

Performance of AAC Block

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Abstract- Dependability assumes an imperative part yet Economy of structure is one of the essential angle whereupon any plan is based be that as it may, best planner is one who turns out with an outline which gives the steady and financial structure the advancement of development innovation is firmly identified with the improvement of satisfactory automation and dealing with innovation. AAC square is an imperative expansion to the kinds of brick work units accessible to the developer and its utilization for stone work is continually increments. This undertaking is an investigation of development of AAC piece workmanship utilized as a part of structure and correlation of the structure built with AAC square and conventional blocks. Likewise think about the advantage and issues looked amid usage of AAC square and recommended results. This will help developers to value the essential constructional points of interest and receive AAC piece brick work in a vast scale wherever it is valuable.

Index Terms- Autoclaved aerated concrete, Masonry brick, cement.

I. INTRODUCTION

AN ISO 9001:2008 CERTIFIED COMPANY AAC Blocks, however to a great extent new to numerous parts of INDIA, it's not another building material. It was created in Sweden in 1922, because of expanding requests of timber supplies. AAC is light weight building stone, included all regular crude materials. AAC piece is utilized as a part of an extensive variety of business, modern and private application and has been being used in Europe more than 90 years, the center east for as far back as 40 years and in America and Australia for a long time. It's a gauge that AAC now represent more than 40% of all development in UK and over 60% of development in Germany. In INDIA generation of AAC: Block began in 1972.

AAC is a light weight, high quality building material and is created in an assortment of structures from hinders, to structure floors and divider boards. Autoclaved circulated air through cement or AAC, is solid that has been made to contain bunches of shut

air pockets. Lightweight and decently vitality proficient, it is delivered by adding a frothing operator to concrete in a shape, at that point wire cutting pieces or boards from the subsequent 'cake' and cooking them with steam (autoclaving) It has directed encapsulated vitality content and performs well as warm and sound protection, because of the circulated air through structure of the material and its extraordinary mix of warm protection and warm mass. It is light, does not consume, is an amazing fire AAC generally simple to work with, and can be cut and molded with hand devices including carpentry devices. AAC moderately simple to work with, and can be cut and formed with hand instruments including carpentry apparatuses. Pieces are made to exceptionally demanding measurements and are generally laid in thin-bed mortar that is connected with a toothed trowel, albeit more ordinary thick-bed mortar can be utilized Wall boards are story stature, fortified and mechanically settled AAC can likewise be utilized as a part of board frame for floor and rooftop development. It has a long life and does not create poisonous gases after it has been set up.

II. MATERIAL & METHODOLOGY

FLY ASH OR SAND

Key element for assembling Autoclaved Aerated Concrete (AAC) squares is silica rich material like Fly Ash, Pond Ash or Sand. The vast majority of the AAC organizations in India utilize Fly Ash to Manufacture AAC Blocks. Fly slag is blended with water to shape fly cinder slurry. Slurry in this way shaped is blended with different fixings like lime powder, bond, gypsum and aluminum powder in amounts predictable with the formula. On the other hand sand can likewise be utilized to fabricate AAC pieces. A 'wet' ball process finely crushes sand with water changing over it into sand slurry. Sand slurry is blended with different fixings simply like fly fiery remains slurry.

LIMESTONE POWDER

Lime powder required for AAC creation is acquired either by pounding limestone to fine powder at AAC production line or by straightforwardly obtaining it in powder shape from a seller. In spite of the fact that obtaining lime powder may be minimal exorbitant, numerous producers choose it instead of putting resources into lime squashing Equipment Like Ball M Jaw Crusher, Bucket Elevators, and so on. Lim powder is put away in storehouses manufactured from mellow steel (MS) or fabricated utilizing block and cement depending of individual inclinations.

CEMENT

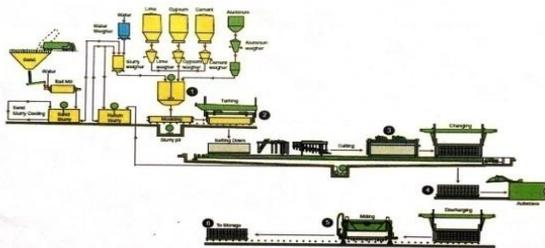
53-review Ordinary Portland Cement (OPC) from rumored maker is required for t fabricating AAC squares. Concrete provided by smaller than usual plants' isn't prescribed because of intense varieties in quality over various bunches. Some AAC industrial facilities may design their hostage concrete preparing units in that capacity a unit can create bond and also process lime. Such industrial facilities can settle on 'real plant' clinker and fabricate their own concrete for AAC generation. Bond is generally put away in storehouses.

GYP SUM

Gypsum is easily available in the market and is used in powder form. It is stored in silos.

ALUMINUMS POWDER/PASTE

Aluminium powder paste is easily available from various manufacturers. As very small quantity of Aluminium powder paste is required to be added to the mixture, it is usually weighed manually and added to the mixing unit.



