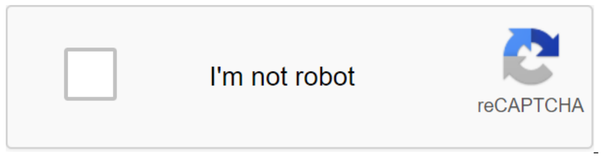

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You read free preview pages from 6 to 11 do not appear in this preview. Autoclaved Aerated Concrete Bricks (AAC) Workshop Report. Upcoming SlideShare Download in... 5 and 1 How does this document? Why not share it! 1. AUTOCLAVED CARBONATED CONCRETE BRICK. The seminar report presented in partial compliance with the bachelor technology degree requirement in CIVIL ENGINEERING BY VIGYAN NIDHI (1428400093) is guided by: - MR. VIKRANT SINGH UNITED INSTITUTE OF TECHNOLOGY NAINI, ALLAHABAD. TO THE FACULTY OF CIVIL ENGINEERING. A.P.J. TECHNICAL UNIVERSITY ABDULAM, LUCKNOW. 2. CERTIFICATE This is to confirm that the report entitled AUTOCLAVED AERATED BRICKS, which is presented by VIGYAN NIDHI, Roll No. - 1428400093, in partial fulfillment of the requirement to award a bachelor's degree in technology at the Department of Civil Engineering of the Joint Institute of Technology, Allahabad. This is a report on the candidate's work under my leadership. The question embodied in this is original and has not been presented at the award of any other degree. Signature: MR. VIKRANT SINGH Faculty of Civil Department, United Institute of Technology, Allahabad. Date: 10/11/2017 3. ACKNOWLEDGEMENT In gives me great pleasure to present a seminar presentation conducted during B. Tech, The Final Year. I owe special thanks to Mr. VIKrantu SINGH, the Civil Engineering Department of the Joint Institute of Technology, Allahabad, for its continued support and leadership throughout my inspiration. It is only his effort that my efforts have seen the light of day. I would also like to acknowledge the contribution of Mr. Santos Kumar Singh, Head of The Civil Engineering Department of the Joint Institute of Technology, Allahabad, in his full support and assistance in the development of the project. I also do not want to miss the opportunity to note the contribution of all teachers of the department in their good help and cooperation in the development of our project. I would like to thank my friends for their contribution to the completion of the project and finally, but not least I would like to thank my parents and almighty god. (VINYAN NIDHI) 4. CONTENT AND INTRODUCTION. THE IMPORTANCE OF AAC BRICKS. TYPES OF AAC BRICKS. THE CHARACTERS OF THE AAC BRICKS. MANUFACTURING PROCESS. COMPARISON OF BRICKS AND CLAY BRICKS. COST ANALYSIS. - AAC BRICKS IN INDIA. 5. - CONCLUSION. 6. INTERVIEW - AUTOCLAVED AERATED CONCRETE (AAC) Brick was first invented in 1923 in Swedenby SwedenArchitect by Dr JohanErrikson. It is also known as AutoclavedCellular Concrete (ACC) bricks or AutoclavedLightweight concrete (ALC) bricks and, autoclavedaeratedconcrete bricks (AAC). These AAC bricks are made with a mixture of cement, ash flies, lime, aerationagents and water involving an aeration process that it's a unique cellular structure. Figure 1 AAC Bricks. For a project developer, this means faster and faster construction costs. For environmentally conscious, this means environmentally friendly products, and for those occupying buildings built with AAC blocks, this means better safety and lower energy costs for cooling or heating. The main raw material for AAC is fly ash. Thousands of tons of fly ash are generated at thermal power plants every day, and its disposal is a cause for concern. In addition, the use of fly ash does not harm the environment at all. In fact, using a fly of ash takes care of issues related to the ash fly. Thus, the use of fly ash toproduce AAC products provides asustainable, economic and environmentally friendly options. After all, all this translates as abetter of peace for future generations. 7. 1 TIPY bricks AEROCON BRICKS AAC are currently available in three sizes: 1. Filling blocks / Bricks: The size of the brick Infill AAC is 600X600 mm and the thickness varies in the range of 75,100,125,150,200 mm. The main advantage of the filling blocks is that they can easily replace 60% of the concrete in the roof slabs and thus help in saving a significant amount of concrete, steel, labor, water, plaster, etc. These blocks are especially suitable for building roofs in large columns of free structures. 