

**STRUCTURAL PERFORMANCES OF EXPANDED POLYSTYRENE  
LIGHTWEIGHT CONCRETE (EPS-LWC) WALL PANEL WITH  
DIFFERENT OPENING CONFIGURATIONS**

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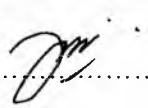
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## ABSTRACT

This study investigates the structural performances of Expanded Polystyrene Lightweight Concrete (EPS-LWC) wall panel with different opening configurations under axial load. Opening in wall panel is importance in the form of windows, doors or as a ventilation purposes. EPS is chosen as the lightweight aggregate because it offers advantages in terms of energy absorbing capacity which suitable for high impact structure like shear wall. Since it is understood that the lightweight concrete will have strength reduction, steel fabric reinforcement is used to strengthen the wall panel structure. Steel fibre has been also added to this structure to improve the lightweight concrete strength. The compressive strength obtained for EPS-LWC wall panel in this study is  $20.87 \text{ N/mm}^2$  and the density is  $1900 \text{ kg/m}^3$ . Two (2) different opening locations have been set and the structural performances are compared. The opening configurations are chosen to investigate the deep beam effect at the top and base end of EPS-LWC wall panel. The loading capacities obtained are  $477.70 \text{ kN}$  and  $463.70 \text{ kN}$  for each opening location. EPS-LWC wall panel has set to have pinned-fixed end conditions. Both EPS-LWC wall panel samples deformed in single curvature profile. For a wall with slenderness ratio of 13.33 the EPS-LWC is classified as short wall and had experienced crush failure. Maximum displacement recorded is  $1.45 \text{ mm}$  and  $1.18 \text{ mm}$  for each sample. It could be observed that there are several hairline cracks occurred at the top left of opening edge and propagated towards the EPS-LWC wall panel edges.

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