Autoclaved circulated air through solid (AA is produced using silica sand, lime, cement and water, to which a growing operator is included. The AAC producing process begins when the sand is ground to

the required fineness in a ball process. Crude materials are then naturally weighed and estimated in the blender alongside water and an aluminum glue (the growing operator). Subsequent to blending, the slurry is filled metal forms in which the extending operator responds with alternate components. The blending brings about a compound response that extends the blend to frame little, finely scattered air spaces. The molds are sent to a pre-curing space for a few hours. At that point the semi-strong material is transported to the cutting machine. The cutting machine cuts the molds, utilizing steel wires, into the size required for the building components. The items homogeneity joined with our high accuracy cutting innovation, brings about pieces with dimensional resiliences of 1/16" the last stage in the generation procedure is steam weight curing in autoclaves for up to 12 hours. Square, boards and other AAC components are expelled from the autoclave, bundled and sent to the completed item stockpiling, AAC strengthened components, for example, piece boards, divider boards, and lintels contain steel support work that is dealt with for consumption with a water based acrylic, at that point set in the form before the slurry is included. The assembling procedure is then the same as depicted above for unreinforced components.

BATCHING, MIXING, CASTING

Coal fly ash will be sent to electronic scale in the batching building by pump at the bottom slurry tank to be measured When the slurry concentration arrives at batching requirement, the control system will turn of the pump to stop pump slurry. The measured slurry will be directly discharged into casting mixer. Lime and cement will be sent to electronic scale in the batching building by single screw conveyer at the bottom of their silos. When measuring arrives at the required quantity, they will be sent to casting mixer by screw conveyer. Aluminum powder will be measured by manual, and added intoaluminum mixer to be prepared suspending liquid one by one for each mould. The finished suspending liquid can be directly added into the casting mi The slurry temperature should be arrived at required process temperature before casting. And mould will be moved to the bottom of the casting mixer by ferry car.

AUTOCLAVED AND FINISHED



III. RESULT ANALYSIS

- 3.1. Water Absorption Test
- 3.2. Comparative Strength Test
- 3.3. Sound Acoustic Test
- 3.4. Fire Resistance Test
- 3.5. Thermal Conductivity

3.1 COMPRESSIVE STRENGTH TEST

Aim: To determine compressive strength of AAC blocks, ordinary brick and fly ash brick.

Apparatus: Compressive testing machine, Weight balance, AAC Blocks, Ordinary brick, Fly-ash brick.

Procedure: Compressive strength of AAC is an important parameter in construction and design. Compressive strength tests were carried out by applying axial load on AAC cubes. For this test AAC cubes were cut into desired dimensions by using cutting machine. Load is applied until the crack in the specimen occurs.



ORDINARY BRICK

SR. NO.	L (cm.)	B (cm.)	H (cm.)	AREA (cm ²)	LOAD (KN)	COMP. STRENGTH (N/mm ²)	AVG. STRENGTH (N/mm ²)
1	22.4	10	7.9	224	101.1	4.5	4.8
2	21.7	10	7.9	217	73.6	3.3	
3	22.6	9.2	7.9	207.9	138.3	6.6	

RESULT:

Compressive strength of AAC blocks = 6.10(N/mm²)
 Compressive strength of ordinary brick = 4.8(N/mm²)
 Compressive strength of fly-ash brick = 7.7(N/mm²)

CONCLUSION:

By performing this practical we can find the Compressive strength of AAC block, ordinary brick and Fly ash brick as 6.1 N/mm² 4.8 N/mm² & 7 N/mm² respectively.

By comparing this result we can found that the Compressive strength of Fly ash brick is highest as 7.7 N/mm²

As per Is 2185-3 (1984) pg no. 7 (for AAC block), AAC block of dry density between 751- 850 Kg/m³ & compressive strength up to 6 N/mm² comes in grade I category.

3.2 FIRE RESISTANCE TEST

Aim: To determine Fire Resistance Test for AAC Block

Apparatus: Fire resistance test apparatus, 50x50x50 mm AAC block

Procedure:



Fire resistance test was done to find out effects of fire on the properties of AAC. Test was done on 50x50x50 mm cubes at six different temperatures. These temperatures were fixed to be 100° 300°C. 500°C, 700°C, 900°C and 1000°C, and were on the electrical muffle furnace. Three AAC samples were tested for each temperature.

AAC blocks were cut by using a cutting machine: all the blocks were dried at temperature of 60 C for the period of three days by using electrical oven. Each of the three samples selected for testing should be faced to desired temperature inside the oven for 30 minutes. Each sample was weighted before and after testing for determining effect of fire on the weight loss of AAC blocks. After fire resistance test, compressive strength of the sample was determined to detect effect of fire on strength properties of AAC blocks.

IV. COMPARISON

NO	PARTICULARS	AAC BLOCK	CLAY BRICK
1	SIZE(L*H*B)	(650*250*75-300)mm	(230*750*115)mm
2	Precision in size	Variation 1(+/-)	Variation 2.15(+/-)
3	Dry Density	550-650 kg/m ³	1800 kg/m ³
4	Fire resistance	2 to 6 hr depending on thickness	2 hr
5	Compressive strength	3-4.0 N/mm ² (As per IS:2185 part III)	2.5-3 N/mm ²
6	Sound reduction index(dB)	45 TO 200mm thick wall	50 for 230 mm thick wall
7	Thermal conductivity	0.16	0.81
8	Mortar consumption With 1:6	0.5 bag of cement	1.35 bag of cement
9	Construction Tamper Mason	30 sq. m	20sq. m
10	Contribution to carpet area	3-5%	No contribution

V. CONCLUSION

Experiment performed in order to investigate the physical and mechanical properties of AAC block during study on AAC blocks properties and thus a concluded that properties like compressive strength, fire resistivity, sound insulation, thermal insulation is higher compared to brick And on working on the particular building mason work concluded that the overall cost is reduced to 33% on use of AAC block.

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