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JSPM's Bhivrabai Sawant Polytechnic, Wagholi, Pune

Vision and Mission of the Institute:

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To develop globally competent technocrats by imparting quality technical education for socio-economic enhancement of the nation.

Mission:

M1: To nurture and maintain an environment of high academic standard for diploma students, encouraging higher education and entrepreneurial abilities.

M2: To deliver quality education by imparting basic engineering knowledge, interpersonal skills, critical thinking and creativity.

M3: To equip students with technical skills, ethical and moral values to meet aspirations of the society and industry to contribute sustainable development of the nation.

Vision and Mission of the Department:

Vision:

To develop diploma Civil engineers to meet ever changing industry and societal requirements for socio-economic growth of nation.

Mission:

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M2: To develop professional skills and critical thinking ability through co-curricular and extra-curricular activities.

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TECHINICAL ARTICLE OF SCIENCE AND CIVIL ENGINEERING

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HOD DESK

There are many career paths for civil engineers. Civil engineers are essential in government agencies, private and public sector undertakings to take up various mega projects like metro railway projects, express highway corridors, industrial structures, reservoir projects, flyovers, townships and mega city projects. Today, the world is undergoing vast changes in technological revolution, population growth and environmental concerns. All these changes create unique challenges for civil engineers. The next decade under the leadership of our prime minister, will be the most creative, demanding and rewarding times for civil engineers.

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HOD

Mrs. Sayyad T.D.

CONTENT

"TRAFFIC VOLUME STUDY ON INDIAN NATIONAL HIGHWAY"

KADAM DIGVIJAY DEVIDAS[1],FUNDE ROHIT RANJIT[2], BARAIKAR AMIT DHANURDHARI[3]

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ABSTRACT

Thermal bridges in the thermal insulation of envelopes occur in all forms of building construction and should be minimised to reduce local heat losses. This paper presents the effect of thermal bridges on the comfort of the habitat within a building. Indeed, the thermal bridges increase the heat losses of a building and thus the consumption of heating. Thermal bridges cause additional heat losses compared to losses through the walls of the building. These losses can exceed for some 40% of the total heat losses through the envelope. An example of an energetic effect of a thermal bridge has been presented. For this example, the heat losses on a floor height and per meter of façade were calculated. The results showed that from 5 cm thickness of insulation, the difference between the loss curve in the absence of thermal bridge, and the loss curve taking into account the thermal bridge is almost independent of the thickness of the insulating. Another example was also presented to demonstrate the effect on thermal bridging when increasing the levels of insulation to a normal corner. The results showed that for a 50% and 100% increase in the thickness of the insulation, the U-value, linear heat loss coefficient ψ and surface temperature factor fRsi were considerably decreased.

Keywords : Thermal Bridges, Linear Heat Loss Coefficient , Heat Losses, Insulation, Surface Temperature Factor, Buildings.

1. INTRODUCTION

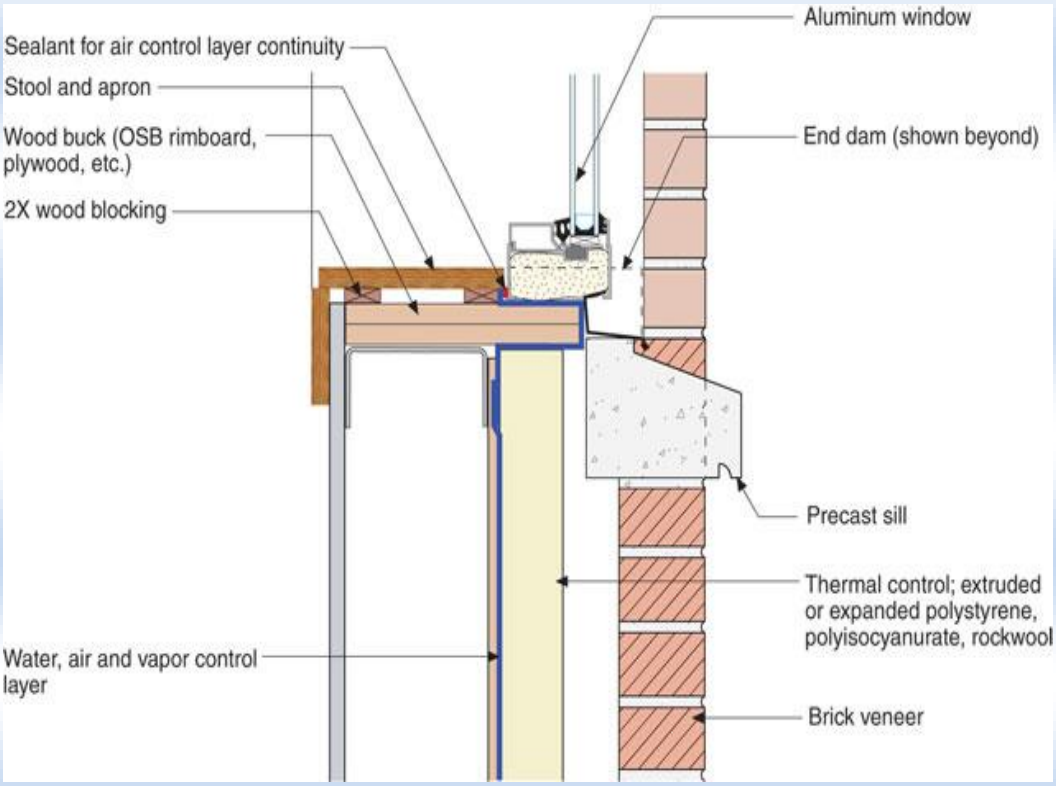
Thermal bridges are parts of a building where the insulation barrier is broken. Ideally, the insulating complex should be continuous around the heated space. These weaknesses of the insulation can cause the condensation of the water vapor and thus the possible formation of black marks and molds [1-3]. The most common are linear thermal bridges, which correspond to a junction between two walls (low-wall exterior floor, intermediate floor-exterior wall, highwall exterior floor, balcony-tile, exterior wall-wall, etc.).. There are also thermal bridges on the outline of joinery, thresholds of doors and windows, ducts, etc. The French energy performance of new building regulation RT 2012 imposes a loss value not to be

exceeded for the thermal bridges between floors and external walls, but also a limit to the sum of all the thermal bridges of a building. This measure should lead to a generalization of insulation from the outside, which remains the best way to eliminate the majority of thermal bridges. In cases where only the thermal insulation from the inside is suitable, it is strongly recommended to set up thermal bridge breakers and to provide insulation on floating screed.

