

Department Of Civil Engineering
VAAGESWARI COLLEGE OF ENGINEERING



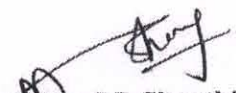
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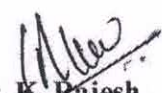
This is to certify that the major project entitled “A CASE STUDY ON SEISMIC RETROFITTING OF REINFORCED CONCRETRE BUILDINGS” submitted by the following students in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in civil engineering, and is a bonafied record of the work performed by.

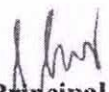
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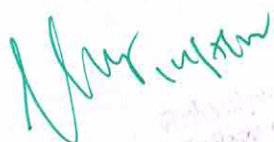
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ABSTRACT

Recent earthquakes, starting with the 1971 San Fernando Earthquake in California, left major destructions damaged the infrastructure, and raised questions about the vulnerability and design practice of structures, especially concrete structures. Design codes have been updated to include seismic provisions but structures built before 1971 have to be retrofitted. The focus of this paper is concrete structures. Surveys done after earthquakes have shown that the major problem with concrete structures is columns. Other critical structural elements include, but are not limited to, gravity design frames, footings, shear walls, connections, and beams. There are two major categories of retrofit options for concrete structures; local and global methods. Local methods focus at the element level on a particular member that is deficient and in improving it to perform better. Those methods include adding concrete, steel, or composite to the outside of the member. All three methods are effective but each presents some disadvantages: concrete is labor intensive, steel requires heavy construction equipment's, and composites have high initial cost. Global methods concentrate at the structure level and retrofit to obtain a better overall behavior of the entire structure. The different global techniques are addition of shear walls or steel bracings, and base isolation. All three methods are effective. Shear walls are usually an expensive solution but they are flexible in their distribution allowing them to be hidden in the architecture. Steel bracings allow for openings but their connections to the existing structure can be problematic. Finally, base isolation is an option that is becoming increasingly popular and that provides good behavior in earthquake for low to mid high structures.

KEYWORDS: Retrofitting, Local method, Global method, Jacketing, seismic vulnerability, Seismic retrofitting, Base isolation


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CHAPTER-9

CONCLUSION

9.1. GENERAL CONCLUSIONS

A general overview of the results showed that a better structural seismic performance of the model after the seismic retrofitting was accomplished, and prove that the chosen structural methodology of this modification is a sufficient optimized design for this existing building.

More detailed, applying steel bracings and prefabricated concrete walls (shear walls) improved the structure's characteristics such as stiffness, strength and ductility. The stiffness was mainly enhanced by the added steel bracings in the longitudinal direction, which increased the frequency remarkably. Moreover, the structure became more ductile primarily because of the steel bracings applied; hence, an improved of the capability to undergo plastic deformation before fracture is achieved. After performing the seismic retrofitting, the strength of the structure was developed by both applied retrofitting techniques; however the shear walls had the largest contribution for the stabilization of the accomplished structural performance. Another aspect that lead to these achieved improvements is the choice of material and section properties for seismic retrofitting.

Since our research is regarding an existing structure, all the existing conditions and properties must be maintained as much as possible the same, such as support types, connections between the structural elements, sizes of each structural element, soil type and so forth. The reason is to adjust to the current situation and achieve more realistic results. In conclusion, we maintained as much as possible all the properties and conditions of the structure; therefore, the obtained results are reasonable and realistic. However, another conclusion is that we should not have enormous expectations on the level of strengthening improvements of the structure against seismic hazards since, the present conditions limit the analysis.

This research study provides gaining more knowledge concerning the strengthening of existing structures under seismic vibrations. Moreover, understanding more the concept of

seismic retrofitting methods and how they can be properly applied in practice in order to obtain an appropriate retrofitting with sufficient results that fulfil the requirements of the building regulations and standards

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ANALYSIS AND DESIGN OF AN IRRIGATION SYSTEMS

A major project submitted in partial fulfillment of the requirements

for the award of the degree of

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

by

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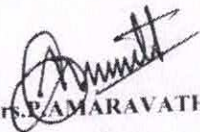



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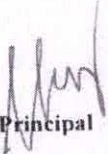
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ABSTRACT

The artificial application is used to assist the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall. In the modern challenge of improving the growth of plants and reducing costs justifies that the development of an irrigation system that will minimize the waste of water and reduce workers and monitor overhead is crucial. Land and water are the basic needs for agriculture and economic development of the country. According to International Water Management Institute (IWMI), one-third of the world's population will face absolute water scarcity by the year 2025. Agriculture which consumes more than 80% of the country's exploitable water resources. The overall development of the agriculture sector and the intended growth rate in GDP is largely dependent on the judicious use of the available water resources. Hence, this Scheme on Micro Irrigation (MI), which aims at increasing the area under efficient methods of irrigation

Sprinkler irrigation requires an understanding of soil-water-plant relationships and that irrigation timing and amount depends on soil water holding capacity, weather, and crop growth progress. Adequate system design, installation, proper operation and maintenance are important for realizing the benefits of sprinkler irrigation over the system lifetime. Furrow irrigation is also suited to the growing of tree crops. In the early stages of tree planting, one furrow alongside the tree row may be sufficient but as the trees develop then two or more furrows can be constructed to provide sufficient water. Sometimes a special zig-zag system is used to improve the spread of water. Drip irrigation is a type of micro-irrigation system that has the potential to save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil surface or buried below the surface. The goal is to place water directly into the root zone and minimize evaporation.

This project helps to analyze the usage of water, type of soil, type of crop, area of land, source of water, pressure energy of different types of irrigations on land selected. and to supply the water by designing and installing the drip irrigation system and furrow irrigation system in the selected land.

