Overview of Concrete Block Wall Construction without Mortar

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Abstract
Interlocking bricks masonry has gained rapid popularity in many foreign countries as an alternative to conventional bricks for sustainable housing. It is being always challenge for researchers to make interlocking brick with light weight material at low cost and improve the performance against aggressive environment. An experimental effort made in this concern. The results of an experimental investigation in which the compressive strength, water absorption and density were investigated by using varying percentage of fly ash, stone dust, and sand with different mix proportion. Mainly the weakest part of a masonry wall is the mortar joint, as the substitution of lime for aggregate reduces the overall strength of the joint. A manmade fibre, fly ash, glass fibre reinforce polymer (GFRP), scoria aggregates, EPS beads utilize as reinforcing material to produce the interlocking blocks which gives appreciable results discuss in detail. The experimental results compared with that ordinary brunt clay brick and interlocking brick found durable in aggressive environments and have sufficient strength for their use in sustainable building construction.

Keywords: light weight blocks, Interlocking blocks, concrete blocks, bonding

I. INTRODUCTION
Interlocking block masonry is one of the building system which almost full fills all the requirements of being a sustainable masonry. Interlocking blocks are made with locally available light weight material. This light weight & higher compressive strength it is possible to use this blocks in multistoried building compare to normal brick masonry. Light weight material like flyash cannot be easily disposable so it can be used as light weight material by replacing and reducing use of cement. And also for reducing price and increasing the strength many natural and manmade reinforcing material like, sisal, bamboo, coconut fibre, jute, used in the production of light weight blocks. Light weight concrete block having density less than 1800 Kg/m$^3$ and greater than 400 kg/m$^3$ which is much less than regular concrete block. Light weight concrete block having low weight, less amount of dead load and easy to place. So the overall cost of construction work with interlocking and light weight blocks reduces.

II. REVIEW OF LITERATURE
A. Abhinandan R. Gupta & Dr S.K.Deshmukh:
The study done and shown in this paper is on towards sustainability. The concept of interlocking brick and its strength parameters are checked by laboratory testing and computations method. When the comparison of interlocking brick wall with the normal brickwall, the strength and durability are more. Interlocking brick not only increases strength but also decreases the quantity of mortar required for bonding of wall units. Further the application of these type bricks used to reduce the material, reduction in environmental pollution. When the brick masonry wall is subjected to lateral forces, it fails due to shearing or overturning as the bonding is weak in horizontal directions.

B. Abhijitsinh parmar, Urvish Patel, Aditi parmar, Payal parmar, Avadh vaghasiya:
In this research they have tried to make a concrete having possible lesser density and higher compressive strength using waste and eco-friendly material like EPS beads, Rice Husk Ash, Fly Ash. These three materials are easily available in local market and easy to use. EPS beads replaced by coarse aggregates and fine aggregate is replaced with fly ash and rice husk ash. When in concrete mixes with EPS beads are sound and thermal insulation. With the help of these material the overall cost of the construction is reduced.
C. Ahmad Z., Othman S. Z., Md Yunus B., Mohamed A.: 

The masonry standard the compressive strength is basically dependent on factors such as the mortar strength and the relative values of unit and mortar strength. Interlocking brick has less use of mortar. Therefore there is a need to investigate the behaviour of masonry walls using interlocking bricks. In this study a series of tests have been conducted; physical properties and compressive strength of brick units given. The purpose of the experimental investigations is to obtain the analyse and the behaviour of masonry walls. The results showed that the brick is categorized as common brick. Interlocking brick wall have maximum compressive stress about 3.6N/mm².

D. Akeem Ayinde Raheem, Olugbenro Olusanjo Falola and Kehinde Joseph Adeyeye: 

The production and testing of lateritic interlocking blocks were examined. The experiments involved the production of 250 × 130 × 220 mm³ interlocking blocks with laterite samples obtained from Aroje, Idioro and Tewure using a locally fabricated manual steel mould and a 4.5 kg rammer. The blocks were tested in the laboratory. The blocks are water absorption and resistance to abrasion. The results indicated that all blocks are satisfied the minimum 28 day wet compressive strength of 1.0 N/mm² and that recommended by Road Research Institute.