2. STUDY OF THERMAL BRIDGES

2.1 Effects of thermal bridges -Thermal bridges have the disadvantage of cooling the inner surface. This lowering of the inner surface temperature can cause condensation and mold problems, causing stains, drips or efflorescence. A set of conditions must come together for the molds to grow: Spores and food are needed, which is not a problem because spores are ubiquitous and mold feeds on anything. On the other hand, the local relative humidity must exceed 80% for a long time. This superficial humidity depends on the humidity of the air and the temperature of the surface.

2.2 Types of thermal bridges -There are geometric thermal bridges such as angles and corners, and thermal material bridges, in which a heat conductive material passes through the insulating layer. Thermal bridges are also classified as linear bridges, which have a certain length, and point bridges, in which the interruption of the insulating layer remains local. Any curvature in the insulating layer or in the wall constitutes a thermal bridge geometric. The isotherms must follow the curvature of the wall and the flux lines, which are perpendicular to them, become narrower towards the inside of the curvature. Fig. 2 shows a typical geometric thermal bridge, consisting of an angle between two walls, the wall consisting of bricks with mineral wool and an outer lining of cement blocks. Red corresponds to 20 ° C and blue to 0 ° C. The hue changes at each degree. Thin lines are flow lines, plotted every W/m. It can be seen that the inside and outside temperatures of the corner are slightly lower than those in the wall. It is also noted that the flow lines are a little tighter towards the inside of the corner than in the wall.



2.3 How to avoid thermal bridges?

Some thermal bridges, such as door and window frames, balcony brackets and fittings between shell elements are unavoidable. They should therefore be designed to reduce their effects. Here are some general principles that can be applied together or separately.

A design that places the insulation on the outside of the load-bearing structure often makes it possible to avoid most thermal bridges. It is as well the double wall (the interior wall being carrier) as the outer insulation plastered or barded. Buildings with homogeneous walls made of light materials (solid wood, autoclaved aerated concrete or porous bricks) can also be considered as such if the slabs are made of similar materials or, if they are more conductive (concrete) they do not completely cross the walls, but stop in the middle.

External insulation has many other advantages:

- Increased inner thermal inertia, thus improving summer comfort and better use of passive solar gains in winter.

- Stabilization of the temperature of the structure, thus slower aging of this one.

- Decrease, and in most cases total elimination of the risks of condensation in the building elements.

2.4 Detection of thermal bridges

In the plane and section of construction details, a material thermal bridge appears as an interruption of the insulation layer. It is therefore easy to detect, and should be corrected or treated appropriately before building. plans and detail cuts represent only a section of the envelope element, and it is possible that a thermal bridge, including a point bridge, exists outside this section. The more complicated the construction, the higher the probability of finding thermal bridges. On an existing building, the thermal bridge is detected primarily by its effects: appearance of mold, condensation, cold or hot areas. It can also be detected using thermography [10-12]: it is an image of the external surface temperature. As this temperature is even higher than the external surface is better heated, especially by thermal bridges, it is also, to a certain extent, an image of thermal bridges.

IV.CONCLUSION

Through this work, it has been shown that the method of construction chosen should make it possible to avoid as much as possible the thermal bridges which must always be taken into account in the calculation of the thermal transmittance. Under normal conditions, the maximum values of the thermal transmittance of the building elements of the heated rooms make it possible to satisfy the requirements of thermal comfort and absence of superficial condensation. In addition, the absence of condensation on the thermal bridges must be ensured. The following conclusions can be drawn: - The presence of thermal bridges allows heat loss and cooling of interior surfaces. - Thermal bridges increase the risk of mold especially when the relative humidity of the air layer near the surface exceed 80% for a prolonged period. - To avoid thermal bridging, place the insulation on the outside, the supporting structure being inside the insulating layer.

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"PRODUCTION OF ECO BRICKS FROM INDUSTRIAL WASTES"

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Abstract–

urbanization lead to a vast generation of solid waste and discharge of these waste materials became a major problem. Dumping and landfilling of solid waste leads to environmental degradation i.e ground water contamination through leaching, which results in soil pollution and also impact on human health. In recent years, the utilization of solid waste as become more potential to recycle the valuable material and decrease the volume of solid waste, other pollutants and dumping cost. This paper is concern to reuse and recycle the available solid waste generated from paint industry. to find a socioeconomic, eco-friendly solution, waste trash can be recycled for the preparation of bricks, which sustain a cleaner environment. The increased quest for sustainable and eco-friendly materials in civil construction works. It is useful to provide sustainable and potential solution in the construction field. Keywords: eco-friendly products, industrialization, solid waste, recycle.

INTRODUCTION

The conventional materials which are predominantly used in construction process, such as concrete type bricks, hollow type blocks, solid blocks, pavement type blocks and floor tiles are generated from the already existing naturally available resources. This results in defragmentation of the environment due to vast exploration and which lead to depletion of naturally existing resources. Moreover, different kinds of noxious substances such as high level concentration of carbon monoxide, oxides of sulphur and nitrogen, and suspended particulates are released surplus into the open atmosphere during the operation phase and manufacturing of materials. These emissions creates toxic impact on environment and disturb the functioning phrases of environmental air, natural water resource, extensive soil, large flora species, fauna species and aquatic life, and it reflects on human health along with their living standard. Therefore, various concentrations in the environment may lead to degradation of prevailing atmosphere. To Improve sustainability and environmental conservation and has gained significance in our society in recent years. Due to more improvement in using sustainable, low

cost, ecofriendly, lightweight and corpus construction materials in civil works has been emphasized to investigate as the growing needs, to improve the quality of environment and to maintain the materials requirements as per the standard.