KEYWORDS:

Sprinkler irrigation, Drip irrigation, Furrow irrigation, Analysis and Design system, International water management institute (IWMI), Micro irrigation (MI), Soil-water-plant relationship



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CHAPTER-9

CONCLUSION:

Traditional agriculture is an extractable process where all resources - human, water, and land are taken and applied to immediate use. Modern agriculture uses planned technology and emphasizes management practices of conservation and renewability of resources. Modernization forces the growth of an infrastructure concomitant with rural development, urbanization, and industry. Overall economic development depends on the effective use of population and conservation of water and land as vital resources of the environment. The concepts of probability, water balance, and rainfall-runoff techniques integrated with socio-economic research methodologies can be used to evaluate the potential for the integration of these techniques into the modernization process. The steppe and pasture region with its traditional farming system of rainfed barley-livestock suffers from continuous barley cropping and overgrazing of natural pastures which causes water loss and soil degradation to progress at an alarming rate. New strategies for managing existing water and land resources, in harmony with traditional practices, can be formulated to intensify the effectiveness of human resources using capital investment in equipment to implement varying scales of irrigation systems and water harvesting farming.

Based on the following different types of analysis and design process of irrigations the selected land is suitable for drip irrigation because of the crops which are planted in that field. Also According to the seasonal variations and the other needs, the drip irrigation is installed in the field. The sprinkler and furrow irrigations are also useful for the selected land but as the land is of clay soils water must be applied slowly to avoid surface water ponding and runoff. So, drip irrigation is selected on the land.

A CASE STUDY ON HIGH STRENGTH CONCRETE BY PARTIAL REPLACEMENT OF CEMENT WITH GGBS

*A major project report submitted in partial fulfillment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

In

CIVIL ENGINEERING

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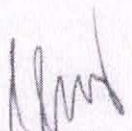
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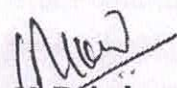
This is certify to that the major project report entitled "A TOPIC ON A CASE STUDY ON HIGH STRENGTH CONCRETE BY PARTIAL REPLACEMENT OF CEMENT WITH GGBS", submitted by the following students in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in CE, and is a bonafied record of the work performed by

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ABSTRACT

Concrete is mixture of cement, fine aggregate, coarse aggregate and water. Concrete plays a vital role in the development of infrastructure. viz, buildings industrial structures, bridges and highways etc., leading to utilization of large quantity of concrete. As cost of concrete is attributed to the cost of its ingredients which is expensive, this led to usage of economically alternative materials in its production. High Performance Concrete (HPC) is a concrete meeting special combinations of performance and uniformity requirements that cannot be always achieved routinely by using conventional constituents and normal mixing. This leading to usage of economically alternative materials in its production. This requirement is drawn the Atten Slag (GGBS) at a different proportion. GGBS is by-product of steel manufacturing industry and it is a fine powder of iron slag. The present paper focuses on investigating characteristics of M50 concrete with partial replacement of cement with Ground Granulated Blast Furnace Slag (GGBS). Compressive strength of M50 grade of concrete with 0.35 water to cement ratio was investigated; in which, to determine compressive strength with partial replacement of cement with GGBS. In our experimental investigations, it is observed that, the compressive strength of concrete has been increased by 3%. The concrete mix of M50 prepared was tested at 7, 14 & 28 days. GGBS being a by-product serves as an eco-friendly material. The use of GGBS overcome pollution problem in the environment and it helps in the durability of concrete.

Keywords: Granulated Blast Furnace Slag, economically alternative materials, Compressive strength, concrete mix.

CHAPTER-4

CONCLUSION

- The partial replacement of OPC with GGBS improves the workability, as it has been observed that the slump value increases with the increase of replacement of cement with GGBS.
- The use of GGBS in concrete resulted in an increase in setting time, as the initial rate of reaction of slag is slower than that of cement.
- The delay in setting time is closely linked to the GGBS replacement level, as higher amount of slag increases the setting time.
- Shear type of failure was observed in slump as the GGBS content was increased.
- The replacement of OPC by GGBS up to 40 % shows the increase of 2~3% in compressive strength of 28 days curing; however beyond 40% replacement by GGBS the reduction in strength is substantial.
- The use of GGBS as partial replacement of cement helps to reduce the Energy consumption in the manufacturing of cement.
- The replacement of cement by GGBS helps to reduce the cement content of concrete, thereby reducing the cost of construction because the price of GGBFS is about 25 - 50% less than that of OPC.
- Reuse of the slag helps to protect the environment from pollution and friendly disposal of the waste slag from steel industries.
- All kinds of pozzolanic materials are efficient in reducing the permeability of concrete far below the control one.
- Workability of concrete increases with the increase in GGBFS replacement level.
- As the GGBS content increases, the water/binder ratio also decreases for the same workability and thus, the GGBS has positive effects on the workability.

PLANNING OF RESIDENTIAL BUILDING WITH SOLAR ROOFING SYSTEM

*A major project report submitted in partial fulfillment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

in

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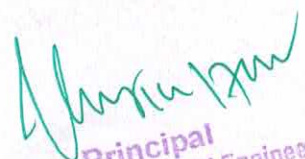
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ABSTRACT

The main concept of this Project is to cover all 9 principles required for a Residential Building having rooms like Hall, Kitchen, Two Bedrooms, Guest room, Drawing room, Study room with sufficient ventilation, parking area, family room for watching movies, garden area for landscaping and vegetation, even a swimming pool which can be included on owner's recommendation and with Integrated Solar roofing technology which makes the building power efficient. Aim is to provide all comforts to residential building in less area where the modern building in urban areas are lacking them.

A Duplex building in an area of 10mx10m is planned considering all this aspects and provided with the Integrated Solar roofing Technology which makes the building smart and power efficient. Integrated Solar Roofing System that serves all the functions of a traditional roof while generating energy, it reduces thermal conductivity better than a traditional roof while enhancing the appearance of the regular roof.



CHAPTER-10

CONCLUSION

Unlike solar panels, solar shingles do not require a separate roof during installation. They look like traditional asphalt, making it possible to use them as the primary roofing material. The ability of shingles to double as the roof and generator of solar energy will give them an advantage over panels in the future.

At the moment, the same few companies that manufacture shingles also perform the installation of solar shingle roofs. The installation cost will reduce as the technology becomes common and more shingles roof installers join the market. This will increase competition forcing installers to lower prices to attract clients.

