

**UNIVERSITI TEKNOLOGI MARA**

**STRUCTURAL BEHAVIOUR OF DOUBLY  
REINFORCED LIGHTWEIGHT CONCRETE  
WALL PANEL UNDER AXIAL LOAD**

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## ABSTRACT

Recently, lightweight reinforced concrete walls have gained greater acceptance from many countries in conjunction with the Industrialized Building System (IBS) introduced. Essentially, the system gives many advantages in reducing dead load, the dependency of foreign labour and better investment in technologies, techniques and processes of construction. Lightweight 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 behaviour doubly reinforced of lightweight wall panel under axial load. The experimental works of wall panel have been done in the Fabrication, Concrete and Heavy Laboratories. There were designed with four samples of wall panels which were D1800NE25D, 1800NE20D, 1800NE15D, 1800NE10D. It was designed as a double layer reinforced wall panel with different slenderness ratio which are 25, 20, 15 and 10. The width and length was 75mm and 1000mm respectively. Foaming agent was used to produce lightweight concrete with density  $1800\text{kg/m}^3$ . The wall was loaded under axial load with pinned-pinned support to determine the ultimate loading, initial crack, crack pattern, maximum deflection and the failure modes of wall panel. The observation from the experimental work shows that the ultimate load was higher for D1800NE10D and lowest for D1800NE25D. The maximum deflection occurred at  $0.5L$  of the wall height. The wall failed in crushing for all samples with exception D1800NE25D failed in buckling mode. Through this study, it proved that theoretical studies of buckling using Euler Theory gave which the maximum deflection at the center of the wall which was about  $0.5H$  under pin end support conditions.

## DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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