II. SIGNIFICANCE: Large amount of waste materials are produced around the globe due to anthropogenic metabolism in both developed and developing countries by industrialization rise in living standard and urbanization can be minimized to a greater extent. According to the World Bank statistics proposed globally on solid waste management sector, the global cities is presently producing about 1.3 billion tonnes of solid waste matter every year and it keeps recurring. This volume is expected to reach the peaks nearly to 2.2 billion tones by the year 2025 and waste trash accumulation rate is assumed to twice over the next two decades. One of the environmental impacts which can effect global due to generation of solid waste is the continuous emission of methane gas which is considered as a powerful and destructing greenhouse gas (GHG), and its impact on the environment can be felt within a minimum period of time. Flooding of land, air pollution and other inevitable health hazards are encountered. The amounts of waste material generated from the various productions and continuously increase to satisfy needs of the increasing living standard of population. On priority, the environmental laws and regulations in recent decades which have become more restrictive. Therefore, alternative methods recommended to choose for better management to utilize these wastes can be design and restored. Eco- friendly waste recycling has proved one of the best management to reduce and reuse the waste in the research field for decades. The management of waste reduces the negative impacts of their disposal. Many experiments have been performed to incorporate waste materials in the production of solid bricks including limestone dust particles, wood sawdust particles, rubber,

III. MATERIALS AND METHODOLGY:

Unfired bricks are manufactured by using following material.

1. Solid Paint waste
2. Cement
3. Fly ash
4. Robo sand (quarry dust)
5. water
6. Bricks

1. **Paint Remnants**: Toxic but unwanted waste, this gathered hydrolysed paint motored and thoroughly combined with water and some decalcifying chemicals, known as both additives, are added is commonly referred as paint sludge or paint remnants. This viscous slurry can be classified as a hazardous waste therefore if this waste is disposed

randomly on the surface. It might lead to degradation of soil fertility, and results in generation of leachate by which ground water gets containminated. Hence it is toxic to agricultural land, and it may even cause damage to the flora and fauna of that ecosystem, wherever this waste discharges.

2. Cement: Cement is a globally used binding material, a matter utilized for construction which helps in setting, hardens and combines with other supplementary materials, binding them together strongly. Cement is commonly used in binding sand and gravel (aggregate) together. Cement is combining with fine aggregate particles to prepare the traditional mortar for civil works, or with sea or river sand particles and gravel aggregates to prepare concrete mix. Cement grades manufactured for construction works are generally not organic in nature; usually lime or calcium silicate based compound, which can be classified as hydraulic and non-hydraulic, based on the adherences of the cement for setting with the presence of water level.

4. Fly Ash: Fly ash, also called as "pulverized fuel as". It is the by-product of coal combustion and that contains particulates. Coal collected by the electrostatic separators or by mechanical methods from the fuel of gases of thermal power plants. Here pulverization means the coal powder. Depending on the source and composition of the coal used in combustion, the constituents of fly ash, which contain equitable mixture of silicondioxide (SiO2)aluminum oxide (Al2O3) and calcium oxide (CaO), and other mineral compounds present in coal-bearing rock strata.

Thus brick contains fly ash, cement and fine aggregate. The cement varies from 15 to 25% in the fly ash and proportionate quantity of fine aggregate. In preparation of brick

the use of fly ash gives enough strength and decreases the water

1. **Bricks:** A brick is constructional building block utilized to make walls, pavements and other elements of masonry construction. Earlier, the term "Brick" referred to a unit composed of clay, but in recent decades it is denote as rectangular unit laid in mortar. A brick constitutes clay-bearing soil, sand, and lime, or concrete materials. Bricks are classified, based on its classes, types, materials, and sizes which varying along with region and time period, and these are produced in large quantities. Two basic categories of bricks are fired and non-fired bricks.

There are four different operations are involved in the process of manufacturing of bricks:

1. Batching
2. Mixing
3. Moulding
4. Drying

Batching:

The ingredients are accurate and precise measurement of materials for making cement is known as batching. Weigh batching is the accurate methodology used globally of measuring the materials. For significant mix is manufacturing of bricks

Mixing:

The materials are paint solid waste, Robo sand, fly ash and cement these are mixed and to get a uniform color then water is added to the mix it is get good uniform color. Work at site with use of brick making. Mixing is most important in manufacturing of bricks

Moulding:

The mould is placed at the ground and standard size of brick mould is 19*9*9cm. Apply the oil to the mould and place the mortar in the mould and compacting the mortar in the mould. After 5 minutes mould is removed from the bricks, and then placed in the sunlight. Within two days bricks will be harder.

Drying: Dehydration of bricks at lower temperature are carried out for sufficient strength. To avoid crack or crumble while holding, carrying and any in constructional phrase they must preserve and sustain the sufficient strength and shape while the conveyance and loading operations during construction. Therefore drying of the bricks is important process.

V. CONCLUSION

The consequences of the present study conducted has proven that the brick making methodology effectually acceptable for solid waste (Paint sludge) and material (cement, quarry dust, and fly ash). Bricks were hardened within 2 days from manufacture time. Mixed binders (cement, fly ash and quarry dust) brick is recommended for external use in construction. This study also concludes that the construction raw materials can be replaced with industrial waste by products during manufacturing in some extended composition to increase the environmental safety. Compared to normal brick paint sludge brick is light in weight and transportation will be easy. The demand for the constructional materials has been rapidly increasing with the needs of construction both in rural and urban areas. These bricks are the sustainable, economical and eco-friendly building material. Bricks which are made from the paint waste is found to have compressive strength is greater than the conventional bricks. It is observed that when amount of cement is increased, strength also increases. When the strength is depends on the size of the particle, increases the strength by reducing the size of the particle.

