



Sensitivity Analysis and Optimization of Coupling Trusses under Earthquake Stiffness Constraints for Multi-Core Supertall Buildings

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Abstract

Multi-Core Supertall Buildings is connected by coupling trusses, whose main structural feature is significantly different from traditional core-tube structures. The strength of the connection between the coupling trusses and the main structure is the main influence factor of the structure index and the bearing capacity of the main components. Therefore sensitivity analysis should be conducted on the impact of the coupling trusses and adjustments should be taken to control the structure index. The paper takes a multi-core supertall as an engineering case to explore the impact of the coupling trusses under earthquake stiffness constraints on the structural performance. The case shows that sensitivity analysis can comprehensively test the impact of coupling trusses on multi-core supertall buildings and the key parts that need to be strengthened, which improved the performance of the structure, promoted the rationality and economy of engineering design.

Keywords: Multi-Core Supertall Buildings, Coupling Trusses, sensitivity analysis

1 Introduction

With the development of office buildings, the demand for large space is increasing rapidly. The frame-corewall structure is one of the most commonly used structural system for high-rise office buildings. Separating the core tube from the frame in order to release the spatial layout of the building is becoming an increasingly common

design method for office buildings. Multi-Core Supertall Buildings with large space is the separation of the corewall and frame which bring new features and challenges to the traditional structural system. It has become the focus of attention to deal with the irregular layout of the structure brought by the building demand.

Existing literature has summarized theoretical research and design practices for Multi-Core