A STUDY OF BRICK MASONARY AND CONCRETE BLOCK MASONARY

MAYUR KUMBHARE *1, KRUNAL GHATOLE*2

*1 Student , MITCOM Department, MIT-ADT University, Pune, Maharashtra, India

*2 Student , MITCOM Department, MIT-ADT University, Pune, Maharashtra, India

ABSTRACT

Economy and stability are the requisites of any structure. Best making is one who comes out with a creation which gives the stable and economic structure. In this paper an investigation on hollow concrete block masonry is carried out and a comparative study is executed with respect to brick masonry construction and strength factor, economy, light weight character and insulation property are study and compared. The strength of hollow concrete block masonry wall is less than brick masonry wall but cost of construction of former wall is very low.

KEYWORDS: Ordinary Portland Cement, Hollow Concrete Masonry Unit, Reinforced Concrete Wall, Hollow Concrete Masonry Block

I. INTRODUCTION

Highly hollow concrete masonry units (HCMU) are ever more commonly used in masonry construction. it granted the construction process itself to be accelerated, and work cost at the construction site to be reduced. hollow masonry units' lower natural weight of masonry constructions, improve outdoor properties of walls, such as sound and thermal insulation. while designing masonry constructions one of the critical mechanical features is compressive strength and deformations. mechanical properties of masonry to a great enhanced depend on constitution of masonry unit's construction, hollowness, type of materials and mortar of the bed joints. One of the basic requirements of human being to keep in the public is shelter. after the evolution of human being, the need of shelter means for safety arises. in ancient times, man started taking shelter in caves, excavated below ground level and under hanging mountain cliffs and this type of shelter just provided safe place from environmental extremities. the concept of stability and safety as per structural features of shelter were completely out of mind. with the development and maturity of human mind, man began to modify the structural formation of shelter so as to address the increasing needs and facilities which an optimum support design possessed

II. METHODOLOGY

- **Properties of cement**:

Ordinary Portland Cement (OPC), 53 grades shall be producer by intimately mix together calcareous and argillaceous and other silica, alumina or iron oxide bearing materials, ignition them at a clinkering temperature and grinding the resultant clinker so as to manufacture a cement capable of complying with this standard. None material shall be added after ignition, other than gypsum (natural mineral or chemical), water, performance improver, and not more than a total of 1.0 percent of air-entraining agents or other

broker including colouring agents, which have proved not to be harmful. ordinary Portland cement of 53 grade confirming to is 12269:2013.

- **Sand :**

sand used throughout the work settlement of plane river sand with maximum size 4.75mm confining to area ii as per is 383-1970 [3] with specific gravity of 2.6.

- **Coarse aggregate:**

Natural granite aggregates having fineness modulus of 7.18 and bulk solidity of 1618kg/m3. the specific gravity of coarse aggregate is 2.67. The flakiness and elongation indicates are 28 and 17% respectivel

- **Hollow concrete blocks**

Hollow concrete blocks of size (16x8x8) inch and (8x8x8) inch were used for manufaturing walls

- **Mortar**

Cement Sand Mortar as Used for Wall Masonry Were Made in The Standard Manner.

III . ANALYSIS / WORK OF CYCLE

i. In the absence of a concrete mixer-for hand mixing and shaping something of scoops and keeping them ready for transposition of mix to machine hopper tray.

ii. Deposition ready-for-use mix into hopper tray-taking back emptied scoop and returning to machine with a filled one.

iii. aliment mix from hopper tray to shape box, filling model complete (i.e. level to top of pour) and tamping with the mold tamper lid.

note :1 for blocks greater than 6" height, the mix is partly hand-tamped with the mold-half filled and then finished off with the tamper lid.

2. During tamping the lid-plate progressively enters the upbuild box on each ensuing tamping blow, normally the tamper lid should level up with the top of upbild box on the fourth or fifth tamping blow.

iv. inhaling the block, returning slide to loading posture (only after the molded block has been removed from the machine), cleaning the mold box walls and push top when necessary and placing a fresh wooden pallet each time into the mold box from a pallet-stack kept beside the machine.

v. selecting off the ejected block on the rsource wooden pallet as ejected from the mold and carrying it far to the curing place.

vi. The use of a concrete mixer will be a great oppurtunity when operating a number of machines simultaneously, depending on daily result.

vii. Some labor will be needed for removing the pallets from the other side of blocks previously molded and now sufficiently rough to permit separation of pallet, cleaning the pallets, keeping them cleaned pallets a wipe with an greasy rag and stacking them near the block making machine. thus, to keep the block making operation going, there must always be sufficient number of ready-for-use pallets on hand stacked near the machine.

IV. RESULTS AND DISCUSSION

- **Testing of individual hollow concrete block and brick units**

(a) The individual hollow concrete block and brick numbers were tested for compression under compressive testing machine and strength values are obtained and cross check and are shown.

(b) The average compressive or crushing strength for hollow concrete blocks of size (16"x8x8") and (8"x8x8") came out to be 33.2 kg/cm^2 and 27.09 kg/cm^2 respectively.

- **Testing of mortar**

(a) Mortar ratio 1:4 (cement: sand) was made and specimens of size (15x15x15) cm were casted and tested for compression after 28 days of curing as per is 4031 (part I) and the compressive strength values.

- **Testing of walls**

(a) Four hollow concrete block masonry walls and four brick masonry walls are constructed and tested after 28 days for compression and their strength values with geometrical parameters.

(b) permissible load values and observed load at failure for eight samples of walls.

- **Economy**

(a) Cost Per Cubic Meter of Brick Masonry Comes Out to be ₹.3875 And Cost Per Cubic Meter of Brick Masonry Comes Out to Be ₹.3290 only.

(b) The Cost of Block Walls Per Metre^3 Hollow Concrete Masonry Comes Out to be 17.78 % Less than that of Brick Walls. So, Block Masonry Is Economical Than Brick Masonry.

V. CONCLUSION

On the basis of results obtained, the conclusions are :

1. Compressive strength of brick units and brick masonry wall are more than compressive strength of hollow concrete block units and hollow concrete wall masonry.
2. Sound insulation quality of hollow concrete masonry is greater than that of brick masonry.

3. thermal insulation quality of hollow concrete masonry is greater than that of brick masonry due to presence of air in hollow concrete units.
4. The cost of block wall per metre^3 of masonry came out to be 17.78% less than that of brick walls. so, block masonry is economical than brick masonry.
5. Maintenance cost of hollow concrete block masonry is less than brick masonry because of efflorescence in brick masonry wall.
6. Hollow concrete block masonry is environmentally eco-friendly because in hollow concrete block unit's constituents can be substituted by waste products like fly ash.
7. Hollow concrete block masonry presents better architectural aspects as compared to brick masonry.
8. Hollow concrete masonry construction represents a faster construction system as compared to brick masonry construction.
9. Hollow concrete block masonry require less mortar than brick masonry because volume of joints is less in hollow concrete block masonry.
10. In case of brick masonry wall failure occurs by crack formation along one side face throughout the height of wall, while as in hollow block masonry failure generates by crushing of top layer only.
11. Factor of safety for hollow concrete block masonry is greater than brick masonry.

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