



Standard Guide for Seismic Risk Assessment of Buildings¹

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INTRODUCTION

Lenders, insurers, and equity owners in real estate are giving more intense scrutiny to earthquake risk than ever before. The 1989 Loma Prieta, California earthquake, which caused more than \$6 billion in damage, accelerated the trend toward considering loss estimation in real estate transactions. The 1994 Northridge, California earthquake, with over \$20 billion in damage, made seismic risk assessment an integral part of real estate financial decision-making for regions at risk of damaging earthquakes. Users of Seismic Risk Assessment reports need specific and consistent measures for assessing the possibility of future loss due to earthquake occurrences. This guide discusses specific approaches that the real estate and technical communities can consider a basis for characterizing the seismic risk assessment of buildings in an earthquake. It uses two concepts to characterize earthquake loss: probable loss (PL) and scenario loss (SL). Use of the term probable maximum loss (PML) is acceptable, provided it is specifically and adequately defined by the User.

1. Scope

1.1 This guide provides guidance on conducting seismic risk assessments for buildings. As such, this guide assists a User to assess a property's potential for losses from earthquake occurrences.

1.1.1 Hazards addressed in this guide include:

1.1.1.1 Earthquake ground shaking,

1.1.1.2 Earthquake-caused site instability, including fault rupture, landslides, soil liquefaction, lateral spreading and settlement, and

1.1.1.3 Earthquake-caused off-site response impacting the property, including flooding from dam or dike failure, tsunamis and seiches.

1.1.2 This guide does not address the following:

1.1.2.1 Earthquake-caused fires and toxic materials releases.

1.1.2.2 Federal, state, or local laws and regulations of building construction or maintenance. Users are cautioned that current federal, state, and local laws and regulations may differ from those in effect at the time of the original construction of the building(s).

1.1.2.3 Preservation of life safety.

1.1.2.4 Prevention of building damage.

1.1.2.5 Contractual and legal obligations between prior and subsequent Users of seismic risk assessment reports or between

Providers who prepared the report and those who would like to use such prior reports.

1.1.2.6 Contractual and legal obligations between a Provider and a User, and other parties, if any.

1.1.3 It is the responsibility of the User of this guide to establish appropriate life safety and damage prevention practices and determine the applicability of current regulatory limitations prior to use.

1.2 The objectives of this guide are:

1.2.1 To synthesize and document guidelines for seismic risk assessment of buildings;

1.2.2 To encourage standardized seismic risk assessments;

1.2.3 To establish guidelines for field observations of the site and physical conditions, and the document review and research considered appropriate, practical, sufficient, and reasonable for seismic risk assessment;

1.2.4 To establish guidelines on what reasonably can be expected of and delivered by a Provider in conducting the seismic risk assessment of buildings; and

1.2.5 To establish guidelines by which a Provider can communicate to the User observations, opinions, and conclusions in a manner that is meaningful and not misleading either by content or by omission.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

¹ This guide is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.25 on Whole Buildings and Facilities.

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