

An Experimental Investigation on Suitability of Cow Waste in Construction Material

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Abstract - In this study how we can use cow wastage as a building material is specified. Study said that it is right time to give best option to conventional Cement and Brick in building construction. It is useful to the society. Due to the urbanization most of the building and road construction are made of conventional cement and brick, while making cement and brick CO₂ emission percentage is high and it cause damage to the environment and it is our duty to save our mother earth from the greenhouse gases and gave proper option to the society. In this study we studied about cow dung plaster as well as cow dung brick. Cow dung is eco-friendly material in which potassium, magnesium and phosphorus like rich minerals are found in it and which are act as a good binder material according to the study. According to study cow dung is anti-thermal and anti-radioactive. Which helps to reduce the harmful radiations. The fibers present in the cow dung also helps for binding. In this study how bricks and plaster is made from cow dung is studied. The main objective of the study is to save environment from greenhouse gases. And reduce the sale percentage of cow as well as bull. And join them directly to the economy.

Index Terms: - Cow dung, Cow urine, Cow dung brick, Cow dung plaster.

1. INTRODUCTION

The forts which are built in ancient period by our Maharaja are found in good condition because the materials and the techniques which were used at that time are superior. The material which is used in ancient time are much stronger than the today's construction material. There are many alternative traditional materials which can be used in place of the modern materials. Cow dung, gypsum and lime are the materials use in the ancient time to build the fort or houses. Because these materials are used to decrease the conduction of heat and also, they are waterproof. In Indian villages the paste of the white soil and the cow dung is applied on the floor and wall for thermal insulation purpose. The ingredients use for making cow dung plaster are gypsum, cow dung

powder, white soil and last but on least citric acid and for cow dung brick are cow dung, lime, cow urine and last white soil. In this study we know about what is cow dung plaster and cow dung brick and its advantages. Today we are live in house which is made up of the concrete which is not totally heat proof and also good conductor of heat. In north India there is 8 months of the summer season and 4 months of the winter season. Our human body can live up to 25⁰c temperature. In summer season temperature is rises up to 40 to 45⁰c and to protect our self we use appliances like cooler AC for reducing the temperature of the room. And in winter season concrete house temperature fall down which required heating of room. Cow dung plaster has lower density and thermal conductivity due to this it confesses cool temperature in summer season and hot temperature in winter season. That why cow dung plaster can save 24% of operational energy as compared to conventional cement plaster. It reduces up to 7 to 10⁰C temperature of the room. One of the greatest advantages of the plaster and brick that there is no need to curing the plaster as well as brick due to these there is no need to pump the water therefore it can save electricity. Cow dung bricks are 100% sun dried due to this fuel consumption is not there. Cow dung plaster we can also apply to floor in our homes. In our homes on floor, we lie tiles and these tiles are very harmful to us in the winter season. In winter season due to low temperature the temperature of the tiles is fall down and when we walk on tiles there may be chances of the "Arthritis disease". To over such problems this study suggests us to use cow dung plaster as well as cow dung brick for our good.

2. NEED OF THE STUDY

Cow dung is a freely available resource. Which is mostly wasted in city area in large amount because many people did not know the value of cow and cow

dung. To stop the wastage of cow dung and reduce the selling percentage of cow to the meatman it is need to attached the cow directly to the economy. From cow farmer can get double income like cow milk, cow dung, and also from cow urine. Also, to provide a shelter to cows living outside on roads so that their dung will be stored make it useful. RCC construction has taken over all traditional techniques as they are cheap and less time taking, but unfortunately most concrete structures are built without the expertise of architects and structure engineers and possess no such resilience. These structures also release more amount of CO₂ which harms the nature and also this is today's need to look backward to traditional building materials used in construction like cow dung, lime, mud etc. The modern tiles which we laying on floor in our house these modern tiles can harm our body due to the temperature absorb by the modern tiles in winter season. There may be chance to cause of Arthritis Diseases.

3. LITERATURE REVIEW

1. Alisha Jawade, "A Review of Experimental Study on Properties of Plaster with Replacement of Cement by Cow Dung and Fly Ash," *TIJER*, Volume 9, Issue 6, June 2022.

As per this study Vedic poultice is much better than usual poultice in every instruction. First of all, it's tone-repairing cement. It needs a little water to fix. It acts as a thermal insulator to stay warm in time-out and cool in summer. There is invariably fresh air in the space. Reduce verdant-house gas sequel and save electricity and water. It protects against hazardous radiation. Vedic poultice becomes a source of profit for multitudinous of the farmer. It can support to reduce the death luck of the farmer and cattle. Vedic poultice reduces the temperature of space up- to 10 ° to 15 °. support to reduce air toxin.

