Comparative study between conventional bricks and AAC Blocks

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Abstract **- In this project we do practical comparison between conventional bricks and AAC blocks. We conducted various tests on conventional bricks and AAC blocks for locating out the properties of both bricks. The time required for construction with conventional bricks is more as compare to AAC blocks. Also, the price for multi storey building is increased. We will solve this problem using AAC blocks in multi storey buildings. Because AAC blocks are lighter in weight as compared with conventional bricks. During this project we take compressive test, water absorption test, weight comparison, labour required and price required for both bricks. AAC blocks are more economical for multi storey building because they required less quantity of steel due to less weight. Due to AAC blocks the cost construction reduces by 20% as reduction of dead load of wall. The need of materials like sand and cement is also reduces by 50% by using AAC block. AAC blocks are 3 times lighter than conventional brick. AAC block cover more area in less weight of conventional bricks.**

Index Terms **- AAC block, Cost, Compressive strength Density, Traditional bricks, Water absorption etc**

I.INTRODUCTION

1.1 Problem Statement

Comparison between conventional brick and AAC Block with respect to cost, time, weight, compressive strength and water absorption etc.

1.2 Objectives

- To study how AAC blocks are helpful in green housing.
- To study practical on the basis of time consumption of construction between conventional bricks and AAC blocks.
- To study the economical, constructional, and structural difference between the structures using above two constructional materials.

II. METHODOLOGY

2.1 Sample collection

- We collected three conventional bricks of size 0.19*0.09*0.09m.
- Also three samples of AAC blocks of sizes 0.6*0.19*0.15m were collected.

2.2 Water absorption test

- Put the brick in oven at temperature 105ºC-115ºC.
- Cool the brick to normal room temperature and take its weight (w1)
- Sink completely dried brick in water at temperature of 27ºC for 24 hrs
- Remove the brick from water and put it in gunny bag then take weight of brick as (w2).
- A brick with water absorption of < 7% provide better resistance to damage by freezing.

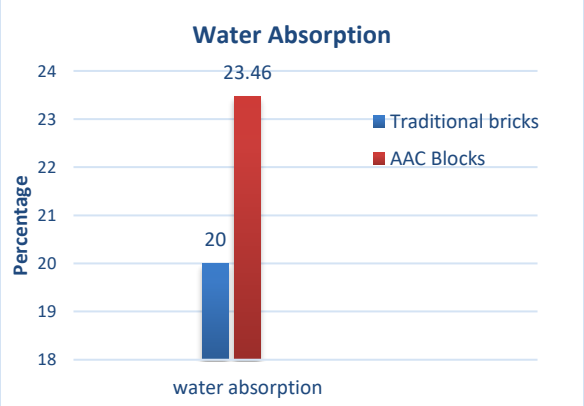

Fig.1 Water absorption

2.3 Compressive strength test

- Place the brick in compression testing machine (CTM) in such way that the load shall be applied to the opposite side of the brick.
- Align the brick centrally on the base plate of the machine.

- Rotate the movable portion gently by hand so that it touches top surface of the brick.
- Apply the load gradually which should be without shock and continuously at the rate of 140kg/cm2.
- Record the maximum load and note any unusual features in the type of the failure.

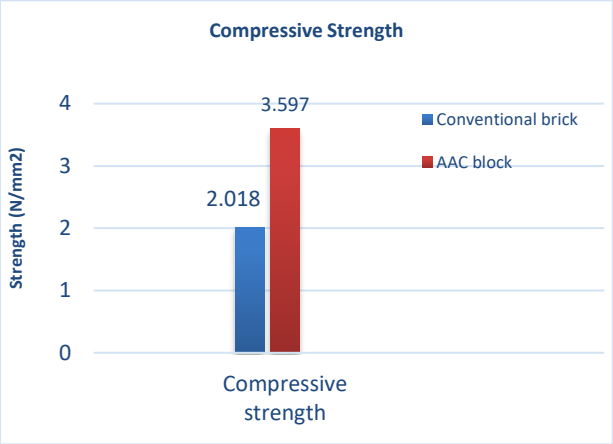

Fig.2 compressive strength

2.4 Weight comparison

- The dimensions of AAC block is 0.6m*0.19m*0.15m.
- The average weight of AAC block is 13kg.
- To construct similar sized constructon,10conventional bricks were required.
- We used mortar of grade 1:6
- The total weight of conventional brick construction similar to size of AAC block is 35.260kg.
- It means the conventional brick construction similar to AAC block size is 2.712 times heavier than AAC block.

