

**The Optimum Outrigger Locations in Outrigger-Braced Structures
with New Governing Equations and Complex Objectives**

by

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Supervisor

Date

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Abstract

OPTIMUM OUTRIGGER LOCATIONS IN
OUTRIGGER-BRACED STRUCTURES WITH NEW
GOVERNING EQUATIONS AND COMPLEX OBJECTIVE

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Thesis Supervisor:

Prof. Er Guo Kang

This thesis is about the numerically analysis of the optimum locations of outriggers in outrigger-braced structure with new governing equations and complex objective. Outrigger-braced structure is a typical structure frequently employed in high-rise building design. It consists of a refined concrete or braced steel main core connected to exterior columns by flexural cantilevers. The moment induced by lateral loadings can be much balanced by the axial forces in the columns, which makes it suitable for high-rise building design. In the preliminary structural design, the locations of the outriggers need being determined first. The analysis for the optimum locations of outriggers was normally based on the objective that the drift reduction is maximum. In outrigger-braced building design, the moment in the core needs also being reasonably reduced in locating the outriggers. In this thesis, a more easily understandable and general solution procedure is employed in analyzing the optimum locations of the outriggers over the height of the building. Two new objectives in obtaining the optimum locations of outriggers are proposed. Based on those objectives, the optimum locations of the outriggers are analyzed numerically which can make base core moment reduced mostly or both the drift and core moment reduced mostly as a whole. Numerically results are presented about the optimum locations of outriggers in various cases and the reduction efficiency. The obtained results are also compared with the conventional results with only the drift reduction being objective.

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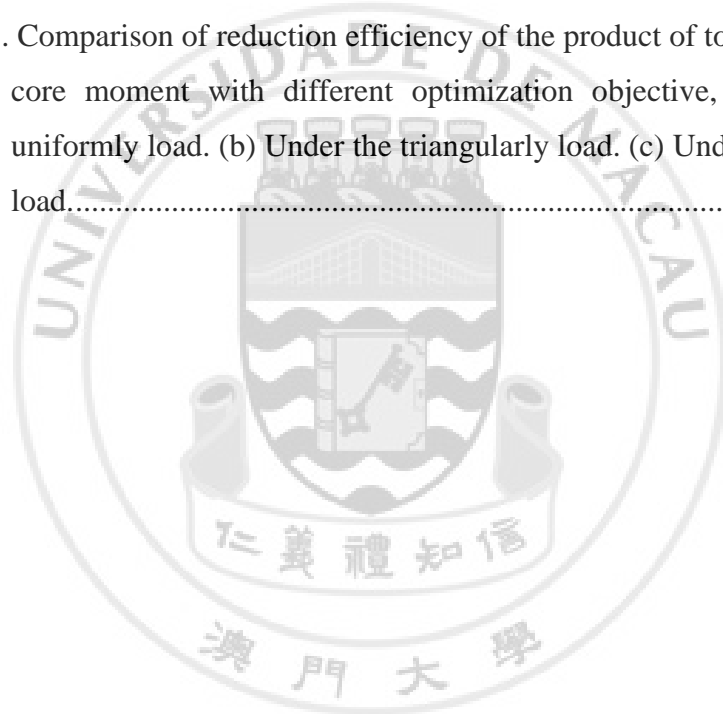
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