

# **FINITE ELEMENT ANALYSIS OF WIRE FABRIC REINFORCED CONCRETE LOAD-BEARING WALL UNDER AXIAL LOADING**

By

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## DECLARATION

I Siti Saharah Bt. Zainal Abidin, 2005613293 confirm that the work is my own and that appropriate credit has been given where reference has been made to the work of others.



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## ABSTRACT

The interaction of intersecting load-bearing walls subjected to axial loading can occur by force transfer through their common interface. In conventional building construction method, wall is less use as the load-bearing elements rather than the space divider. But today the use of clay brick or sand brick wall has been changed by the concrete wall panels because the wall is not only design as the space divider but also as the structural elements for the building as well as beams, columns and slabs. Wire mesh reinforced concrete wall panel is the new method currently used to replace the conventional wall.

However since this current practice is still new in Malaysia, there is a need to conduct a study to ensure the reliability and safety of the wall panel. Besides that, there is insufficient research conducted to study this new construction practice. Thus this research will focus on the understanding of the structural behaviour of the wall panel and also the deflection and maximum strength that occur at the wire fabric reinforced concrete wall panel under axial loading.

This research used Finite Element Method computer program LUSAS 14.0 as a tool to analyze the wall panel. This finite element analysis design the 3-D model of wire mesh reinforced concrete wall panel of wire mesh type B10 with a size of 150x3000x3000 mm (Width:Length:Height). The wall panel will be analyzing under axial loading (without eccentricity). The wall panel is constructed in full scale. Besides that, the boundary condition is assumed as pinned at both top and bottom of the wall panel. This model assigned assigning concrete Grade C30 (BS8110: 1997) and strength characteristic,  $f_y = 485 \text{ N/mm}^2$  for the wire fabric reinforcement.

The ultimate load acquired from the analysis is equal to 1187.81kN and the maximum lateral displacement equal to 1.000 mm. Referring to the theoretical value of the ultimate load for the wall panel taken from BS8110 using the equation is equal to 1700kN. The comparison value between the ultimate load from BS 8110 and the analysis seems that the result obtained from the analysis less than theoretical about 30.13%. The result show that the maximum lateral deflection is lies at the middle height of the wall panel. Through this research, the structural behavior of wire fabric reinforced concrete wall under axial loading (without eccentricity) was successful to analyze using finite element analysis and the result obtained from the analysis can explain the structural behavior of the wall panel.

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