

The Brazilian Standard for Seismic Design: General Aspects and Seismological Basis

Sergio H. C. SANTOS

Associate Professor
Federal University of
Rio de Janeiro, Brazil
sergiohampshire@gmail.com



Sergio Hampshire C. Santos, born 1952, received his civil engineering, M.Sc. and D.Sc. degrees from the Federal University of Rio de Janeiro. He is presently Associate Professor of Concrete Structures in the Engineering School in this University.

Silvio de SOUZA LIMA

Associate Professor
Federal University of
Rio de Janeiro, Brazil
sdesouzalima@gmail.com



Silvio de Souza Lima, born 1949, received his civil engineering, M.Sc. and D.Sc. degrees from the Federal University of Rio de Janeiro. He is presently Associate Professor of Dynamic of Structures in the Engineering School in this University.

Summary

The Brazilian territory presents generally low seismicity. Two regions are exceptions, with non-negligible seismicity: part of the Brazilian Northeast and part of the Brazilian Northwest. Due to this low seismicity, up to 2006 Brazil was practically the only South-American country without a seismic design standard. In this year, the first Brazilian Standard for Seismic Design was issued. The available seismological data and the studies performed for defining the probabilistic distribution functions of seismic magnitudes, in several Brazilian regions, are reviewed herein. The considered probabilistic analyses performed for the definition of the nominal values of horizontal accelerations are also presented. Equal probability design spectra are generated and compared with the ones defined in the standard. Some other aspects of the standard, such as, definition of the seismic design spectra and the allowed methods of analysis are also commented.

Keywords: structural safety; seismic design; standardization.

1. Introduction

The Brazilian territory presents low seismicity, typical of a tectonic intra-plates region. Due to this low seismicity in most of its territory, up to 2006 Brazil was practically the only South-American country without a specific standard for the seismic design of structures.

A complete study of the seismicity of the Brazilian has not been concluded up to now. A study of the global seismic risk was performed for the United Nations, by GFZ-Potsdam, whose results are presented in its *Global Seismic Hazard Map* [1]. This map confirms that Brazil possess a low seismicity, with nominal horizontal accelerations, generally inferior to 0.4 m/s^2 .

Two Brazilian regions are exceptions to be noticed, with a non-negligible seismicity: part of the Brazilian Northeast Region, due to its proximity with the South Atlantic Ridge and part of the Brazilian Northwest, due to its proximity with the border of the Nazca Plate.

From the seismological data that have been collected since the 1970's and from the theoretical studies that have been performed since then, it was progressively recognized by the Brazilian technical community that seismic effects could not be disregarded "a priori" in the design.