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ANDREA PENNA

CURRICULUM OF SCIENTIFIC AND PROFESSIONAL ACTIVITIES

Current academic position
Associate Professor of Structural Engineering
University of Pavia
Department of Civil Engineering and Architecture
(since October 1st, 2015)

Other affiliations.
Fellow, European Centre for Training and Research in Earthquake Engineering, Pavia, Italy.
(since 2012)

Personal data
Born in Genoa (Italy) on 21.05.1973
Home address:
Via Severino Capsoni 17
I-27100 – Pavia (PV), Italy

Previous work experiences

2011-15	Assistant Professor of Structural Engineering University of Pavia Department of Structural Mechanics Department of Civil Engineering and Architecture (since 2012)
2003-11	Researcher European Centre for Training and Research in Earthquake Engineering (EUCENTRE), Pavia
2002-03	Post-doc in Structural Engineering University of Genoa Department of Structural and Geotechnical Engineering

Post-doctoral fellowship on "Seismic response models finalized to territorial-scale risk analyses of masonry buildings" (EC FP5 RISK-UE Project)

Education

1999-2002 PhD in Earthquake Engineering
Polytechnic of Milan (Italy)
Department of Structural Engineering
PhD Advisors: Prof. E. Faccioli (Politecnico di Milano), Prof. S. Lagomarsino (University of Genoa). External reviewer: Prof. M. Tomazevic (ZAG, Ljubljana). Title of Dissertation: A macro-element procedure for the dynamic nonlinear analysis of masonry buildings.

1992-1998 Laurea (M.Eng.) in Civil Engineering (Structural)
University of Genoa (Italy)
Supervisor: Prof. S. Lagomarsino. Title of Dissertation: A methodology for seismic damage and vulnerability survey at urban scale: an application to a historical centre in Umbria

1987-1992 Liceo Classico "V. Tonolli", Verbania (Italy)

Foreign languages

English: Very good (oral), Excellent (written)
Spanish: Good (oral), Good (written)
French: Basic (oral) Basic (written).

Résumé

Andrea Penna, Structural Civil Engineer at University of Genoa, in 2002 obtained a Ph.D. in Seismic Engineering from the Politecnico of Milan. After a a post-doctoral fellowship in Structural Engineering at the Department of Structural and Geotechnical Engineering of the University of Genoa, he has been Researcher at the European Centre for Training and Research in Earthquake Engineering, Pavia (2003-2011). From December 2011 to September 2015 he has been Assistant Professor of Structural Engineering at the University of Pavia. Since October 2015 he is Associate Professor of Structural Engineering at the Department of Civil Engineering and Architecture of the University of Pavia, where he is teaching the courses of "Structural Engineering" (structural analysis and steel structures), "Structural Engineering Design" (reinforced concrete structures) and "Design and Rehabilitation of Masonry Structures".

He has been member of the Organization Committee of the 11th Italian National Earthquake Engineering Conference held in Genoa in January 2004. Dr. Penna has been chairman of sessions in several national and international conferences, member of the scientific committee (and reviewer) of some international conferences (International Conference on Rehabilitation and Restoration of Structures, Chennai, India, 2013; 7th International Conference on Advances in Experimental Structural Engineering, Pavia, Italy, 2017; 10th Australasian Masonry Conference, Sidney, Australia, 2018; International Workshop on Advanced Materials and Innovative Systems in Structural Engineering: Seismic Practices, IWAMISSE2018, Istanbul, Turkey, 2018; 12th International Conference of Structural Analysis of Historical Constructions, SAHC2020, Barcelona, Spain, 2020).

His research activity was initially mainly addressed to numerical modelling of masonry structures, seismic response evaluation of existing buildings, seismic risk analysis and seismic vulnerability of churches, historical buildings and historic centres.

As a researcher of EUCENTRE, Andrea Penna continued working on seismic vulnerability of existing masonry buildings and numerical nonlinear modeling of seismic structural response. At EUCENTRE he also carried out research activities characterized by significant experimental campaigns on the in-plane and out-of-plane response of masonry infill walls (with different reinforcement solutions) in r.c. frame structures (research funded by RDB Hebel SpA), in-plane cyclic response of full scale masonry piers (RDB Hebel SpA, EC-FP6 ESECMaSE project, Xella R&D, Dept. of Civil Protection) and mechanical characterization tests. Within the EUCENTRE executive project 2005-08 he coordinated (together with prof. G. Magenes) a large research program characterized by shaking table testing of three two-storey full-scale stone masonry building prototypes with wooden floors and roofs and different strengthening solutions.

He served as coordinator and co-coordinator of three of the nine research programs of the EUCENTRE Executive project 2005-08 funded by the Dept. of Civil Protection, coordinator of the research programs of the 2009-14 EUCENTRE Executive project and responsible one project in the Executive project 2015. He was Principal Investigator in the SICURA project funded by the Cariplo Foundation and he is co-PI in a joint research project with the Ecole Polytechnique Federale de Lausanne on the study of the seismic response of historic masonry buildings in Basel, and responsible and co-responsible of the University of Pavia Research Unit in several research projects funded by the Department of Civil Protection through the Reluis consortium.

He is author and co-author of more than 150 scientific publications on his research topics and computer programs, mainly dedicated to structural seismic response simulation (seismic analysis of masonry buildings, oil-well response to near-field earthquakes). He also contributed to several non-specialized magazines (Giornale dell'Architettura, Il Giornale dell'Ingegnere, Metrocubo) with articles on seismic risk and mitigation strategies. He also serves as a reviewer for several scientific Journals and conferences. Andrea Penna, together with Prof. Angelo Masi (University of Basilicata), is currently Guest Editor of a Special Issue of the Bulletin of Earthquake Engineering dedicated to the 2016 Central Italy earthquakes.

