INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

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SPECIAL ISSUE FOR
NATIONAL LEVEL CONFERENCE
"Recent Trends and Development in Civil Engineering"

OVERVIEW LOW DENSITY RCC FLOATING STRUCTURE

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Accepted Date: 27/01/2018; Published Date: 01/03/2018

Abstract: Earthquake force in any structure is directly proportional seismic weight of structure and acceleration value. So increase in weight of directly increase the earthquake force so the size of structure members will increase. So decrease in dead load also reduce the cost of structure. Use of light weight concrete block can reduce dead load of masonry wall upto 60-65%. Cost of Individual light weight block may be higher than brick but it will decrease 13-14% overall cost. In this study we tried to find the current scenario of use of light weight concrete blocks in building and its merits and demerits.

Keywords: RCC, Floating, Low Density Concrete block, Light Weight, EPS Beads

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Access Online On:

www.ijpret.com

How to Cite This Article:

Savan M Datta, IJPRET, 2018; Volume 6 (7): 264-268

PAPER-QR CODE

INTRODUCTION

All the framed structure or load bearing mainly constructed using concrete. Density of cocrete depends upon the basic material required like coarse aggregate, fine aggregate, cement etc. & density all these materials are generally more than one. So,if we construct structure using conventional concrete that weight of structure is very & it is imposible that these type of structure can float or any type of liquid. When aggregate is mixed together with dry Portland cement and water, the mixture forms a fluid slurry that is easily poured and molded into shape. The cement reacts chemically with the water and other ingredients to form a hard matrix that binds the materials together into a durable stone-like material that has many uses[1]. Concrete is a composite material composed of coarse aggregate bonded together with a fluid cement that hardens over time. Most concretes used are lime-based concretes such as Portland cement concrete or concretes made with other hydraulic cements, such as ciment fondu. However, asphalt concrete, which is frequently used for road surfaces, is also a type of concrete, where the cement material is bitumen, and polymer concretes are sometimes used where the cementing material is a polymer.[1].Nowadays people are working more on light weight concrete structure to reduce earthquake & other dynamic force. Also cost of any structure depends upon the seismic weight of structure. Autoclaved aerated concrete(AAC), also known as autoclaved cellular concrete (ACC), autoclaved lightweight concrete (ALC), autoclaved concrete, cellular concrete, porous concrete, Aircrete, Hebel Block, and Ytong is a lightweight, precast, foam concrete building material invented in the mid-1920s that simultaneously provides structure, insulation, and fire- and mold-resistance. AAC products include blocks, wall panels, floor and roof panels, cladding panels and lintels[2].The rewards of low weight concrete block is less cost in construction its strength and strenghth is high. The consuption of mortar less compare to brick masonary. Low weight conctrete block is heat, damp and fire resistance cost of labour is comparitively low. Global warming, also referred to as climate change, is the observed century-scale rise in the average temperature of the Earth's climate system and its related effects.[3][4] Multiple lines of scientific evidence show that the climate system is warming.[5][6][7] Many of the observed changes since the 1950s are unprecedented in the instrumental temperature record which extends back to the mid-19th century, and in paleoclimate proxy records covering thousands of years.[8]

Literature review

Gaurav Kumar, et 2016 informed that, The critical position of internal floating columns , external floating columns of G+6 building is analysed. With the help of significant graph , the various parameters like displacement , moments and forces on columns and beams at various floor levels are compared and correlated to each other. Staad pro software is used for the design and analysis of the building. The author concluded that the torsional effect was experienced at the ground level. Author concluded that floating column should be avoided in high rise building specially in earthquake zone 5 because it leads to storey displacement. And increasing in the size of beam and columns can improve the strength of building having floating

columns. In earthquake design the building has to go through regular motion at its base, which leads to inertia force in the building that consecutively causes stresses. For earthquake resistant design the normal building should be able to resist minor, moderate, sever shaking. In the circumstances of the building, simple shape configuration building transfer the earthquake force in the direct path to the base while in complex shape building the load transferring path is indirect which leads to generation of stresses at the corners.