2. Borade Mansi, "Vedic External and Internal Plaster," *IJIRSET*, Volume 9, Issue 4, April 2020.

As per this study Vedic foreign and internal poultice is ready for operation. It does not demanded water for curing consequently it saves thousand litres of water and electricity demanded for pumping the water and also it acts as a thermal bad captain consequently keeps raising cool in summer and warm in time-out. One of the great vantages of Vedic poultice is soundproof, heat substantiation

and conflagration substantiation because of cow soil cream and gypsum is exercised in poultice and it have same characteristics. Vedic foreign and internal is act as thermal bad captain by reducing temperature in the structure. The energy of Vedic foreign and internal poultice is also satisfactory as analogize to usual poultice. Vedic foreign and internal poultice achieved the energy at 7 mm which usual poultice gain at 12 mm viscosity thus the substance is saved, happy area is raises and economy is achieved. This poultice is cost operative as analogize to usual poultice.

3. S. Sathish Kumar," An Experimental Study of Fully Replacement of Cow Dung Ash (CDA), Alumina and Lime for Cement," *IRJET*, Volume 05, Issue 05, May 2018.

As per this study, this poultice is attained side energy and also durability is truly high. Also, it's tone-Curing Concrete (SCC). We hope that cow dung ash can reduce the water content. The cow soil ash (CDA) only substance can rebut 50 of conditions in our ménage. provident wise, we can practicable to reduce the substance cost. The vacuity of substance is generally high. We also spangle ago our traditional construction paraphernalia.

4. Peter Paa-Kofi Yalley, "Strength and Durability Properties of Cow Dung Stabilised Earth Brick," *IISTE* Vol.3, No.13, 2013, ISSN 2224-5790.

As per this study, initial Sunyani planet was chemically stabilised by cow soil. A better compressive energy at the dry country, and after 10 beats of immersion in water, was attained with cow soil stabilisation, and swish valuations were attained at cow soil content of 20. The largely ceased compressive energy of the healed bricks after 10 beats of immersion in water, indicated that workable construction specification is necessary to support stabilised planet bricks from coming into any prolonged direct connection with rainwater. Cow soil stabilisation downgraded substantially the absorptivity from 16.8 for 0 cow soil content to 10.4, when cow soil content was 20. The abrasive defiance swelled with boost in the cow soil content up to 20. The planet exercised in the trials was from Sunyani in Ghana. This planet texture can be nonidentical from the planet texture in another portion of Ghana and the world as an entire. Once the chances of sand, ground and complexion are

determined from preparatory planet identification experiments, the technology acquired in this study can be transferred to another portion of Ghana Africa and to other corridor of the world.

5. D.P. Katala, "Investigation on the Use of Clayey Soil Mixed With Cow Dung TO Produce Sustainable Bricks," Research Article.

The energy of the soil cow soil amalgamation decreases as the luck of cow soil content raises. An initial max in energy was observed at 20 cow soil content. This could again be read as an initial minimum at 10 cow soil content. Curing of the soil cow soil amalgamation did not produce a great deal of disparity in energy up to around 40 soil content. The energy disparity came bigger for complexion content lower than 40 and for curing between 14 and 30days. This is portion of an exploration into the engineering behaviour traditional Namibia construction styles and paraphernalia. It would therefore be necessary to extend this study by carrying out durability testing of the bricks and wall systems made utilizing them. Thermal testing to know, how the heat dissipates through the bricks and hence the walls would also be portion of this extended exploration.

6. Deepak Meshram, "Experimental Study of Eco-Friendly Vedic Plaster," IRJET, Volume 08, Issue 07, July 2021.

The extension of waste pod greasepaint in Vedic cataplasm redounded into further inflow suitable and swelled set viscosity as proportion of pod greasepaint swelled. The extension of waste pod pulverized up to 10 of cargo of Vedic- cataplasm, decreases compressive energy a normal of 37. The valuations attained in the experiments demurring sample- 4 are sufficient to fulfil the minimum valuations stated in IS 2547(portion- II)- 1976. extension of Indian goo water redounded into utmost inflow suitable blend along with compressive energy of 6MPa. This combination of substance can be employed as spray suitable cataplasm in some cases. The test effects also show off that addition of graphene in wimpish instance can ameliorate its energy significantly. farther study is needed to charge styles of involving graphene into cataplasm as swelled chance of graphene.

7. Dr. P. Magudeaswaran, "Development of Eco Brick and Concrete with The Partially Replacement of Cow Dung," IJOSER, Volume 6, Issue 5, May 2018.

Cow soil slipup can be considered as a sustainable structure substance. These bricks are Eco-friendly, and lighter in cargo. The slipup attained by partial relief of complexion with Cow soil redounded in lower energy. The slipup attained by 10 relief of complexion is of third-class slipup. The main reasons for reduction in energy of slipup may be due to the following reasons; Due to the relinquishment of phase mixing and moulding, thus well mingling and contraction of slipup doesn't take position. The void spaces in the slipup swelled due to burning of cow soil. Cow soil ash can also be exercised as a supplementary bonding substance. But the operation of cow soil ash with concrete is limited because of its lesser compressive energy. The 28 days compressive energy attained for 10 relief of cement by cow soil ash is equal than usual M20 blend. The splitting tensile energy and flexural energy attained is lesser.

