

# FABRICATION AND INVESTIGATION ON COOLING MOSAIC TILES

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**Abstract** - Clay tiles are the most common floor of covering in buildings, particularly in traditional residential buildings. Given the important role of the floor characteristics for buildings energy efficiency and indoor thermal comfort conditions, innovative solutions for improving the thermal-energy performance. In this view, cool floor applications represent an effective solutions to this aim. The present work deals with behavior of cool mosaic using waste materials as a replacement for traditional clay tiles, aimed at increasing their "cooling" potential. The paper discusses the possibility of applying an innovative "cooling mosaic", consisting of fabrication of cooling mosaic, on a traditional residential building to improve the thermal conditions of the indoor environment that is adjacent to the floor. It was found that internal temperature was reduced after the applications of the cooling mosaic. Floor with cooling mosaic represent an innovative and relatively inexpensive technique to reduce the building energy requirements for cooling and to improve indoor thermal comfort conditions. We observed that the floor with cooling mosaic maintains a suitable room temperature for all environmental conditions.

**Key words:** Clay soil, Tannery effluent, Shear strength, Shrinkage, Waste stone powder ,Lime

## 1. INTRODUCTION

The word mosaic means the picture of pattern made with small color pieces of chips set in white flash colored concrete. The tiles with this type of work are pattern are called MOSAIC TILES.

Mosaic tiles are being made in different colors, designs and sizes and by using cement. These tiles are manufactured in hydraulic cement. Mosaic tiles (Tesserae) come in variety of style, colors, shapes, manufacturing methods and chemical combinations. Some tiles are manually made while others are found in nature. The following gives a list and description about the main types of mosaic tiles.

## 2. OBJECTIVE

- To develop a cooling mosaic tiles as a partial replacement of cow manure instead of crusher sand.
- To utilize the waste material like cow manure, marble powder.
- This is mainly manufactured to bear the heat,

generated in hot weather condition.

- To decrease the room temperature.
- The present work deals with the behaviour of cooling mosaic.
- Slip resistant.

## 3. LITERATURE REVIEW

Parker et al (1998) estimated annualized cooling energy savings measured summer daily cooling energy savings of 25 per cent and peak-power demand reduction of 30 per cent for a school building in Florida. Estimated annualized cooling energy savings were assuming an aged solar reflectance of 0.55.

Konopacki et al (2001) estimated summer daily cooling energy saving of 11 per cent and a peak-power demand reduction of 14 per cent in a large retail store in Austin, Texas. Estimated annualized cooling energy savings were assuming an aged solar reflectance of 0.55

Hashem Akbari et al (2008) Floors that have solar reflectance and high thermal emittance stay cool in the sun. A Floor with lower thermal emittance but exceptionally high solar reflectance can also stay cool in sun. substitution of a cool Floor for a non-cool Floor may decrease cooling electricity use, cooling power demand and cooling equipment capacity requirement , while slightly increasing heating energy consumption. Cool Floors can also lower the citywide ambient air temperature in summer ozone formation and increasing human comfort.

Aviruch Bhatia et al (2009) conducted a study on determination of energy savings with cool Floor concept using calibrated simulation for composite Indian climate. It has showed that the reduction in the heat flux due to cool gets translated into energy savings of the moulded building.

## 4. MATERIALS TO BE USED

- Coolant Water
- Cement
- Marble powder
- Color chips
- Cow manure
- Crusher sand

## 5.1 COOLANT WATER

A coolant water is the waste water collected from the heavy vehicles. Coolant is a type of fluid which flows which surrounds a device to preventing it's overheating, transferring the heat produced by the device to other device that use or dissipate it. The ideal coolant features have high thermal capacity, low viscosity, and with low-cost, non-toxic and chemically inert, neither causing nor promoting corrosion of the cooling system.

While the term cooling is commonly used in automative and HAVC application, in industrial processing, heat transfer fluid is one technical term more often used, in high temperature as well as low temperature manufacturing applications. Another industrial sence of the word covers cutting fluids.

