

EVALUATION OF FINITE ELEMENT ANALYSIS STEEL FABRIC REINFORCED CONCRETE WALL PANEL

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ABSTRACT

Steel fabric reinforced concrete wall panel is the new method currently used to replace the conventional wall. The formwork used for the construction of the wall is replaced by using tunnel form system. It is fast and cost effective compared to the conventional and some other methods. Steel fabric which also known as wire mesh are used as the reinforcement for the wall panel. It is practically provide a faster installation compared to normal bars. Since this method is still new in Malaysia, a specific guide of this method is not established yet to use as a guideline in designing the building structures. Then, the study of this structural element analysis needs to be carried out. This research will compared the structural performance of steel fabric reinforced concrete wall panel and to analyzed the structural capacity and mode of failure of steel fabric reinforced concrete wall panel by previous researcher. This research used Finite Element Method computer program LUSAS 13.6 as a tool to analyze the wall panel. The 3-Dimensional model of steel fabric reinforced concrete wall panel with double layer of wire fabric type B7 with half of actual size 75 x 1000 x 1500 mm and 150 x 3000 x 3000mm (Width:Length:Height) was simulated. This model assigned assigning concrete Grade C30 (BS 8110:1997) and strength characteristic, $f_y = 485 \text{ N/mm}^2$ for the steel fabric reinforcement. The wall panel will analyzed by different of dimension of wall, wall panel supported, loading distribution and with different eccentricity. Through this research, the structural behavior of steel fabric reinforced concrete wall panel using finite element analysis and the result obtained from the analysis can explain the structural behavior of the wall panel. Therefore, it is successful to investigate the effect of the eccentric load and the different of supported to the wall panel and the objective of the research has been complying.

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CHAPTER 1

INTRODUCTION

1.1 General

The rapid growth of the construction industry especially in building construction in Malaysia has led to the ever-increasing trend of change method from the traditional to newer ones, resulting in constant introduction of newer construction techniques and material to the building construction industry. The newer system or techniques promotes and new research guideline in designing the building structures.

In conventional building construction method, reinforced concrete wall is less use as the load-bearing elements. At present the use of brick wall has been overtaken by concrete wall panels as the wall is the structural elements for the building. The new system and material are introduced in view of the need to meet increasing demand for cost effective building, to innovative and greater design flexibility, to reduce construction time, to reduce heavy equipment on job site, to have fewer specialized trades required, to have simplified utility installation, to have greater structural integrity, to have earlier completion and earlier occupancy, to be environmentally intelligent, to have better quality, to reduce on site labour time and cost, to have simple construction methods, to have no waste material, to be more durable, and so on.

A reinforced concrete wall panel, which is an infilling in the structural frame and is considered not to carry any vertical load, must withstand the pressure or suction due to wind. The panel must be sufficiently strong to resist the bending moment due to its spanning between the members of the frame, and the connections to the frame must be strong enough to transfer the pressures on the panel to the frame either by bearing, if the panel is set in rebates in the members of the frame, or by the resistance to shear of reinforcement that projects from the frame into the panel.