Since 2011, Andrea Penna has been a member of the Teaching Body of the Ph.D. Programme in Computational Mechanics and Advanced Materials of the IUSS of Pavia, in collaboration with the University of Pavia. Since 2014 he is member of the Teaching Body of the Ph.D. Programme in Civil Engineering and Architecture at the University of Pavia and since 2017 he is member of the Ph.D. Programme in Design, Modelling and Simulation in Engineering at the University of Pavia. He has been member of several Ph.D. awarding juries in Italy, Portugal, Switzerland and Colombia.

Andrea Penna participated to a number of post-earthquake survey activities in Italy and other world countries (Pakistan, Chile).

He was invited speaker, as an international expert, at the Earthquake Rehabilitation Conference held in Islamabad on 18th and 19th of November 2005, following the earthquake of the 8th of October 2005, on the subject "Seismic vulnerability assessment of masonry structures". Together with the delegation of international experts, on the 19th of November 2005, he was received by the Prime Minister of Pakistan, Shaukat Aziz. He gave a keynote lecture titled "Seismic assessment and strengthening of stone masonry buildings: recent experimental results, analysis methods and code procedures" at the mini-symposium "Seismic behaviour of existing masonry structures" of the Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics (VEESD 2013), held in Vienna in August 2013. He was also keynote speaker at the 14th D-A-CH Tagung, the joint conference on earthquake engineering and structural dynamics of

Germany, Austria and Switzerland with a lecture entitled "Analysis issues in the seismic assessment of existing masonry buildings".

He has been involved in many research projects, focused on seismic vulnerability and risk of existing masonry structures and heritage buildings as well as on the assessment of the seismic performance of innovative masonry technologies for both structural and non-structural applications.

Member of the International Masonry Society, the Italian Association for Earthquake Engineering and the European Association of Earthquake Engineering. He is also member of the following working groups: TC250/SC8/WG1 Eurocode 8 WG1 "Masonry" (Lead: Sukai Lu, Austria), responsible for the Task Group 1a "Nonlinear analysis," since 2014; European Association for Earthquake Engineering WG10 "Seismic aspects of historical monument preservation" (Lead: Prof. E Vintzileou, National Technical University of Athens, Greece), since 2014; International Federation for Structural Concrete (CEB-fib), Task Group 7.7 "Sustainable Concrete Masonry Components and Structures," (Conv. Dr. F Parisi, University of Naples, Italy), since 2017.

Teaching activity

- Courses given at the Faculty of Engineering of the University of Pavia:
  - Design of Structures (bachelor in Civil and Environmental Engineering, since 2011-12)
  - Structural Engineering (bachelor Civil and Environmental Engineering & master in Building Engineering/Architecture, since 2015-16)
  - Design and Rehabilitation of Masonry Structures (master in Civil Engineering & master in Building Engineering/Architecture: classes and seminars on assessment and rehabilitation of existing structures since 2003-04; appointed since 2017-18)

- Course given in the PhD programme in Civil Engineering and Architecture of the University of Pavia:
  - Complex cultural heritage (organized with Prof. M.P. Riccardi)

- Supervisor of bachelor theses in Civil and Environmental Engineering (15-20 per year) and master theses in Civil Engineering and in Building Engineering/Architecture (2-4 per year)

- Supervisor of MSc students at the ROSE/MEEES Programme, UME School, IUSS Pavia (1-2 per year)

- Ph.D. Faculty

  - Ph.D. Programme in *Computational mechanics and advanced materials* (Coord. Prof. F. Auricchio), IUSS Pavia and University of Pavia, since 2011-12.
  - Ph.D. Programme in *Civil Engineering and Architecture* (Coord. Prof. F. Auricchio), University of Pavia, since 2014-15.
  - Ph.D. Programme in *Design, Modelling and Simulation in Engineering* (Coord. Prof. A. Reali), University of Pavia, since 2017-18.

- Doctoral thesis tutor of:
  1. Alessandro Galasco, University of Genoa (co-supervisor, supervisor: Prof. S. Lagomarsino), title: Seismic analysis of masonry buildings, 2003-2006

2. Maria Rota, IUSS Pavia/University of Pavia, title: Advances in the derivation of fragility curves for masonry buildings, 2004-2007
3. Edoardo Fusco, Università of Naples Federico II (co-supervisor, supervisors: Prof. G. Manfredi, Prof. A. Prota), title: Seismic assessment and retrofitting of historical masonry buildings by advanced materials, 2005-2008
4. Alexandre Anibal Meira Guimaraes da Costa, Universidade do Porto (PT) (co-supervisor, supervisor Prof. A. Arede), title: Seismic assessment of the out-of-plane performance of traditional stone masonry walls, 2007-2012
5. Ilaria Enrica Senaldi, IUSS Pavia, title: The influence of floor and roof diaphragms on the seismic response of existing masonry buildings, 2009-2012
6. Francesco Graziotti, IUSS Pavia, title: Contributions towards a displacement-based seismic assessment of masonry structures, 2010-2013
7. Michele Palmieri, IUSS Pavia, title: A study on the seismic performance of selected strengthening solutions of multi-block stone monuments, 2010-2013
8. Leonidas A. Kouris, IUSS Pavia, title: Dynamic identification and assessment of the response of a full scale unreinforced masonry building tested on shaking table, 2011-2015
9. Stefano Bracchi, IUSS Pavia, title: Response of unreinforced masonry buildings to induced seismicity, 2014-2018
10. Stylianos Kallioras, IUSS Pavia, title: Numerical modelling and testing of unreinforced masonry structures for seismic fragility assessment, 2015-2019
11. Daniele Malomo, University of Pavia, title: Discrete element modelling strategies for the seismic analysis of existing masonry structures, 2015-2019
12. Umberto Tomassetti, University of Pavia, title: Experimental and numerical contributions towards the seismic assessment of the out-of-plane vulnerability of masonry buildings, 2015-2019
13. Francesco Vanin, EPFL (co-supervisor, supervisor: Prof. K. Beyer), title: Equivalent-frame models for in-plane and out-of-plane response of unreinforced masonry buildings, since January 2015, ongoing
14. Chiara Morandini, University of Pavia, tentative title:

