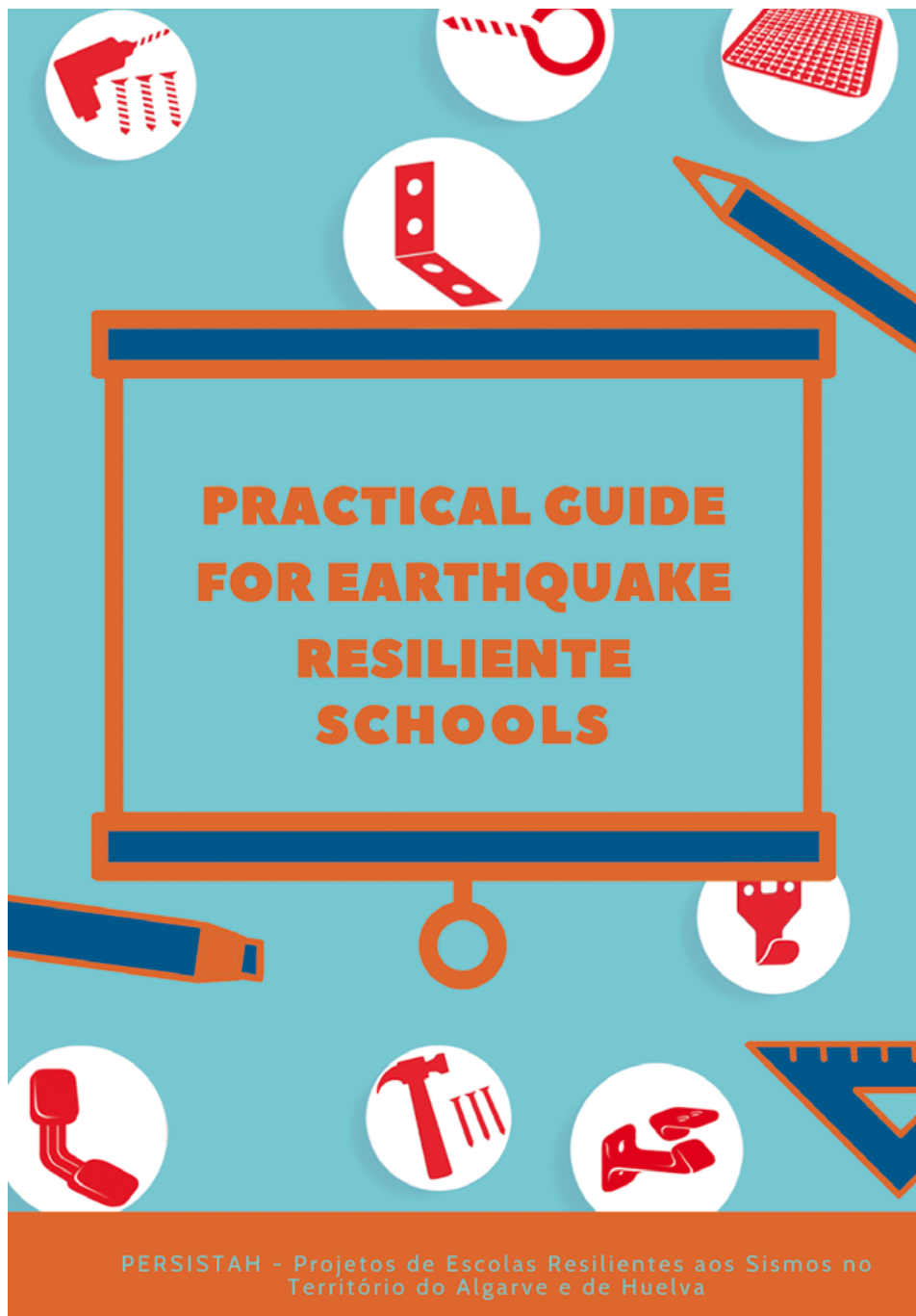


Mónica Amaral Ferreira
Beatriz Zapico Blanco (coords.)



Editorial Universidad de Sevilla

PRACTICAL GUIDE FOR EARTHQUAKE RESILIENT SCHOOLS

Mónica Amaral Ferreira
Beatriz Zapico Blanco (coords.)



PRACTICAL GUIDE FOR EARTHQUAKE RESILIENT SCHOOLS

**PERSISTAH Project
(Projetos de Escolas Resilientes aos SISMos
no Território do Algarve e de Huelva)**

Mónica Amaral Ferreira

Carlos Sousa Oliveira, João Estêvão, Antonio Morales Esteban,
Beatriz Zapico Blanco, Emilio Romero Sánchez, Jaime de Miguel Rodríguez,
María Victoria Requena García de la Cruz y Luís Sá



Sevilla 2020

Series Ediciones especiales

Ferreira, M.A.; Zapico Blanco, B.; Oliveira, C.S.; Estêvão, J.; Morales-Esteban, A.M.; Romero, E.; Requena, M.V.; de Miguel, J.; Sá, L. Practical Guide for Earthquake Resilient Schools, Ferreira, M.A.; Zapico Blanco, B. (coords.), Sevilla, Editorial Universidad de Sevilla, 2020.

