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3.2.2 Lateral load resisting systems; 3.3 Lateral resisting systems and modelling examples; 3.3.1 Moment resisting frames (MRF); 3.3.2 Shear walls; 3.3.3 Bracing systems; 3.3.4 Outrigger structures; 3.3.5 Tube structures and modelling example of the Willis Towers; Bundled tube; 3.3.6 Diagrid structures and modelling example of the Gherkin; 3.3.7 Super frame (mega frame) structures and modelling example; 3.4 Modelling example of the Burj Khalifa; 3.4.1 Model set up; 3.4.2 Analysis and result; 3.5 Modelling example of Taipei 101 with tuned mass damper (TMD); 3.5.1 TMD modelling; 3.5.2 TMD modelling result; 3.6 Conclusion; References; Chapter 4 Earthquake analysis of buildings; 4.1 Introduction; 4.2 Basic earthquake knowledge; 4.2.1 Categories of earthquake waves; 4.2.2 Measurement of earthquake; 4.3 Basic dynamic knowledge; 4.3.1 SDOF; 4.3.2 SDOF under earthquake; 4.3.3 MDOF under earthquake; 4.3.4 Response spectrum; 4.3.5 Modal analysis; 4.3.6 Response spectrum from Eurocode 8; 4.3.7 Ductility and modified response spectrum; 4.4 Modelling example of the response spectrum analysis using SAP2000; 4.5 Time history analysis and modelling example using SAP2000; 4.5.1 Fundamentals of time history analysis; 4.5.2 Modelling example of time history analysis using SAP2000; 4.6 Push-over analysis and modelling example using SAP2000; 4.6.1 Introduction; 4.6.2 Modelling example of push-over analysis using SAP2000; References; Codes and building regulations; Software and manuals; Chapter 5 Progressive collapse analysis; 5.1 Introduction; 5.2 Design guidance for progressive collapse analysis; 5.3 Risk assessment; 5.4 Design and analysis method; 5.4.1 Indirect design method; 5.4.2 Direct design method; 5.4.3 Selection of design method; 5.4.4 Structural analysis procedures and acceptance criteria

Sommario/riassunto

The successful design and construction of iconic new buildings relies on a range of advanced technologies, in particular on advanced modelling techniques. In response to the increasingly complex buildings demanded by clients and architects, structural engineers have developed a range of sophisticated modelling software to carry out the necessary structural analysis and design work. Advanced Modelling Techniques in Structural Design introduces numerical analysis methods to both students and design practitioners. It illustrates the modelling techniques used to solve structural design problems