

A photograph of modern skyscrapers at night, with their windows illuminated from within, creating a grid of light against the dark blue sky. The buildings have curved facades and are reflected in the glass surfaces.

MODERN CONSTRUCTION

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Construction of Low-Cost Rigid Pavement Using Alternative Material

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The use of materials that are otherwise wasted have advantages and may prove to be environmental friendly. This chapter discusses the properties of such material which can be used in road construction. The chapter also discusses the provisions of IRC: 37 2015 and the use of such materials. Design of cement concrete pavement using low-cost materials as per IRC 58 – 2015 recommendation and reducing the time required for construction, rehabilitation and reconstruction is the primary objective of this chapter. Using alternate materials can improve the performance of recycled materials used for construction of concrete pavement thus improving the quantify the quality of the pavement construction and rehabilitation. Further, this approach allows exploring newer methodologies necessary for making a more cost-effective decision. If the same approach has been used in other state, a good comparison may be made. The success may eventually lead to effective highway construction. To reduce the cost by the replacement of cement by usually cheaper alternatives binder and the use of steel slag increase mechanical property. We also aim to reduce the pollution and proper disposal of the used industrial and domestic waste.

Cost Effective Acoustic Material: The Sugarcane Bagasse

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Non-stop research is a foot to replace synthetic materials with green-materials for sound absorption purposes. Employing of agricultural waste as building materials has been a successful trend throughout the years. This research targets to utilize sugarcane bagasse (SB) fibers as sound barriers with sodium silicate as an adhesive. The SB fibers were treated in an alkaline solution for delignification and to improve the surface morphology. The SB fibers were casted into sheet and further tested for sound transmission loss. Experimentation revealed that the fabricated sheets can be viable option as a sound absorbing medium. A tubular porous structure was observed through Field Emission Scanning Microscope (FESEM). It has the capability to be used as a low-cost, biodegradable, and eco-friendly acoustic material as compared to glass wool and other synthetic acoustic materials.

Advancements in new materials in acoustic sector can yield enhancements in building quality, and act as a solace for tenants. The acoustic presentation is a significant perspective in this. Designers these days have to manage a lot of technical features altogether including exteriors, air-conditioning, structural layouts, acoustic insulation and inner treatments, materials bio-compatibility, material waste management and soon. At the same time, customers want to buy

Structural Health Monitoring through Image Processing Technique in RCC Beam

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Structural Health Monitoring (SHM) is a concept increasingly used in the last decade to describe a variety of systems introduced on full-scale civil infrastructures with the intent of assisting and educating operators about the continued 'fitness for purpose' of structures under incremental or sudden changes in their condition. Traditional sensors have recently been used to track cracks, such as strain gauges and displacement sensors. These sensors require a huge set up and measure only at distinct points or along a line, making it difficult to detect cracks in close vicinity. This research explores the use of digital image processing using a minimal setup including a DSLR camera and software to identify and monitor the crack in a concrete beam. Image capturing and image processing through dedicated algorithms keep a process very much easy and that too in low cost. A crack detection model is developed to analyze real time as well as acquired images and the results are validated successfully. The obtained results confirm that the envisaged approach is the foundation for an effective and time-compressing solution for identification and monitoring of cracks in a beam using the MATLAB approach as described in this research. This research could be extended further to analyze cracks in columns, walls and to detect deterioration in structures over a particular period.

An Analytical Study of Performance of Retrofitted Column

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RC columns often need strengthening to increase their capacity to sustain the applied load. This research investigates the effect of elevated temperature on behavior of reinforced concrete (RC) circular columns strengthened with different fiber reinforced polymer (FRP) systems. For this purpose, 5 column specimens were prepared. The test matrix of models comprised: 1 unstrengthened or control columns, 2 columns strengthened which were wrapped with a single layer & double layer of CFRP sheet having a thickness of 1mm & 2mm respectively, and 2 specimens strengthened which were wrapped with a single layer & double layer of GFRP sheet having a thickness of 1.3mm & 2.6mm respectively. In addition to control specimens at room temperature (i.e. 26°C), some other columns were subjected to high temperature regimes of 100 °C, 200 °C, 300 °C, 400 °C & 500 °C. Behavior of the both unstrengthened & strengthened columns were analytically investigated on all of the five specimens divided into one un-strengthened specimen and four strengthened ones. A finite element model was developed to study the behavior of these columns in finite element (F.E) package ANSYS 14.0. The research demonstrated that at elevated temperature CFRP sheets were more resistance & performed better than GFRP sheets.