Fig.3 weight comparison

2.5 Dry density

- Dry the brick in a oven at temperature of 105-115 degree Celsius till it attain substantially constant mass.
- Then cool the brick in room temperature and record the weight as W.
- After measure the dimension of brick and calculate the volume.
- Now calculate the dry density by the formula weight/volume.

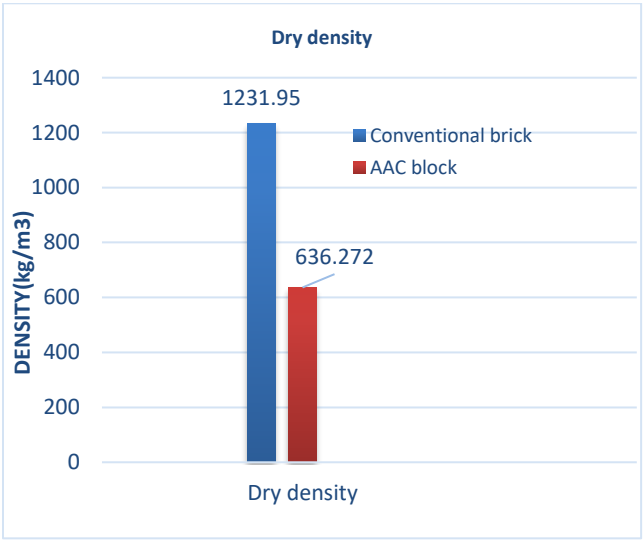

Fig.4 Dry density

III. CALCULATION FOR DENSITY OF AAC BLOCK MASONRY

Weight of AAC block with chemical = 12.765 kg
Size of AAC block sample = 0.6*0.19*0.15m
∴ Density AAC block masonry =12.765/0.6*0.19*0.15
= 746.491 kg/m3

Fig. 5 Chemical applied AAC block

IV.COMPARATIVE RESULTS FOR TESTS CONDUCTED

Sr.No.	Test conducted	Traditional brick	AAC block
1.	Water absorption	20%	23.461%
2.	Compressive strength	2.875N/mm^2	3.597N/mm^2
3.	Dry density	1293.047kg/m^3	760.233kg/m^3
4.	Weight comparison	2.58 kg	13 kg
5.	Total cost	15527rs.	7383rs.

V.COMPARATIVE COST RESULTS

Activity conducted	Conventional brick	AAC block
Size of wall	4*8ft	4*8ft
Labors required	3 persons	2 person
Wages of labor	300rs.	300rs.
Time required	3hrs.	1.30 hrs.
Material required	Bricks=1288nos. Sand=70 boards Cement=2bags	Bricks=43nos. 25 kg chemical bag=3nos. 40kg chemical bag=4 nos.
Weight of brick	2.58 kg	13 kg
Cost of brick	7 Rs.	80 rs.
The total cost for construction	15527rs.	7383rs.

VI.CONCLUSION

1. The use of AAC block reduces the overall cost of project. By using AAC block it is possible to speed up the construction process.
2. The compressive test of AAC block is more than traditional clay brick.
3. The dry density of AAC block is nearly ½ of traditional clay bricks.
4. It helps in reducing dead load of structure. Due to less dead load by AAC block less reinforcement require in beam and column which makes beam and column comparatively lighter member.
5. AAC is manufactured from common natural raw materials, therefore it is efficient and ecofriendly. Therefore, we can use AAC block instead of traditional clay brick in multistorey buildings.

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