

A Detail Study on Autoclave Aerated Concrete

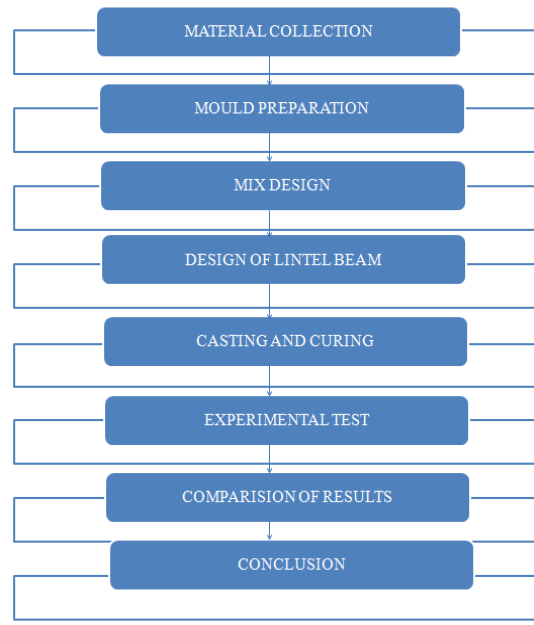
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Abstract: The transformation from natural soil to innovative material in the field of masonry construction has shown the day to day progress in engineering technology. In addition, global warming also has its own growth where construction industry remains the main reason behind the peak depletion of the top soil. Rise in urbanization, privatization, deforestation, pollution etc..These are the factors that lead to natural extinction. Such scenario affects the livelihood of construction industry in case of quality, cost and its own worthiness. To overcome the sarcastic outcome, an innovative material is developed – AAC blocks. Autoclaved aerated blocks are the new creation which play a vital role in making a globalized earth. This innovation focuses on Eco friendliness and directs a path to sustainable development. It also satisfies the rules of 3R's reduce, recycle and reuse. In this journal the basic experimental test was conducted.

KeyWords: Autoclaved aerated concrete, compressive strength, flexure strength, pull out test.

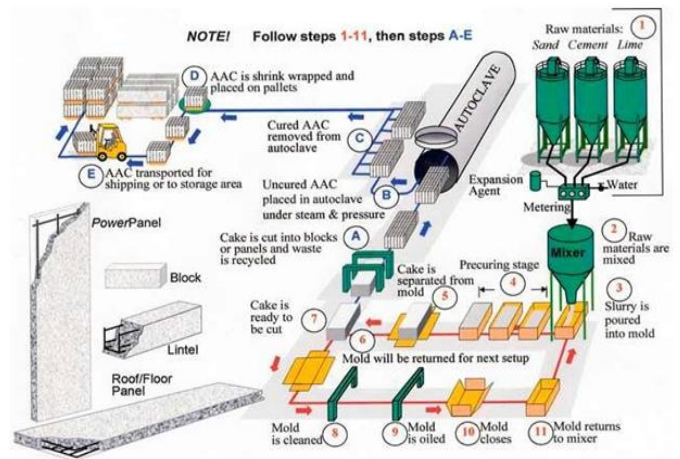


1. INTRODUCTION

AAC stands for Autoclaved Aerated Concrete. It was invented in early 1920 s by a Swedish architect named Dr. Johan Axel Eriksson. AAC is manufactured by a process that involves slurry preparation, foaming /rising, cutting, and steam curing (autoclaving). The raw materials of the AAC block is fly ash, cement, aluminum powder, gypsum, lime. and water. Bigger size leads to faster laying at site. Reduced weight translates to reduced dead-weight on structure and higher thermal insulation.

1.1 MANUFACTURING PROCESS

The autoclaved aerated concrete production process differs slightly between individual production plants but the principles are similar. Portland cement, lime, gypsum, aluminum powder is mixed to form slurry. The slurry is poured into the moulds. Over a period of several hours, two processes occur simultaneously.



2. METHODOLOGY

2.1 ADVANTAGES OF AAC BLOCKS

- High fire insulation
- High strength, easily transport and use.
- It reduces almost by 50% mortar used in bricks.
- These bricks do not require soaking in water for 24 hours. Sprinkling of water before use is enough.

3 EXPERIMENTAL TESTS

WATER ABSORPTION TEST

Water absorption test was conducted at the AAC blocks of 4" and 6" as shown in table 1.

Table 1 Water absorption Test for AAC blocks

S.No	Days	AC Blocks (4") (%water absorbed)	AC Blocks (6") (%water absorbed)
1	3	33.23	18.6
2	7	28.54	20.27
3	14	23.32	22.4
4	28	20.22	19.67

COMPRESSIVE STRENGTH TEST

Compressive strength test was conducted for 200X 200 specimen shown in table 2.

Table 2 Compressive strength of AAC blocks

S.NO	Size of Specimen (mm)	Max Load (kN)	Compressive strength (N/mm ²)
1	200X200	147	3.64
2	200X200	162	3.72
3	200X200	153	4
Average			3.78

FLEXURAL STRENGTH TEST

Flexural strength test was conducted at the AAC blocks of specimen of 600X200X200 as shown in table 3.

Table 3 Flexural Strength for 8" Blocks

S.NO	Size of Specimen (mm)	Max Load (kN)	flexural strength (N/mm ²)
1	600x200x200	65	0.72
2	600x200x200	63	0.7
3	600x200x200	59	0.65
Average			0.69

PULLOUT TEST

The test results of pull out test using 8mm, 12mm and 16mm diameter bars are shown in fig 4,5,6 respectively.

Table 4 Pull out Test with 8mm Dia of bar

S.No	Size of Bars	Pull out Load (kN)
1	8mm	4.5
2		4.0
3		3.5
4		4.5
5		5.0
6		4.0
7		4.5
Average		4.285

Table 5 Pull out Test with 12mm Dia of bar

S.No	Size of Bars	Pull out Load (kN)
1	12mm	6.5
2		5.5
3		5.0
4		6.0
5		5.5
6		6.5
7		6.0
Average		5.857

Table 6 Pull out Test with 16mm Dia of bar

S.No	Size of Bars	Pull out Load (kN)
1	16mm	7.0
2		4.5
3		8.5
4		5.0
5		8.5
6		4.5
7		8.0
Average		6.572

LIME TEST

Table 7 Lime Test Report (Temperature)

S.NO	TIME IN MINUTES	TEMPERATURE In°C
1	0	21
2	5	29
3	10	32

4	15	39
5	20	45
6	30	61

CONCLUSION

Aerated light weight concrete is unlike conventional concrete due to some mix materials and properties.

Several advantages in AAC blocks are decrease structural elements and reduce the bearing capacity.

In this study the material properties and mechanical properties of AAC blocks were investigated.

1. From the literature studies I learned how to increase the bond strength and flexural strength in AAC and in the future I will use AAC as a flexural member like beams.
2. In future study carried out the Durability test for Autoclaved Aerated Concrete (AAC) Blocks.
3. The Experimental test is carried out for beams to examine the flexural strength of AAC beams.

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BIOGRAPHY



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