

Standard Specifications for Concrete Structures -2002 “Seismic Performance Verification”

CONTENTS

| | |
|-------------------------------------------------------------------------------|-----------|
| CHAPTER 1 GENERAL | 1 |
| 1.1 Scope..... | 1 |
| 1.2 Definitions..... | 1 |
| 1.3 Principles of seismic design..... | 3 |
| 1.4 Aseismic structural planning..... | 5 |
| CHAPTER 2 LOADS | 7 |
| 2.1 General..... | 7 |
| 2.2 Ground motion for the performance verification..... | 8 |
| CHAPTER 3 METHODS OF SEISMIC PERFORMANCE VERIFICATION | 12 |
| 3.1 General..... | 12 |
| 3.2 Safety Factors..... | 14 |
| 3.3 Estimation of Response Values | 16 |
| 3.3.1 General..... | 16 |
| 3.3.2 Method for analyzing the structure and the ground Independently | 18 |
| 3.3.3 Response Analysis | 20 |
| 3.4 Estimation of Limit Values | 21 |
| 3.5 Verification..... | 22 |
| CHAPTER 4 ANALYTICAL MODEL..... | 24 |
| 4.1 Modeling of structures using finite elements..... | 24 |
| 4.1.1 General..... | 24 |
| 4.1.2 Modeling of Members..... | 25 |
| 4.1.2.1 Linear Members | 25 |
| 4.1.2.2 Planar Members | 26 |
| 4.1.3 Mechanical Model of Materials | 27 |
| 4.1.3.1 Concrete | 27 |
| 4.1.3.2 Re-bar..... | 30 |
| 4.2 Modeling of Structure by Lumped Mass and Beam Element Characteristic..... | 32 |
| 4.2.1 General..... | 32 |
| 4.2.2 Mechanical Model of Members | 33 |
| 4.3 Modeling of Ground..... | 37 |
| 4.3.1 Ground model for coupled analysis | 37 |
| 4.3.2 Ground model to analyze a structure independent of the ground | 38 |
| CHAPTER 5 STRUCTURAL DETAILS | 40 |
| 5.1 General..... | 40 |
| 5.2 Longitudinal re-bar | 40 |
| 5.2.1 Development of longitudinal re-bar..... | 40 |
| 5.2.2 Splices of longitudinal re-bar..... | 41 |
| 5.3 Lateral Re-bar | 42 |
| 5.3.1 General..... | 42 |
| 5.3.2 Spacing of Lateral Re-bar | 42 |
| 5.3.3 Splices of Ties | 43 |
| 5.3.4 Anchorage of Lateral Re-bar..... | 45 |

| | | |
|-----|----------------------------------|----|
| 5.4 | Connection of Members..... | 46 |
| 5.5 | Planar Members | 46 |
| 5.6 | Verification by Experiment | 47 |