

## “EXPERIMENTAL STUDY OF ECO-FRIENDLY VEDIC PLASTER”

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**Abstract:** This project is based on “To reduce environmental impact due to artificial construction materials”. In this days this is a need of construction sector to develop *energy efficient materials with enhanced* durability by incorporating natural waste. From this study we found out the strength comparison, initial and final setting time, consistency, soundness of both mortars. And we can also known the difference about the specific gravity of Vedic plaster and normal cement. From the ancient time, peoples in the rural areas have been using cow dung plaster for thermal comfort. This is ease to application. Cow duck plaster have low durability and less life span that’s why this plaster has not been utilized as the main construction material. Vedic plaster obtained from naturally available materials like gypsum and cow dung ash with a proper proportion mix. And this will decrease environmental pollution obtained due to the cement and its by- products. The prepared vedic plaster composite has so may uses, this can be apply where non-load bearing, economical lightweight material is required. Except it changes in properties of plaster waste shell powder can used for making the components because it reaches minimum values which is required by component standards.

**Keywords :** Vedic plaster, Graphene, Nano-particles, bio-filler, seashell, etc.

### 1.Introduction :-

In India daily maximum 3 milinons tonnes of dung is realised and this waste is not used properly. At that time the Human population is growing up day by day, thus demand of houses is also increased .This affects lots of pressure on construction sector for construction of houses with rapid rate and reducing construction cost of houses and also maintaining quality of construction. Increase in population the rate of many types of waste generation is aslo increases. In this days lots of effort are being made to incorporate waste material in construction materials to decrease waste accumulation and to decrease cost of construction which make it more eco friendly.

On making core construction materials many literatures are available, like cement more eco friendly by reducing carbon footprint and also mainly to decrease consumption of energy during it's manufacturing. Plaster is a outer layer of material on walls inside and outside of buildings as well as House's. That's why this directly

affect on heat transmission of building from the walls of building. In ancient era, the structures must be in the construction of pyramid Gymsym plaster was used having life if almost 1000 years, In ancient construction era insulation of structure was must to decrease energy consumption of House's and structures Due to the thermal comfort cow dung was plaster was used for houses in the ruler part of India. This plaster is good thermal insulator which prevents from sun radiations and cow dung is cheapest as it easily available also, The enzymes present in cow dung are good binders which prevents damage of plaster due to salts and the humidity. The life of plaster is also higher than cement because gypsum is mixed in it. Gypsum and cow dung also improve saline land which does not have long-term saline effects on houses.

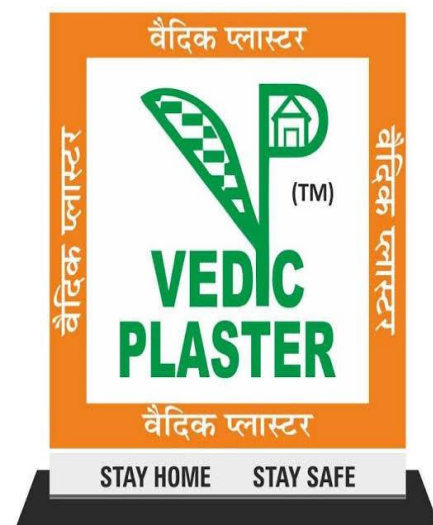


Fig. Vedic plaster

### 1.1 Graphene Nano- particles

Graphene is a monolayer of carbon atoms, tightly bounded, It is an allotrope of carbon in the form of a plane of sp<sup>2</sup>-bonded atoms with a molecular bond length of 0.142 nanometers. Graphene is the lean compound called to man at one atom thick, the radiant material known (with 1 square meter weighing 0.77 milligrams around.



Fig. Graphene powder

Features of graphene used :

1. Improve mechanical stability.
2. very thin sheets.
3. very high aspect ratio.

### 1.2 Seashell Powder

Sea Shell Powder is formed from the deep-sea snow crab shells, natural and safe aspect. it is the core obtained by de acetylation of chitin. Seashell Powder is derived from natural sea shell.



Fig. Seashells

### 1.3 Advantages of Vedic Plaster Over Conventional Plaster

1. Vedic Plaster is eco-friendly product and easily available.
2. It is simply to apply on the surface.
3. It saves water because no curing to be required.
4. It have better thermal insulating property.( Save the electricity)
5. It is fire resistant, sound resistant and radiation resistant.
6. Vedic Plaster confess cool temperature in summer and hot in the winter.
7. It can be used for ceiling design , gives attractive and smooth finish .
8. Vedic Plaster can be used by adding shell powder within it.

### 1.4 Defects in conventional plaster

1. **Blistering** : The formation of one or more swellings on the treated plaster surface.
2. **Cracking** : The formation of one or more crack not considerable to structural cause. Generally, the most important reason for cracks is settlement. Settlement is not only mean that foundation to be settled and it leads to cracks in building.
3. **Crazing**: The formation of a lines of hair cracks on the finished plaster surface. Called as `map crazing', when it forms a haphazard pattern over the wall-surface affected.
4. **Grining**: texture on the surface of the plaster of the pattern of joints or similar breaks in the continuity of the surface characteristics of the background. It is due to the difference in suction between the masonry units and the mortar, as well as by taking out mortar joints.
5. **Peeling**: The removal of loose areas of plaster work from the background. Peeling from plaster could be a result of wet trowelling of the white coat when the plaster was originally applied.

## 2. METHODOLOGY

### Experimental Study Of Effects of Nano Particles And Bio Fillers On Strength Of Vedic Plaster.

- Study of literature for suitable nano material and biofillers.
- Determination of test parameters from references IS codes.
- Preparation of material composition/proportion.
- Preparation of test samples as per procedure described in IS code.
- Curing and testing of test specimens as described in codal provision.
- Analysis of test results for optimum composition and economical consideration.
- Calculation and comparison cost of application modified and conventional plaster. Fig.testing specimen.



### 3. RESULTS AND DISCUSSION

A. The test result for the freedom from coarse particles obtained in the laboratory is 4.89 % which satisfies the IS requirements.

B. The tests result obtained in the setting time for plaster is 65 minutes which satisfies IS requirements.

C. Compression Strength Test takes place under Compression Testing machine in laboratory after 7 days .

D. The lowest strength obtained with replacement of vedic plaster with 15% of waste shell powder which suggests further addition of shell powder will not only decrease the strength of existing plaster but unfit for any practical usage.

### 4. CONCLUSIONS

1. The addition of waste shell powder in vedic plaster resulted into more flow able and increased set density as proportion of shell powder increased.

2. The addition of waste shell powdered up to 10% of weight of vedic-plaster, decreases compressive strength an average of 37%.

3. The values obtained in the tests excepting sample-4 are sufficient to fulfill the minimum values stated in IS 2547 (part-II)-1976.

4. Addition of Indian gum water resulted into most flow able mix along with compressive strength of 6MPa.This combination of material can be utilized as spray able plaster in some cases.

5. The test results also show that inclusion of graphene in weakest specimen can improve its strength significantly. Further study is required to assess methods of including graphene into plaster as increased percentage of graphene.

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