IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 6, June 2021

DOI: 10.17148/IARJSET.2021.86159

"Construction of Walls with Self Interlocking Bricks"

Shubham Garad, Prathamesh Kadgi, Pratik Ahir, Shivam Khillare, Prof. Kiran Ghorpade

(Department of civil engineering /Trinity Academy of Engineering, Pune)

Abstract -With the increase in material costs in the construction industry, there is a need to find more cost saving alternatives so as to maintain the cost of constructing houses at prices affordable to clients. The worldwide housing shortage has stimulated a search for appropriate, easy, fast and cost-effective new ways of wall construction. A structural component need to be developed in masonry buildings construction is new interlocking mortar less concrete masonry blocks and a worldwide interest in the development of masonry of this type has taken place in recent years. The use of the mortarless interlocking block building system has not yet become popular in India even though this system has been used in other countries

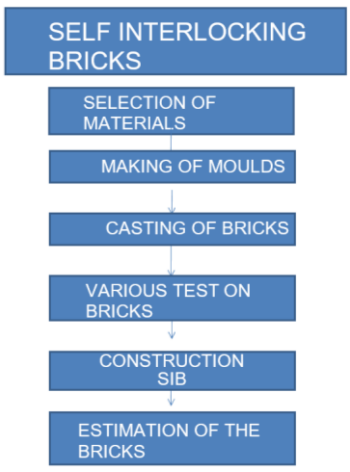
Keywords – Self Interlocking brick, High strength, Less in weight, More durable.

1. INTRODUCTION

The bricks which are locked against each other without use of cement mortar to form a structurally stable wall that reduces the cost and time of construction to almost half. At present there is a high demand for houses in India which is finding difficult to be fulfilled by builders and contractors adopting relatively slow construction practices leading to high construction cost. Thus there is demand for a product which can reduce construction cost and also increase the speed of construction without compromising quality and safety. Without compromising the quality and safety, the reduction in construction cost and speeding up the construction progress can be achieved by variety of ways, but we are concentrating on partitioning materials as partitioning of the space within the framed buildings is one of the major activity in the context of material requirement, speed & cost. Partitioning unit is costing around 40 to 45 % of the total construction cost. A fast & cost-effective alternative to conventional masonry used in partitioning work in buildings will be a great boon to the construction. So, through this project we are attempting to develop a product named "Self-Interlocking Bricks". It will be used in partitioning the space in framed buildings. It will not demand mortar for construction & plastering to conventional extent. It will reduce the material & labor cost of partitioning of space and will speed up the construction.These are the bricks which will interlock themselves when the masonry is under construction and will either not require any mortar to interlock the bricks in adjoining layers or will require very less mortar for the said purpose and also for finishing of surface by the way of plastering. These bricks will have inherent projecting parts, which fit exactly into depressions in the adjoin bricks placed aside, such that they are automatically aligned horizontally and vertically - thus bricklaying is possible without special masonry skills.Since the bricks can be laid dry, no mortar is required and a considerable amount of cement is saved.

2. METHODOLOGY

Following steps are followed for the methods of Bricks



IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 6, June 2021

DOI: 10.17148/IARJSET.2021.86159

❖ **Material Used –**

- **Terracotta**
- **Aerated Concrete**
- **Rice Husk**
- **Lime**
- **Fly ash**

❖ Terracotta - Terracotta is refractory clay product and sand is used in ornamental parts of Building. By varying iron oxide in clay, desired color can be obtained. The clay is mixed with powdered glasses, pottery and sand ground to fine powder pugged several times till gets uniform and soft for Molding. Terracotta is impervious, hard and cheap.

❖ Aerated Concrete - Aerated concrete is similar to foam concrete in properties and is used for the same purpose however it is simpler to manufacture and items form it have more stable quality than form foam concrete. In particular, these applies to their bulk density these are the chief advantages of Aerated concrete over for a concrete among the
main short comings of cellular concrete had high tendency to deformation shrinkage.

❖ Rice Husk - The cement-to-RHA ratio is generally 1: 4, by volume. Two types of bricks can be produced: white bricks, with a compressive strength of 4 N/mm, using ash (amorphous silica) from field kilns, burnt below 900°C black bricks, with a compressive strength of 1.4 N/mm, using boiler ash (crystalline silica), burnt up to 1200°C.

