UNIVERSITI TEKNOLOGI MARA

PERFORMANCE OF STEEL FIBRE AND WIRE MESH IN WALL PANEL SUBJECTED TO AXIAL LOAD

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of University 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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ABSTRACT

Exploration and development of new and high performance construction materials, such as fibre reinforced concrete has offered many advantages and gained confidence amongst builders in Malaysia. Towards greater development of IBS components, utilisation of steel fibre in concrete mix to replace reinforcing bars improved significantly. Investigations showed the mix provides durable and strong concrete especially when subjected to flexural influences. Most design codes have not stipulated thorough regulations on steel fibre concrete structural elements. It is thus necessary to understand the effect of material contents on the mechanical strength properties of this steel fibre concrete. In this study steel fibre is applied into wall panel (**SteFib WP**) aiming at better understanding about the mix subjected to compressive axial load. **SteFib WP** was prepared using Grade 40 normal OPC concrete with water cement ratio of 0.354, dosage of 5 kg (0.4%) steel fibre of 1200 MPa strength, measuring 75x1000x1500 mm (thickness:length:height). The aspect ratio (h/l) and slenderness ratio (h/t) of the wall panel are 1.5 and 20 respectively. The wall panel was subjected to compressive axial load with pinned-fixed end conditions and both ends pinned until failure. **SteFib WP** samples failed in buckling. The addition of steel fibres increased the flexural and ultimate capacity of the plain concrete wall panel. The improvement includes fracture toughness, helps to stop micro cracks forming macro-cracks, improves concrete ductility and its energy absorption capacity, as well as enhances overall durability. Fibre concrete mix is practical and economically attractive as it can be mixed, placed, and compacted using normal techniques. Since CIDB is committed in IBS construction, **SteFib WP** contributes to the development as an IBS component. **SteFib WP** has better carrying capacity and advantages in terms of crack control than reinforced concrete wall panel.

TABLE OF CONTENT