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"Determining and analysis of Critical Success Factors of Construction Project"

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Abstract-

Many researchers identified several factors related to successful implementation of numerous types of projects. They are project schedules/plans, client acceptance, monitoring and feedback, communication, trouble-shooting, and characteristics of the project team leader. However, according to industry literature outside the construction industry, CSFs should include issues important to the activities of the organization's current operations and future success. The construction stage is where all the project goals of the contractual parties like time, cost, performance, quality, safety and so on are established and put to the examination. The degree of effectiveness of the project management functions and the degree of success of the project goals will determine the degree to which the individual party will perceive the project as being successful from its own viewpoint. Therefore, this study will classify the extent of the relationship between CSFs and project accomplishments to determine the success of a construction project. Keywords- success criteria, critical success factors, construction projects

I . INTRODUCTION

A construction project is completed successfully as a result of many jobs and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment (Sugumaran B. 2014). Certain factors are more critical to project success than others. These factors are called as critical success factors (CSFs). The term "critical success factors," in the context of projects management, was first used by Rockarts (1982) and is defined as these factors gives success on projects (Sanvido et al. 1992). The development and growth of any developing countries depends on successful implementation of new projects. In India, construction industry is the second largest industry after the agriculture for giving employment. The construction industry is progressive in nature due to the changing uncertainties in technology, government budgets, and development processes (Albert P.C.chan2004). The Construction industry of India is an important indicator of the development as it creates investment opportunities across various related sectors.

II. OBJECTIVES

- Define critical success factors that measures project success
- Identification of critical success factors contributing to success of construction project.
- Evaluate the weightage of each CSF's using questionnaire survey.

III. RESEARCH METHODOLOGY

There are various methods for study of success factors for any project like analysis of cluster pattern, analytical network process, and point scale method. However, for this study we will be use Relative Importance Index method (RII) by conducting questionnaire survey through construction industry experts.

CSF's Model for Construction Project:

The initial goal of this research was to identify the factors contributing to the success of project. For this, a comprehensive literature survey was conducted and detailed list of variable factors was prepared. The factors were classified under 10 perspectives adopting the BSC concept. The BSC framework contains the following perspectives:

1) Cost

2) Time

3) Quality

4) Productivity

5) Client satisfaction

6) Peoples

7) Health and safety

8) Innovation and learning.

R.I.I. Method for CSF's Model

A questionnaire survey is conducted to elicit the attitude of owner, consultant, and contractor towards the factors affecting the performance of construction project. The respondents were asked to indicate by their local experience, level of importance of each one of the identified 46 factors of performance on five –point likert scale, such as

1. Not important

2. Moderately important

3. Slightly Important

4. Very Important

5. Extremely Important

IV. RESULT AND DISCUSSION

The main objective of this research is to identify the critical success factor that leading to success for construction company. The questionnaire survey was carried out among the 20 construction companies which are located in Pune city region of Maharashtra and they are operating in local market. All the construction companies have their projects in building, housing and infrastructure Sector. The questionnaire survey was conducted during face to face interview and it consists of total 46 factors. The respondents were asked to evaluate the importance level of the factors and give the weightage according to weightage as explained in earlier.

V. CONCLUSION

The main objective of this study is to define critical success factors and their impact on project success. The study of CSF's for construction projects is based on the views of the respondents.

- The Analysis result derived from the study, suggests that leadership of project manager is very important in all types of projects. His quality regarding leadership, motivation, and decision taking ability ensures the success of project

. • Also Health and safety criteria in organization must be followed, if any accident happens there is very rare chances to permit the remaining work.

- From study it is also noticeable that number of disputes between the parties involved in construction project adversely affects the success rate of project.

- As Per the views of respondents, the success must be achieved if the work should be done as per the planned schedule.

- To improve the overall performance of any construction project, the company should try to implements these CSF's effectively.

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"Causes of Delay in the Construction Industry in Pune region of India"

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ABSTRACT

A construction project is successful if it is completed in given timeframe or on time. There are various reasons which leads to failure of the project. Construction delay is one of them. Delay in projects downturns the development in all other related fields. Construction delay study was conducted to analyse the causes of delays, the effects of delays and methods of minimizing construction delays. The study was carried out based on literature review and a questionnaire survey. The data for this study was collected through a detailed questionnaire survey. Construction process is more complex for urban development because of large number of parties engaged in it i.e. client, contractor, designer, suppliers, consultant and labours. It is important to analyse whether the delay is critical or not as identification of critical delays helps in taking appropriate measures at the correct time. Memoir is to evaluate the various types of delays and the reasons for those delays that are currently affecting the projects in Pune region of India. A total of nine groups were contributed to the cause of construction delays. The level of importance of the delay variables and the groups were computed and ranked. Eighty-three factors that affects delays were identified based on literature review. The questionnaire survey was distributed to the construction sites. Sixteen sites were visited to collect data around Pune region of India. Personal interviews were conducted to clarify responses. Based on the questionnaire survey the overall results indicated that the most important causes are: Fluctuation of prices, High waiting time for availability of work teams, shortage of labours, and lack of high technology of mechanical equipment, unqualified of labour.

Keywords – Construction Delay, Factors, building projects, Ranking, Pune region

1. INTRODUCTION

Project delay can be defined as an incident that causes stipulated time to complete all or part of a particular projects. Delay can also be defined as the time overrun, either ahead of the date for project completion specified by the contract or further than the extended contract period where an addition of time has been granted. Delay in construction project is considered one of

the most common problems causing a multitude negative effect on the project and its participating parties. Therefore, it is essential to identify the actual causes of delay in order to minimize and avoid the delays and their corresponding expenses. The project delay in the construction industry affects not only the construction industry but the overall economy of a country as well. Project delay involves manifold issues; these issues concern right to recuperate costs of the project delay or the need to extend the project with the substantial right to recovery costs for adjustments to the contract schedules. One of the main objectives and policies of any public or private sectors dealing with the implementation of project is to enhance the projects performance process, through reduction of costs, completion of the construction project within their contract sum and time limit and improve quality. When project delays are unexpected, they are hardly manageable and have rather negative impacts on the project activities and outcomes. An unexpected delay will extend the overall duration of project activities and imposes an increase in project costs. It produces time-associated cost effects that will increase the resource consumption and will require extra time upon reaching project success.

