Review

The key value of this book is in reminding readers of the non-technical qualities, such as cultural sensitivity and communication skills, that seismic safety advocates must embody, concludes Damian Grant.

Why do buildings collapse in earthquakes?

Author: Robin Spence and Emily So
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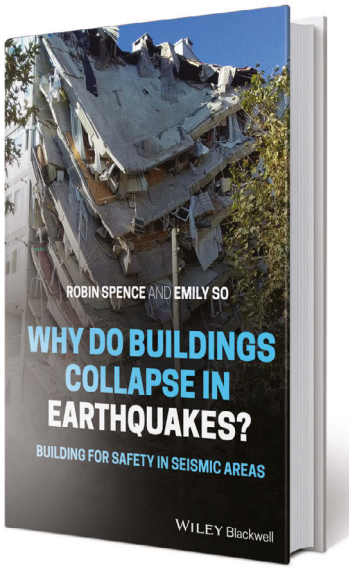
> AN IMPORTANT LESSON IS THE ROLE THAT CLIMATE PLAYS IN CONSTRUCTION TYPOLOGIES THAT ARE FOUND IN A REGION



THIS BOOK STARTS with the conundrum posed in its title: given that engineers and seismologists have taken such huge strides over the last five or six decades in developing technical solutions for seismic-resistant buildings, why has the global earthquake mortality rate barely reduced?

The answer that the authors develop over the next 300 or so pages is that implementing seismic safety measures is not just a technical problem, but fundamentally a social, economic and political one. They argue that engineers are just one of many stakeholders that bear responsibility for solving the earthquake problem, and that governments, the private sector and individuals and homeowners all have an important role to play.

Throughout the book, they draw examples from across the seismically hazardous areas of the globe – both in describing the impact of destructive earthquakes from the last few decades, and in highlighting successful programmes of seismic risk reduction. They stress the important role of field reconnaissance in learning lessons from earthquakes – perhaps not surprisingly, given the authors' prominent involvement in the UK-based Earthquake Engineering Field Investigation Team (EEFIT; affiliated society of the Institution of Structural Engineers), and their role in setting up the Global Earthquake Consequences Database.

The book also covers common construction materials and typologies used around the world, and how these different construction types typically fare in earthquakes. An important lesson – especially for the reviewer, a smug engineer from temperate New Zealand – is the role that climate plays in construction typologies that are found in a region. For example, thick mud or stone walls, valuable for their thermal mass in arid climates, are heavy and brittle – terrible properties when considering seismic resistance.

Of course, unfavourable climate is not the only feature contributing to building collapses in earthquakes. After extolling the successes of building code development, particularly over the past half century, the authors discuss how codes have had less success in reducing risk in the developing world. They cite gaps in the codes themselves, such as not accounting for culturally appropriate and locally available materials, and implementation hurdles, such as corruption and failure to enforce the codes, as examples of what has gone wrong.

Another novel feature of this book is the inclusion of biographical profiles of nine people (seven individuals and one couple) who have all made strong contributions to seismic risk reduction in their communities. Interestingly, of the nine, only two are engineers. For what it's worth, only one (Dr Lucy Jones, an eminent California-based seismologist) has been recognised with awards from the US Earthquake Engineering Research Institute (EERI). This again reflects the emphasis of the book on the role of non-engineering stakeholders, and non-technical solutions to the earthquake problem.

The intended audience for this book is tricky to define. According to the authors, it could be read by government officials, political representatives, business managers and homeowners, as well as architects and engineers.

I find it difficult to imagine a homeowner in an earthquake country purchasing a 300-page hardcover textbook by UK-based academics, but that is not to say that such a reader would not find the contents valuable. Certainly, Chapter 9, which describes how different stakeholders can contribute to seismic risk reduction, should be required reading for those who are being called to arms: government officials and international agencies, business owners, non-governmental organisations, insurers, individual citizens, and of course engineers.

As a practising earthquake engineer, I have a few minor quibbles with the book, but they probably reflect more a difference in emphasis in my own work – often carried out at the higher end of the economic development ladder for private clients – compared with that of the authors.

There is only brief mention in the book of a shift of engineers' focus, particularly since the 2011 Christchurch earthquake, towards resilience-based design and a 'functional recovery' seismic design objective – beyond the typical 'life safety' objective we've targeted for four or more decades.

And seismic-resistant technologies that can help us achieve these stretch goals, such as base isolation, supplemental damping devices and unbonded post-tensioning systems, are also given only a few passing mentions.

That said, there are many books on the market covering these innovative technical solutions to the earthquake problem. The value of this book is in reminding us of many other important qualities that seismic safety advocates, including engineers, must embody: cultural sensitivity, flexibility, empathy, communication skills, persistence and bravery. To this end, the nine individuals profiled in the book – and the two authors – are edifying role models.

Damian Grant
PhD, CEng

Damian Grant is an Associate Director at Arup, and Seismic Skills Leader for Arup's UKIMEA region. He co-authored the 4th edition of *Earthquake Design Practice for Buildings* for ICE Publishing, and is current Vice Chair of the Society for Earthquake and Civil Engineering Dynamics (SECED) committee.