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U-BOOT TECHNOLOGY

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Abstract:- First of all we understood the concept of the U-Boot Technology according to their use in construction industry, and for that purpose various research papers published is collected in phase-I and studied this research papers and understood the idea of U-Boot Technology and how it is implemented is analised & According to this, availability of material is checked & material required in appropriate proportion is taken according to the mix design. For that purpose mix design is carried out. According to availability of materials, materials was collected and on this material required test are carried out. According to mix design, we casted 18 concrete blocks and on this block flexural and compression test was carried out & From comparison of this result, we concluded that U-boot technology beneficial was proved.

Key Words: (Economical concrete, U-boot Technology)…

1.INTRODUCTION

Lean construction is a method of production aimed at reducing costs, materials, time and effort. Essentially, the methodology is to minimize the bad and maximize the good.Using the principles of lean-construction, the desired outcome would be to maximize the value and output of a project while minimizing wasteful aspects and time delay.

Many a times the drainage covers that cover potholes for sewage and other underground civil access points are made from cast concrete wither reinforced using steel bars. These structures lack durability owing to non- flexibility and do not sustain under cyclic load as in the vehicles on road moving over these drainage cover point

1.1 Problem statement

An increasing number of construction academics and professionals have been storming the ramparts of conventional construction management in an effort to deliver better value to owners while making real profits.

As a result, lean-based tools have emerged and have been successfully applied to simple and complex construction projects. In general, lean construction projects are easier to manage, safer, completed sooner, and cost less and are of better quality. Significant research remains to complete the translation to construction of lean thinking in several areas of construction.

1.2 Solution

Lean construction concepts and methodologies and is more prevalent, proved that it could enhance the construction management practices in various aspects. Also, it is intended to develop methodology for process evaluation and define areas for improvement based on lean approach principles.
This project identifies the modular construction methods and u-boot technology of casting concrete as the methods of lean construction . The project work will include the design development and testing of permutations of the above said methods and thereby proving their effectiveness in terms of cost saving , time saving and durability .

1.3 Objectives of Project

1. Identification of various lean construction models for project execution of low cost sanitation facility enclosures to stand the cost , time and durability.
2. Proposal of innovation in construction methods, materials in the form of U-boot technology of casting and modular rebar sets in various permutations for effective low cost , manufacture time and maximum durability

2. SYSTEM DEVELOPMENT:

2.1 System Design:

(Here we define the principle of working, functional Components, discuss their shapes and geometry through graphical / pictorial representation and define the list of components (Bill of materials) --- categorizing the Standard parts and bought outparts)--accordingly we decide as to which parts are to be designed / drawn /manufactured.

2.2 Mechanical Design:

This section is where we carry out theoretical design and analysis of the critical components we fear will fail under the given system of forces . The design work is carried out in two stages as elaborated sample below:

Part -1 : Mathematical Design of the part using standard text book formulae

Title : Design and Analysis of slabs with different Pour value of concrete , and Fibre content layout for minimum weight and minimum cost configurations.
Materials Template:

What we need that we save the data below as standard template and recall it for each new design of different concrete mixes of different pour value.

Part -2 The experimental results will be determined using Universal testing machine and the maximum stress produced (σ Mpa) & and maximum deformations (δ mm) will be determined and thus all three results of (Theoretical / Analytical / Experimental) will be compared.

Part-3 Statistical tools and Software used : Minitab
I) Types of Analysis: Design of Experiment using Taguchi Analysis between three subject factors
a) Pour Value of concrete
b) Fibre content
c) Additive addition
For Concrete mix designs M20 ....
Result parameters under study will be Strength , Weight and Cost
II) Ansys study the effect of different subject factors on output parameters & there by determining the optimum parameters for
a) Maximum Strength.

b) Minimum Weight.

c)Minimum Cost.

2. METHODOLOGY

Design Methodology:
Proposed work:
1. Literature review: Technical papers, white papers, patent documents, etc
2. Material selection for reinforcement in FRC and u-boot
3. Slump test for various grades are prepared
4. CAE of critical component and meshing using Ansys
5. System design of testing mechanism as for the component selection, geometry and profile selection, charge system selection, mounting & orientation.
6. Mechanical design of components under given system of forces to determine functional dimensions of the components to be used using various formulae and empirical relations
7. Manufacturing, assembly of the device and test-rig for experimental analysis and validation
8. Testing and trial to derive performance characteristic of equipment under various load conditions.
9. Statistical analysis &/or Mathematical modeling for validation.
10. CAE of critical component and meshing using Ansys Result discussion and thesis preparation.

A) Result In 7 Days :-

Specimen No.	Compressive strength (Mpa)	Flexural strength (Mpa)
01	46.15	7.54
02	45.89	7.67
03	46.15	7.54
Average	46.07	7.59

B) Result In 28 Days :-

Specimen No.	Compressive strength (Mpa)	Flexural strength (Mpa)
01	71	11.6
02	70.6	11.8
03	71	11.6
Average	70.87	11.67

3. CONCLUSION

After testing the different specimens (Plain Cement Concrete Block, FRC + Concrete Block, Concrete+ FRC +U-boot Block) we reach to conclusion that U-Boot technology is advantageous and beneficial in construction industry.

Due to fact, that the structural behavioural of this new kind of monolithic flat slabs will the same as for solid slabs, excluding slab edge column connection, we surely can talk about appropriateness of use and advantages of the new technology.

By using U-BOOT Technology, it is possible to save large amount of concrete and steel. and also possible to reduce the self weight of the structure

Concrete uses will reduced 1kg of recycled plastic replaces 100kg of concrete. Reducing material consumption made it possible to make the construction time faster, to reduce the overall costs. Besides that, it has laid to reduce dead weight upto 50% which allows creating foundation sizes smaller

The technology is environmentally green and sustainable. Avoiding the cement production allows to reduce global CO_2 emission. The use of the bubble deck system qualifies for LEED points in a North America.

This technology is very prospective in a modern construction and perhaps future of civil engineering belongs to this new kind of hollow slabs.

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