Nearly every new home today is provided with a solar power system. The practice has become popular because more people are now interested in sustainable homes.

Residential solar roofing will continue to grow in popularity over time. Eventually, Homeowners and developers will prefer shingles over panels for their lower cost, construction convenience, sleek aesthetic, and easier installation.

A STUDY ON STRENGTH OF EXTERNAL AND INTERNAL SELF CURING CONCRETE

A Major project report submitted in partial fulfilment of the requirements

for the award of degree of

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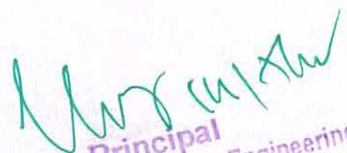


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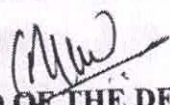
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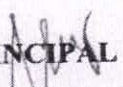
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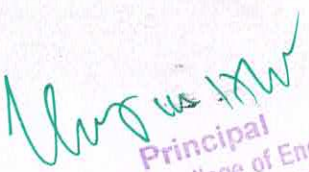
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ABSTRACT

Curing plays a major role in the construction of a building. And the major disadvantage of curing is the excess wastage of water in the form of runoff. In places where water is hard to find, places like Rajasthan, the process of curing becomes hard and costly also. To avoid the cons caused due to general curing, this experiment is conducted. The development of self-curing materials is now being considered for real engineering applications. In the past decade, there has been a huge interest in materials that can self-cure, and provide strength equal to that of general curing. Self curing chemicals can be made from a variety of polymers and chemicals. In this experiment, a few types of chemicals are considered and are tested on cubes and cylinders to test its compressive strength and split tension for 3 days, 7 days and 28 days. M35 mix was considered as reference. The various conclusions obtained were presented.

Concrete is most widely used construction material due to its good compressive strength and durability. Concrete can be cured by water curing and by self-curing agent. Plain concrete needs congenial atmosphere by providing moisture for a minimum period of 28 days for good hydration and to attain desired strength. Self curing concrete is the one which can cure itself by retaining its moisture content. In the present study, the affect of admixture (PEG 400) on compressive strength, split tensile strength, flexural strength and durability test by varying the percentage of Polyethylene Glycol (PEG) by weight of cement from 0% to 2% were studied for M20 and M30 mixes. Super plasticizers are water reducers which are capable of reducing water content by about 30 percent. It was also found that 1% of PEG 400 by weight of cement was optimum for M20, while 0.5 % was optimum for M30 grade concretes for achieving maximum strength without compromising workability.

Key words: Self curing, Polyethylene Glycol, Super plasticizers, compressive strength, split tensile strength, flexural strength.


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CHAPTER-12

CONCLUSION

Experimental work has been conducted on different self curing chemicals and the results were presented and discussed. The following conclusions can be derived from the above results: From the experiment conducted, it has been observed that the values of cubes and cylinders, after 28 days, from general curing, give high results. The values of all the other cubes and cylinders, from the various chemicals used, gave weak results except for the chemical, Polyethylene Glycol 200 used at 1%. The use of 1% of Polyethylene Glycol 200; gives approximately close values to that of general curing. The compressive strength of cubes, for 28 days, of the use of 1% of PEG is equal to the values obtained from general curing. The splitting tension of PEG used at 1% is observed to be more than that of general curing for 28 days.

The strength of self-curing concrete the optimum dosage of PEG400 for maximum strengths (compressive, tensile and flexural strength) was found to be 1% for M20 and 0.5% for M30 grades of concrete. The strength and durability properties of internally cured concrete with PEG prove to be best among the alternatives percentage and prove to be the best when compared to external curing. Strength of self curing concrete is on par with conventional concrete.

While considering the internal curing with that of external curing, the cost of internal curing proves to be cheaper when compared with that of external curing. Performance of the self-curing agent will be affected by the mix proportions mainly the cement content and the w/c ratio.

“WASTE WATER TREATMENT BY ELECTROCOAGULATION”

*A major project report submitted in the partial fulfillment of requirements
for the award of the degree of*

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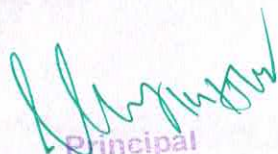


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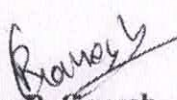



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ABSTRACT

Coagulation and flocculation are traditional methods for the treatment of polluted water. Electrocoagulation presents a robust novel and innovative alternative in which a sacrificial metal anode doses water electrochemically. This has the major advantage of providing active cations required for coagulation, without increasing the salinity of the water.

Electrocoagulation is a complex process with a multitude of mechanisms operating synergistically to remove pollutants from the water. A wide variety of opinions exist in the literature for key mechanisms and reactor configurations. A lack of a systematic approach has resulted in a myriad of designs for electrocoagulation reactors without due consideration of the complexity of the system. A systematic, holistic approach is required to understand electrocoagulation and its controlling parameters. This will enable a priori prediction of the treatment of various pollutant types.

CHAPTER 11

CONCLUSIONS

The technology has been applied at BMP over a period of 2 years. A range of different processing options and variables were thoroughly investigated and ultimately excellent results achieved.

The undertaken research and experiments proved that electrocoagulation is a revolutionary technology, significantly underused in wastewater treatment.

The removal rates, particularly for difficult to treat contamination such as soluble phosphorus are much superior to the results achieved using the traditional wastewater treatment methods.

The following conclusions were reached:

- Electrocoagulation can be successfully used for the treatment of wastewater generated in the low temperature rendering facility (stick water).
- The most suitable and economically practical for the EC treatment is a combination of stick water and the kill floor effluent (blood water), in the 50:50 ratio.
- Free fat must be removed from the sheep processing kill floor wastewater before mixed with stick water.
- Typical removal rates are as follows:

Phosphorus	70 – 90 %
Oil & Grease	90 – 95 %
TKN	50 – 65 %
TSS	90 – 95 %
COD	80 – 90 %
- The sludge produced during the process can be returned to the by products plant and utilised while mixed with the rest of the product.

