

**UNIVERSITI TEKNOLOGI MARA**

**ANALYSIS ON WIRE MESH REINFORCED  
CONCRETE WALL WITH OPENING**

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## DECLARATION

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## ABSTRACT

Over the years, reinforced concrete walls have gained greater acceptance from many countries in conjunction with the Industrialized Building System (IBS) introduced. Essentially, the system gives an advantaged in reducing the dependency of foreign labour and a better investment in technologies, techniques and processes of construction.

Wire fabric reinforced concrete wall panel has been used in Malaysia in the past few years and still a new construction method. This type of wall may require sequential analysis in making an effective product that gives advantages in all aspects and gives better performance. This research paper analyzes the wire mesh reinforced concrete wall panel with opening in a full-scale model by using a finite element computer program.

The analysis of the wall panel model yielded from the computer program LUSAS of version 13.6 by using a 3-dimensional model of the wall panel. It was modeled as a double layer wire mesh reinforced in the 75 x 3000 x 3000 mm (Width:Length:Height) size of the wall with opening of 1200mm x 1200mm in the middle of the wall. Material properties used are Grade C30 for normal weight concrete and the minimum yield strength of the wire mesh is 485 N/mm<sup>2</sup>. The wall panel analyzed under direct compressive axial load acting directly in the middle of the wall (without eccentricity) with pinned support at the top and bottom of the wall model.

The analysis shows that the wall panel failed by crushing because of the slenderness ratio of the wall is 20. If the panel got a higher  $H/t_w$ , it will fail by buckling. Higher stress concentration appears at the upper sharp corner of the opening and it proves the assumption made before. The provision of opening somehow produces discontinuities or disturbances in the normal distribution of stresses that lead to the stress concentration to happen at the abrupt change of opening. The tension crack develop at the upper part of window opening and compression crack happen at side of the opening and develop through the sharp edge of opening.

Through this research analysis, it is proved that the finite element program is a good method of structural analysis in obtaining the requirement of design of any structure.

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