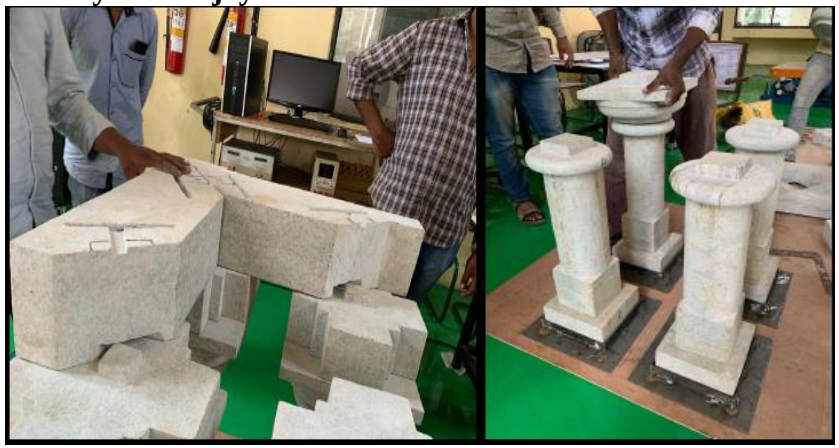
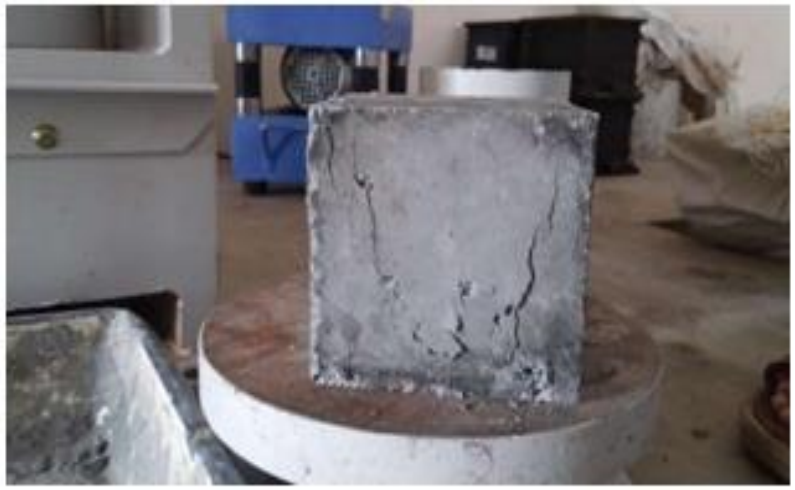
# K. S. SCHOOL OF ENGINEERING AND MANAGEMENT - 560062

## Department of Civil Engineering

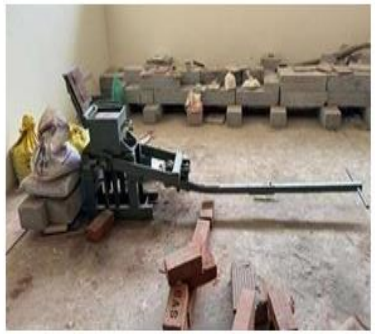
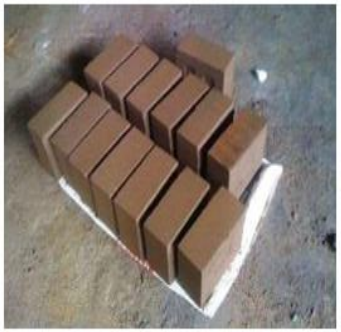
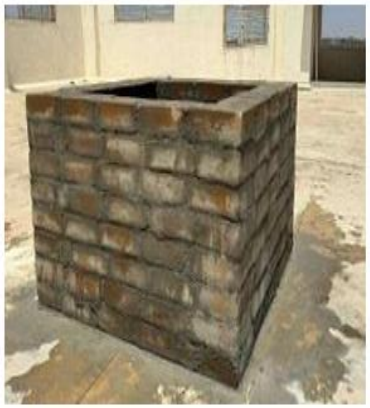
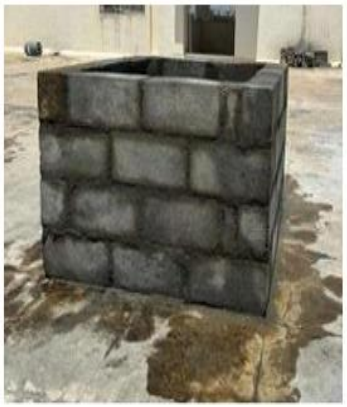
| SL. NO | NAME OF THE PRODUCT | DESCRIPTION |
|---|---|---|
| 1 | **Experimental investigation on beam-column joint in a dry stone masonry structure.**<br>**Faculty : Dr Vijaylakshmi akella**<br>  | Stone masonry joints with motor (stone masonry walls) have been widely studied from both experimental and numerical investigations, but very scarce experimental information is available on beam-column dry joints of stone masonry that constitutes the joint more frequently used in the historical constructions in south India. Therefore, the present work aims at increasing the insight about the response of typical ancient beam-column joints under different types of loading. To attain Such goal, different experimental approaches are considered: static and dynamic tests. Significant features of the structural behavior shown by the joints are discussed and conclusions on their ultimate capacity and observed failure mechanisms are addressed. The model was calibrated with the finite element analysis by validating the natural frequency. |
| 2 | **Experimental Study on Sustainable Thermal Blocks For Trombe Walls To Condition Buildings**<br><br>**Faculty : Dr Vijaylakshmi akella** | Trombe walls are popular among sustainable building constructions. They are known as storage walls a solar heating wall. A trombe wall is a simple wall in which air gap is created in the wall, which decreases the heat transfer from outside to inside or vice versa. The brick or block used to construct the trombe wall is known as thermal block.<br>Thermocouples connected to a thermocouple reader are used |