SOIL STABILISATION USING GEOSYNTHETICS

A major project report submitted in partial fulfillment of the requirements for the award
of the degree of

BACHELOR OF TECHNOLOGY

In

CIVIL ENGINEERING

By

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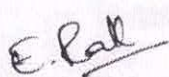
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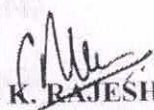
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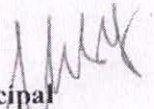
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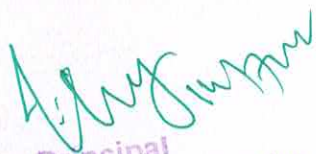
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ABSTRACT

Soil stabilization is the process which involves enhancing the physical properties of the soil in order to improve its strength, durability etc. by blending or mixing with additives. The different types of method used for soil stabilization are: Soil stabilization with cement, Soil stabilization with lime, Soil stabilization using bitumen, Chemical stabilization and a new emerging technology of stabilization by Geo textiles and Geo synthetic fibers.

In this study, we are making use of bamboo fibers as geo synthetic material for stabilization of soil. With the introduction of bamboo fibers to the soil the CBR values will improve and thickness of pavement layer also gets reduced. It also reduces the intensity of stress on subgrade. Bamboo fibers is such a geosynthetic material which is easily available, ecofriendly and also cost effective. With the application of soil stabilization method in construction the overall cost gets reduced when compared to the ordinary method of construction.

The different tests were conducted in order to determine the different characteristics and properties of the black cotton soil and obtained with following results. The liquid limit of the soil with addition of bamboo fibers was found to be decreasing when compared to liquid limit of soil

alone. The plastic limit of the soil decreased with the addition of fibers. The shrinkage limit of the soil was increased with increase in fibres.

The MDD of the soil with addition of bamboo fibers by weight of soil is found to be increasing up to 0.75% after that it decreases and the corresponding OMC is decreased with addition of fibers. The shear strength of soil decreased substantially with addition of fibers. The CBR value of the soil increased substantially.

From the limited laboratory study conducted we concluded that the 0.75% of bamboo fiber can substantially improve the properties of Black cotton soil. And thus 0.75% of bamboo fiber is the optimum fiber content for black cotton soil.

Keywords: Geosynthetics, Bamboo fibre, Soil stabilization, Geo textiles, Black cotton soil.

CHAPTER 6

CONCLUSIONS

On the basis of present experimental study, the following conclusions are drawn

1. According to the Highway Research Board classification, the black cotton soil sample has been categorized as A-7-6 (4.549)
2. There is substantial increase in MDD with increase in addition of fibers upto 0.75% by weight beyond which it decreased.
3. There is substantial decrease in OMC with increase in addition of fibers.
4. In unconfined compression test it was observed that the shear strength of the soil has increased with the increase in percentage of bamboo fibers, when compared to that of shear strength of soil tested without fiber.
5. The shear strength of the soil is maximum when 1% (by weight of soil) of bamboo fibers is added to it. Hence in order to obtain higher shear resistance 1% of fibers (by weight of soil) can be considered as the optimum fiber content.
6. The California bearing ratio (CBR) of the soil alone is obtained as 1.82% and it increased to 5.41% after stabilizing it with optimum percentage of bamboo fibers.
7. The percentage increase in CBR value after stabilizing it with optimum percentage of fibers is 197.25%.
8. In the case of sedu soil there is substantial increase in MDD with increase in addition of fibers.
9. In unconfined compression test it was observed that the shear strength of the soil has decreased with the increase in percentage of bamboo fibers, when compared to that of shear strength of soil tested without fiber.
10. The California bearing ratio (CBR) of the soil alone is obtained as 4.28% and there substantial increase in CBR value with addition of fibres.

DESIGN & ESTIMATION OF A RESIDENTIAL BUILDING

A major project report submitted in the partial fulfillment of the
requirements for the award of the degree of

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

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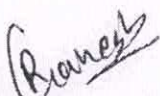


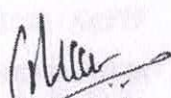
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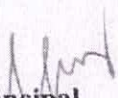
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ABSTRACT

Food, clothing and shelter are the primary requirements of a human being. Shelter is one of the most important and basic need for survival. Due to huge population growth, people have shifted from rural to urban areas and are building large-scale houses in small areas. Hence proper planning and purposeful design of a building is very important.

Planning (all the drafting and detailing) is done by using Auto CAD. Design of RCC structural components (slab, beam, column, staircase etc.) is done by "Limit State Method" using IS 456:2000 code. Design of building steel is done as per IS 800:2007. Different loads acting on the member are considered according to IS 875:1987. Estimation is done by using rates from Schedule of Rates (2020-21).

In this project, design and estimation of a residential building is discussed.


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CHAPTER 11

CONCLUSION

This project includes all the various activities like orientation, planning according to the rules and regulations of NBC code, considering vastu principles for happy living and drawings of plan, elevation and sectional views. And also arrangement of different building components and furniture as per the requirements is important in planning. Design of each and every component should be accurate and should not have failure in any case. So, it is essential to design each component carefully because one is dependent on the other.

COMPARATIVE STUDY ON FIBER REINFORCED CONCRETE AND CONVENTIONAL CONCRETE

A major project report submitted in partial fulfillment of the requirements

for the award of the degree of

BACHELOR OF TECHNOLOGY

in

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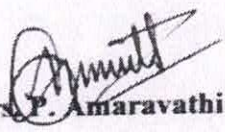


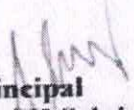
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ABSTRACT

Fiber Reinforced Concrete (FRC) is a composite material consisting of fibrous material which increases its structural integrity. Fibers are an ideal ingredient for improving the performance and durability of concrete and mortar. They increase energy absorption and fire resistance. Whilst reducing shrinkage crack, fracture formation and crack widths.