- PhD awarding Juries and Review:
  - Universitat Polytecnica de Catalunya (Spain) - external reviewer (2006)
  - UME School, IUSS Pavia (2011, 2018)
  - EPFL Lausanne (2011, 2014)
  - Universidad de Medellin (2016)
  - University "G. d'Annunzio" Chieti-Pescara (Italy) – external reviewer (2016)
  - Roma Tre University (2017)
  - University of Cambridge (2018)
  - University of Naples "Federico II" – external reviewer (2018)

- Courses given outside Pavia and dissemination:
  - Numerous education courses for practising engineers and architects in Italy on the seismic design and assessment of masonry buildings, since 2003; Ordini degli Ingegneri della Province di Alessandria e Asti (Alessandria), Ordini degli Ingegneri delle Province di Biella e Vercelli (Vercelli), Ordine degli Architetti della Provincia di Cuneo, Ordine degli

Architetti della Valle d'Aosta, Ordine degli Architetti della Provincia di Alessandria, Ordini degli Architetti delle Province di Biella, Vercelli, Alessandria e Novara (Santhià, VC), Ordine degli Ingegneri della Provincia di Imperia (Sanremo), Ordine degli Ingegneri della Provincia di Savona, Provincia di Genova, Ordine degli Ingegneri della Provincia di Milano, Regione Lombardia (IREF) sede di Brescia, Collegio dei Geometri della Provincia di Brescia, Ordine degli Ingegneri della Provincia di Venezia (Venice and Portogruaro), Ordine degli Ingegneri della Provincia di Vicenza; Ordine degli Ingegneri della Provincia di Padova, Ordine degli Ingegneri della Provincia di Treviso (Treviso and Vittorio Veneto); Regione Toscana (Florence), Ordine degli Architetti della Provincia di Lucca, Scuola Edile Spezzina (La Spezia), Ordine degli Ingegneri della Provincia di Bologna, Consiglio Nazionale degli Architetti (Udine), Fondazione Vajont, Longarone (BL), Ordine degli Ingegneri della Provincia di Lucca, Ordine degli Ingegneri della Provincia di Massa – Carrara, Ordine degli Ingegneri della Provincia di Grosseto), EUCENTRE Pavia short courses on Seismic Design of Masonry Structures (since 2005), EUCENTRE Pavia short courses on Seismic Assessment and Retrofitting of Existing Masonry Buildings (since 2007), EUCENTRE Pavia short course on Reduction of Seismic Risk of Heritage Buildings (2008), Fondazione CAMPUS Lucca.

- Participation and talks in public events on topics related to seismic risk, vulnerability analysis and structural assessment of masonry structures, organized by the local societies of chartered engineers Ordine degli Ingegneri (Milano, Sanremo, Modena, Reggio Emilia, Parma, Piacenza, Brescia), associations (Museo di Storia Naturale di Milano - Gruppo Naturalistico della Brianza) and technical conferences (SAIE, Tecnargilla).
- "Seismic assessment of existing masonry buildings," course at the University of Medellin, Columbia, November 2016. Invited by Prof. Ricardo Leon Bonett Diaz
- Invited seminars and courses at several Italian and International Institutions

Invited lectures

- Earthquake Rehabilitation Conference, Islamabad, November 18, 2005, (after the earthquake of October 8th, 2005) *Seismic vulnerability assessment of masonry structures*.
- Vienna Conference on Recent Advances in Earthquake Engineering and Structural Dynamics, Vienna, August 28th, 2013, *Seismic assessment and strengthening of stone masonry buildings: recent experimental results, analysis methods and code procedures*, in the minisymposium on "Seismic behaviour of existing masonry structures"
- 14th D-A-CH Tagung, Zurich, August 21st, 2015, *Analysis issues in the seismic assessment of existing masonry buildings*.
- 21st Congreso Nacional de Ingenieria Estructural, Campeche, Mexico, November 14th, 2018, *Estrategias y herramientas para el análisis no lineal de la respuesta sísmica de construcciones históricas.*

Invited seminars

- February 14th, 2005 "Analisi non lineare delle costruzioni in muratura soggette a sisma", Faculty of Engineering, University of Ferrara, Italy;
- July 21st, 2005 "Analisi sismica non lineare di strutture in muratura", Faculty of Engineering, University of Pisa, Italy;
- April 14th, 2007 "The evaluation of ancient building vulnerability before and after an earthquake" in *Retrofitting of ancient non monumental built-up local seismic culture and local sustainable*

development: problems, methods, techniques, Centro Universitario Europeo per i Beni Culturali, Ravello, Italy;

- April 16th, 2007 "L'analisi sismica non lineare degli edifici in muratura: modelli, strumenti, applicazioni e problemi aperti" Faculty of Engineering, University of Naples "Federico II", Italy;
- May 8th, 2007 "Non-linear macro-element seismic analysis of masonry buildings: models, methods, tools and problems" Faculty of Engineering, University of Porto, Portugal;
- April 15th, 2008 "Enhanced seismic capacity of masonry structures with bed joint reinforcement" Bekaert seminar, Bouillon, Belgium;
- April 18th, 2013 "Macro-element modelling of masonry walls. Modelling issues, recent developments and applications" School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne, Switzerland.

Research projects

As a member of the research units of the University of Genoa, he has been involved in many research projects, mainly focused on seismic vulnerability and risk of existing masonry structures and heritage buildings.