HUGO COSTA, et 2010The developed mixture design method proved to be able to obtain, with great versatility, structural LWAC within the specific gravity spectrum from 1.2 to 2.0, being possible to accurately adjust the specified density combining different types of LWA mixture. The correct control of LWA properties and its accurate consideration on the dosage of LWAC mixture proved, together with the good correlation between LWA density and strength, that the method allows predicting, with high accuracy, LWAC density, strength and Young modulus, presenting mean errors of 1%, 4% and 3%, respectively. Feret´s expression used to predict the strength of binding paste matrix is adequate to LWAC mixture design method, since it is possible to predict the concrete strength, by correcting the initial value with the coefficient *Cf*. Also the proposed prediction for Young modulus proved to be reliable, by first estimating the Young modulus of binding paste matrix and correcting it with the coefficient *CE*.

E. Watanabe, et 2003With a growing population and a corresponding expansion of urban development in land-scarce island countries and countries with long coastlines, the governments of these countries have resorted to and reclamation from the sea in order to ease the pressure on existing heavily-used land space. There are, however, constraints on land reclamation works, such as the negative environmental impact on the country's and neighbouring countries' coastlines and marine eco-system, as well as the huge economic costs in reclaiming land from deepco astal waters, especially when the sand for reclamation has to be bought at an exorbitant price. In response to both the aforementioned needs and problems, engineers have proposed the construction of very large floating structures (VLFS for short) for industrial space, airports, storage facilities and even habitation. Japan, for instance, have constructed the Mega-Float [1] (a VLFS test model for floating airport terminals and airstrips) in the Tokyo bay, the floating amusement facilities in the Hiroshima Prefecture, the Yumeshima-Maishima floating bridge in Osaka, the floating emergency rescue bases in Yokohoma, Tokyo and Osaka, and the floating oil storage systems in Shirashima and Kamigoto. Canada has built a floating heliport in Vancouver and the Kelowna floating bridge on Lake On in British Columbia. Norway has the Bergsoysund floating bridge and the Nordhordland bridge which has a floating portion, while the United States has the Lacey V. Murrow bridge and the Hood Canal floating bridge. Vietnam has a floating hotel. These VLFSs have advantages over the traditional land reclamation solution in the following respects: they are cost effective when the water depth is large; environmentally friendly as they do not damage the marine eco-system, or silt-updeep harbours or disrupt the ocean currents; they are easy and fast to construct and therefore sea-

space can be speedily exploited; they can be easily removed or expanded; and the structures on VLFSs are protected from seismic shocks since the energy may be dissipated by the sea.

Ghanshyam Kumawat, et2016, Bricks can be of different types such as burnt clay bricks, cellular light weight concrete blocks, autoclave aerated concrete blocks etc. The bricks which is used in this project is of cellular light weight concrete blocks (CLC blocks). Cellular lightweight concrete blocks further classified in 3 grades such as Grade A, Grade B, Grade C. The density of cellular light weight concrete blocks are less as compared to conventional burnt clay bricks and it is porous, non toxic, reusable, renewable and recycled. Therefore cellular lightweight concrete blocks are used in the high rise residential building at the replacement of the conventional burnt clay bricks. And the comparison has been made between cellular light weight concrete blocks and the conventional red bricks by analysis a G+12 residential building. Due to lightweight of these blocks there will be less dead load will act on the structure , therefore the structure became lighter. If the structure will be lighter than there will be reduction in the reinforcement, reduction in the size of the member , reduction in the concrete and also by using these blocks there will be no use of coarse sand for the plastering purpose. And the building should be constructed in a most economical way.

Jorge A. Tito, et 2010Lightweight concrete is used to construct a segmental bridge, which is a project for students of Structural Analysis and Design of the University of Houston Downtown. The lightweight concrete is done with expanded shale and clay, an industrial material provided by a local industry. As part of the student project, the most important properties of the aggregate are obtained in the laboratory and used for the trial mix design. The resulting concrete has a density of 112 lb/ft3, design strength of 9,000 psi, and modulus of elasticity of 3'700,000 psi, values that compare well with the literature. A total of 23 ft3 is prepared in the laboratory to make the 21'3" long post-tensioned beam. The students accepted the project with enthusiasm and full participation, the assessment of the course showed a high acceptance of the project.

Conclusion

Use Light weight structure members can reduce earthquake force up to 20-25 % also it can reduce overall construction cost up to 15%.

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