Roman pattern of curved and flat tiles that makes rain channels on a roof.

Fig 2. Imbrex and Tegula

C. Roman Tiles: It's flat in the middle, with a concave curve at one end and convex curve at the opposite , to permit interlocking.

Fig 3. Roman tiles

D. Pantiles: It's with an S-shaped profile, allowing adjacent tiles. These end in a ridged pattern resembling a ploughed field.

Fig 4. Pantiles

E. Mission or Tiles: Its semi-cylindrical tiles laid in alternating columns of convex and concave tiles Originally, they were made, by forming clay around a curved surface Today barrel tiles are mass produced from clay, metal, concrete or plastic.

Fig 5. Mission or Tiles

F. Interlocking Roof Tiles: It's similar to pantiles with side and top locking to improve protection from water and wind.

Fig 6. Interlocking Roof Tiles

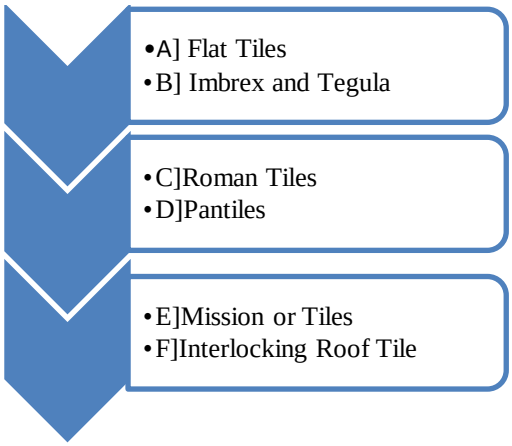

Figure 7 : Types of Roofing Tiles

VI. BENEFITS OVER GREEN ROOF

A green roof can increase the life expectation of a roofing system by guarding the roofing accoutrements from direct ultra – violet radiation and high temperatures. As a result, the roof structure can bear lower conservation, saving the proprietor plutocrat in relief costs over the long – term life of the roofing system. A well – maintained green roof can more than double the number of times a roof needs to be replaced compared to a standard roof before , making up for some of the installation costs is added.

The 4 main benefits of a green roof A green roof provides a rainwater buffer, purifies the air, reduces the ambient temperature, regulates the inner temperature, saves energy and encourages biodiversity in the megacity.

VII. LEED

Agriculture roofing can qualify for utmost of the credits that green roof can. Also, there's LEED airman credit called " Original Food product " that can be potentially attained for producing food, and 1 point is awarded for placing a vegetable garden which occupies at least 50 of unused roof top space(banning mechanical outfit, etc.)(USGBC, 2014). The credits that cannot be attained by husbandry roofing are3.7.1. SS Credit – cover or Restore Habitat and3.7.5. WE Credit – Outdoor Water Use Reduction. Unlike green roof, comestible shops bear frequent watering that disqualifies these credits. still, husbandry roofing system guarantees 3 LEED points and still contributes to over 20 points toward LEED instrument.

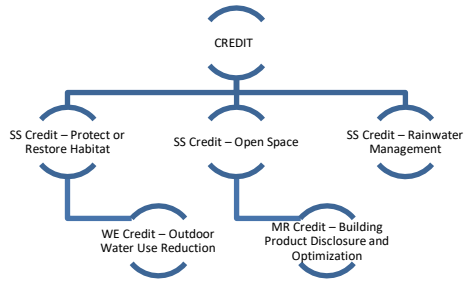

Figure 8 : Credits

• SS Credit – cover or Restore Habitat(1 point) Using native or acclimated foliage restores 30(including the structure footmark) of all portions of the point linked as preliminarily developed.

• SS Credit – Open Space(1 point) give out-of-door space lesser than or equal to 30 of the total point area(including structure footmark). A minimum of 25 of that out-of-door space must be vegetated(turf lawn doesn't count as foliage) or have overhead vegetated cover.

• SS Credit – Rainwater Management(implicit 3 points) Manage on point the periodic increase in runoff volume from the natural land cover condition to the post developed condition.

• WE Credit – Outdoor Water Use Reduction(implicit 2 points) Reduce the design's geography water demand by at least 50 from the calculated birth for the point's peak soddening month beyond a maximum two- time establishment period.

• MR Credit – Building Product Disclosure and Optimization Sourcing of Raw Accoutrements(implicit 2 points) Green roof contributes towards having at least 25 of the total value of design accoutrements that have environmentally, economically, and socially preferable life cycle impacts. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard.

VIII. CONCLUSIONS

By replacing the swash beach in making roofing penstocks would reduce its manufacturing cost as well as dealing price and makes it more affordable. therefore, medication of similar beach replaced roof penstocks will significantly reflect healthy environmental and profitable benefits. Replacing the ordinary huts and conventional poor class roofs with important effective alternate roof cover is being the most required. However, Rice cocoon, etc., If we replace 1 swash beach with agrarian wastes(sludge cob.) effectively, it'll laterally reduce the demand for river sand and reduce the manufacturing cost of complexion roof penstocks, which induce the conversion of hooch's in slum areas into tiled houses. therefore, both profitable and environmental benefits do in this manner if the manufacturing of roof penstocks is made in large scale. Rice cocoon ash in making roof penstocks will be light effective if the replace transferred rate lies between 5- 10. therefore, studies prove that relief of Rice cocoon ash in roof penstocks with analogous compressive strength, it gives a great benefit in both profitable and environmental concern. And further relief of Rice cocoon ash at the chance of(14, 21, 28, 35 and 42) effectively, it laterally reduces the strength of the low cost roof penstocks. therefore, both profitable and environmental benefits do at the chance of 5- 10, Rice cocoon ash and it can be followed for a timber of low cost roofing penstocks. Since husbandry roofing helps the society to come healthier and greener, more detailed and useful information on products, tilling styles and ways should be participated on an indigenous base so as to let rooftop husbandry be extensively conceded and rehearsed worldwide.

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