EDITORIAL COMMITTEE

José Beltrán Fortes
(Editorial Universidad de Sevilla Director)
Araceli López Serena
(Deputy Director)

Concepción Barrero Rodríguez
Rafael Fernández Chacón
María Gracia García Martín
Ana Ilundáin Larrañeta
María del Pópulo Pablo-Romero Gil-Delgado
Manuel Padilla Cruz
Marta Palenque Sánchez
María Eugenia Petit-Breuilh Sepúlveda
José-Leonardo Ruiz Sánchez
Antonio Tejedor Cabrera

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher (Editorial Universidad de Sevilla).

This work has been developed within the framework of the PERSISTAH project, *Projetos de Escolas Resilientes aos Sismos no Território do Algarve e de Huelva* (0313_PERSISTAH_5_P), developed jointly by the universities of the Algarve and Seville and funded by the European Commission through the call EP – INTERREG VA Spain Portugal (POCTEP).



Digital edition of the printed edition 2020

© Editorial Universidad de Sevilla 2020
c/ Porvenir, 27 - 41013 Sevilla
Tlf. 954 487 447; 954 487 451 - Fax 954 487 443
Correo electrónico: eus4@us.es
Web: <<https://editorial.us.es>>

© Mónica Amaral Ferreira y Beatriz Zapico Blanco (coords.) 2020

© Mónica Amaral Ferreira (Instituto Superior Técnico/Universidade do Algarve), Carlos Sousa Oliveira (Instituto Superior Técnico), João Estêvão (Universidade do Algarve), Antonio Morales Esteban (Universidad de Sevilla), Beatriz Zapico Blanco (Universidad de Sevilla), Emilio Romero Sánchez (Universidad de Sevilla), Jaime de Miguel Rodríguez (Universidad de Sevilla), María Victoria Requena García de la Cruz (Universidad de Sevilla) y Luís Sá (Autoridade Nacional de Emergência e Proteção Civil) 2020

ISBN-e: 978-84-472-3053-2

DOI: <http://dx.doi.org/10.12795/9788447230532>

Layout and digital edition: Dosgraphic, S.L. (dosgraphic@dosgraphic.es)

Summary

Chapter 1. Why is this guide necessary?	9
Chapter 2. Context	11
Chapter 3. What to do before an earthquake?	13
3.1. Identifying non-structural risks at school	15
3.1.1. Classrooms.....	15
3.1.2. Corridors.....	16
3.1.3. Libraries and study rooms	17
3.1.4. Laboratories and activity rooms.....	17
3.1.5. Gyms.....	18
3.1.6. Canteens and cafeterias	19
3.1.7. Checklist Non-structural elements	19
3.2. Reducing non-structural risk at school	23
3.2.1. Tall shelves and cabinets	27
3.2.2. Computers, televisions, printers, photocopiers, scanners	29
3.2.3. Paintings, frames and mirrors.....	30
3.2.4. Furniture and equipment on wheels (pianos, chairs, desks, vending machines)	31
3.2.5. Ceiling lamps and fans, plant pots and others hanging objects	32
3.2.6. Built-in hanging light fixtures	32
3.2.7. Suspended ceilings	33
3.2.8. Glass partitions and windows.....	34
3.2.9. Hazardous substances	35
3.2.10. Vases and plant pots.....	37
3.2.11. Parapets, ledges and decorative elements	37
3.2.12. Chimneys	39
3.2.13. Tiles	39
Chapter 4. What to do during an earthquake?	41
4.1. Self-protection measures in the event of an earthquake	41
4.1.1. Know what to do!.....	41
4.2. Self-protection measures in the event of a tsunami	42

Chapter 5. What to do after an earthquake?.....	45
Bibliography	47
List of Illustrations	49

This guide is intended to be a resource, and not a manual, for increasing the resilience of an educational community, by showing the community what they can do on their own account and how they can strengthen their ability to handle seismic risk (for example, being informed and familiarised with the characteristics that affect the vulnerability of an area in the event of an earthquake, and prepared to protect the students under their responsibility before the earth shakes).

This “Practical Guide for Earthquake Resilient Schools” therefore has a dual aim:

1. To provide a tool that allows the school community to identify, assess, mitigate and monitor the risks and adverse effects that they may face in the event of an earthquake, both on and off school grounds. The guide focuses particularly on the effects caused by the non-structural elements that are one of the main causes of the property, human and functional losses during an earthquake, which occasionally prevent classes from starting again for an indefinite period of time.

2. To draw up an intervention model (mitigation plan) that can be applied to all educational levels, increasing the seismic resilience of the school community.

This guide allows the teaching staff and management team of schools to play an active role in managing risks in their schools, promoting and strengthening the long-term and effective participation of the entire educational community.