| | | |
|---|---|---|
| |    | to measure the variation in temperature between the outside and inside surfaces of the block, when exposed to sunlight. The thermocouple will be inserted into the block. The thermal block is then cured for a period of 7 days. A room of size 1 x 1 x 1 m constructed and exposed to outdoor climate conditions.<br>An infrared thermometer is used to note the surface temperature difference between the two sides of the wall. This adaptation of modified thermal block in the construction of a trombe wall can reduce the indoor temperature during hot days while also adding sustainable benefits such as a reduced carbon footprint, less consumption of electricity to condition the building. |
| **3** | **Studies on early age characteristics of self-cured GGBFS based concrete mixes.**<br><br>**Faculty : Dr Rashmi H R** | Curing of concrete plays a major role in developing the concrete microstructure and pore structure and hence improves its durability and performance. In the current project, an attempt has been made to develop internal-curing of concrete by using Polyethylene Glycol (PEG-400). In this experimental work, the mechanical characteristics of hardened concrete were investigated using M25 concrete grade with partial cement replacements of 0, 50 and 70% GGBFS and self-curing agents of 0.5, 1 and 1.5 % polyethylene glycol. At |

| | | |
|---|---|---|
| |   | 7 and 28 days old, cubes and cylinders are cast and evaluated for compressive strength and split tensile strength. For M25 concrete, the test results of normal concrete are compared with those of concrete containing GGBFS and Polyethylene glycol 400. The test findings showed that adding 1.5% of a self-curing agent increased strength when replacing 50% of cement with GGBFS, while adding 1% of a self-curing agent improved strength when replacing 70% of M25 grade concrete. |

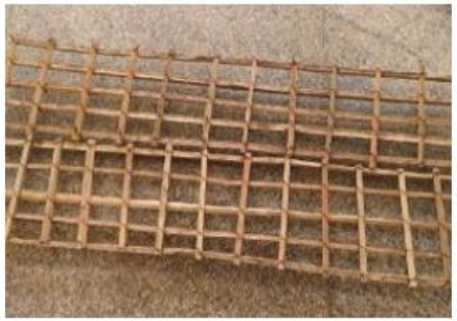
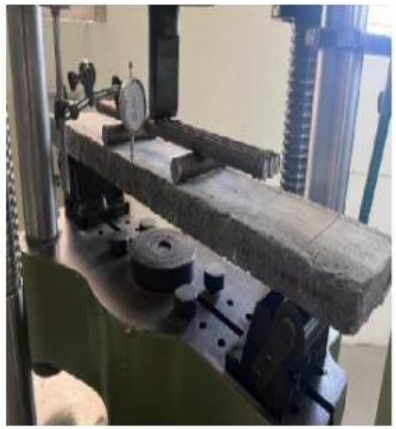
# K. S. SCHOOL OF ENGINEERING AND MANAGEMENT - 560062