2. Jumbo Blocks/Bricks: Jumbo blocks are usually at a size of 600X200 mm, and the thickness ranges from 75100,125,150, to 200 mm. Jumbo AAC bricks results in the use of much smaller bricks and therefore less mortar is required. These bricks are more suitable for unlifting bearing walls, high-rise buildings, etc. 3. Heat blocks/bricks: These blocks are also called Aerocool thermal units, which are 300X200 mm and 50 mm thick, respectively. These blocks are ideal for roofing, as they delay the flowand also help the interiors stay unward in winter and cool during the summer. 8. 2 CHARACTERSTICS OF AAC BRICKS (Light weight: The typical structure of AAC bricks resulted in light units. Their weight is only one third of the density of clay bricks, which makes them easy to handle on the spot. Reducing the weight of a brick reduces the dead weight on the design; therefore, AAC bricks are ideal for low-load bearing soil and seismic zones. Even for the construction of additional floors in an existing building, AAC blocks are an ideal choice because their smaller weight will not affect the stability of the structure. Using AAC bricks from the foundation stage of the building helps save a significant amount of concrete and steel. Fire resistance: The walls are built of AAC bricks, with a minimum thickness of 100mm can withstand fire for up to four hours, making them a safe choice in Especially for industries and companies that are vulnerable to fire accidents, these blocks are of great help. 9. 3 Sound Insulation: Another One AAC bricks are their soundproofing. - A brick of good quality AAC can minimize the transmission of sound to 42 decibels. Famous brick manufacturers AAC have a sound class rating for their units, making them ideal for building walls in hotels, auditoriums, hospitals, etc., where sound insulation is essential. Thermal insulation: Thanks to the closed cellular structure of AAC bricks, they provide excellent insulation. They help interiors stay cooler in the summer and warmer in winter, which further helps the user save electricity bills and thus helps in preserving natural resources. Strength and durability: AAC bricks with a higher weight ratio help build a stronger and more economical structure. Because they remain independent of environmental conditions, they provide a longer life of the building. 4 10. Perfect finish and dimensional stability: The autoclave process used in the production of AAC bricks gives the blocks ideal sizes along with low tolerances. Dimensionally perfect blocks help in the construction of homogeneous, thin walls with perfect finish. Consistent quality control: Since brick making in India is an unorganized market, the quality of conventional bricks often varies from manufacturer to manufacturer. Thus, consistent quality control is a problem with traditional bricks, which is not a problem with AAC bricks. Fig. 2. Cellular structure of AAC 5 11 blocks. AAC BRICK MANUFACTURING PROCESS. Step 1 - Raw preparation:- AAC blocks the production process begins with the preparation of raw materials. The list of raw materials and related details are below: Fly ash: - The key ingredient for the production of Autoclaved Aerated Concrete (AAC) blocks silica rich material like fly ash, ash pond or sand. Most AAC companies in India use ash to produce AAC blocks. - Fly ash is mixed with water to form a fly ash suspension. Manure is thus formed mixed with other ingredients like lime powder, cement, plaster and aluminum powder in quantities according to the recipe. Alternately, sand can also be used to produce AAC blocks. The wet ball mill finely grinds the sand with water, turning it into a sand suspension. The sand suspension is mixed with other ingredients in the same way as fly ash manure. Fig. 3. Worker feeding pond ash in sludge tank for AAC blocks the production process. 6 12. Limestone powder: - The lime powder needed to produce AAC is produced either by crushing the limestone to fine powder at the AAC plant or by directly purchasing it as powder from the supplier. While buying lime powder may be a bit Many manufacturers choose it rather than invest in lime crushing equipment like ball mill, jaw crusher, bucket lifts, etc. rice. 4. Crusher for chopping lime stone. Cement:- Cement:- Ordinary Portland Cement (OPC) from a well-known manufacturer is required to manufacture AAC units. Cement supplied by mini-factories is not recommended due to sudden changes in quality in different batches. 