PI in research projects with public financing

- Research Program No. 2 "Numerical-experimental check of the indications concerning existing masonry buildings" of the EUCENTRE Executive Project 2005-2008 (funded by the Department of Civil Protection), Co-PI: Prof. Guido Magenes, 2005-2010
- Research Program No. 9 "Innovative tools for the experimental evaluation of seismic damage and vulnerability of structures" of the EUCENTRE Executive Project 2005-2008 (funded by the Department of Civil Protection), Co-PIs: Prof. Alberto Pavese, Dr. Claudio Strobbia, 2005-2008
- Research Project e3, "Seismic vulnerability of masonry buildings", EUCENTRE Executive Project, 2012-2014.
- Masonry Structures line of the RELUIS Executive Project funded by the Department of Civil Protection, co-PI: Prof. Guido Magenes, 2014-ongoing
- Line RS 11 of the RELUIS Executive Project funded by the Department of Civil Protection, co-PI: Prof. Guido Magenes, 2014-ongoing
- Topic C.2.1.2 - Improvement of the seismic assessment of existing masonry buildings by improving structural analysis and assessment procedures, EUCENTRE Executive Project 2014-16 funded by the Department of Civil Protection, co-PI: Prof. Guido Magenes, 2014-2016
- Topic C.1.1 – Analysis of masonry buildings designed/strengthened according to the Italian building code, EUCENTRE Executive Project 2016 funded by the Department of Civil Protection, co-PI: Prof. Guido Magenes, 2016
- Topic 15 – Analysis of new and existing masonry buildings designed/assessed according to the Italian building code, EUCENTRE Executive Project 2017 funded by the Department of Civil Protection, co-PI: Dr. Maria Rota, 2017-ongoing
- Seismic assessment of stone masonry buildings in Basel, Canton Basel-Stadt and Federal Office for the Environment (OFEV), Co-PIs: Prof. Katrin Beyer (EPFL), Prof. Guido Magenes (University of Pavia), Dr. Thomas Wenk (Consulting, Switzerland), 2015-2018
- Agreement between EUCENTRE and RELUIS for the technical and scientific support activities related with the seismic events in the territory of the Lazio, Marche, Umbria and Abruzzi regions since August 24th 2016, funded by the Ministry of Cultural Heritage, 2017

Participation as PI/co-PI in research projects with private financing

- Aerated autoclaved concrete in seismic areas, Research project between EUCENTRE and RDB Hebel S.p.A. – Principal Investigator, co-PI: Prof. Gian Michele Calvi, 2004-2007
- Development of innovative tools for the seismic design of reinforced masonry elements, Research project between EUCENTRE and Bekaert NV – Principal Investigator, co-PI: Prof. Gian Michele Calvi, 2005-2008
- Seismic behaviour of AAC masonry, Research project between EUCENTRE and Xella R&D – Principal Investigator, co-PI: Prof. Guido Magenes, 2008-2015
- Seismic response of AAC URM structures, Research project between EUCENTRE and RDB Hebel S.p.A. – Principal Investigator, co-PI: Prof. Guido Magenes, 2009-2012
- Seismic performance of masonry buildings with load bearing masonry elements with horizontal bed-joint truss reinforcement, Research project between EUCENTRE and Bekaert NV – Principal Investigator, 2009-2010
- Calibration of numerical models for masonry spandrels based on large-scale tests, funded by KGV Praventionsstiftung (CH), Switzerland – Principal Investigator, co-PI: Prof. Guido Magenes, 2011-2012
- SICURA (Innovative strategies for the safety, use and valorisation of the architectural heritage), funded by the Cariplo Foundation within the call "to promote good rules for the prevention and conservation of the historical and architectonical heritage " – Principal Investigator, 2013-2015
- Study the vulnerability of masonry buildings in Groningen," funded by Nederlandse Aardolie Maatschappij B.V. – Co-Investigator, 2014-ongoing

Participation in other research projects

1998 Department of Structural and Geotechnical Engineering (DISEG) – University of Genoa: damage and vulnerability survey of the historical centre of *Roccanolfi di Preci (PG) after the Umbria-Marche earthquake of 1997* (pilot project funded by the National Seismic Survey)

2000-02 Research agreement between DISEG – University of Genoa and Tuscany Region: Dynamic identification of some strategic public buildings *in the areas of Lunigiana and Garfagnana by means of forced and ambient vibration tests,* coordinated by prof. L. Gambarotta.

2000- 03 *WESTERN LIGURIA* Research Project – *Scenario analyses in Western Liguria and solutions for the conservation of historical centres*, coordinated by prof. S. Lagomarsino, funded by INGV-GNDT (National Institute of Geophysics and Volcanology – National Group for the Defence against Earthquakes)

2000- 03 Research project *TRAIANO – Assessment and reduction of the seismic vulnerability of the existing building stock,* coordinated by prof. E. Cosenza, funded by INGV-GNDT (National Institute of Geophysics and Volcanology – National Group for the Defence against Earthquakes)

2001-04 EC-FP5 RISK-UE project - *An advanced approach to earthquake risk scenarios with applications to different Europeans towns,* coordinated by dr. Mouroux, funded by the European Commission (FP5).

2002-03 Research project co-funded by MIUR Conservation strategies for cultural heritage buildings based on structural monitoring, coordinated by prof. A. De Stefano.

2003-04 Research agreement between DISEG - University of Genoa and Sanremo Municipality for the assessment of the "*Seismic vulnerability of school buildings*", coordinated by prof. Lagomarsino.

2003-04 Research Agreement between EUCENTRE and the Tuscany Region *"Definition of guidelines for the seismic assessment of strategic and relevant buildings in the Tuscany Region, according to the new Italian seismic code (OPCM 3274)"*

2004-08 EC-FP6 Research Project *ESECMaSE "Enhanced Safety and Efficient Construction of Masonry Structures in Europe"* (RU University of Pavia), coord. prof. E. Fehling (Univ.Kassel)

2005-08 Line 1 "Assessment and reduction of the seismic vulnerability of masonry buildings", of the RELUIS Executive Project 2005-2008 (Research Unit of the University of Pavia), national coordinators proff. Sergio Lagomarsino and Guido Magenes (funded by the Department of Civil Protection).