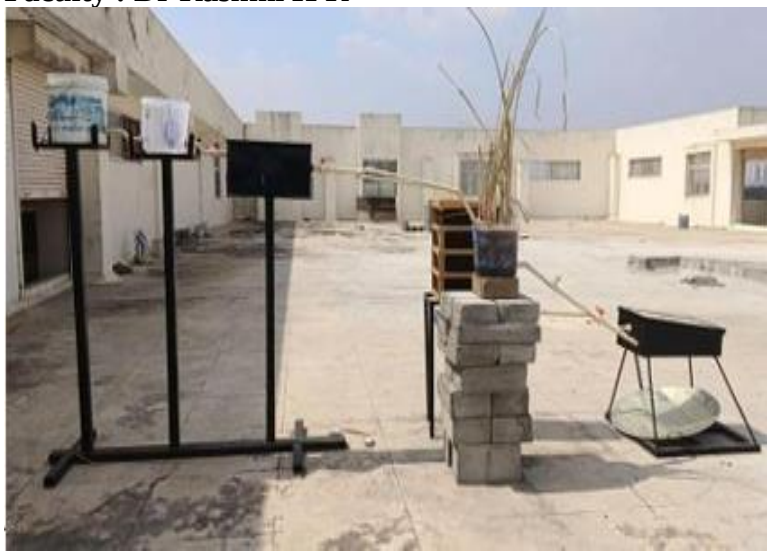
## Department of Civil Engineering

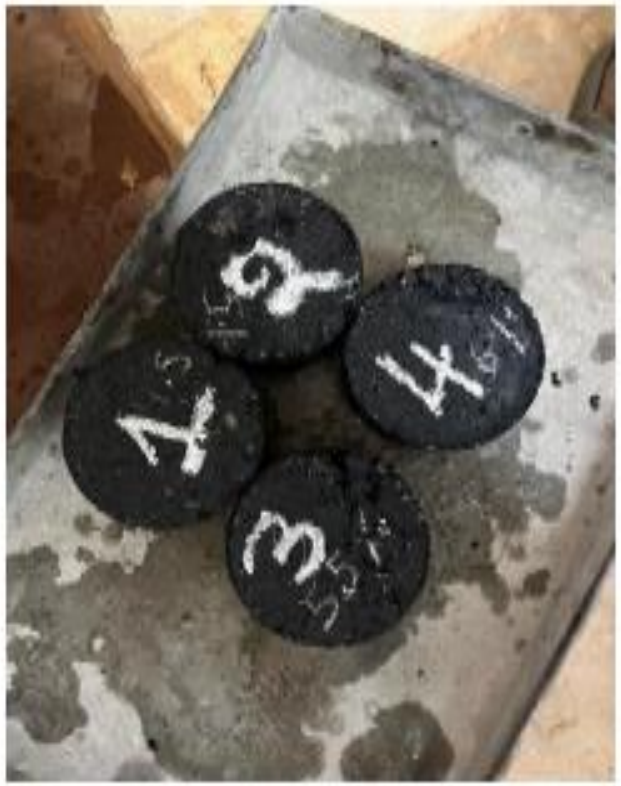
| | | |
|---|---|---|
| **4** | **Experimental Investigations on Thermal Performance of Stabilized Mud Block**<br>**Faculty : Dr Vijaylakshmi akella**<br>     | The thermal performance of a building is crucial for understanding energy transfer between the structure and its environment. Stabilized mud blocks, made from locally sourced soil, M-sand, and cement, offer a sustainable building solution that minimizes costs related to acquisition and transportation. These blocks, produced using a Mardini stabilized mud block press, are designed to enhance durability and compressive strength.<br><br>The use of stabilized mud blocks can significantly reduce indoor temperatures during hot days, leading to lower energy consumption for cooling and contributing to a reduced carbon footprint. This sustainable approach not only enhances comfort but also promotes energy efficiency in building design. |

