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# "A REVIEW ON REINFORCED CONCRETE ROOF WITH DIFFERENT COVER SIZE BLOCK "

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## ABSTRACT

***Concrete blocks are becoming increasingly common in the building of both load-bearing and non-load-bearing constructions. This paper addresses the topic of compressive strength of hollow blocks created using various replacements and mix ratios. This paper's primary goal is to examine the many characteristics of hollow blocks created in a variety of sizes, materials, and mix proportions. This study's findings show how the replacement of fine and coarse aggregates with waste materials such vermiculite, cements kiln dust, quarry dust, etc. affected the compressive strength.***

***Key Words:*** *Concrete blocks, Load bearing & Non load bearing construction, Aggregates.*

## I. INTRODUCTION

In developing countries, there is a breakwater or groin that employs a concrete cellular caisson filled with stones covered by concrete blocks as an economical type of structure. However, it is reported that those concrete blocks are moved by wave action. There are currently only a few studies that concern the stability of concrete blocks at the water surface level. In this study, a hydraulic experiment was carried out to know the different effects on the stability and mobility of the cover concrete blocks due to several factors. These include variations in water level and in the type and crown height of concrete blocks. As a result, the stability of the blocks decreased in the case where the crown height of the blocks was higher than the crown surface of the caisson. This was also evident when the water level was near the crown surface of the caisson. As a recommendation, the stability of the blocks can be improved either by making a block with a high hole rate or by making a sloped surface at the crown of the block.

The basic requirement of human being is shelter. In ancient time human starts living in caves below ground level, after that they started constructing walls from mud, they developed the techniques of burnt clay brick masonry for making the structure part of the shelter. Now days, hollow concrete blocks are being very popular in construction. These blocks are being mostly used in the construction of multi- storied buildings, factories and residential buildings. These concrete hollow blocks are commonly used in compound walls because of cheapness. These concrete hollow blocks are more useful due to its lightweight and the most important feature is ease of ventilation. The concrete hollow blocks are made out of mixture of cement, sand and stone chips. It reduces cement in masonry work and reduced the cost of construction. The hollow concrete blocks found out due to different advantages-

1. Sound control
2. Small dead load
3. Resistance to fire
4. Adequate strength
5. Superior thermal insulation
6. Economy

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7. Highly Environmentally Eco friendly
8. Reduction in mortar consumption
9. Fast and Easier construction system

Better Architectural features The first Concrete block as a replacement for stone and wood in the building was used in the United States. The first concrete block house built up in 1837 on Staten Island in New York. Harmon S. Palmer, designed first hollow concrete block in 1890. Palmer patented the design of hollow block in 1900 after 10 years of experimental research. Palmer's blocks were 8-inch(20.3cm)×10-inch(25.4cm)×30-inch(76.2cm) and they were heavy in weight. These early hollow blocks were cast by hand and average output was about 10 blocks per hour. Now concrete blocks are manufacturing by automated process that can make up to 2000 blocks per hour. The Compressive strength of masonry is one of the most important property in the design of masonry structure. This strength depends upon several factors such as unit strength, mortar strength, grouting, grout strength, geometry of the blocks, bedding mortar, and the type of bonding and bedding arrangements adopted. In extreme hot or cold climate countries these concrete blocks possessing low thermal conductivity and also serve as a thermal insulation material which minimize the energy consumption by minimizing the dependence on electricity for air conditioning or heating. In all countries, the different conventional materials are replacing to the concrete hollow blocks because most conventional materials cost is increasing. In the review study we found that hollow blocks of double- H shape gives more strength with semi-grouted masonry and low strength with fully grouted masonry.

## II. LITERATURE REVIEW

**Alavez-Ramirez, et.al (2012)** conducted experiment on thermal conductivity of coconut fibre filled ferro cement sandwich blocks. The study evaluates the potential use of coconut fibre as thermal isolating filler for ferro cement block walls in sandwich configuration of schools and houses roofing in Puerto Escondido, Oaxaca, Mexico.Thermal conductivity measurements were performed to compare the thermal behavior of ferro cement block walls filled with coconut fibre to other typical building materials of the region. Measured thermal conductivities for red clay brick, hollow concrete block and lightweight concrete brick block walls are 0.93, 0.683 and 0.536 W/m K respectively. Thermal conductivity of the proposed configuration is 0.221 W/m K and that is lower than typical materials used for home-buildings in this region. [1]

**NahroRadiHusein,et.al (2013)** conducted experimental study on using lightweight web sandwich block using thermocol as a floor and a wall. The experimental investigation was focused on the strength capability of lightweight web sandwich block (LWSP). This study deals with the LWSP's strength under flexural loading (one-point load & third point load) by treating these LWSPs as a floor and also, studying LWSP strength under axial load by treating these LWSPs as a wall. Thirteen specimens of LWSP was casted in this study with size of (500 mm*400 mm*100 mm), with core size of (450 mm*105mm*60 mm), three prism cores are used in each block. Ten specimens are LWSP with aerated concrete as a core and three LWSP with thermocol as a core which are encased by ferro cement with difference water cement ratio (w/c) and difference waterproofing admixture.
The performance of the LWSP is investigated in terms of first crack load, load-deflection curve for flexural load with (one-point loading and third point loading), modules of rupture, ultimate flexural load, axial load-deformation curve and the failure mode.
The unit weight of the LWSPs which have aerated concrete as a core is (1850-1950) kg/m3 and the unit weight of the LWSPs which have thermocol as a core (1250-1300) kg/$m^3$. [2]