2005-08 Line 10 "Definition and development of databases for risk assessment and emergency planning and management", of the RELUIS Executive Project 2005-2008 (Research Unit of the University of Pavia), national coordinator prof. Domenico Liberatore (funded by the Department of Civil Protection).

2006-07 Bilateral Project between Italy and India "Seismic vulnerability of historic centres in India" (Research Unit of the University of Pavia) in collaboration with the Indian Institute of Technology Madras, India, (funded by the Ministry of Foreign Affairs as a high relevance scientific cooperation project).

2006-08 STEP Project (Strategies and Tools for Early Post earthquake assessment), CE – FP7 [2006-2008]

2009-10 Research project between EUCENTRE and ANPEL "Seismic design of large reinforced masonry infills" [ANPEL, 2009-10].

2010-11 Research project between EUCENTRE and ANPEL "Development of a design software for large reinforced masonry infill walls"

2008-11 Research Programme e5/1 ("Displacement-based methods for the seismic assessment of masonry buildings and possible implications for design"), EUCENTRE Executive Project 2008-2011.

2008-11 Research Programme e5/2 ("Knowledge levels and confidence factors for masonry buildings and cultural heritage "), EUCENTRE Executive Project 2008-2011.

2009-13 RELUIS Executive Project 2009-2013, Tools for the assessment and management of seismic risk of the existing building stock. *New aspects in the assessment of existing structures and retrofit interventions and evaluation of seismic risk of the existing building stock at the regional scale. Vulnerability assessment of masonry buildings, historical centres and cultural heritage* (coordinated by Proff. S.Lagomarsino, G.Magenes and C.Modena).

2009 Technical-scientific supporting activities for the emergency phase and the beginning of the reconstruction in the Abruzzi areas hit by the earthquake – item 12, Ordinance 15th of April 2009 of the Presidency of the Council of Ministers [EUCENTRE, 2009].

2010-11 Seismic assessment of the INGV building in Catania [INGV, 2010].

2010-12 Reduction of seismic risk of the cultural heritage in Italy and in India [Scientific collaboration project funded by the Lombardy Region, 2010 - 2012].

2011-12 Agreement with RELUIS (Laboratories University Network of seismic engineering) for the seismic assessment of masonry buildings of the Italian railway network (RFI).

2011-12 Bilateral project between Italy and Slovenia "Protection of cultural heritage from earthquakes*"* in collaboration with the Engineering and Geodesy Faculty of the University of Ljubljana, Slovenia (funded by the Ministry of Foreign Affairs as a high relevance scientific cooperation project).

2011-13 PRIN2009 Project "Analysis and modelling approaches for multi-layer masonry typologies for the conservation of historical buildings (coordinated by Prof. S. Lagomarsino).

2011-13 Research Project e1 ("Seismic assessment of masonry buildings accounting for the knowledge level and for the different sources of uncertainty "), EUCENTRE Executive Project 2012-2014.

2013-15 Research Project SIGMA - SeIsmic Ground Motion Assessment (UR EUCENTRE), funded by EDF, AREVA, CEA and ENEL (coordinated by Dr. G. Senfaute).

2013-15 Coordinator of the project SICURA (Innovative strategies for the safety, use and valorisation of the architectural heritage), funded by the Cariplo Foundation within the call "to promote good rules for the prevention and conservation of the historical and architectonical heritage " – University of Pavia

2014-16 Topic C.2.1.1 – Improvement of the seismic assessment of existing masonry buildings accounting for limited knowledge of the structure and for the different sources of uncertainty, EUCENTRE Executive Project 2014-16

2014-16 Topic C.2.1.3 - Improvement of the seismic assessment of existing masonry buildings by developing fragility curves for masonry buildings, EUCENTRE Executive Project 2014-16

Development of computer programs

Together with Sergio Lagomarsino and Alessandro Galasco, Andrea Penna is author of the structural analysis program TREMURI. The TREMURI computer program is a dedicated analysis tool for the nonlinear seismic analysis of masonry buildings, based on the equivalent frame modelling strategy with nonlinear macroelements representing masonry structural members. TREMURI (and the derived professional program 3Muri) is used in several countries as a professional tool and in many universities worldwide for research purpose.

The Universities where TREMURI and 3Muri are used for teaching or research purposes include:

- ITALY: Università degli Studi di L'Aquila; Politecnico di Bari; Università degli Studi di Bergamo; Università degli Studi di Brescia; Università degli Studi di Bologna; Università degli Studi di Camerino; Università degli Studi di Cassino; Università degli Studi della Campania "L. Vanvitelli"; Università degli Studi di Catania; Università degli Studi di Ferrara; Università degli Studi di Firenze; Università degli Studi Genova; Università Politecnica delle Marche; Politecnico di Milano; Università degli Studi del Molise; Università degli Studi di Napoli "Federico II"; Università degli Studi di Padova; Università degli Studi di Palermo; Università degli Studi di Parma; Università degli Studi di Pavia; IUSS Pavia; Università degli Studi di Perugia; Università degli Studi di Pisa; Università degli Studi di Roma "La Sapienza"; Università degli Studi di Salerno; Università degli Studi del Sannio; Politecnico di Torino; Università degli Studi di Trento; Università degli Studi di Udine.
- ALGERIA: University of Science & Technology Houari Boumediene, Algeri.
- ARGENTINA: Universidad Nacional de Cordoba; Universidad Tecnologica Nacional, Mendoza.
- AUSTRALIA: University of Adelaide.
- BELGIO: KU Leuven; Université de Liège.
- CANADA: McMaster University, Hamilton, Ontario; University of British Columbia, Vancouver; École de Technologie Supérieure, Montréal; Concordia University, Montréal.
- COLOMBIA: Universidad EAFIT, Medellin.
- CROATIA: University of Zagabria; University of Osijek.
- ECUADOR: Universidad de Cuenca.
- EL SALVADOR: Universidad de El Salvador.
- FRANCE: Laboratoire Genie de Production, Ecole Nationale d'Ingenieurs Tarbes, Tarbes; Laboratoire de Mécanique et Génie Civil, Université Montpellier II, Montpellier.
- GERMANY: University of Kassel, University of Karlsruhe.