When water freezes, it expands. Since there is water in moist concrete, it's susceptible to freezing, which creates pressure in the concrete's pores. If this pressure exceeds to concrete's tensile strength, it can rupture. When concrete is exposed to multiple freeze-thaw cycles, cracking, scaling and crumbling can occur. Adding fibers to the concrete will improve its freeze-thaw resistance and help keep the concrete strong and attractive for extended periods of time.

During the curing process, concrete experiences shrinkage as the water evaporates. This process can cause cracks or other imperfections in the concrete. Fibers can help to improve a concrete's resistance to shrinkage, which will in turn reduce its cracking.

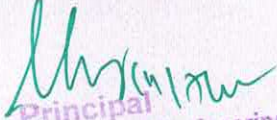
In applications where the look and feel of the concrete is important, micro-synthetic or stealth fibers can create a clean, nearly invisible finish. If your concrete will be used in a driveway, patio, or walkway, this sleek look will catch the eye of neighbors and guests.

Keywords: Fiber Reinforced concrete, Fire resistance, Shrinkage crack, Improve Freeze – Thaw resistance, Reduce Effects of Shrinkage, Look.

CHAPTER-7

CONCLUSIONS

- OPFRC exhibited increase in 28 day compressive and flexural strength by about 21 percent and 6.4 percent, respectively, as compared to control mix. It also exhibited a significant reduction in drying shrinkage. The drying shrinkage of control concrete was 0.06 percent while that of the FRC was 0.03 percent.
- The 28 days compressive strength of concrete cubes reinforced with steel fibers at optimum dosage is found to be 54.44 N/mm^2 . As Compared to the conventional concrete compressive strength increases by 28.82%.
- The 28 days Split tensile strength of Cylindrical specimens reinforced with steel fibers at optimum dosage if found to be 5.66 N/mm^2 . As compared to the conventional concrete split tensile strength increases by 23.50%.
- The 28 days of Flexural strength of beams reinforced with steel fibers at optimum dosage is found to be 6.22 N/mm^2 respectively. As compared to the conventional concrete flexural strength increases by 34.05%.
- The water absorption value of steel fiber reinforced concrete is found to be 0.47%. As compared to the conventional concrete water absorption capacity is reduced by 53%.
- The water absorption value of polypropylene fiber reinforced concrete is found to be 0.37%. As compared to the conventional concrete water absorption capacity is reduced by 65.74%.
- The sorptivity value of steel fiber reinforced concrete is found to be $0.081 \text{ mm/min}^{0.5}$. As compared to the conventional concrete sorptivity capacity is reduced by 50.00%.
- The sorptivity value of Polypropylene fiber reinforced concrete is found to be $0.041 \text{ mm/min}^{0.5}$. As compared to the conventional concrete sorptivity capacity is reduced by 74.69%.


Principal

AN EXPERIMENTAL INVESTIGATION ON HIGH STRENGTH BINARY BLENDED POLYMER HYBRID CONCRETE USING POLYCARBOXYLATE AS SUPER PLASTICIZER

*A Major project report submitted in partial fulfillment of the
Requirements for the award of the degree of*

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

by

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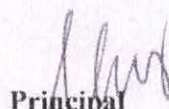
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ABSTRACT

Concrete is the world's most consumed material after water on the earth planet. Concrete is the material which is said to be strong in compression and weak in the tension. Steel is the ductile material to withstand tension in the concrete. Cement is the non-acidic and alkaline which prevent the steel from corrosion. The main focus in this experimental study is made to make concrete strong in tension with less use of steel and with the use of some fibres. The Steel crimped fibers are said to be used to improve the properties of concrete which have the improvement to the age factor of concrete. The use of Polypropylene fibers is to improve the flexural property in the concrete. Past Experimental studies by some of the past researchers has shown the use of polycarboxylate super plasticizers is to improve the workability and to reduce the water content in the concrete and improve the compressive strength with the emphases on the different properties of concrete to overcome the different botheration in concrete. Concrete has been serious issue happen in now daily so we need to discover the arrangement of this issue. In this undertaking to be center around attributes quality of solid evaluation of cement with various corresponding of supplanting of concrete with and we including pleated steel fiber. The concrete cubes are to be casted with polypropylene and steel crimped fiber in vary rates 0%, 0.5%, 1.0%, 1.5% and 2.0% by volume of concrete and also polycarboxylate super plasticize is used. To believe the expense of development to be examines. The 3D squares were tried for compressive quality (150 mm x 150 mm x150 mm) size 3D shape. The curing is done for 3,7,21 and 28 days. Compressive strength of cubes with different percentages of fibres is determined with the help of UTM machine. At last, the quality presentation of mixed fiber concrete is contrasted with the normal concrete.

Keywords: Hybrid fibre, polypropylene, Polycarboxylate, mechanical strength.



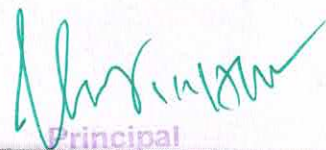
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CHAPTER 7

CONCLUSION

- After performing the series of tests, we have concluded that our project was able to achieve the higher strength in compression, as compared to the normal concrete and at the same time making it more economical.
- Due to the addition of polypropylene and steel crimped fibres in concrete we were able to achieve higher creep.
- Also, we were able to achieve the higher workability due to the use of polycarboxylate superplasticizer.
- We also encountered there was an increase in compressive strength.
- The changes in compressive strength of the hybrid polymer concrete are as shown in table after curing.
- Maximum strength of concrete was achieved with 2% of fibres in concrete on 28 days of curing.
- As the percentages of fibres in concrete and curing time increases, compressive strength also increases.
- More is the fibres percentage i.e, 0.5% to 2% more is the strength achieved



**A STUDY ON STABILIZATION OF BLOCK COTTON
SOIL BY USING FLY ASH**

*A Major project report submitted in partial fulfilment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

in

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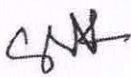



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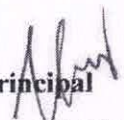
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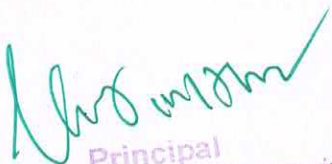
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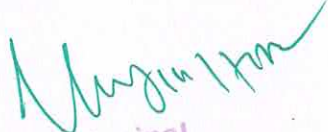
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ABSTRACT

The soil at a given site is not always ideal. They may lack strength and compress too much under load. In such situations rather it would be better for an engineer in charge to relocate the facility or alter the soil structure, stabilize the soil. Now with the scarcity of good building sites, the engineer has to contend with the available site & improve the soil properties and build. This stabilization can be defined as a method to improve the engineering properties of soil. A well-stabilized soil will have higher shearing strength, lower compressibility and lower permeability and a better freeze and thaw resistance. These are the fundamental requirements for a safe and economical design of foundations, highway, pavements and airport runways.

