

Replacement of Brick Masonry Using Eps Core Panels

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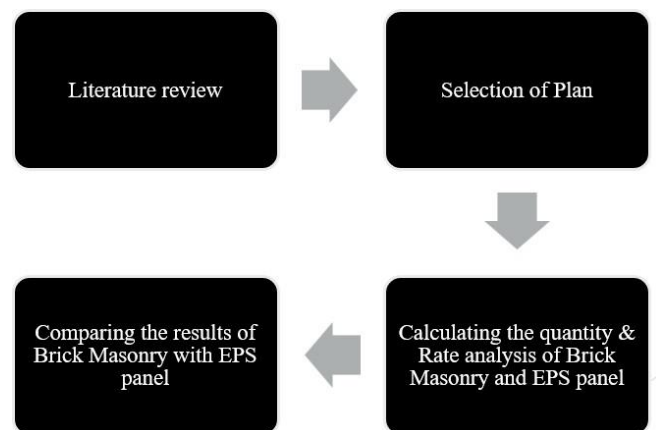
Abstract - The situation involving developing countries in Asia particularly India is not an exception, as it experiences the phenomenon of a rapidly growing middle class that demands more housing. The resultant increased need for faster and cheaper methods of construction has led to the adoption of innovative techniques aimed at reducing cost of constructions and producing affordable housing. This method has several advantages when compared to the traditional in-situ construction such as reduced risk of theft, consistent supply of labor. An example of advanced building material is Expanded Poly-Styrene (EPS). It highlights the advantages associated with using EPS vis-à-vis conventional building materials like bricks in reinforced concrete structure. In terms of material, time and labor, EPS is found to be a more cost-effective option. Additionally, it saves significant time when compared to brick infill material. By incorporating advanced materials such as EPS into construction one can achieve sustainable development objectives while promoting green technology.

Key Word : Expanded polystyrene (EPS), Green technology, Cost Effective, Affordable.

1.INTRODUCTION

Modern cost-effective construction system is the EPS core Panel. These panels can act as non-load-bearing elements and load-bearing ones. It's a 3D panel that is made up of a welded wire space frame with polystyrene insulation core. The panel is placed and then shotcrete on both sides of the panel. They are built from EPS panels which are made of welded wire space frames based on trusses, for stress transfer and stiffness provision. This design guarantees the structure's strength and stability. The EPS panel consists of high tensile wires welded reinforcing meshes and self-extinguishing expanded polystyrene. The factory manufactures these parts which are later assembled at site. Shotcrete adds supporting capacity to the plate. Welded mesh fabric is used to firmly tie down and pin the steel wire truss through the polystyrene material, whereas it is tilted for extra support. This creative fusion creates a spatial framework preventing any shift in the polystyrene core, thus ensuring rigidity as well.

2. METHODOLOGY :



2.1 Componentes of EPS Panel

- The outer layer of shotcrete.
- Welded reinforcing mesh of high wire.
- The core of expanded polystyrene sheet.
- Diagonal wire (stainless or galvanized wire).
- The inner layer of shotcrete.

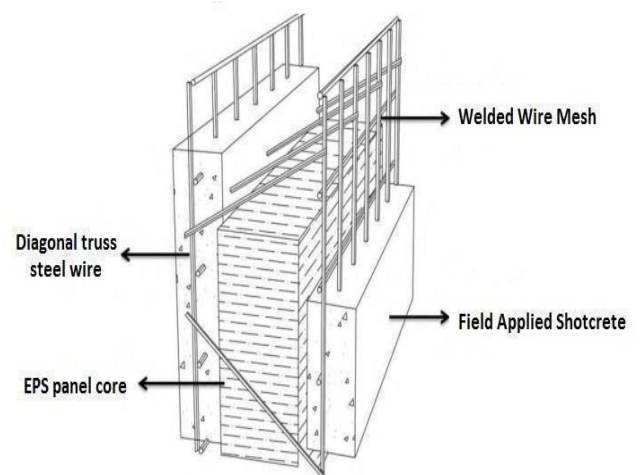


Fig -1: Components of EPS Panel

2.2 Methodology includes :

1. Typical Building plan
2. Calculation of brick masonry
3. Calculation of EPS panel
4. Comparing the result

Table 1 : Details of Proposed building included for the study

Type of building	Residential
Total floor area	135.77 m ²
Type of structure	Framed structure