8. Leopold Mbereyaho, "Assessment of Cohesive Soil – Cow Dung Mortar Properties as Replacement of Cement Mortar for Simple Plastering Works," RJESTE, Volume 3, Issue 2, 2020.

The ideal of this study was to charge the interpretation of soil mortar made utilizing cohesive soils mixed with cow soil, and analogize it with the usual Portland cement mortar to establish its felicity as finishing accoutrements, with reflection of its affordability and its stability to the terrain. The cohesive soil uprooted from one of the original spots was settled to prize organic matters, and also the Atterberg limitations test was conducted to establish the cohesive status of the soils. The cow soil was mixed with the cohesive soil with nonidentical probabilities 10, 20, 30, 40, to make separate cells, which were kept for 3 days in water for the water immersion test. Latterly they were dehydrated for 28 days in an open-air room, before they were tried consequently. The stylish water immersion for all cells was set up to be 19.82 in moderate which corresponded to 20 of cow soil content. The loss of the cohesive soil mortar mixed with cow soil content from 10 to 20 showed off an boost from 24.7 to 25.3; and also it dropped to 24.2 and 22.9 independently at 30 and 40. The continuity test was conducted

visually and it showed off that no checks in plastered mortar and was well attached to the wall. As conclusion, the soil mortar mixed with cow soil could be exercised in construction conditioning especially in publishing process. The content of 20 of cow soil showed off more good parcels and advanced continuity, and thus it could be considered as a low- cost indispensable construction substance to cement mortar for some structural ingredients under usual conditions. In order to shake the earlier loss and checks in mortar due to robotic drying by sunshine, this mortar shouldn't be left in open area at least at earlier stage of seven days.

9. Arunima M, "Study of Strength of Earth Brick Reinforced with Coir Fibre and Cow Dung," IJERT, Volume 8, Issue 06, June 2019.

Energy and continuity characteristics of planet slipup corroborated with coir grittiness and cow soil was set up to be bettered than the usual bricks. The planet bricks stabilized with 20 cow soil and 1 coir grittiness exhibits ultimate compressive energy and abrasive energy which indicates the stylish combination. Respectable enhancement in compressive energy and reduction in mass were displayed by planet bricks corroborated with cow soil and coir grittiness. Dry compressive energy Coir has implicit to boost the compressive energy of bricks. A proliferation in compressive energy with boost in of coir fibre up to 1 and cow soil up to 20 was observed. Farther extension of cow soil and coir grittiness leads to the reduction of compressive energy. Wet compressive energy Absorption in water for 24 hours downgraded the compressive energy assimilated to the compressive energy in their dry country. Environment and frugality Use of cow soil and coir grittiness minimizes the environmental cases of waste deposit in extension to the cost of construction of structure. It's cost operative because of the volume of complexion is more in usual slipup assimilated to the corroborated slipup. The coir grittiness and cow soil are fluently accessible and cheap value which makes the modified slipup as cost operative by minimizing volume of complexion needed, consequently we can save plutocrat.

10. Zoe Zi, "Cow Dung Theory of Leadership," United Kingdom, 2020.

Now a days world faces numerous expostulations such a rapid-fire urbanization, climate revise etc. This book contains dissection of the fresh terrain and an indispensable energy and antipollution substance.

11.Sahadeva Dasa (2014): Cow Dung – A down to earth solutions. Department of environmental studies Delhi, India.

This book contains research on cow dung a down to earth solution for warming and nature. The books have all the scientific data that plays a role to control global warming. This book explains the use cow dung through their personal observation.

4. CONCLUSION ON THE LITERATURE REVIEW

After a study we understand that cow dung can be use as construction material after adding some additive in it. Without harming the nature from cow dung, we can make building construction materials. Huge usage of cement and modern materials will not lead the future of construction to good ecology. Cow dung is most worthy materials. It is easily available in daily basis and can be used as building material. In India from ancient time cow dung use in their lives. In India cow wastage use in agriculture field, for flooring purpose and also in medical use. Cow dung is very light material. Its most important property that building material which is made from cow dung have breathy property. Its breath harmful gases and neutralised it. It is durable. Scientists have studied that the mixture of cow dung and lime gives better strength and it can replace the concrete and fly ash bricks. In Bikaner Dr. Shivdarshan Malik Sir research on the cow dung and he got big achievement in it. Shivdarshan sir made plaster named as "Vedic plaster" as well as bricks named as "Gaucrete" which is totally eco-friendly building material without harming the nature.

Cow dung can play an important role in the future of human being. In future place of cement can be replaced by cow dung after adding some additives in cow dung. To give beautiful environment condition to our next generation we have to save the cow. Save cow for future it is very beneficial to environment as well as human being.

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