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Book Review

Title: **Earthquake Disaster Simulation of Civil Infrastructures. From Tall Buildings to Urban Areas**

Authors: **Xinzheng Lu, Hong Guan**

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The book's authors (Professors X. Lu and H. Guan) are internationally recognized experts in the field of structural engineering. Their main areas of work are: accidental actions/extreme events, designing high-rise buildings and the progressive collapse of buildings. Their standing as top-grade researchers is clear from the projects in which they have taken part and the wide diffusion of their results in high-impact journals.

In this book, Professors Lu and Guan give a compilation of their recent work on the effects of earthquakes in urban areas using numerical simulations. The book is, in general, very well written and organized, combining a sound theoretical approach with interesting practical applications.

First-time readers will be surprised by the quality of the figures and the care with which they have been chosen. The book's format and extension are appropriate to its purposes, and there are a large number of references which will doubtless attract the readers' interest.

The first of the book's thirteen chapters introduces the topic and outlines its objectives. Chapters 2 and 3 deal with high-fidelity and high-performance computing, respectively, applied to high-rise buildings during earth movements. In both chapters the theoretical approach, combined with interesting practical applications, is complete and faultless. Chapter 4 deals with the application of the techniques introduced in Chapters 2 and 3 to two of the world's leading supertall buildings, the Shanghai Tower (Shanghai) and the Z15 Tower (Beijing). Both cases are well chosen and the results given in the accompanying figures are perfectly clear to the reader.

Chapter 5 describes two simplified models (flexural-shear and fishbone) that achieve close proximity to the actual behavior of buildings in seismic action. In Chapter 6 earthquake disaster simulation is applied to tall buildings, considering the ground motion intensity measure, base shear force and the buildings' optimal design.

Chapter 7 gives a very useful comparison between the Chinese and American standards in the seismic design of buildings. Chapter 8 describes the use of multiple degree-of-freedom models to simulate multi-storey and tall buildings, while Chapter 9 explains visualization techniques for urban areas subjected to earthquakes, useful for urban planners when drawing up possible

emergency procedures. These techniques will also be useful for the decision making of non-professional users.

Chapter 10 describes useful strategies to obtain information on urban areas from high-performance/low-cost technologies as an alternative to using super computers. Chapter 11 describes the application of the tools described in Chapters 8, 9 and 10 to a number of real towns and cities in China, including areas with only 56 buildings to one with 230,000, demonstrating the excellent qualities of the proposed methods. Chapter 12 deals with earthquake loss prediction for typical areas, ending with Chapter 13, in which the book's main contribution and future needs are highlighted.

Readers will find here the latest and most advanced methods for the study of tall buildings and urban areas during earth tremors and the book will interest a wide range of professionals, including undergraduates and researchers. Although the concepts and techniques involved are quite technical, the book is easy to read due to the methodical way in which each chapter is structured, and it will doubtless become an indispensable part of any technical library.