DETERMINATION OF LATERAL BEHAVIOUR OF FRAMED TUBE STRUCTURES AND COMPARISION WITH CONVENTIONAL SHEAR WALL STRUCTURES

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SRI LANKA

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DECLARATION

I hereby declare that the content of this thesis is the output of original research work carried out at the Department of Civil Engineering, University of Moratuwa. Whenever the work done by others was used, it was mentioned appropriately as a reference.

L M V Kanchana

ABSTRACT

Even today, only a very few number of tall buildings are available in Sri Lanka, compared to other countries in the world. However with increase in population and due to the limited space availability the latest trend is to spread buildings vertically than laterally. Nowadays, there is a much greater demand for taller buildings relative to the past.

After concrete was introduced to construction world, it gained many improvements within a short time period and because of that concrete buildings spread all over the world. Due to the higher strength ranges that can be achieved by good quality concrete, the section dimensions of members in concrete buildings have reduced drastically in the recent past. The increase in height accompanied with the reduced member sizes formed slender buildings, which require more attention focused on the lateral stability of the building. This problem was however solved by the introduction of various efficient structural forms such as shear walls, shear cores, outriggers, framed tube, etc. in to the building skeleton.

The lateral behaviour of framed tube substructure and conventional shear wall structure is observed in this research to a certain extent. 40, 35, 30, 25 and 20 storey framed tube buildings are analysed for different lateral load combinations. The same scenario is carried out for conventional shear wall structure. Mainly the deflection, wind induced acceleration and fundamental period due to lateral loads are observed and analysed. The frame tube structures give 50% reduction in deflection and wind induced acceleration.

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