7 13. Some AAC plants can plan their captive cement processing facilities, as such a unit can produce cement as well as recycle lime. Such plants can choose a large factory clinker and produce their own cement for the production of AAC. Cement is usually stored in bunkers. Gypsum: - Gypsum is easily available on the market and is used as a powder. Aluminum powder/paste: Aluminium powder/paste is readily available from a variety of manufacturers. Because a very small amount of aluminum powder/paste is required to add to the mixture, it is usually weighed by hand and added to the mixing unit. 8 14. Step 2 - Dosing and Mixing:- Rice. 5. Suspensions, water, lime powder, cement and plaster are poured in accordance with a set of dosages during the production of AAC blocks. Autoclaved Aerated Concrete (AAC) unit is used to form the right mixture for the production of Autoclaved Aerated Concrete (AAC) units. - Dung ash/sand is pumped into a separate container. Once the desired weight is poured in, the pumping stops. Similarly, lime powder, cement and plaster are poured into separate containers using screw conveyors. Once the required amount of each ingredient is filled in their individual container management system releases all the ingredients in the drum mixing. Mixing the drum like a giant bowl with a stirrer rotates inside to ensure proper mixing of ingredients. Steam can also be fed onto the device to maintain temperatures in the 40-42oC range. 9 15. Fig. 6. Cement, lime powder and plaster are sent from the silo to the mixing tank using a screw conveyor during the production of AAC units. - A smaller bowl-type structure used to feed aluminum powder is also attached as part of the mixing unit. To produce AAC units, the entire dosing and mixing operation is completely destroyed and requires minimal human intervention. Dosing and mixing processis is carried out continuously, because if there is a long gap between charging and unloading ingredients, the residual mixture can start to harden and choke the entire block. 10 16. Fig. 7. Cement, lime powder and plaster are sent from silo to mixing tank using screwconveyor during production of AAC blocks. To produce AAC units, the entire dosing and mixing operation is fully automated and requires minimal human intervention. The whole operation is monitored by control systems integrated with computer and CCTV cameras. As with any industrial operation, there is a provision for intervention and extraordinary actions integrated within the management system. Fig. 8. Control panel and CCTV cameras help monitor and monitor the production of AAC units. 11 17. Step 3 - Casting, Rise and and AAC blocks the production process includes casting, growth and pre-treatment. Once the desired mixture of raw materials is ready, it is poured into the molds. This process has different names. It's called casting, pouring or sculpting. For the current discussion, we'll call it a casting. After careful mixing of suspension, suspensions containing ash (or sand), lime powder, cement, plaster and aluminum, pour mold. The shapes can be of different sizes depending on the installed capacity. Before casting the molds are covered with a thin layer of oil. This is done to ensure that the green cake does not stick to the mold. While the suspension is mixed and poured into oil-oiled shapes, aluminum reacts with calcium hydroxide and water to form hydrogen. Millions of tiny hydrogen bubbles are released because of this reaction. This causes the formation of tiny unconnected cells, causing the suspension mixture to expand. Such an expansion could be twice the original volume. This process is very similar to the growth of the idli or dhokla test. Cells are the cause of light weight and the insulation properties of AAC blocks. Once the growth process is over, the green cake is allowed to settle and heal for some time. This provides the cutting strength needed to cut the wire. Usually the process of lifting and pre-treatment takes about 60-240 minutes. Growth depends on raw materials and weather conditions. It should be noted that the weather is one of the main factors influencing the growth process. 12 18. It should be ensured that the green cake is not subjected to vibrations during pre-treatment, otherwise it may develop cracks. Fig. 9. Casting during the AAC block manufacturing process. Step 4 - Demoulding and cutting: - In previous posts we have seen suspensions cast into shapes and allowed to rise and gain strength during pre-treatment. Once the green cake has reached the strength of the cutting, it is ready to demoulded and cut as required. Demulding and cutting are very important processes in the production of AAC blocks. These two processes play an important role in determining the amount of rejection as well as the measurable accuracy of the final product. As soon as the mold comes out of the preliminary room, it rises by crane or rolled on the rails for demulding. The rise or rental of a green cake is determined by the technology of deployment. 