2. LITERATURE REVIEW

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3. Mezher, T.M. and Tawil, W. (1998) Causes of delays in the construction industry in Lebanon. Engineering, Construction and Architectural Management 5(3), 252-260. Mezher & Tawil (1998) carried out a research in to find out the Causes of delays in the construction industry in Lebanon. A total of 64 causes of delays were identified through research in which client, contractor and consultant were undertaken the study.

3.PROBLEM STATEMENT

Failure to achieve targeted time, budgeted cost, designer changes or errors, weather, late deliveries and specified quality result in various unexpected negative effects on the projects. These are the reason that delay occur. Normally, when the projects are delayed, they are either extended or accelerated and therefore affects additional cost. In additional, the increasing of the oil price world, give the impact to the construction project. The cost for the construction also will increase because the price to buy the material and to pay the labour salary will increase too. If the situation is left and untreated, it will lead to more serious problems in the future upcoming construction project in India.

Scope of Study - The scope of the study will cover the construction project in Pune. This study is needed to evaluate the level of understanding and applying these delay concepts in planning, design and field operation. The questionnaire will be distributing to the management team include site engineer, project manager, safety officer, supervisor and others**.**

Significant of Research - To study the factor that cause delay in construction project and produce the statistical result. The result of the study will be the guideline to the parties that involve, so that it will avoid any source that will happen in their project. To suggest several factors that can avoid the delay in construction project may reduce the risk of delay in construction project.

4. TYPES OF DELAYS

The type of delay can also have an impact activity which need a more detailed analysis to determine whether additional time extension is warranted or not. There are four basic ways to categorize type of delays:

4.1. Critical or noncritical

4.2. Excusable or non-excusable

4.2.1. Excusable delay with compensation

4.2.2. Excusable delay without compensation

4.2.3. Non-excusable delay

4.3. Compensable or non-compensable

4.4. Concurrent or non-concurrent

5. CAUSES OF DELAY

1. Project related factors include contract duration, legal disputes between various parties, type of project bidding, ineffective delay penalties.

2. Client related factors include finance and payments of completed work, owner interference, slow decision making and unrealistic contract duration imposed by owners.

3. Contractor related factors include site management, improper planning, contractor experience, mistakes during construction, and improper construction methods by subcontractors. Contractors are fully responsible for delays cause by subcontractor, because subcontractor included among contractor's factors.

4. Consultant related factors include experience of consultant, inspection and testing.

5. Designer or consultant related factors include preparation and approval of drawings, quality assurance or control.

6. EFFECTS OF DELAYS

Time overrun - When the stipulated completion time is pushed forward, the project is said to have experienced time overrun.

Budget overrun - When a project is completed at a cost higher than what was budgeted, it is said to experience a budget overrun. Poor quality completed project- As highlighted in the previous section inferior workmanship and/or inferior quality materials, can lead to issues of project quality.

Litigation - Disputes can lead to court cases for resolution especially when large penalties are at stake.

Conclusion

The survey results indicated that the majority of delay factors are relevant to shortage of labours, lack of high technology of mechanical equipment, site mobilization. Most factors related to consultant it is due to not understanding the client necessities, not having proper project information, absence of some detail in drawing etc. In other factors due to which delay occurs are project conditions like providing services from utilities (water and electricity), complication in work due to weather. Delay also occurs due to external factor like change in government, regulation and location, unqualified of labours etc. The all ranking indices

explained earlier were used to rank delay causes from viewpoints of the nine groups. Total 16 respondents participated in this survey. Top 10 causes ranked by Relative Importance Index (RII) technique. The relative importance index, RII, was computed for each cause to identify the most significant causes. The causes were ranked based on RII values. From the ranking assigned to each cause of delays.

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"An Economical, Eco friendly and Technical Assessment of Cement Replaced by Marble Dust in Permeable Concrete"

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Abstract –

The main objective of this project is to investigate the possibility of utilizing waste marble dust (MD) in cement and permeable concrete production. The research work was divided into four sections. The first section deals with the properties of cement modified with marble dust (marble dust blended cement), whereas the second section discusses the properties of concrete contained marble dust as a cement replacement. The replacement ratios which have been studied were 0.0%, 5.0%,, 10.0% , and 15% by weight. Water to powder ratio (w/p) or water to cement ratio (w/c) were 0.35 and 0.40 in case of cement replacement. Physical, mechanical and chemical properties of cement and concrete modified with marble dust were investigated. The third section this introduction to permeable concrete roads reviews its applications and engineering properties, including environmental benefits, structural properties, and durability. The fourth section deals with checking of compressive strength of traditional permeable concrete and cement replaced by marble dust in permeable concrete. Checking economy of cement replaced by marble dust in permeable concrete.

Key Words- Economy, Strength, Durability, Eco friendly.

INTRODUCTION

In general, the industry of dimensional marble stone has contributed to the development of more environmental problems due to waste generation at different stages of mining and processing operations. Waste generation continues from mining process to completed product and is about 50% of mineral mined; the dried slurry product is less fine. 90% of the particles are below 200 m. Depending on the type of process involved, the sludge generated is equal to between 20% and 30% of the weight of the marble stone worked. Leaving the waste materials to the environment directly can cause environmental problems. Hence, many countries have been working on how to reuse the waste material so that they

reduced hazards to the environment. Among these waste materials, waste marble dust, where it is a by-product of marble processing factories.

II. OBJECTIVE OF STUDY

The specific objectives of this study:

a. To study the strength properties of permeable concrete for replaced cement by marble dust for different percentage of replacement.

b. To study the permeability properties of permeable concrete for replaced cement by marble dust for different percentage of replacement.

c. To find out economical and optimum percentage of replaced cement by marble dust.