E. Achal Garg, Harinder Yadav: 

This study is based on behaviour of interlocking blocks by using red mud for different variables. In this paper, the author is attempting to summarize the potential use of red mud in building materials of its utilization. The attention is to develop an extensive red mud form framework for building materials industry of India as it has great strength of reducing the cost of construction material & developing a low cost housing technique.

F. Bansal Deepak: 

The Indian masonry design standard (IS 1905-1987) does not deal with dry interlocking block masonry, hence does not prescribe the design values for this masonry like basic compressive strength, tensile strength & shear strength. This block masonry by Hydriform interlocking has been tested in the field. Experiment found to have better strength than the conventional brick masonry using cement sand mortar (1:6). The basic compressive strength is more than the minimum values given in the Indian masonry design standard (IS 1905-1987). These blocks have low exemplify energy compared to burnt clay brick. It is resulting in promotion of green construction technology. The paper gives the technical specifications and raw material options and many more with the building standards.

G. Carrasco, E. V. M., Mantilla, J. N. R., Espósito, T., Moreira, L. E.: 

This paper deals with technical assessment of the performance of walls constructed with interlocking bricks of iron ore by-products and cement under simple compressive loading. Three walls with dimensions of 150 cm width, 240 cm height and 15 cm thickness were built and tested. The first opening appear with a stress of 0.56 MPa, corresponding to only 3.8% of the rupture stress of the brick alone. Horizontal displacement was negligible in all the walls and buckling was not observed. Results showed high compressive strength of 14.57 MPa for bricks, 9.82 MPa of the prisms and 25.2 MPa of the mortar. The walls showed good mechanical strength of 2.05 MPa, which represents 14% of the brick strength. Deformations were high. And axial deformation modulus was of 420 MPa, which indicates a flexible behaviour of the wall. Although the wall is flexible, the fissuration stress is relatively high. Indicating excellent performance of the wall. Another very positive aspect is that this stress is only 13.6 % of the compressive strength of the wall and 1.9% of the brick, which indicates that there is a very large strength reserve.

H. Dr.N.Arunachalam, V.Mahesh, P.Dileepkumar, and V.Sounder: 

The study defines that compressive and tensile strengths of lightweight concrete of density 1700 kg/m³ to 1800 kg/m³ with different aluminium powder content. Based on an earlier investigation of the, cement to combined aggregate ratios of 1:6, 1:8, and 1:10 have been selected. Both sand and quarry dust have been tried as fine aggregate. Aluminium powder was added at 0.2% to 0.8% by weight of cement. For that the ultimate strength of LWC is of the range between 3N/mm² – 10.5N/mm² for different aluminium powder content. Addition of more than 0.2% of aluminium powder reduces the compressive strength effectively.

I. Khandaker M. Anwar Hossain: 

This study gives results of an investigation on the potential industrial utilization of volcanic scoria. The scoria is assessed for its utilization as a cement additive. Scoria specified as a light weight material. The utilization of scoria as a heat-insulating material is also tested and the results are also found to satisfy the ASTM requirements. Scoria concrete shows good heat-insulating. Scoria can be used as an energy saver.
This paper shows usage of Cellular Light-weight Concrete (CLWC) blocks gives a possible solution to building construction industry. An aim is made to study on cellular lightweight concrete blocks, and recommend as it can be used in construction industry.

### III. Conclusion

Among the papers that we studied half of them were light weight and other half were interlocking. Most of the people used glue instead of using mortar. If interlocking blocks are not light in weight they are difficult to place but if they are light in weight then they are easy to place. Even it has low maintenance. EPS beads and fly ash are easily available so they can be used as light weight material. Interlocking is not only effective in modern terms but in traditional way also. Use of interlocking concrete blocks the cost of labour is also negligible. With interlocking of concrete blocks we can improve the aesthetic view of building. And also the failure at joint is reduced.

### REFERENCES


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