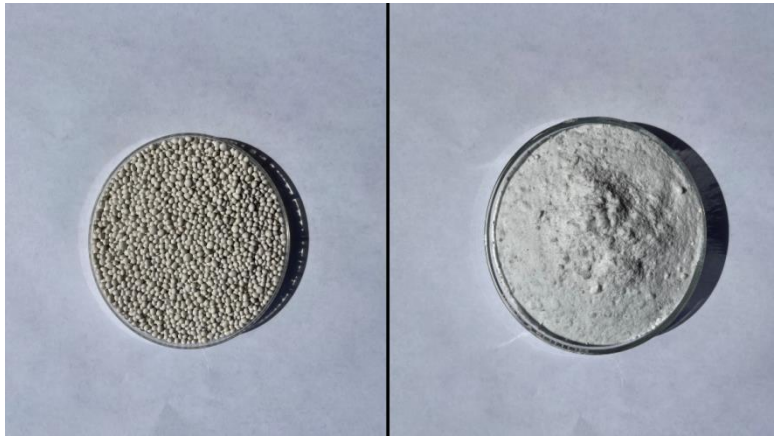
# K. S. SCHOOL OF ENGINEERING AND MANAGEMENT - 560062

## Department of Civil Engineering

| | | |
|---|---|---|
| **5** | **Experimental Investigation on Use of Bamboo Mesh and Egg Shell Powder in Sustainable Ferrocement Elements**<br>**Faculty : Veerendra Kumar**<br>  <br>  <br>  | This investigation focuses on the experimental study of bamboo as a reinforcing mesh in sustainable ferrocement elements. By analysing the properties of key materials—cement, fine aggregate, and bamboo—the research aims to optimize a cement mortar mix to achieve a compressive strength of 50 MPa. The project involves casting ferrocement panels using both steel and bamboo meshes, followed by flexural strength testing to compare their performance.<br><br>The comparative study of ferrocement elements shows that those reinforced with welded mesh have a 50% higher yield capacity and significantly greater stiffness, making them suitable for heavier loads. In contrast, bamboo mesh elements experience greater deflection and cracking after yield, indicating reduced load-carrying capacity. While bamboo mesh offers sustainability benefits, it is better suited for lighter loading conditions. These findings underscore the distinct applications and limitations of each reinforcing material in ferrocement construction. |

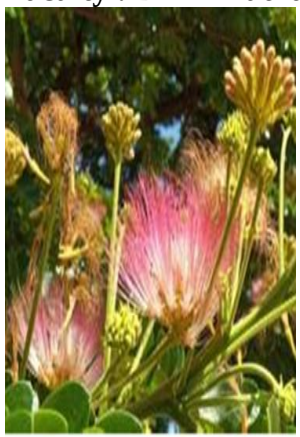
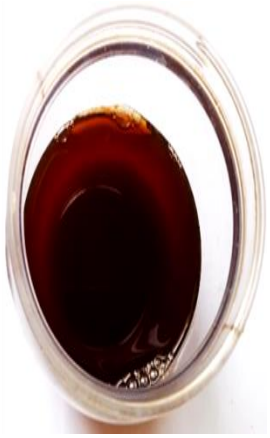
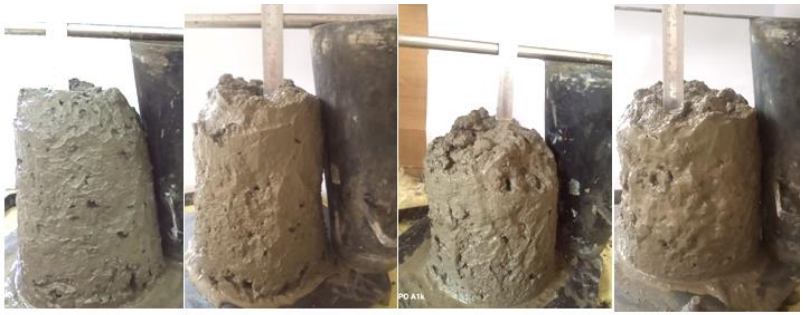
| | | |
|---|---|---|
| **6** | **Potential Use of Biofilters, Constructed Wetland and Solar Driven Disinfection for Grey Water Treatment in Rural Areas.**<br>**Faculty : Dr Rashmi H R**<br>  | The purpose of this project was to develop a solar water purification system aimed at treating biologically contaminated grey water using solar energy and UV disinfection. This innovative method has shown promise as a simple and reliable solution for water purification, particularly in rural areas where water quality is often compromised.<br><br>Overall, this project confirms that the integration of biofilters, constructed wetlands, and solar disinfection can effectively remove contaminants from grey water while being eco-friendly and low-cost. This approach not only improves water quality but also offers a sustainable solution for rural communities facing water scarcity and contamination challenges. |