**Al-Tuhami Abu Zeid& Al-TuhamiAbdAllahb (2012)** conducted experimental study on precast hollow-block reinforced concrete bearing walls. This study deals with technique for enhancing the behavior of sandwich block bearing walls under in-plane loads. The suggested technique is based on presenting a complete interaction wall block in the two directions, by using fully interacting vertical and horizontal concrete ribs along with the traditional two parallel concrete layers. Each wall block consists of light weight filling material blocks, two parallel reinforced concrete layers and reinforced concrete ribs. The longitudinal reinforcement of the ribs is slightly protruded outside the wall block to be used for assembling the reinforced concrete walls and slabs in the building construction site. The filling material blocks may be polystyrene-foam or any light weight filler material having good thermal and sound insulation and

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allows for concreting without crushing. In the present work, experimental study and technical details of the suggested technique along with those of the traditional sandwich blocks are presented.
The experimental work is conducted on full scale specimens to verify the applicability and efficiency of the proposed method. Results indicated that the ultimate loads, failure modes, and load deflection relationships of the proposed walls are greatly improved by using the suggested technique. [3]

**Al-Tuhami Abu Zeid Al-TuhamiAbdAllah and Ahmed Ismail Gabr (2012)** conducted experimental study on flexural behavior of RC sandwich and hollow block bearing walls. The suggested technique was based on presenting a fully composite action of sandwich block bearing walls by adding longitudinal and transverse concrete ribs along with the existing two parallel concrete wythe. The aim of this paper is to examine the effect of the presence of ribs that connects the two concrete wythe for enhancing structural behavior of the wall blocks that exposed to bending loads. Experimental work and 3D numerical analysis of sandwich blocks as well as hollow block bearing wall blocks subjected to flexural load is conducted. Parametric study is carried out in order to focus on the main sensitive parameters as span to depth ratio and wythe thickness that influence the flexural capacities of wall blocks. [4]

**D. Surrya Prakash, D. Praveen Kumar (2014)** conducted experimental study on natural fibre sandwich composite blocks-analysis, testing and characterization. The paper deals about the development, comparison, testing and analysis of composite materials and sandwich composite blocks. In this paper we have carried out testing of mechanical and physical properties of coir composites, SMC laminate, bamboo composite, cement bonded wooden particle composite. Then we have used SMC laminate on coir composite so as to increase its strength. Also we have carried out tensile test for bamboo composite, coir composite, cement bonded composite. Then we have compared the values of these composites. Water absorption test and flame test of coir composite, bamboo composite has been carried out, so as to find out the mechanical and physical properties of composite materials. Finally, bending test and analysis of sandwich composite blocks has been carried out for bamboo-EPS sandwich block and bison-EPS sandwich block to understand the characteristics of sandwich composite blocks. [5]

**JagadeshSunku, Abhaya Shankar (2014)** conducted experimental Study on eco-friendly inorganic bonded sandwich blocks (Aerocon blocks). This paper reports the production of inorganic bonded sandwich blocks (Aerocon blocks) made of two fibre reinforced cement sheets enclosing a light-weight core composed of portland cement, binders and a mix of silicaceous and micaceous material aggregates. The use of fly ash and its substitution for timber-based products makes the blocks eco-friendly. Aerocon blocks are resistant to water, fire, termites and rodents which makes them withstand adverse weather conditions. Also, they exhibit very good thermal and acoustic insulation properties. Blocks are strong, durable, light weight and easily re-locatable. Design of the product and method of application makes it suitable for seismic and cyclone prone zones. Blocks are also suitable for fast track construction by elimination of onsite wet plastering and curing. The blocks have wider applications such as external load bearing walls, Internal partition walls, flooring and roofing, fascias, sun hoods, infill or veneer walls with steel or concrete structures, louvers, shelves. [6]

**Ananda Selvan et al [ 2021]** A light weight concrete block using granulated corncob as an aggregate is investigated in this research work. Considering corn cob after removing the corn is said to be agricultural waste. Finding practical uses of this waste for manufacturing concrete block may preserve the environment and also allow green technologies. These concrete blocks are studied in terms of compressive strength, water absorption; density and unit weight were experimentally studied. The results obtained are submitted which shows that corn cob blocks have sufficient material properties for non-structural application in building for construction of partition walls.
This is the alternative for blocks in expanded clay, expanded polystyrene, particles of cork, coconut coir etc. In this research a clay brick is compared as a reference block or control block. Nine specimen blocks were prepared in a size of 400mm x 200mm x 100mm and cured for 7 days, 14 days and 28 days and subjected to compressive strength test, water absorption test and density. The results are compared with conventional clay bricks. Corn cob blocks offered a good strength, low density and less water absorption. [7]

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## III. COMPRESSIVE STRENGTH TEST

Each block was first dried, weighed, and placed between the platens of a compression testing machine. Soft wood plates were placed beneath and on the top of the block separating it from the platens of the machine. The load was applied in small increments until failure, and the failure load of the block was recorded. The stress at failure was calculated using the gross area of the block normal to the load.

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