- **Test Performed on Brick**

1. **Compression Test**
2. **Absorption Test**
3. **Soundness Test**
4. **Hardness Test**
5. **Shape & Size**

Size of block: 650 x 245x185 in mm

=0.65 x 0.24 x 0.185 in m

Volume of block = LxBxH Vol. of block= 0·0294 cu.m
No. of blocks volume of concrete mould Volume of 1 block = 0.0294 Cu.m
No. of .Blocks =**35 NOS**

- **Tests Performed on Wall**
- 1. **Physical test**

Water absorption test

- 2. **Mechanical test**

Compressive test.

- 3. **Non-Destructive Testing Methods** – Rebound Hammer Test

Fig.no. 1 Interlocked Bricks

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 6, June 2021

DOI: 10.17148/IARJSET.2021.86159

Fig.no.2 Compression Test on Wall

Fig.no.3 Rebound Hammer Test

2. Site Visit to

Blocks Manufacturing Plant

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 6, June 2021

DOI: 10.17148/IARJSET.2021.86159

3. COSTING OF MATERIAL

Sr.no	Material	Rate(rs)	To be used
1	Cement	350	7 kg=210rs
2	Fly ash	1.8	360 kg=648rs
3	Lime	3.5	150 kg=525rs

4. RESULT

Point	Sand Brick	Concrete Brick	Self-Interlocking Brick
Time required for construction	More	More	Less
Strength of the brick	Medium	High	High
Overall cost	Average	Economical	Economical
Weight	Medium	Heavy	Light
Surface Finish	Rough	Rough	Smooth
Tools required	More	More	Less
Water Curing	More	More	Less

5. CONCLUSION

Without the need for high skilled masons (except for the base course), by saving cement (less mortar) and with the speed of construction, the building costs are lower than for standard masonry construction. Additional costs are saved by building load bearing walls, instead of infill walls between structural frameworks. The structural stability and durability of interlocking block constructions can be far greater than for comparable timber constructions. Grout holes and channel blocks provide means to insert steel reinforcements in vulnerable parts of buildings for increased wind and earthquake resistance. Interlocking blocks can be produced on a small scale on the building site (for self-help construction), or on a large scale in centralized production units. The interlocking block technique is suitable for the construction of multi-storied buildings, in the same way as for standard masonry constructions. Compared with conventional masonry, the dry assembly of interlocking blocks saves construction time and a large amount of mortar, which would otherwise be required for the horizontal and vertical joints.

6. REFERENCES

1. Development of an Innovative Interlock Blocks
T. Praveen Kumar, R. Vigneshvar Journal of Civil Engineering and Environmental Technology Print ISSN: 2349-8404; Online ISSN: 2349-879X; Volume 1, Number 5; August, 2014 pp. 114 – 118

2. Design Procedure for Semi Interlocking Masonry (Journal of Civil Engineering and Architecture 9 (2015) 517- 525 doi: 10.17265/1934-7359/2015.05.003)

3. Sustainable Dry Interlocking Block Masonry Construction BANSAL DEEPAK (Dy General Manager (Projects), HUDCO, Hudco Bhawan, Delhi 110003, INDIA), 15th International Brick and Block Masonry Conference, Florianópolis – Brazil – 2012

4. Development of Lightweight Cement Blocks Saya Ramakrishnan,
Swinburne University of Technology,4th International Conference on Structural Engineering and Construction Management 2013, Kandy, Sri LankaOverview of Concrete Block Wall Construction without Mortor
Abhijitsinh Parmar,
International Journal for Innovative Research in Science & Technology| Volume 3 | Issue 10 | March 2017 ISSN (online): 2349-6010

5. Study of a new Interlocking Stabilised Compressed earth masonary block
Prof.RuteEires, Prof.Thomas Sturm, Prof.AiresCamões
,Prof.Luís F. Ramos

6. Behaviour of Interlocking mortorless block masonry
M. S. Jaafar, A. H. Alwathaf, W. A. Thanoon, J. Noorzaei Proceedings of Institution of Civil Engineers Aug2016 issue CM-3 Pages 111-117)

7. Design Procedure for Semi Interlocking Masonry Yuri Totoev
Journal of Civil Engineering and Architecture 9 (2015) 517-525 doi: 10.17265/1934-7359/2015.05.003