Earthquake-safe Buildings

A Series of Educational Articles for Developing Nations to Improve the Earthquake Safety of Buildings

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This tutorial was first published by the Earthquake Engineering Research Institute, a nonprofit corporation, in 2022. The Earthquake Engineering Research Institute is the leading non-profit membership organization dedicated to understanding earthquake risk and increasing earthquake resilience in communities worldwide.

This tutorial was written and reviewed by volunteers, all of whom participate in EERI and IAEE’s World Housing Encyclopedia project.

Any opinions, findings, conclusions, or recommendations expressed herein are the author’s and do not necessarily reflect the views of any organization.

Copies of this publication may be downloaded from the World Housing Encyclopedia website at <http://www.world-housing.net/>.

This publication is intended to be translated into other languages and to be modified as required to suit the conditions in those countries, with acknowledgement to EERI and removal of EERI’s logo and branding. Permission from the publisher to disseminate part or all of this publication is unnecessary.

## Acknowledgements:

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About the World Housing Encyclopedia:

The World Housing Encyclopedia (WHE) is an Encyclopedia of Housing Construction in Seismically Active Areas of the World, hosted by the Earthquake Engineering Research Institute (EERI) and the International Association for Earthquake Engineering (IAEE). The goals of the WHE are:

* To share knowledge on housing construction practices
* To encourage use of earthquake-resistant technologies
* To develop guidelines and technical resources for improving seismically vulnerable construction
* To offer services and technical support to communities across the world on earthquake resistant housing technologies

# Table of Contents

Article 1. Bandung and Earthquakes

Article 2. Avoiding Soil and Foundation Problems during Earthquakes

Article 3. Three Structural Systems to Resist Earthquakes

Article 4. Why Walls Are the Best Earthquake-resistant Structural Elements

Article 5. Are Walls in Buildings Helpful during Earthquakes?

Article 6. How Do Buildings with Reinforced Concrete Columns and Beams Work in Earthquakes?

Article 7. Principles for Earthquake-safe Masonry Buildings

Article 8. Tying Parts of Buildings Together to Resist Earthquakes

Article 9. Local Wisdom and Building Safety in Earthquakes

Article 10. Infill Walls and How They Affect Buildings during Earthquakes

Article 11. A Common Structural Weakness to Avoid: Soft Story

Article 12. A Common Structural Weakness to Avoid: A Discontinuous Wall

Article 13. A Common Structural Weakness to Avoid: Short Column

Article 14. Preventing a Building from Twisting during Earthquake

Article 15. Why Buildings Pound Each Other during Earthquakes

Article 16. Construction Codes and Standards

Article 17. What to Look for in Building Regulations

Article 18. What to Expect from a Building Designed according to Codes

Article 19. Importance of Checks during the Design of Buildings

Article 20. Importance of Checks during the Construction of Buildings

Article 21. Preventing Damage to Non-structural Components

Article 22. Retrofitting Buildings against Earthquake

Article 23. Advanced Earthquake-Resilient Approaches for Buildings

Article 24. Urban Planning and Earthquake Safety

Article 25. Tsunamis and Buildings

# Introduction

The need for this publication became apparent after a 2019 survey of building industry stakeholders in Yogyakarta, Indonesia. One hundred and forty engineers, architects, contractors and building owners were asked to suggest changes that their building departments could make in order to improve building safety during earthquakes. The most prevalent suggestion was that building departments should take on an educational role. The survey respondents believed that information, including the earthquake hazard, effects of earthquakes on buildings, and building regulations related to building safety should be readily available to all stakeholders, as well as to the staff of building departments themselves.

The 25 information articles in this document have been written initially for people in the building industry as well as the general public of Indonesia’s third largest city, Bandung. Over the years, the author has spent many months there. Although the articles are somewhat context-specific, they are intended to function like a template. The intention is that the articles will be modified to suit local contexts, including construction materials and methods. Then, if necessary, be translated into local languages, for the many earthquake-affected cities and regions in the developing world.

Having developed this educational resource of articles, The World Housing Encyclopedia seeks partners in developing countries to translate, edit as necessary and disseminate them. A partner must possess a desire to improve the earthquake-safety of local buildings, to be experienced in earthquake-resistant design, to be highly reputable and respected locally, and in a position of influence in the local building industry. After editing and translating the articles to increase their local relevance, a partner will disseminate them.

Potentially, the most strategic partner is a local or regional building department. Ideally, it would host the local version of the articles on its website, and even make printed copies available for those seeking building permits as well as the general public. Alternatively, a partner might be a government department, a national earthquake society, a consortium of university staff, or a large consulting engineering firm. A partner’s input into the final local version of the articles will be acknowledged and this will help raise the partner’s public profile. The partner might also offer to answer queries arising from the articles.

As well as posting the articles on a website and or printing articles for those visiting in person, additional dissemination methods are possible. For example, the articles could be published as a series of newspaper or magazine articles. Magazines read by building professionals and building and home owners could be targeted. Perhaps articles could also be promoted to appropriate professional education and construction training institutions.

Finally, some guidance for translators and editors modifying articles to suit local contexts:

* Review suggestions for “References”. Add references particularly relevant to your city or country and remove any that could be unhelpful.
* Replace any images or diagrams with those more appropriate to your local situation and remove any you consider irrelevant.
* Rephrase text as required for your country. Use local place names where appropriate to make articles as specific and as relevant as possible to your city or region. As an example, in Indonesia the phrase “local wisdom” is very popular (see Article 9), but in other countries “traditional construction” might be more appropriate.
* Review critically the content of each article to ensure your local version will be fully applicable to your readership. Check that assumptions made in the template articles are valid for you. For example, when discussing how to tie buildings together in Article 8, it is assumed that suspended concrete slabs are present. But in some countries, wooden floors are commonly used in conjunction with masonry walls.
* Consider the format in which the articles are to be published. If they are being published as one document, then there is no need to have the introductory footnote in each article. However, that footnote is appropriate when the articles are published, say, as a series in a newspaper or magazine.
* Remember that the articles are specifically written for the general public. The articles therefore are to be understood by ordinary people. In any rewriting and translation, avoid technical terms or jargon. Strive for clarity and readability.
* When you have edited and or translated the articles, please email a pdf version to The World Housing Encyclopedia ([whe@eeri.org](mailto:whe@eeri.org)) where it will be also posted on its website.
* If you have any queries during the translation or dissemination process, please contact Andrew Charleson at [Andrew.w.charleson@gmail.com](mailto:Andrew.w.charleson@gmail.com).
* Thank you to partners with The World Housing Encyclopedia to improve the earthquake safety of buildings, but especially housing, in your communities.