Dietlinde Köber • Mario De Stefano Zbigniew Zembaty Editors

Seismic Behaviour and Design of Irregular and Complex Civil Structures III



Contents

Par	t I Seismic Load, Ground Motion, Rocking Excitations	
1	Effect of Soil Compliance on Seismic Response of Slender Towers Under Rocking Excitations	3
2	Evaluation of Foundation Input Motions Based on Kinematic Interaction Models	11
3	Transverse and Longitudinal Seismic Effects on Soil-Steel Bridges	23
Par	t II Seismic Analysis and Design of Irregular Structures	
4	Deformation Based Seismic Design of Generally Irregular 3D RC Frame Buildings for Minimized Total Steel Volume Oren Lavan and Philip J. Wilkinson	39
5	Fast Nonlinear Response History Analysis: An Application to Irregular Building Structures	47
6	Seismic Behaviour of an Irregular Old RC Dual-System Building in Lisbon	5′
7	A Database for Assisted Assessment of Torsional Response of In-Plan Irregular Buildings	6

8	Modified Mode-Adaptive Bi-directional Pushover Analysis Considering Higher Mode for Asymmetric Buildings K. Fujii	83
9	Structural Irregularities in RC Frame Structures Due to Masonry Enclosure Walls	97
10	Influence of the Soil Initial Shear Modulus on the Behaviour of Retaining Walls for Deep Excavations in Bucharest – Case Studies	111
11	Seismic Performance of Uneven Double-Box Tunnel Sections for Subway	127
	Tsutomu Otsuka, Kota Sasaki, Shinji Konishi, Yuya Nishigaki, Kouichi Maekawa, and Ryuta Tsunoda	
12	Failure Probability of Regular and Irregular RC Frame Structures	141
13	Assessment of Nonlinear Static Analyses on Irregular Building Structures	153
14	Seismic Assessment of an Irregular Unreinforced Masonry Building	163
15	Assessment of Global Torsional Sensitivity of Common RC Structural Walls Layout Types	177
16	Seismic Design Particularities of a Five Story Reinforced Concrete Structure, Irregular in Plan and Elevation Dietlinde Köber	189
17	Effect of the Mechanical Properties of Concrete on the Seismic Assessment of RC Irregular Buildings	201
18	An Assessment of American Criterion for Detecting Plan Irregularity	215
19	Effects of Modelling Assumptions on the Plan Irregularity Criteria for Single Storey Buildings	233

Contents ix

20	Numerical Study on Seismic Response of a High-Rise RC Irregular Residential Building Considering Soil-Structure Interaction	249
21	Optimum Torsion Axis of Multi-storey Buildings Based on Their Dynamic Properties	263
22	Seismic Behaviour of 3D R/C Irregular Buildings Considering Complex Site Conditions Ioanna-Kleoniki Fontara, Konstantinos Kostinakis, and Asimina Athanatopoulou	279
23	Application of Artificial Neural Networks for the Assessment of the Seismic Damage of Buildings with Irregular Infills' Distribution	291
	Konstantinos Kostinakis and Konstantinos Morfidis	
24	Dynamic Eccentricities in Pushover Analysis of Asymmetric Single-Storey Buildings	307
25	Suggestions for Optimal Seismic Design of Wall-Frame Concrete Structures	321
26	Dynamic Resistance of Residential Masonry Building with Structural Irregularities	335
27	Effect of Mass Irregularity on the Progressive Collapse Potential of Steel Moment Frames	349
Par	t III Seismic Control and Monitoring of Irregular Structures	
28	On the Response of Asymmetric Structures Equipped with Viscous Dampers Subjected to Simultaneous Translational and Torsional Ground Motion	363
29	Base Isolation as an Effective Tool for Plan Irregularity Reduction	377

30	Study on Polymer Elements for Mitigation of Earthquake-Induced Pounding Between Buildings in Complex Arrangements	391
31	Procedure of Non-linear Static Analysis for Retrofitted Buildings Structures Through Seismic Isolation Gabriel Dănilă	403
32	Observations of Damage to Uto City Hall Suffered in the 2016 Kumamoto Earthquake K. Fujii, T. Yoshida, T. Nishimura, and T. Furuta	413
33	Preliminary Evaluation of Seismic Capacity and Torsional Irregularity of Uto City Hall Damaged in the 2016 Kumamoto Earthquake	427
Ind	ex	441