Soil is a complex material. Recycled and waste materials like fly ash, bagasse ash, rice husk ash can be used to soil stabilization to improve physical and chemical properties of soil. In addition to those properties which can be improved by soil stabilization are shear strength of soil, UCS and bearing capacity etc. The objective of this study is to check the amount of fly ash at which sample of soil and fly ash gives optimum values of UCS and after that is added in different proportions in the sample of soil and optimum quantity of fly ash to achieve the optimum value of CBR.


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CHAPTER -7

CONCLUSION

Based on the present tests, the following conclusions can be drawn:

1. Specific gravity increases with increase in amount of fly ash.
2. Liquid limit increases with increase in amount of fly ash.
3. Plastic limit increases with increase in amount of fly ash.
4. It increases the shear strength.
5. It increases soil bearing capacity of foundation.
6. By adding additives it improves soil strength.
7. The inclusion of different percentage of fly ash in natural soil generally resulted in some increasing in unconfined compressive stress.
8. Fly ash has good potential for use in the geotechnical application. When used in structural fills or embankments, fly ash offers several advantages over natural soils or rock.
9. The relatively low unit weight of fly ash makes it well suited for placement over soft or low bearing strength.

WASTE POLYTHENE IN BITUMEN

*A major project submitted in partial fulfillment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

in

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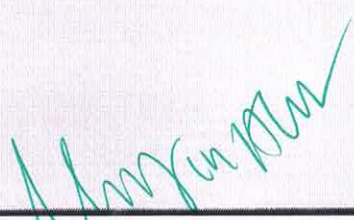
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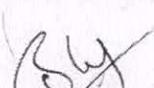


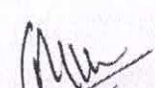
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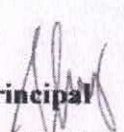
This is certify to that the major project entitled "A Topic on "WASTE POLYTHENE IN BITUMEN" submitted by the following students in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Civil Engineering, and is a bonafied record of the work performed by

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ABSTRACT

The waste plastic and its disposal is a major threat to the environment, which results in pollution and global warming. The utilization of plastic waste in bituminous mixes enhances its properties and also its strength. In addition it will also be a solution to plastic disposal & various defects in pavement viz., pot holes, corrugation, ruts, etc. the waste plastic used are poly-ethylene, poly-styrene, poly-propylene. The waste plastic is shredded & coated over aggregate & mixed with hot bitumen and resulted mix is used for pavement construction. This will not only strengthen the pavement and also increases its durability. The titanium-di-oxide is used as a smoke absorbent material, which will absorb the smoke from the vehicles. This innovative technology will be boon for Indian hot-eco-friendly. In this paper, we have discussed about the soil properties to be considered in design of pavement, pavement design, process of construction flexible and plastic-smoke absorbent pavement.

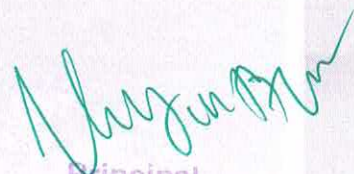
KEYWORDS: plastic waste, flexible pavement, strength, eradication of pot holes

CHAPTER 5

CONCLUSION

The expansion of plastic waste adjusts the properties of bitumen. The utilization of plastic wastes in development of roads draws out a superior execution. Since there is better authoritative of bitumen with plastic. The recurrence of purge spaces is likewise diminished because of expanded holding and contact territory between plastic wastes and aggregates or bitumen. This eventually helps in lessening the absorption of moisture and oxidation of bitumen by entangled air. Henceforth, the roads can hold up under substantial activity, in this way expanding their toughness. In penetration test (0.1 mm) of bitumen with plastic, the value diminished from 47mm to 31 mm for 5 % plastic waste in bitumen and decreasing persistently on expanding plastic squanders rate and for 15 % plastic waste, the esteem lessened to 0.7mm when contrasted with ordinary bitumen on account of expanded hardness. The ductility value has additionally diminished from 72 cm to 42 cm for 5 % plastic waste in bitumen and consistently diminishing on expanding plastic wastes rate and for 15 %, the value diminished to 0.5 cm and 0.8 cm and weak disappointment is acquired because of interlocking of plastic material with bitumen.

Softening point and specific gravity values expanded with the expansion in rate of plastic waste however subsequent to achieving the ideal level, the qualities began diminishing. So it is fitting to utilize adjusted bitumen in pavement development to limit issues like, Rutting and Skidding of vehicles amid hot atmosphere conditions. By and large increment in softening point values demonstrates bring down temperature defenselessness and is predominantly favored in hot atmospheres. The adjustment in the softening point qualities might be because of the chemical nature of plastic wastes included. The reason for changes in particular gravity qualities is high surface thickness without any adjustments in its weight. So we analyzed that 7-9% plastic waste expansion in bitumen gives ideal outcomes. Likewise, notwithstanding easing the natural issues of these substances, bitumen and different materials will be additionally devoured less (thickness of different layers can be lessened through expanding thickness of pavement). Thus the utilization of waste plastics for flexible



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**EXPERIMENTAL STUDY ON STRESS-STRAIN
BEHAVIOUR OF BACTERIAL CONCRETE**

*A major project submitted in partial fulfillment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

by

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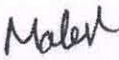



