

Use of Saline Soil as option for Modeling Clay for Idol Making

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Abstract: Ganesh chaturthi is one of the main festivals celebrated in India, it is the most celebrated festival in western India. After predetermined time the idol is immersed in water bodies every year. Idols made from Plaster of Paris have increasing demand for this festival for few advantages over traditional Modeling Clay. Low cost and toughness of idol are main reasons for increased use of Plaster of Paris idols in society. In the present study, in addition to Plaster of Paris and Modeling Clay, Saline Soil is introduced to make such Idols in lesser cost than Modeling Clay. Saline Soil found near creek areas can be used to make such idols in less expenditure. India has very large costal area and many creeks. This soil has nearly the same properties as the Modeling Clay. As Modeling Clay and Plaster of Paris are made from Gypsum and as India has limited mines of Gypsum, they are expensive. As compared to that, India has plenty of creeks in western part of the country and hence abundant amount of Saline Soil. This fact makes this soil cheaper to avail. Saline Soil with addition of small amount of Calcium Carbonate is a better option for making idols.

Keywords: Calcium Carbonate, Ganesh Chaturthi, Modeling Clay, Plaster of Paris, Pollution and Saline Soil

I. introduction

As overall pollution after immersion of idols in rivers as well as sea is increasing exponentially, surveys were carried out to find actual reasons. These idols are made either by modeling clay or plaster of Paris. After the immersion of an idol in water, the one made of modeling clay, dissolves quickly as compared to that made of plaster of Paris. Idols made from plaster of Paris do not dissolve in water; it takes years for POP to deteriorate. So, plaster of Paris is the main reason for pollution. When some idol makers were asked why they preferred to make POP idols instead of modeling clay idols and why there was comparatively more demand to POP idols by people, it was revealed that this was because of the cost. Final cost of a POP idol is much lesser than that of a modeling clay idol. This is because POP is available to idol makers at a cheaper rate as compared to modeling clay.

Both the clays are made from Gypsum and hence produced only in Rajasthan and Gujarat. Due to limited mines of gypsum and large distance transportation these clays are costly. If model makers use Saline Soil instead of modeling clay, it will be available at a cheaper rate than the modeling clay. Reasons behind it are less transportation and less chemical and mechanical processing on soil. As there are many number of creeks situated in western India, Saline Soil is easily available in these areas very near to model makers and that reduces the transportation cost. Only chemical to be added to the soil to use it for idol making is Calcium Carbonate which is very cheaply available in the market and that reduces the chemical processing cost of the soil. In addition, as saline soil is salty in nature, it is not used for agricultural or farm use, so it is not used for any other purpose. Using this salty soil for idol making and immersing those idols in river water or sea water doesn't pollute the water as it is natural soil and not manufactured like POP and modeling clay.

It was observed that Saline Soil developed cracks on its surface when it became dry, which was an unfavorable property for idol making. This happens due to low water holding capacity of the Soil. Plaster of Paris has the highest water holding capacity among these three soils resulting in best finishing of idols made from it whereas modeling clay has lesser water holding capacity and saline soil has the least water holding capacity. After testing all the three Soils i.e. Modeling Clay, Plaster of Paris and Saline Soil in a soil testing laboratory it was concluded that this variation in water holding capacity of soils was because of varying proportions of Calcium Carbonate. Plaster of Paris has the highest Calcium Carbonate content (72.70% by weight) whereas Modeling Clay contains lesser Calcium Carbonate (62.40% by weight) and Saline Soil has the least Calcium Carbonate (51.6% by weight). If 11% Calcium Carbonate is added to Saline Soil and Calcium content is brought up to 62.70% then the soil is nearly identical to modeling clay in order to use it for making idols.

II. Objectives

This project aims at assessing the feasibility of the following:

1. Use of Saline Soil for making idols.
2. Reduce cost of Idols.
3. Make idols more eco-friendly.

III. Methodology

In order to compare the idols made from saline soil and modeling clay, idols from both the soils were made. To come up with better results, different percentages of calcium carbonate were added and three idols of saline soil were made; one with addition of 8% calcium carbonate by weight, another with addition of 11% calcium carbonate by weight and last one with addition of 14% calcium carbonate by weight.

As saline soil collected from the creek was in wet condition, it was oven dried. It was then crushed into powder form and all debris were separated. Further, all the soil was distributed in three equal parts to make three idols with different concentrations of calcium carbonate. First part of dried soil powder was added with 8% calcium carbonate by weight, second part of soil was added with 11% calcium carbonate by weight and third part of soil was added with 14% of calcium carbonate by weight. Three parts of soil were mixed separately. Water was added to each part and pastes were made. Three pastes were filled in three different moulds of idol. Three idols were compared for cracks and finishing properties.

IV. Observations

It was found that the development of cracks on dried saline soil idol decreased as the content of calcium carbonate increased. The idol made with mixture of saline soil and 8% calcium carbonate was observed to be with fewer cracks on the surface whereas the idols made with mixture of 11% and 14% calcium carbonate were found to nearly be with no cracks on the surface.

It was observed that Calcium content also affected the surface finishing of the idol. Idol made with 8% calcium carbonate had a very rough surface. Idol made with 11% calcium carbonate had a smooth surface and that made with 14% calcium carbonate had a moderate finish.

Calcium content also affects the brittleness of the idols. It was observed that the brittleness of the idols decreased as the content of calcium increased.

TABLE 1: Chemical properties of Saline Soil, Modeling Clay and Plaster of Paris

	Saline Soil	Modeling Clay	Plaster of Paris
1) pH	7.3	8.1	8.1
2) Calcium Carbonate (%)	51.6	62.4	72.7
3) Organic Carbon (%)	0.651	0.014	0.028
4) Phosphorous(kg/ha)	4.452	6.679	0.557
5) Potassium (kg/ha)	1180.03	361.6	415.3
6)Electrical Conductivity (mS/cm)	4.26	1.83	5.4

V. Conclusion

It was seen that Saline Soil became very similar to modeling clay when 11% calcium carbonate was added to it.

It is concluded from this study and experiment that saline soil can be used for making idols when 11% Calcium Carbonate by weight is added. Total cost of making idols reduces as only expenditure required is for the Calcium Carbonate which is available at a low cost in the market.

If using saline soil for making traditional Lord Ganesh idols becomes a trend it is possible that after a few years it is not necessary to add extra calcium to the soil to use it for making idols. Because as the idols made from this soil are going to be immersed in same creek or nearby river and the dissolved soil from these idols is again going to deposit on the creek banks. It will result in slowly increase of calcium content of the Saline Soil which is favorable for idol making. This will further reduce the expenditure used for addition of Calcium Carbonate in the soil externally.

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