IV. RESEARCH METHODOLOGY

a. Slump Cone test

b. Weighing of materials

c. Mixing Concrete:

d. Mix proportion

e. Size of test specimen

f. Compaction of Concrete: Cubes are filling in tree layers. Compaction is done by tamping rod by 25 storks at each layer. Compaction is done by tamping rod.

g. Curing: The test specimens shall be stored in a place free from vibration, in moist air of at least 90 percent humidity and at temperature of 27 + 2° C for24 hours + 1/2 hour from time addition of water to the dry ingredients.

VI. CONCLUSIONS

This study is concluded that we can replace cement by marble dust from 5% to10% in permeable concrete. 5% replacement of cement by marble dust in permeable concrete can gives better results than 10% and 15%.10% replacement of cement by marble dust can be considerable in permeable concrete.5% replacement of cement by marble dust in permeable concrete is saved around 135 Rs/M3 concreting and 10% replacement of cement by marble dust in permeable concrete is saved around 274 Rs/M3 concreting. 5% and 10% replacement having good permeability and reuse of marble dust can be done in this concrete hence it is Eco friendly.

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"Causes Prevention and Repair of Cracks in Building for Civil Engineering Projects"

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Abstract

Cracks in building are a common occurrence. It affects the stability and appearance of buildings. So, it is important to understand the cause of cracks and the effective measures should be taken for prevention. Though cracks in concrete cannot be prevented entirely but they can be prevented by using proper material and technique of construction and considering criteria. Sometimes water penetrates through cracks in building and cause severe damage to building. There are many reason of occurrence of cracks like moisture, thermal movement, elastic deformation, chemical reaction, foundation movement, vegetation and earthquake. We all dream of a house structurally safe and aesthetically beautiful but it is not so easy. So, timely identification of such cracks and adopting preventive measures is essential. In this paper, we will discuss about the methodology for prevention and repair of cracks in building. This research paper also gives information about result of Rebound Hammer Test and Ultrasonic Pulse Velocity Test for determining strength of concrete. Because strength of concrete is also an influencing factor for repairing cracks in building. So, we can say if crack repair is assumed to be building of structure then this paper can be assumed as foundation of it.

Keywords- Crack, Structural Failure, Concrete, Causes, Prevention, Repair Technique, Epoxy, Grouting

INTRODUCTION

Cracks are the most common problem that occurs in any type of concrete structure such as, beams, columns, etc. A building component develops cracks whenever stress in the component exceeds its strength. Stress in a building component could be caused by externally applied forces such as, dead, live, wind or seismic loads and internal forces such as, moisture changes, thermal movements and chemical reaction. There are numerous causes of cracking in concrete, but most instances are related more too concrete specifications and construction practices than by stresses due to induced forces. Cracks are classified in two categories: Structural Cracks and Non-Structural Cracks. Structural cracks are occurring due to incorrect design, faulty construction or over loading. These may endanger the safety of a building. Non-Structural cracks are mostly due to the internally induced stresses in building materials and these generally do not directly result in structural weakness. When concrete becomes older cracks become causes of leakages and seepages and give entree to the moisture, oxygen, chloride etc. and other aggressive chemicals and gases into the concrete causing serious degradation of the structure. Cracking are early indication of failure of structure. Light weight concrete shrinks more.

II. METHODOLOGY

A. Repair of Cracks The repair of cracks can be achieved with the following techniques:
1) By epoxy-injection grouting
2) By routing and sealing
3) By flexible sealing
4) By stitching
5) By providing additional reinforcement
6) By drilling and plugging
7) By prestressing steel
8) By grouting
9) Dry packing
10) Overlays
11) Auto geneous healing
12) Surface coatings Here we will discuss about most popular repair technique of cracks such as epoxy-injection method and grouting

III. PREVENTION OF CRACKS

1) By creating slip joints under the support of RCC slab on walls, cracks by elastic deformation can be prevented.
2) Construct various joints such as expansion joints, construction joints, slip joints and control joints to prevent cracks from thermal movement.
3) Slab should be provided with thermal insulation.
4) Concrete should be of good quality. Use richer mix of cement concrete 1:1.5:3 to prevent cracks. 5) In mixing of cement concrete or cement mortar, Use minimum quantity of water, as per water cement ratio.
6) Do not use excessive cement in the mortar mix. Because as a general rule, the richer the mix is, the greater the shrinkage will be. And shrinkage is one of the major causes of occurrence of cracks. 7) Use largest possible aggregate and the materials should be of good grading and quality.
8) As soon as initial setting has taken place, the curing should be started and be continued for at least seven to ten days.
9) Fine materials which contain silt, clay and dust should not be used. The coarse sand/fine aggregate used in cement concrete and cement mortar mix should has silt and clay less than 4%. 10) Use coarse and fine aggregates after washing to reduce silt contents

IV. TESTING OF CONCRETE IN STRUCTURES

1. Non-destructive test (NDT)
    - Surface hardness test
    - Rebound hammer test
    - Ultrasonic pulse velocity test
    - Radioactive methods
    - Nuclear methods
    -
2. Partially-destructive tests
    - Pull-out testing
    - Cast-in method (look-test)
    - Drilled-hole method (CAPO-test)
    - Pull-off test

A. Rebound Hammer

Test A Swiss Engineer Ernst Schmidt, in 1948 developed the Rebound Hammer. This method has been acceptable worldwide for non-destructive testing of concrete structural element. The principle of this method is that the rebound of an elastic mass depends on the hardness of the surface against which the mass impinges. The hammer consists of a plunger connected with a spring driven metal mass. The plunger is held against at 90˚ to the smooth concrete surface, firmly supported and pressed. This will impart a fixed amount of energy. Upon release, the metal mass rebounds, the plunger being still in contact with concrete. The distance travelled by the metal mass or the amount of rebound is noted on a scale which gives an indication of the concrete strength. Larger is the rebound; higher is the strength of concrete.

B. Ultrasonic Pulse Velocity Test

The Pulse Velocity method involves the measurement of velocity of the electronic pulses passing through concrete from a transmitter to a receiver. The principle of this test is that the velocity of sound in a solid material is a function of the square root of the ratio of its modulus of elasticity E to its density p. The density and elastic properties are related to the quality and strength of the material. The range of pulse velocities is from 3 to 5 km/s. These pulses in the frequency of 15-175 kHz generated and recorded by electronic circuits.

