

# **Analysis of Thin-walled elements using Expanded Polystyrene (EPS) Core Systems in Multi-storied Buildings**

## **ABSTRACT**

Due to rapid growth of urbanization & migration of the people, the demand for housing sector especially for Economical Weaker Section (EWS), Mid Income Group (MIG) & Low-Income Group (LIG) segment of population is growing faster. Traditional burnt bricks, quarry stones, timber, and corrugated iron sheets remain the most commonly used conventional construction materials. Recent days the environmental related issue is been faced largely used to conventional materials, hence there is need of the alternate material which will be strong, durable, energy saving, cost effective, time saving & much more sustainable form of material which can be used along with the traditional material used for construction. To overcome with such problem many advanced construction material & technologies is been developed around the world. One such advanced construction material is called as Expanded Poly-Styrene (EPS). EPS buildings are fast to construct, cost saving and have thermal characteristics that are suitable for areas with extreme weather conditions. This type of an advanced material can be thought of viable substitute to achieve a goal of sustainable construction & to promote a green technology. In this project, we will be analysing the critical EPS wall of a complete structure for different load combinations as per IS 456:2000 for a G+5 residential building. G+5 model was analysed for its structural stability and designed for beam and column sizes using ETABS for Hyderabad region. From the designed sizes, complete EPS wall structure was analysed for longest wall (on top floor) in the structure with wind loads as pressure using ANSYS. EPS sandwich wall has different elements such as EPS, mesh, cross bars and shotcrete. Deflection and stress were compared for normal brick solid wall and EPS sandwich solid wall for Hyderabad location. Also, 3 additional cases were analysed for Hyderabad, Chennai and Bangalore regions.

Different cases for the EPS sandwich wall to study stiffness are as listed below:

1. Wall with door opening
2. Wall with door and window opening
3. Wall with ventilator opening

Observed that from the complete analysis of various studies solid wall which is located in Chennai region undergoes maximum deflection.

**Keywords:** EPS, ANSYS, STAAD, Multi-storeyed Building, Stiffness