## 5.2 CEMENT

Cement is a binder, a substances that sets and hardness and bind other materials together. Cement is usually a grey powder before being mixed with other material and water. Cement powder causes allergic reactions at skin contact.

## 5.3 Marble powder

Marble are commonly used as a building material since the ancient times. The industry's are disposing of the marble powder material, consisting of very fine powder, today constitutes one of the environmental problems around the world. Marble blocks have been cut into smaller blocks in order to give them the desired smooth shape. During the process of cutting about 25% the original marble mass is lost in the form of dust. In turkey marble dust is settled by sedimentation and then dumberd away which results in environmental pollutions, in addition to forming dust in summer and threatening both agriculture and public health. Therefore we utilize of the marble dust in various industrial sectors especially the construction, agriculture, glass and paper industries would help to protect the environment

## 5.4 Colour Chips

Mixing of various color marbles chips, tiles, granites, etc are collectively called as color chips. These color chips are used for good looking purposes. Pioneer in the industry, we are engaged in offering a compressive range of marble chips. Under this range, e offer tumbled stones and white marble chips. These types of stones are proximately used as decorative atones and landscaping stones. Along with this, these stones are used in concrete for construction purposes.

We offer these stones in different sizes, texture and colours to satisfy divergent demands of the clients. Tailor made solutions in terms of shapes and sizes can also be provided as per the clients requirements. Welcome quires for natural limestone's & stones from overseas countries like United

Kingdom, United States Australia, China, Denmark, France, Netherland, New Zealand & Norway.

## 5.5 Cow Manure

Cow manure contains the three main plant nutrients: nitrogen, phosphorous and potassium. Even the various natural variations occurs among manure from different cows, the amount in fresh cow manure with bedding or litter are roughly 11 percent nitrogen, 4 percent phosphorous and 10 percentage of potassium, and the nutrients become available to plants at a moderate speed . Fresh cow manure with bedding or litter also has sizable water content 86 percent therefore; it is beneficial because it helps to keep soil evenly moist throughout the growing season.

Added to the cow manure's will benefits is the fact that it is not difficult to find. Many of the dairy farmers offer free manure to public who haul it away. Even the payment is possible, it is generally no more than a small fee for enough to fill a truck's bed. Check before getting cow manure, however, because a big different exists between fresh manure and aged manure, both are fine to use, but they need to be treated and used differently.

## 5.6 CRUSHER SAND

Crusher sand can be produced with rotor impact mill or rotor centrifugal crusher. Both machines operate based on an impact principle and feature a vertical soft rotor. In both cases, those ensure high yield of sand, excellent cubical shape and the ability entire lifespan of the crushing tools.

## 6. MANUFACTURING PROCESS:

- ❖ To prepare the wet facing mix in the facing layer
- ❖ To fill the wet facing mix to a proper level in the mould. Facing mix in mould to a depth of 8-16mm
- ❖ Vibrate the mould lightly it helps to release entrapped air
- ❖ To prepare backing mix. This mix is a dry mix.
- ❖ Spread the dry backing mix evenly over the above layer to a depth of 6-8mm so that it can absorb excess slurry brought up the surface due to vibration of facing mix.
- ❖ Place the mould in hydraulic press and apply minimum 140 kg/cm<sup>2</sup> pressure.
- ❖ After pressing, remove the mosaic from mould gently on the pallet and transfer to the rack.

- ❖ Store the mosaic in cool and moist place for 24 hours. Afterwards keep these mosaics under coolant water for 7 days for curing.
- ❖ Grout the tiles to fill up imperfections, if any, with near white or coloured cement slurry. Air dry these tiles for 24 hours.

## 7. CONCLUSIONS

1. The water absorption capacity was found to be 8.95 % more for the cooling mosaic.
2. From the bulk density test it was found that the bulk density of cooling mosaic was 28.02 %.
3. The cow manure present in the cooling mosaic absorbs some amount of water and it is used later to control heat and also used to make the room temperature comfortable based on the climatic condition.

## 8. REFERENCES

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