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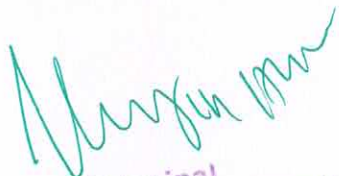

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ABSTRACT

Concrete is the most commonly used building material, but the cracks in concrete create problem. Cracks in concrete occur due to various mechanisms such as shrinkage, mechanical compressive and tensile forces. Cracking of the concrete surface may enhance the deterioration of embedded steel bars as ingress rate of corrosive chemicals such as water and chloride ions in to the concrete structure increased. In this method, of enhancing the performance of concrete, the calcite precipitating spore forming bacteria and forms precipitates of calcium carbonate, as a byproduct, which fills the cracks and makes cracks free concrete prepared with bacteria is called as bacterial concrete. Thus, this study is an attempt to define bacterial concrete, types and classification of micro organisms, working of bio concrete as a repair material, advantages and disadvantages of bacterial concrete and specification by literature review is discussed. The percentage of bacteria selected for the study is 0.2% by weight of cement. Various tests such as compressive strength, flexural strength of concrete were analyzed in this study. Knowledge of the stress-strain curve for concrete is particularly important for columns with high axial load levels, when the moment curvature characteristics of the column are largely dependent on the concrete compressive strength and the stress strain relationship.

Keywords: Concrete, Bacteria, Cracks, Bacterial concrete, stress - strain curves.


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CHAPTER – 6

CONCLUSION

The following conclusions are drawn from the experimental investigations conducted on the standard grade conventional and bacterial concrete.

6.1 CULTURE OF BACTERIA

Bacillus subtilis is a soil bacterium. *Bacillus subtilis* can be proved in laboratory which is proved to be safe and cast effective.

6.2 STUDIES OF STRESS-STRAIN BEHAVIOUR OF BACTERIAL CONCRETE

The bacterial concrete mixes have shown improved stress for the same strain levels compared to that of conventional concrete mixes at all the ages. From the results ultimate lateral strain and longitudinal strain occur at 0.062 and 0.367 for conventional concrete. Ultimate Lateral strain and longitudinal strain occur at 0.068 and 0.4 for bacterial concrete.

The ultimate stress occurs at 10.167 N/mm^2 for conventional concrete.

The ultimate stress occurs at 11.32 N/mm^2 for bacterial concrete.

6.3 STUDIES ON CRACKING IN CONCRETE

It is concluded that bacterial concrete will have the higher life compared to conventional concrete because calcite precipitate crystals impermeable the concrete specimens and resist the harmful solutions into the concrete thereby decreasing the effects they may cause.

A CASE STUDY ON ZERO ENERGY BUILDING

A Major project report submitted in partial fulfillment of the requirements

for the award of the degree of

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

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ABSTRACT

The concept of Zero Energy Building (ZEB) has gained wide international attention during last few years and is now seen as the future target for the design of buildings. Worldwide Buildings consume up to 40% of the total global energy and 36% of carbon dioxide emissions. By the year 2030, the consumption is expected to increase up to 50%. In India building sector consume a total of 70% of the electricity generated in the country. Studies indicate more than 50% of energy is used in buildings for occupants comfort like cooling and lighting. Energy consumption in the building sector will continue to increase until buildings can be designed to produce enough energy to compensate the growing energy demand of these buildings. Toward this end, many governments promote zero energy buildings. A zero-energy building is a building with zero net energy consumption; it means the total amount of energy used by the building on an annual basis is equal to the amount of energy produced on the site or off the site. These buildings do not increase the amount of greenhouse gases and less impact on climate.

Keywords: Net zero Energy Building, Design, Energy reduction strategies, Foot print, barriers, Advantages, Energy consumption, Climatic change, Energy Resources, Non-Renewable Energy Resources, Renewable Energy Resources, PV Solar Module.


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CHAPTER-12

CONCLUSION

- The zero-energy concept will reduce global warming and helps to retain the nature. The specialty of the zero-energy building is that the whole building is made keeping sustainability and green building in mind. The every aspect of the building was planned with 'green' approach, showcasing the latest in HVAC technology alongside recycled materials. Also, it is necessary to optimize the usage of water, chilled water and hot water and STP and solar energy conversion using suitable energy conversion devices.
- Worldwide acceptance of Zero energy building technology may require more government incentives or building code regulations, the development of recognized standards or significant increases in the cost of conventional energy. The Zero energy building designs. Difficulty in finding trained contractors and builders, lack of public awareness, regulation and political agenda, financing are not the barrier to achieve goal. Zero energy buildings are the good solution to significant reducing energy use and greenhouse gas emissions for the life of the building.
- With the advancement in renewable technology, Zero energy buildings are the future. Many governments have framed Zero energy building laws. Few governments are also providing subsidies to individuals and organizations for creating Zero energy buildings. But the goal of zero energy buildings would not be fulfilled till the time all the people don't understand their responsibility and contribution towards energy consumption.

A RESOLUTION OF WASTE MATERIAL MANAGEMENT IN KARIMNAGAR

A Major project report submitted in partial fulfillment of the requirements

For the award of the degree of

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

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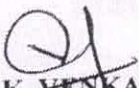


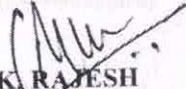
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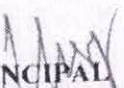
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ABSTRACT

Waste management is a major problem in Karimnagar principally because of the lack of a recycling infrastructure, trained workforce, and other related factors. It was estimated that tones of solid wastes were "mismanaged" in the district. Lots of garbage is being dumped near the Manair river which involves high amount of water and air pollution which is a substantial hazard for the people living around.

At the same time, it is important to acknowledge that waste management involves diverse stages, which include "Generation and Storage, Collection and Transfer, Sorting, Treatment, Material recovery and Disposal." This process can cut off the pollution and also gives many more advantageous results.

Keywords: Waste management, Mismanaged, Pollution, Hazard, Treatment.