A. Cracks Repair in Building by Grouting Method

We used Portland cement grouting method to repair cracks in our selected site. Injection of slurry or a liquid solution into a soil or rock formation is termed as grouting. The injected material is referred to as the grout. The Ordinary Portland Cement used in grouting should be as per IS: 269 and sand and water should be as per IRS Concrete Bridge Code. With the approval of the Divisional Engineer, admixtures can be added to impart non-shrinkable properties and to improve flow ability of grout. The water cement ratio (by weight) for the grout should be 0.4 to 0.5, when crack width exceeds 0.5mm, the lower ratio should be used. Pressure grouting equipment is used to inject grout in the cracks. We used Air Compressor with a capacity of 3 to 4 cum/per minute. The grouting pressure should be 2 to 4 kg/cm2.

VI. CONCLUSIONS

This research work concludes that though it is impossible to guarantee against cracking yet attempts can be made to minimize development of crack. Some prevention could be taken care of during the construction process itself. Any lack of attentiveness can lead to a cause for damage in the building in its future, which can also lead to the failure of structure. And also, not all type of crack requires same level of attention. Cracks may occur due to various reasons, as discussed earlier. The occurrence of cracks cannot be stopped but particular measures can be taken to restrict them to reduce the level and degree of consequences. The potential causes of crack can be controlled if proper consideration is given to construction material and technique to be used. Generally speaking, for causes and prevention of cracks in particular case it is necessary to make careful observations. In case of existing cracks, after detail study and analysis of crack parameters, most appropriate method of correction should be adopted for effective and efficient repair of crack.

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" LIFT IRRIGATION" -Civil Engineering Projects

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Abstract

-As per the NABARD – National Bank for Agricultural and Rural Development (India), there are 1401 LIS financed by them. The total financial outlay (TFO) is Rs. 6462.5 million . The proposed area under irrigation is 22000 hectare. Out of these LIS, as many as 573 LIS are defunct. The main reason is poor distribution of water. In addition there are LIS which are financed and implemented by government, sugar factories and individual farmers. In case of irrigation schemes, the importance of "Lift Irrigation Schemes" is unique and distinctive. In such schemes, many farmers can come together and implement a large lift irrigation scheme on private or co-operative basis. This way, they get certain benefits of large schemes.

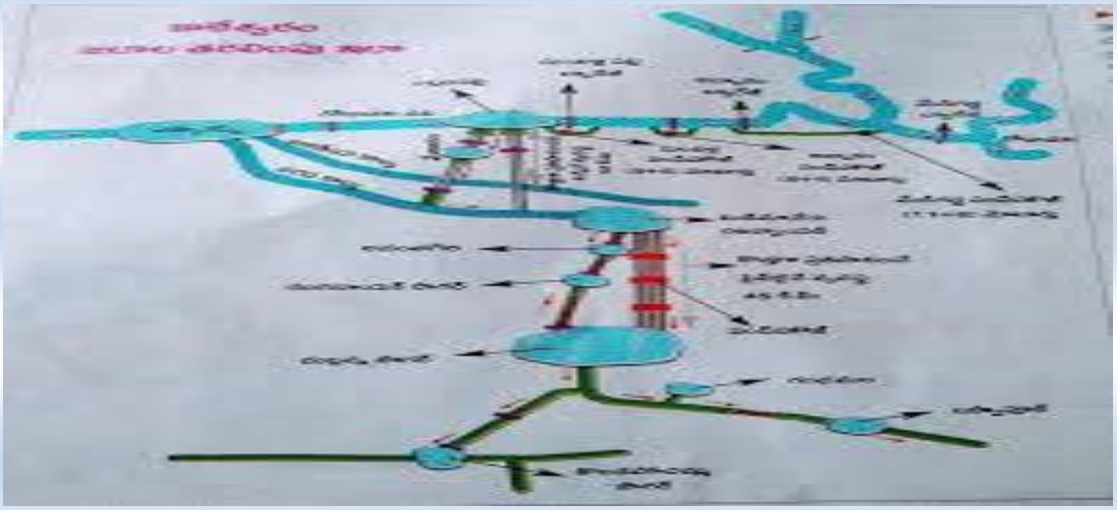
Key Words: Nabard, Lift irrigation, Head works, sumpwell, Sinha river, Bhopalebandhara

- **INTRODUCTION** Such large lift irrigation schemes comprise of two main parts. To carry water by means of pumps from the source of water to the main delivery chamber which is situated at the top most point in the command area and to distribute this water to the fields of the beneficiary farmers by means of suitable and proper distribution system. Of these two, the first part is comparatively easy and there are some technical guide lines for its design. If this is properly implemented for selection of pipes (diameter and pressure rating), valves and pump sets, there does not arise any problem in this part. But the second part of distribution is very important and comparatively complicated. The reasons are: The distribution system totally comprises gravity pipe lines. The gravity lines are designed totally on the basis of the available head, without any pumping system. This limits the job of design engineer. The area under the irrigation is scattered with varying topography. Therefore, each gravity pipe line has different available heads and different lengths. The area of individual farmers is different. The design engineer has to select the diameter of pipe from the standard diameters available in the market. The pipe diameter selected is the next higher diameter (than the design diameter) available in market. Higher diameter pipes are used and this affects the discharge through the pipes. The pipe line

carrying water to the low level fields carry more water than the similar requirement on the elevated field. The distribution is not proper and dissatisfaction and frustration on the part of farmers leads to indifference and apathy towards scheme.