- GREECE: Aristotle University of Thessaloniki; National Technical University Athens; Technical University of Crete.
- HUNGARY: University of Technology and Economics, Budapest.
- INDIA: Anna University Chennai; Indian Institute of Technology-Madras Chennai.
- IRAN: Iran University of Science and Technology, Teheran; Babol Noshirvani University of Technology.
- MACEDONIA: University "Ss. Cyril and Methodius", Skopje
- MALTA: University of Malta
- MEXICO: Universidad Michoacana de San Nicolás de Hidalgo
- NETHERLANDS: Eindhoven University of Technology.
- PAKISTAN: National University of Sciences & Technology, Islamabad.
- PERU: Pontificia Universidad Catolica de Peru.
- PORTUGAL: Istituto Superior Tecnico Lisbona; Universidade do Minho; Universidade do Porto; Universidade do Aveiro; Universidade NOVA de Lisboa; Laboratório Nacional de Engenharia Civil.
- ROMANIA: University of Timisoara.
- SLOVENIA: University of Lubiana; University of Maribor; Slovenian National Building And Civil Engineering Institute (ZAG).
- SPAIN: Universitat Politecnica de Catalunya, Barcellona; Universidad de Sevilla; Universidad de La Rioja, Logroño.
- SWITZERLAND: Ecole Polytechnique Federale Lausanne; Eidgenössische Technische Hochschule Zürich.
- TURKEY: TC Istanbul Kultur University; Istanbul Technical University;
- UK: University of Portsmouth; University College London.
- USA: University of California, San Diego.

Research awards

Andrea Penna and co-authors received the *H.W.H. (Timber) West Award* for best paper related to seismic response or retrofit of masonry, attributed for the paper Magenes G., Penna A., Senaldi I., Galasco A., Rota M. (2013) "Experimental Investigation on the Effect of Diaphragm In-plane Stiffness on the Seismic Response of Masonry Buildings," 12th Canadian Masonry Symposium, Vancouver 2013, and special mention at the *Italian Heritage Award*, Roma 2013, on international award for the conservation of cultural heritage – award for the research, training and innovation in the conservation of cultural heritage (special mention to the EUCENTRE Foundation for the scientific collaboration project "Reduction of seismic risk of the cultural heritage in Italy and in India").

Research activity outside Italy

- Universitat Politecnica de Catalunya, Barcelona (Spain) - July 2002
  Invited to collaborate to the seismic vulnerability analysis of the buildings of the Eixample district in Barcellona (Prof. A. Barbat and Prof. L. Pujades).

- 2009-13 External Consultant of the research project "Field Experimental Characterization of Stone Masonry Constructions under Earthquake Actions", coord. Prof. A. Costa (Universidade do Aveiro, PT) funded by the Fundação para a Ciência e Tecnologia (Portugal).

Revision and updating of codes/guidelines

Andrea Penna collaborated to the revision of the Italian seismic code OPCM 3274/2003, contributing to the preparation of the corrections published with Ordinance PCM 3431/2005, for the parts related to new and existing masonry buildings (chapters 8 and 11).

- Working groups: WG10 – "Seismic Aspects of Historical Monument Preservations" of the European Association for Earthquake Engineering;
- coordinator of WP1a "Nonlinear analysis" of CEN TC 250/SC8/WG1 "Masonry" for the preparation of proposals for the revision of Eurocode 8 (EN 1998-1 e EN 1998-3);
- Task Group TG7.7 "Sustainable Concrete Masonry Components and Structures" the International Federation for Structural Concrete (CEB-fib).

Editorial activity

Regular reviewer for several international journals, including but not limited to:

Engineering Structures, Journal of Earthquake Engineering, Earthquake Spectra, Bulletin of Earthquake Engineering, Earthquake Engineering and Structural Dynamics, Soil Dynamics and Earthquake Engineering, Construction and Building Materials, Materials and Structures, ASCE Journal of Engineering Mechanics, ASCE Journal of Structural Engineering, Earthquake Engineering and Engineering Vibrations, International Journal of Architectural Heritage, International Journal of Masonry Research and Innovation, Earthquakes and Structures, Buildings, Structures, Structures and Buildings, Computers and Structures

Guest editor of the Special Issue of the Bulletin of Earthquake Engineering on the 2016 Central Italy earthquakes, 2017 ongoing (together with Angelo Masi)

Member of the Editorial Board of *Progettazione Sismica* (Seismic Design)

Post-earthquake damage survey activity in Italy and abroad

Umbria – Marche earthquake, 26th of September 1997

Damage and vulnerability survey activity in the historical centre of Roccanolfi di Preci (PG), within a pilot project under the aegis of the Assistant Commissary for the Cultural Heritage of the Umbria Region, realised in collaboration between the University of Genoa, the University of Padoa and the Politecnico of Milan, funded by the National Seismic Survey – Italian National Department of Civil Protection. Creation of a cd-rom database for filing the computerized survey forms and corresponding photographic documents.

Novi Ligure (AL) earthquake, 11th of April 2003

Agreement between DISEG – University of Genoa and Piedmont Region: damage and usability survey and survey of the seismic vulnerability elements of the churches located in the arear struck by the earthquake. Based on the compiled survey forms, regional funding for damage reparation and seismic vulnerability reduction were distributed

Salò (BS) earthquake, 24th of November 2004

Mission supporting the Civil Protection Department for post-earthquake usability surveys: Dr. Penna coordinated the Eucentre-ROSE School task force of 29 engineers which allowed to complete the usability surveys of public buildings (town halls, schools, hospitals) in the areas struck by the earthquake in the Brescia province, within two days from the event

Kashmir (Pakistan) earthquake, 8th of October 2005

Participation to the international reconnaissance mission in the areas struck by the strong Pakistan earthquake (M 7.6, more than 70.000 victims), with inspection to the most severely damaged centres of Muzaffarabad, Balakot, Gahri Habibullah and Abbottabad (November 2005).
EUCENTRE mission in January 2007, during the post-earthquake rehabilitation and reconstruction phase.