STUDY ON FLEXIBLE PAVEMENT AND QUALITY CONTROL MANAGEMENT

A major project report submitted in partial fulfillment of the requirements
for the award of the degree of

BACHELOR OF TECHNOLOGY

In
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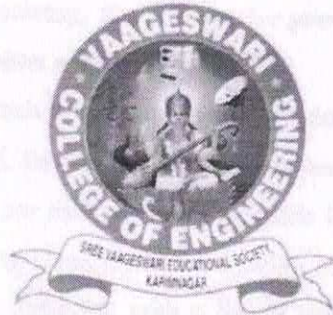
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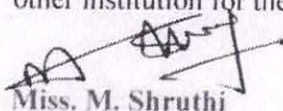


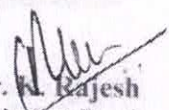
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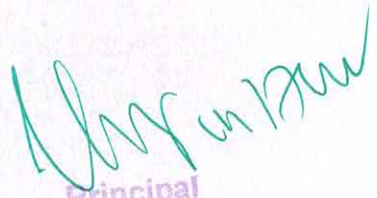
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ABSTRACT

The study is a survey to evaluate the flexible pavement conditions to determine the design of flexible pavement. Hence, the design of flexible pavement uses the concept of layered system.

Regarding the pavement design, it forms an important part of detailed engineering study. The satisfactory performance of the pavement will result in higher savings in terms of vehicle operating costs and travel time, which has a bearing on the overall economic feasibility of the project. This project discusses about the design methods that are traditionally being followed and examines the relative merits of flexible pavement.

Currently, majority of the Indian roads are flexible pavements, the ones having bituminous layer/s. earlier, there used to be scarcity of cement and India went for flexible pavements with bituminous toppings. Now, flexible pavement are preferred over cement concrete roads as they have a great advantage that these can be strengthened and improved in stages with the growth of traffic. Another major advantage of these roads is that their surfaces can be milled and recycled for rehabilitation. The flexible pavements are less expensive also with regard to initial investment and maintenance.

Organization and duties of each individual is framed in this and the same is followed. This stands as the standards for the Quality Control Team. Using this, existing practical conditions are checked and reached to a conclusion about how the quality is maintained

Main focus is on the Quality Control Management in a construction activity. Thesis is to be prepared on how the Quality control management exist and the way it is being functioned. It can be done by drawing comparisons with the standard way and practical way.

Key Words: Pavement Design, vehicle operating cost, Design of flexible pavement, bitumen, rehabilitation, Quality control management.


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CHAPTER-9

CONCLUSION

Design of flexible pavement as per IRC-37 and quality control methods for construction of fully access control express highway as ORR –package (@km 72 to 83).

As per the Design of the pavement the thickness of each layers are observed as follows:

Sub Grade : 500mm.

GSB : 200mm.

WMM : 250mm.

DBM : 130mm.

BC : 50mm.

- For the above design the material properties of the aggregate and bitumen tests conducted as per the IS code and are within the allowable limits.
- Quality control of the project comprises of material and methodology as per the standards of ISO 9001:2008 code Quality control methods.
- Quality management used in the project as per the guidelines of network methods (Ganpt, bar charts, mile stone chats, critical part method and program evaluation review technique).

CASE STUDY ON GEOPOLYMER CONCRETE

*A major project report submitted in partial fulfillment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

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ABSTRACT

Concrete is the world's most versatile, durable and reliable construction material. Next to water, concrete is the most used material, which required large quantities of Portland Cement. Ordinary Portland Cement production is the second only to the automobile as the major generator of carbon di oxide, which polluted the atmosphere. In addition to that large amount energy was also consumed for the cement production. Hence, it is inevitable to find an alternative material to the existing most expensive, most resource consuming Portland Cement. Geopolymer concrete is an innovative construction material which shall be produced by the chemical action of inorganic molecules. Fly Ash, a by- product of coal obtained from the thermal power plant is plenty available worldwide. Flyash is rich in silica and alumina reacted with alkaline solution produced aluminosilicate gel that acted as the binding material for the concrete. It is an excellent alternative construction material to the existing plain cement concrete. Geopolymer concrete shall be produced without using any amount of ordinary Portland Case study on geopolymer concrete with M 20 grade concrete.

Keywords : Geopolymer concrete , Flyash , Strength , Curing , Applications

CHAPTER VI

CONCLUSION

Geopolymer concrete is well known for its promising mechanical properties, acid resistance and fire resistance and therefore is a potential alternative construction material with comparable properties to OPC concrete. The constituents of Geopolymer Concrete shall be capable of being mixed with a relatively low alkali activating solution and must be curable in a reasonable time under ambient conditions. Geopolymers emit approximately 80% less CO₂ than OPC during production, making it a more environmental friendly building material. Like OPC concrete, geopolymer concrete has a brittle failure. Alternatively, fibres can be added to improve the ductility of concrete. The properties of geopolymer include high early strength, low shrinkage, freeze-thaw resistance, sulphate resistance and corrosion resistance. These high-alkali binders do not generate any alkali-aggregate reaction. The geopolymer binder is a low CO₂ cementitious material. It does not depend on the Calcination of limestone that generates CO₂. This technology can save up to 80% of CO₂ emissions caused by the cement and aggregate industries. Due to the high early strength, Geopolymer Concrete shall be effectively used in the precast industries, so that huge production is possible in short duration of time.

As the curing temperature in the range of 60°C to 90°C increases, the compressive strength of fly ash-based geopolymer concrete also increases.

- Longer curing time, in the range of 24 to 72 hours (4 days), produces higher compressive strength of fly ash-based geopolymer concrete. However, the increase in strength beyond 48 hours is not significant.
- The slump value of the fresh fly-ash-based geopolymer concrete increases with the increase of extra water added to the mixture.
- The compressive strength of heat-cured fly ash-based geopolymer concrete does not depend on age.
- Geopolymer concrete has excellent properties within both acid and salt environments. Comparing to portland cement, the production of geopolymers have a relative higher strength, excellent volume stability, better durability.

Low-calcium fly ash-based geopolymer concrete has excellent compressive strength and is suitable for structural applications. The salient factors that influence the