

**COMPARISON OF TRANSFER FLOOR SYSTEMS FOR
A REINFORCED CONCRETE TALL BUILDING
UNDER GRAVITY AND WIND LOADS**

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Master of Science Degree in Structural Engineering

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Sri Lanka

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Dissertation submitted in partial fulfilment of the requirements for the
degree Master of Science Degree in Structural Engineering

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February 2025

Declaration

I declare that this dissertation is my own work and does not include any material previously submitted for a degree or diploma at any other university or institute of higher learning without proper acknowledgment. To the best of my knowledge, it does not contain any material previously published or written by someone else, except where acknowledgment is made in the text.

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The research for this Master's dissertation has been carried out by the above candidate under my supervision.

Name of the supervisor: Prof. M.T.R. Jayasinghe

Signature of the supervisor:

Date: 27.02.2025

Abstract

In modern urban environments, tall buildings are a common solution to space constraints and urban density challenges. The design of these structures, particularly their transfer floor systems, play a crucial role in their stability and performance under various loads. Transfer floors are structural elements that redistribute loads from columns or walls above to a different grid of columns or walls below, allowing for greater architectural flexibility and the incorporation of larger open spaces in the lower levels of buildings. This thesis presents a comprehensive comparison of transfer floors with transfer beams, Transfer plate, waffle slab transfer floor system and cellular slab transfer floor systems for a reinforced concrete tall building with 30 storeys, under gravity and wind loads. Finite element modelling and structural analysis software are employed to simulate and evaluate the global performance of each structure under specified loading conditions. The depth of the transfer floor, which is a significant portion of the overall cost is also compared in each structure. Furthermore, the ease of construction is also discussed for each type of transfer floor. In addition, the weight of each transfer floor is also evaluated and discussed in relevance to the cost.

The results indicate differences in the behaviour and efficiency of each transfer floor system. The findings provide valuable insights into optimal design choices for engineers and architects aiming to enhance safety, functionality, cost-effectiveness and constructability of tall buildings. This research contributes to the ongoing developments in more efficient structural systems under different criteria in the design and construction of tall buildings with transfer floors

Keywords: Transfer Floors, Transfer Beams, Transfer Plate, Waffle Slab, Cellular Slab, Reinforced Concrete Building, Tall Buildings, Wind Load, Lateral Displacement, Inter Storey Drift, Constructability, Overall Depth, Concrete Weight.

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