| | | |
|---|---|---|
| **7** | **"Utilization of waste plastic in bituminous pavement**<br>**Faculty : Veerendra Kumar**<br>  <br>Marshall sample moulds | The experimental investigation is made to determine the properties of locally available aggregates and bitumen, after which dense graded bituminous mix is design as per MORTH specifications. The optimum binder content is determined initially for the conventional bituminous mix. For this mix, Waste plastic is added as percentage by weight of optimum binder in ranges from 6% to 16% at interval of 2%. Marshall stability test are performed for this samples to determine the best possible blending of waste plastic to get an improved bituminous mix. Dense graded bituminous mix with 5% bitumen content and 12% waste plastic was most efficient mix which had improved Marshall stability value by 21.36%, Decreased Marshall flow value by 10.86% and considerable decreased percentage volume of voids by 5.16%, as compared to conventional dense graded bituminous mix. |

| | | |
|---|---|---|
| **8** | **"Recovery of phosphorus as a struvite from grey water through crystallisation process using low-cost magnesium source"**<br><br>**Faculty : Dr Rashmi H R**<br><br>  | Grey water, which contains dissolved phosphorus, offers an eco-friendly solution to recycle this valuable nutrient, reducing dependency on limited phosphate rock and lowering environmental pollution. The research focuses on using inexpensive magnesium sources, such as brine water to form magnesium ammonium phosphate (struvite). Struvite is a valuable fertilizer that releases nutrients slowly into the soil.<br>The study examines factors like pH levels, the ratio of magnesium to phosphorus, reaction time, and the starting phosphorus concentration to find the best conditions for recovery. Lab experiments were carried out to make the process efficient while using fewer chemicals. The quality of the recovered struvite, including its structure and purity, was also studied to confirm its usefulness as a fertilizer. The results show that using low-cost magnesium sources can recover up to 90% of phosphorus when conditions are optimized. This approach not only reduces nutrient pollution in water but also contributes to recycling valuable resources. The process is practical and can be easily included in grey water treatment systems, providing both environmental and economic benefits. |

# K. S. SCHOOL OF ENGINEERING AND MANAGEMENT - 560062

## Department of Civil Engineering

| | | |
|---|---|---|
| **9** | **"Investigations of the Effect of Natural Plasticizer on Properties of Concrete"**<br>**Faculty : Dr Amrutha Dhiraj**<br>    <br>  <br>70 mm 0.5 % 77 mm 1.0 % 90 mm 1.25% 110 mm 1.5% | Admixtures are commonly used in construction to improve concrete properties. However, chemical plasticizers, which contain formaldehyde, pose environmental hazards.<br>This study develops a natural plasticizer from locally available Rain Tree Pods as a sustainable alternative. The optimum dosage of the natural plasticizer was determined using the marsh cone test for water-cement ratios of 0.40, 0.45, and 0.50. Results showed that the natural plasticizer improved concrete workability and strength, with a 28-day compressive strength increase of 8% compared to the control mix and 2.5% more than the chemical plasticizer. No strength reduction was observed at 7 and 14 days. Durability was also better than the control mix, and cost savings of 72% were achieved. The natural plasticizer proved to be a more economical and environmentally friendly alternative to chemical plasticizers. |

# K. S. SCHOOL OF ENGINEERING AND MANAGEMENT - 560062

## Department of Civil Engineering

| | | |
|---|---|---|
| **10** | **"Development of alkali activated aggregates in making mortar and concrete"**<br>**Faculty : Dr Naveena M P**<br>  <br>  | The use of artificial or manufactured aggregates presents a promising alternative to M-sand and natural coarse aggregates (NCA) in cement composites. In this thesis, we explore the feasibility of producing Alkali Activated Fine Aggregates (AAFA) and Alkali Activated Coarse Aggregates (AACA) to be employed as fine and coarse aggregates in cement mortar and concrete, aiming to replace M-sand and NCA.The AAFA and AACA are produced using GGBS and alkaline solution using pelletization technique. GGBS is a solid by product from the steel making process that possess cementitious property.<br><br>It is a popular supplementary cementitious material/admixture used to improve the concrete characteristics. Alkaline solution was prepared by mixing sodium hydroxide and sodium silicate solutions. Both AAFA and AACA are manufactured using concrete mixer at different angle of inclination and speed. The investigation assesses the AAFA and AACA feasibility, through a comprehensive examination of their physical, chemical, mineralogical, and morphological characteristics. Multiple influential factors are taken into account to assess both the flow characteristics and strength of the mortar. |