

Computation of Risk Coefficients (C_{RS} , C_{RI}) for Obtaining Risk-Targeted Earthquake Hazard Values for Several Caribbean Territories

Richard P. Clarke

Department of Civil and Environmental Engineering, Faculty of Engineering, The University of the West Indies, St Augustine, Trinidad and Tobago, West Indies; E-mail: Richard.Clarke@sta.uwi.edu

Received 25 October 2018; Revised 06 February 2019; Accepted 19 March 2019)

Abstract: *The most critical input data for the calculation of the earthquake force on a structure are the spectral accelerations S_s and S_l which are obtained from maps. For building codes before 2012, these values are uniform hazard – all locations have the same probability of being exceeded. However, the codes since 2012 require S_s and S_l that are uniform risk – all structures must have the same probability of collapse. To convert from uniform hazard to uniform risk requires the risk coefficients C_{RS} and C_{RI} , and these are not available for the Caribbean region. Therefore, the government agencies responsible for approving structural design do not allow use of building codes after 2009, and hence, the advantages of those codes are not available. If engineers use such codes with uniform hazard values, this would contradict the aim of the codes and design forces can be underestimated. Obtaining the uniform risk coefficients by the usual approach is costly and time consuming since special-purpose software implementing numerical analysis is required and not available in the Caribbean. In this paper, the risk coefficients are determined for several Caribbean territories by an alternative approach based on an analytical solution reported to give excellent results compared with the conventional approach. The calculated risk coefficients for the Caribbean are in the ranges of 1.03 to 1.11, and 1.02 to 1.19 for C_{RS} and C_{RI} , respectively. Engineers can now safely and consistently use the latest building codes for the structural design of Caribbean structures.*

Keywords: *Risk Coefficients, Caribbean Risk-Targeted Seismic Ground Motion*