13 19. The manufacturing process can be widely classified as a flatbread and tilt-cake based on how the green cake is demoulded and sent to the cutting line. The horizontal cutting machine has no moving parts. Cutting the operation is achieved by moving the green cake through the horizontal cutting machine. It has a profile plate that scratches the sides of the green cake to give it a trim. Once the profiling is done, horizontal incisions are made through the cake using stationary steel wires. These wires can be adjusted offline to get the desired height of AAC blocks or panels. Depending on the customer's preferences, some horizontal cutting Can sport an upper bark removal device in the shape of an arrow. Fig. 10. Horizontal cutting machines using stationary wires. 14 20. Comparison between AAC bricks and clay bricks S.No. Options AAC Bricks Clay Bricks 1. Soil consumption. Ground zero intake. A 1 square foot area with a clay brick wall will consume 25.5 kg of top soil. 2. Labor. Work. An organized sector with good HR practice. An unorganized sector with rampant child labour. 3. Manufacturing company. A modern factory. Unhealthy working conditions due to toxic gases. 4. Compression force. 3-4 H/m2. 2.5-3 H/m2 5. Fire resistance (8th wall). Until 7 o'clock. About 2 o'clock. 6. CostBenefit. Reducing the dead weight leads to savings in steel and concrete. No 7. Heat resistance. Approximately 30% for heating and cooling. No 8. Speedof production. HIGH MINIMUM 15 21. COST ANALYSIS The cost of building materials varies from region to region. In Mumbai, bricks cost from 6 to 7 rubles per unit. In the state of Uttar Pradesh, it's approximate. 5/- per unit. For example, one cubic meter consists of 600 bricks, which costs about 3000-4000 rubles/- cubic meter. However, AAC units are available in the Rs.2800-4000/per m3 range. Builders prefer AAC, given the many advantages of materials, as shown above. 16 22. AAC Manufacturing in India o The first AAC unit plant in India was founded in the early 1970s by Siporex in Pune. S.No. Brand Name Company Location 1. Aerocon Aerocon India. Rajot 2. Aerocon HIL Golan. 3. Ascolit Aswany Construction Pvt. Surat Ltd. 4. Xtralite Ultratech. Hyderabad 5. Renacon RenaatProconPW.Lt. Chennai 6. Reliconz Reliconz Brix Pvt. Ltd. Hyderabad 7. JK Smart Blox JK LakshmiCement. Jajar 8. Magicrete Megicrete Building. Surat 9. Premier AAC Ecocare Construction Products Pvt. Ltd. Vijayvada 10. Siorex BG Shirke Group. Pune 11. Efcon PhoenixProcon Pvt.Ltd. Baula 12. Ekogreen EcogreenPvt. Gandinagar 13. Ecolite JVS Comastco Sinaar 14. BBEL Avanta Palval 17 23. A: However, it is difficult to replace old materials with new ones. Comparative analysis shows that in almost all parameters, AAC blocks have an excellent advantage over burnt clay bricks. The use of AAC blocks saves the total cost of the project; speeds up the construction process, reduced environmental and social impact. o It can therefore be concluded that the use of ACC blocks over burnt clay bricks is recommended. o It is recommended that developers, contractors and individuals promote this product because it is in the national interest. 18 24. «REFERENCES» o www.aacindia.com o www.indiamart.com o www.constructionworld.in o www.grihaindia.org,Report AtulKapur, HIL Upgrading India"s life spaces, February 26, 2013. o www.iosrjournals.org, Investigation of the use of Aerocon Unit and M-Sand in low cost construction HousingK.Jaiganesh 1, 1, o International Journal of Engineering Research and Technology (IJERT), burned clay bricks against Autoclaved Aerated concrete blocks. Comparative Analysis , Radhika Shukla, Architecture Department miET Nagpur University, Mumbai, India. about www.google.com/images/aeroconbricks. 19 25. CONTENT AND INTRODUCTION. THE IMPORTANCE OF AAC BRICKS. TYPES OF AAC BRICKS. THE CHARACTERS OF THE AAC BRICKS. MANUFACTURING PROCESS. COMPARISON OF BRICKS AND CLAY BRICKS. COST ANALYSIS. - AAC BRICKS IN INDIA. 26. CONCLUSION. Conclusion. autoclaved aerated concrete blocks project report pdf