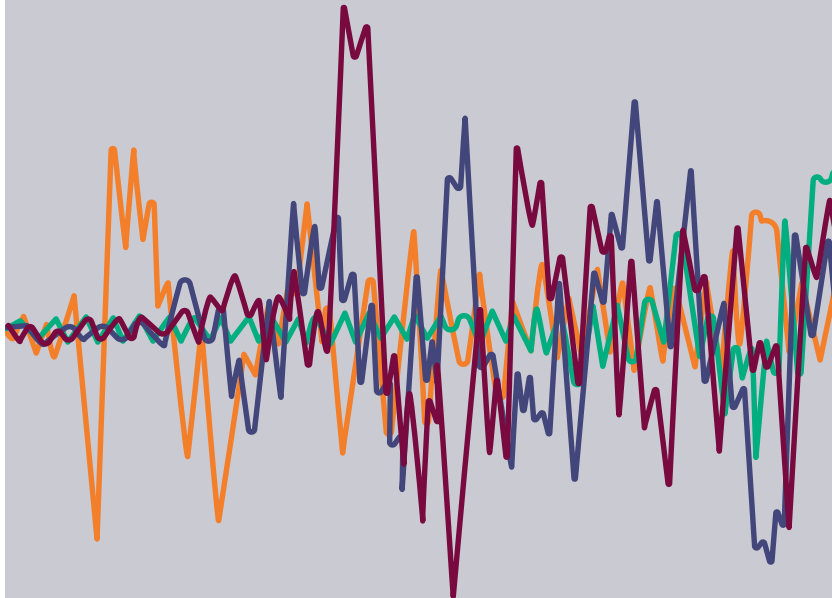


# Examples for the seismic design of steel and concrete buildings to Eurocode 8

Examples to Eurocode:

# 8



# **Examples for the seismic design of steel and concrete buildings to Eurocode 8**

**A companion to:**

**Manual for the seismic design  
of steel and concrete buildings to  
Eurocode 8**

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## Publishing

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Front cover image: based on Seismosoft's SeismoMatch 2021 – A computer program for spectrum matching of earthquake records <https://seismosoft.com/>

Published by The Institution of Structural Engineers  
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Published (version 1.0) February 2022

ISBN 978-1-906335-54-0 (print)  
ISBN 978-1-906335-55-7 (pdf)

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# Foreword

This guidance is applicable to the design of buildings in earthquake-prone countries around the world, provided that any local requirements contained in the relevant National Annex or National Code of Practice are respected. Although the UK is classified as an area of very low seismicity for which design to BS EN 1998 (Eurocode 8)<sup>1</sup> is not a requirement, explicit consideration of seismic actions for the design of buildings in the UK may be required in certain circumstances.

The examples provided, complement The Institution of Structural Engineers' *Manual for the seismic design of steel and concrete buildings to Eurocode 8*<sup>2</sup>, that assists the engineer engaged in the seismic design of structures to BS EN 1998. Readers are strongly advised to refer to the IStructE *Manual* when using this guidance. The terminology and notation used in the *Manual* is also used here.

The authors wish to thank Nelson Lam, Goman Ho, Neil Horsfield, Matt Fox and Nick Ely who contributed to the technical review process for this guidance.



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## Aims and scope

These examples provide simple calculations for the design of basic structural elements in reinforced concrete and steel for most buildings within the scope of BS EN 1998<sup>1</sup>. They are primarily intended for application in areas of moderate to high seismicity for the majority of low to medium-rise (not exceeding 40m), medium ductility class buildings. Readers may not have prior knowledge of BS EN 1998-1<sup>3</sup> but should have some prior experience of structural design to Eurocodes.

The first example introduces basic dynamics — as many engineers in non seismic-prone areas have not carried out the dynamic analysis of a building in the course of their studies/practice.

Examples 2–4 present the design of a beam, column and shear wall, in reinforced concrete respectively, while Examples 5–8 present the design of a beam, column, connection, and bracings, in steel respectively.

The examples have been designed to be used independently. As a result, a degree of repetition between each is unavoidable. Wherever possible, relevant imagery and tabulated information from third party sources have been included within the examples to aid readability.

Examples for the design of foundations and supporting soils are not provided; and suitably qualified, geotechnical engineers should be consulted in these instances. Examples of structural analysis, stability and robustness are covered extensively elsewhere and also not included here.

**Note: analysis stress resultants used in the calculations in this guidance are arbitrary or taken from the analysis of arbitrary structures e.g. stress resultants in Examples 2, 3 and 4 are not related to each other, nor to the frame in Example 1.**

It has also been observed that the capacity design principles in BS EN 1998-1 are not always applied appropriately in modern computer software or via hand calculations. These examples offer design calculations that follow the capacity design principles in BS EN 1998-1 and support the user's understanding of the code. They may also be used to assist with the validation and verification of software, and for checking software output.

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