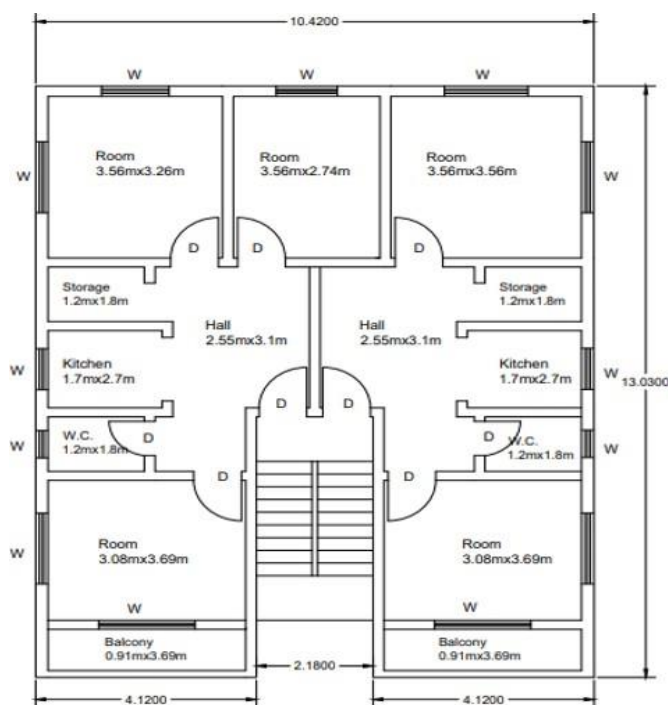


Fig 2 : Building Plan

Table 2 :

Sr. No.	Description	Unit	Amount
1	Brick masonry (including Plastering.)	m ³	8195.62 Rs
2	Expanded polystyrene panel (EPS) including shotcrete	m ³	4864.88 Rs

Result & Discussion :

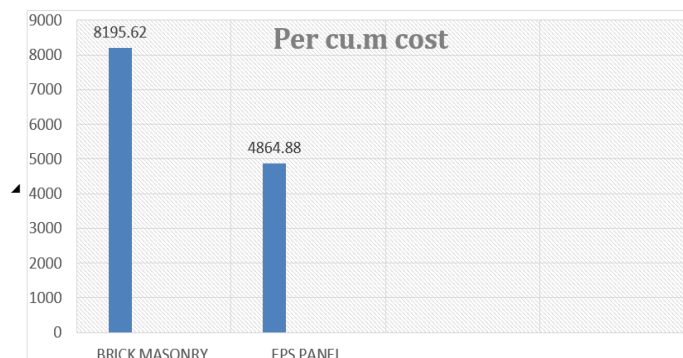


Fig 3 : Results graph

- After carrying rate analysis EPS panel is 30-35% cheaper than the conventional brick masonry
- Construction cost and labour cost can be reduced, as EPS panels are light in weight eliminating the need for heavy equipment
- The use of EPS panels ensures strength, durability and moisture resistance.
- By using EPS panel system the carpet area gets increased because width of the panels are less than that of conventional brick masonry.

3. CONCLUSIONS

- EPS core panel system is a modern, efficient, safe and economic construction system for the construction of buildings.
- EPS panel system requires less labours and it also reduces construction time.
- EPS core panel system positively contributes to the green-building approach.
- The EPS technology can be used as independent construction system or to combine with reinforced concrete skeleton system and act as an isolated wall element.

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