L'Aquila earthquake, 6th of April 2009
Mission supporting the Civil Protection Department for post-earthquake usability surveys: starting from the 7th of April 2009, Dr. Penna was coordinating EUCENTRE survey teams working on the assessment of strategic structures (including the S. Salvatore hospital, the complex of the juvenile court, the Pasquali-Campomizzi barracks), public structures (e.g. schools) and structures hosting relevant production activities (e.g. pharmaceutical industries).

Chile earthquake, 27th of February 2010
Reconnaissance mission organised with the "La Sapienza" University of Rome in the areas hit by the seismic sequence of 2010 (main event on the 27th of February 2010, M 8.8), with inspections to the most severily damaged centres (Talca, Concepcion, Costitucion, Cauquenes) and damage survey to masonry (confined masonry, adobe) buildings and historical (churches) buildings also in the area of Santiago.

Emilia earthquakes, May 2012
Reconnaissance mission in the areas hit by the seismic sequence of 2012 (main events on the 20th and 29th of May 2012, M 5.9 and 5.8 respectively), covering the most damaged centres in the provinces of Modena, Mantua, Ferrara and Bologna and damage survey to masonry and historical buildings. Post-earthquake usability surveys supporting the activities of the Civil Protection Department.

Central Italy earthquakes, 2016-17
Reconnaissance missions organized by EUCENTRE, Reluis and EERI in the areas hit by the seismic sequence of 2016-17 (main events on the 24th of August 2016, M 6.0, 26th of October 2016, M 5.9 and 30th of October 2016, M6.5, and 18th of January 2017, M5.5), covering the most damaged municipalities of Amatrice, Accumoli, Arquata del Tronto, Norcia, Visso, Preci, Camerino and Amandola. Post-earthquake assessment of schools for supporting public decisions on rehabilitation strategies. Coordination of the surveys carried out by the University of Pavia and EUCENTRE of the post-earthquake damage surveys to heritage structures (more than 300 churches).

Professional experience and consultancy

Andrea Penna is a registered Professional Engineer since 2001, currently registered in the *Albo degli Ingegneri della Provincia di Pavia*. Professional experiences including, but not limited to:

2002-04	Finite Element Modelling, Identification, Static and Seismic Analysis of the Bell Tower of the S. Martino's Church in Castellazzo Bormida (Italy)
2002-04	Structural Monitoring of the S. Giacomo's church in Costa Merlassino, Cantalupo Ligure (Italy)
2003-05	Finite Element Modelling and Assessment of Improved Seismic Behaviour of the Madonna della Creta Sanctuary in Catellazzo Bormida (Italy)
2003-04	Design of Seismic Repair and Retrofitting of the Loggia of San Sebastiano in Ovada (Italy) – Municipality of Ovada
2003-04	Design of Retrofitting Interventions on the S. Fedele's Church in Malvino, Sardigliano (Italy)
2004	Structural Analysis of a Masonry Arch Bridge (SP 62 Serra del Monte-Cecima, Italy) - Studio Calvi srl
2004-05	Seismic Retrofit Interventions of the Natività di Maria Church in Cantalupo, Alessandria (Italy)
2004	Fast Seismic Vulnerability Assessment of the Historic Centre of Bussana Vecchia, Sanremo (Italy)
2005-09	Technical Consultancy on the Renovation Works on the "Franco Alfano" Auditurium, Marsaglia Gardens, Sanremo (Italy), Municipality of Sanremo
2005-06	Seismic Assessment of Four Schools in Sanremo (Italy) (Scuola Media "Pascoli", Scuola Media Superiore "Colombo", Scuola Elementare e Media "Volta") – Municipality of Sanremo
2005-06	Seismic Assessment of the Building of the Comunità Montana Argentina Armea in Arma di Taggia (IM) – Comunità Montana Argentina Armea

2005-06 Design of Repair and Retrofitting Interventions on the Churches of S. Nicolò da Bari, S. Martino in Tresnico, San Michele Val di Sur and S. Maria Nascente in Gardone Riviera (Italy), damaged by the November 24th, 2004, earthquake

2007 Seismic Assessment of the Police Headquarter (Questura) in Imperia (Italy) – Ministry of Interior

2008-09 Seismic Assessment of two Schools in Ceriana, Italy (Asilo G. B. Rubini and Scuola Media G. Natta) – Municipality of Ceriana

2008-09 Seismic Assessment of the City Hall of Cesio (Italy) - Municipality of Cesio

2008-09 Seismic Assessment of the City Hall of Pieve di Teco (Italy) - Municipality of Pieve di Teco

2008-09 Seismic Assessment of the City Hall of Chiusanico (Italy) and Nursery/Primary School (Italy) - Municipality of Chiusanico

2009 Evaluation of the Structural Integrity and Conservation and Damage Conditions of the Villa Basile di San Rizzo, located in Stresa (Italy).

2009-11 Consultancy on Static and Seismic Aspects of the completion of the Restoration Works on the Youth Hostel of Ceriana (Italy), affected by partial collapse – Municipality of Ceriana

2010-11 Support to the Modellig and Analysis of Masonry Buildings included in the permanent monitoring programme of the Seismic Observatory of Structures - SGM Engineering

2015 Scientific Collaboration to the Experimental and Modelling Activities (Including Validation) on URM Buildings and Components Typical of the Groningen Province (The Netherlands) – EUCENTRE Foundation

Publications

[A] Monographs

[A.1] Decanini L.D., Liberatore D., Liberatore L., Magenes G., Penna A., Sorrentino L. (2012). Report on the Maule (Chile) February 27th, 2010 earthquake, IUSS Press. Pavia.