Strength Properties of Concrete in Saline Water

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Concrete is a construction material comprising of several constituents viz. cement, fine aggregate, coarse aggregate and water. The quality of concrete depends on its mix composition, consistency of its constituents as well as its workmanship on site. The quality of concrete needs stringent monitoring to ensure that it meets the required standard. Over the years, engineers have developed many tests to assess concrete quality. It is a well-known fact that there is an effect of different chemicals (sodium chloride (NaCl) and potassium sulphate (K₂SO₄) in nominal strength of specimens made with quasbrittle materials such as concrete, rock, ice, ceramic, and composite materials. The compressive strength of hardened concrete is generally considered to be an index of its other properties depends upon many factors e.g. quality and quantity of cement water and aggregates batching and mixing placing compaction and curing. The pH value of saline water varies between 7.4 and 8.4. Corrosion of reinforcing steel occurs below a pH of 11.

Sodium chloride or rock salt could be used as a deicing agent to melt ice at temperatures below 20 °F; it has a characteristic sharp taste and is readily soluble in water. Sodium chloride in mixing water reported it to

Causative Factors of Delay in Construction of Multi-storied Residential Buildings

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Construction delay is a global phenomenon and creates major concerns for Project performance. Delay means late completion of work as compared to agreed contract duration. The aim of this paper is to identify delay factors, its effects and to analyse these factors by Relative Importance Index Method. It can be minimized by mutual efforts of all participants. It increases completion time, cost of construction, over heads, disputes, and third party claims. Reviews of literatures, interviews with experts, questionnaires indicate that the top ten most important delays are Owner Interference, inadequate Contractor experience, Financing & Payments, Labour Productivity, Slow Decision Making , Improper Planning & Scheduling , Late Supply of Materials by Owner, Poor Communication & Coordination, Inefficient Site Managements the, Discrepancies & Mistakes in Drawings and Contract Documents.. Delays can be minimised by tackling above delay factors by amicable and efficient joint efforts by all participants.

Time is an essence of construction mathematically delays are functions of time. Project success lies in its timely completion with in budget with specified quality. Delays are costly and often result in disruption of work, loss of productivity, late abdonment, and termination of contract,

Role of GRIHA in Sustainable Rating

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A green building is one that has the least amount of environmental impact possible. A sustainable building, often known as green construction, refers to both a structure and the use of environmentally responsible and resource-efficient processes throughout a building's life cycle, from site selection to design, construction, operation, maintenance, restoration, and demolition.

Green Buildings' Advantages (In comparison to conventional structures, green buildings use 40% to 60% less electricity, depending on the range of measures used.) Green buildings use 40 percent to 80 percent less water than conventional structures, depending on the range of measures used.)

Site design, construction management, occupant comfort and well-being, sustainable building materials, performance monitoring and validation, and inventiveness are among the 34 criteria in the GRIHA V 2019 rating system. The rating criteria (required and optional/non-mandatory clauses as defined by the GRIHA rating system) have been divided into the following categories.

Sustainable Site Planning: -Conservation-centric efficient utilization of resources.

To improve the efficiency of systems and operations while maximising resource conservation and utilisation (land, water, natural habitat, avoid wildlife, and energy).

Road Construction Delay and its Implications

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The main purpose of this thesis is to determine different important factors which cause obstruction of time in the progress of project execution and thus causing delay in completion of project and indirectly increasing the cost of project. The construction industries are very complex, requires well co-ordination with different people, with good skill. Construction can begin despite many 'unknown' matters such as incomplete design, non-availability of suppliers, lack of information, uncertain site conditions, and so on. As a consequence delays are common in construction industries. So main focus is to find the ways how road construction work is controlled without being delayed and complete within schedule time. The objective of this paper is to find factors which affect road construction delay and thus maintaining the cost of project. Questionnaires are sent to contractor, client and engineers to know their views about different factors which are the reasons for delay in project completion and increase the cost of the project. Using the data received from Questionnaires we compare the factors using different tools, methods such as WAI method and rank the factors according to their importance as viewed by engineers, clients and contractors.

The construction industry is true power of national economy system. In

Techniques for Reducing Cost of Building Construction

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The main purpose of our research is to reduce the cost of building by using different cost reduction technique. Cost reduction technique that is adopted here is based on the advance building material. Our cost reduction technique is done by the comparative study of the brick masonry material like cement, sand, mortars as well as bricks. During the comparison study, Red clay bricks with economical and advanced materials like AAC (Autoclaved Aerated Concrete) blocks it are found that it does not affect the strength of the structures. When building construction starts, masonry work and plaster work are also known as one of the major phase to reduce the construction cost .As the bricks play a important role for cost reduction in building construction, here bricks have been replaced by other materials like AAC blocks and fly ash bricks. After analogize the three materials like burnt clay bricks, AAC blocks and fly ash bricks it has been concluded that the AAC blocks will cost 26.4% lesser than burnt clay brick and 14.15% lesser compared to fly ash brick for the construction of the mentioned project. This paper explores and summarizes the cost of the equal units of fly ash bricks. Later find out that which brick usage will be the most cost reducing material.

There are various cost reduction techniques in It is essential for