The distribution system is controlled by valves on the basis of time schedule. The farmers operate the valves to their benefit which results in altercation and quarrels among the farmers. India is basically an agricultural country and most of its resources depend on the agricultural output. Water is evidently the most vital element in the plant life. Water is normally supplied to the plants by nature through rains. However to get maximum yield, it is essential to supply the optimum quantity of water and to maintain correct timing of water. It is possible only through a systematic irrigation system by collecting water during period of excess rainfall and releasing it to the crop as and when required. Irrigation is defined as the process of artificially supplying water to soil for raising crops. It is the science of raising an efficient, low cost, economic irrigation system tailored to fit natural conditions. It is the engineering of controlling and harnessing various natural sources of water, by the construction of the dams and reservoirs, canals and headworks and finally distributing the water to the agricultural fields. Lift irrigation system is that system of irrigation in which irrigation water is available at a level lower than that of a land to be irrigated and hence water is lifted up by pumps or other mechanical devices for lifting water and then conveyed to the land to be irrigated. The irrigation from wells is an example of lift irrigation system. In some cases the irrigation water may also be required to be lifted up from a canal or any other source of water when the level of water is lower than that of the land to be irrigated.

- **2.STUDYAREA**



The post monsoon flow in the Deccan Rivers usually carries huge stone bank. The site for pumping operation is located on that bank along which water flows. If the river water is at opposite bank it will necessitate the laying of pipeline in riverbed, which would not only be expensive but troublesome. The site for well must be such that inlet pipe level is short & it must be situated above the high flood level. The location should be such that the length of rising main is shortest & also alignment of rising main should not follow any depression or high mounds, which will cause either excessive cutting due to need of lowering pipeline below the depression or requires provision of bends in the rising main which is not desirable. As far as possible the site should be at the upstream end of command. If the site is situated at the downstream end of command, it will be unnatural since it runs the channel contrary to the direction of flow of river as the command area would normally be rising from downstream to upstream. This in turn results in installation of more H.P. pump. The village Angar comes in Moholtaluka of Solapur district. This village is situated on Mohol – Modnimb road & is on left bank of Sin river. Rainfall in the area is very low & it is unevenly distributed due to which main crops like Jamar dwindles if rains are not in time. Hence, Farmers of this village came forward for implementation of lift irrigation scheme on back water of Bople

- Bandhara on Sinariver so that sufficient water is available for this scheme.
- Name of work: Proposed lift irrigation scheme
- River: Sina river, Boplebandhara
- Taluka: Mohol
- District: Solapur
- Near railway station:Mohol on SolapurPune railway line
- Command Area: 30 Ha
- Area to be irrigated: 30 Ha
- Type of soil available: Black Cotton SoilThis soil has been named Black Cotton soil because it is black in color & good for taking cotton crop in it.
- Source of water: Sina river Boplebandhara back water Gut No. 1 at Pasalewadi
- Table 1 Economical suggested cropping pattern 3. DATA ANALYSIS The Executive Engineer starts survey work or fieldwork only after the inspection of site. As a thorough inspection it is necessary to fix the sites for inlet, jack well& delivery chamber, so that finally minor works are taken in hand. It is experienced that much efforts are likely to be

wasted if the site is not inspected & subordinates are not properly instructed. Firstly the copies of village maps in which area it is situated are obtained& entire village map is copied. Where more than one village is covered, combined tracing is done. Except in the flat area where the contour map having not much meaning & where

- the visual inspection is necessarily not advisable its better if entire area is contour surveyed. It determines the economical lift. After the completion of above work sites for jack well, delivery chamber are fixed by checking. L-section for inlet pipe & rising main are surveyed. Here, levels along with fixed interval of the change of ground slope points are taken giving correct profile. The extension of level beyond edge of water is at least about 8m. The lowest water level & highest flood level must be marked accurately on the L-section. Many times H.F.L. can be found recorded on a nearby structure like a bridge. Centers of jack well, delivery chamber & inlet chambers should be marked with long headers (at least 75 cm above ground) & buried flush into the ground. As inlet chamber center usually situated in water, marking stone or pit is located clearly away indicating accurately the chainage. All the points of rising main having turns, sudden change in slope are also marked. These markings are of much use while the work is in hand. The instruments used are Tripod stand, Dumpy level,Staff,Altimeter and the difficulties occurred during implementation of main pipeline areroadcut, Railway crossing, M.S.E.B. Line, Water supply

- **6. MODEL**

This model has been prepared on the principle similar to that of Lift Irrigation & Drip Irrigation scheme. Some elevation difference is kept between the canal & the tray (farm) so as to achieve practical condition. Model consists of:

- 4 * 4 tray (farm)
- Submersible pump – 3m head
- NRV
- PVC pipe – 180mm
- Lateral pipe – 12mm
- Online Drippers
- End stoppers Model is working as

1. Firstly, submersible pump is dipped into the canal water for 10 minutes to allow the water fill in it.

2. After 10 minutes' switch is put on so that water is lifted up to the well situated in the farm through the main pipeline.

3. The non-return valve is attached to the main pipeline so that water will not go back in source.

4. Air valves are attached on the main pipeline according to the requirement to reduce the water hammer effects. 5. After that the water is passed to the main pipeline of distribution system through the screen filter from well. The screen filters is provided to reduce the silting in the distribution pipeline so that Pipe line would not choke-up. 6. The water possess path of traveling as main pipeline followed by sub main pipeline followed by lateral pipeline & finally to the crops through the drippers. Difficulties faced to run model is due to Excess water was coming through the drippers due to high pressure of motor. To overcome this problem, we have increased the elevation difference & made the bypass way to the main pipeline so that pressure of water will be decreased & excess water will again fall in the canal. 7.

- **CONCLUSIONS**

The location of site is at Solapur district, Moholtaluka, village Angar. This region falls under dry zone of Maharashtra, hence face a lot of problem of scarcity of water. The precipitation observed is also very low. Electricity available for pumping water is around 10 hours instead of 16 hours specified by NABARD. In such a situation, optimum use of resources like water, electricity should be achieved. Also the design has to be economical. The total head between the source and actual site is 75m. Hence water has to be lifted from the source to the site. In order to achieve these objectives, we proposed a lift irrigation scheme which would help to make optimum use of these resources. The scheme is so designed to irrigate a total area of 75 acres using the motor of total capacity of 90 HP

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