[A.2] Rota M., Penna A., Strobbia C., Magenes G. (2008) "Derivation of empirical fragility curves from Italian damage data" ROSE Report 2008/08, IUSSPRESS, Pavia.

[B] Book chapters

[B.1] Guerrini G., Graziotti F., Penna A., Magenes G. (2018) Dynamic Shake-Table Tests on Two Full-Scale, Unreinforced Masonry Buildings Subjected to Induced Seismicity. In: Conte J., Astroza R., Benzoni G., Feltrin G., Loh K., Moaveni B. (eds) Experimental Vibration Analysis for Civil Structures. EVACES 2017. Lecture Notes in Civil Engineering, vol 5. Springer, Cham.

[B.2] Romão X., Penna A. (2018) Code-Based Procedures for Seismic Safety Assessment and Retrofit. In: Costa A. *et al.* (Eds), Strengthening and Retrofitting of Existing Structures, Building Pathology and Rehabilitation, 9, pp. 301-320, Springer Nature, Singapore, https://doi.org/10.1007/978-981-10-5858-5_13.

[B.3] DeJong, M., Penna, A. (2016) Design of Masonry Structures, in A.Y. Elghazouli (ed.) Seismic Design of Buildings to Eurocode 8, pp. 235-254, CRC Press.

[B.4] Graziotti, F., Magenes, G., Penna, A. (2016) "Experimental Campaign on Double-Leaf Stone Masonry Specimens at the University of Pavia and EUCENTRE Pavia, in N. Augenti, F. Graziotti, G. Magenes, F. Parisi (eds.) Experimental Researches on the Seismic Behavior of Masonry Spandrels: An International Perspective, EUCENTRE Research Report, pp. 5-46, EUCENTRE Press.

[B.5] Penna, A., Rota, M., Galasco, A., & Mouyiannou, A. (2015). Towards the Use of Time-History Analysis for the Seismic Assessment of Masonry Structures. In Seismic Assessment, Behavior and Retrofit of Heritage Buildings and Monuments (pp. 83-111). Springer International Publishing.

[B.6] Penna A., Magenes G. (2012). Masonry Buildings, in Decanini et al. (ed.) Report on the Maule (Chile) February 27th, 2010 earthquake. IUSS Press, Pavia.

[B.7] Penna A. (2011) Tools and strategies for the performance-based seismic assessment of masonry buildings, in M. Dolšek (ed.) Protection of built environment against earthquakes, Springer (Dodrecht, Heidelberg, London, New York), ISBN 978-94-007-1447-2 e-ISBN 978-94-007-1448-9 DOI 10.1007/978-94-007-1448-9.

[B.8] Magenes G., Penna A. (2010) Costruzioni di muratura, in D. Guzzoni (a cura di) "Norme tecniche per le costruzioni. Guida alla interpretazione e applicazione del D.M. 14.1.2008 e della Circolare esplicativa 617/2009", ed. Il Sole 24 Ore, Milano, 2° edizione.

[B.9] Magenes G., Penna A. (2009) Existing masonry buildings: general code issues and methods for analysis and assessment, in E. Cosenza (ed.) Eurocode 8 perspectives from the Italian standpoint workshop, Napoli, Doppiavoce, pp. 185-198, ISBN 978-88-89972-16-8.

[B.10] Magenes G., Penna A. (2006) Edifici con struttura in muratura, in D. Guzzoni (a cura di), Norme Tecniche per le Costruzioni. Analisi e commento al D.M. 14 settembre 2005. Progettazione, esecuzione, collaudo, manutenzione e utilizzo delle opera. I nuovi criteri per l'antisismica, Il Sole 24 Ore, Milano, ISBN 88-324-5957-4.

[C] Articles in international journals

[C.1] Penna A, Calderini C, Sorrentino L, Carocci CF, Cescatti E, Sisti R, Borri A, Modena C, Prota A (2019), Damage to churches in the 2016 central Italy earthquakes, BULLETIN OF EARTHQUAKE ENGINEERING, pp. 1-28 doi.org/10.1007/s10518-019-00594-4

[C.2] Penna A., Galasco A., Tondelli M., Rota M., Magenes G. (2019) “Seismic vulnerability of old Italian railway stations” RILEM Bookseries Vol. 18, 2019, pp. 1229-1237.

[C.3] Senaldi I., Guerrini G., Caruso M., Graziotti F., Magenes G., Beyer K., Penna A. (2019) "Experimental seismic response of a half-scale stone masonry building aggregate: effects of retrofit strategies", RILEM Bookseries, Vol. 18, pp. 1372-1381.

[C.4] Kallioras S, Graziotti F, Penna A (2019) Numerical assessment of the dynamic response of a URM terraced house exposed to induced seismicity. BULLETIN OF EARTHQUAKE ENGINEERING, 17(3): 1521-1552.

[C.5] Graziotti F, Penna A, Magenes G (2019) A comprehensive in situ and laboratory testing programme supporting seismic risk analysis of URM buildings subjected to induced earthquakes. BULLETIN OF EARTHQUAKE ENGINEERING, 1-25.

[C.6] Cattari S, Camilletti D, Lagomarsino S, Bracchi S, Rota M, Penna A (2018) Masonry Italian Code-Conforming Buildings. Part 2: Nonlinear Modelling and Time-History Analysis, JOURNAL OF EARTHQUAKE ENGINEERIG, 22(sup2): 2010-2040.

[C.7] Manzini CF, Magenes G, Penna A, da Porto F, Camilletti D, Cattari S, Lagomarsino S (2018) Masonry Italian Code-Conforming Buildings. Part 1: Case Studies and Design Methods, JOURNAL OF EARTHQUAKE ENGINEERIG, 22(sup2): 54-73.

[C.8] Morandi P, Albanesi L, Graziotti F, Li Piani T, Penna A, Magenes G (2018) Development of a dataset on the in-plane experimental response of URM piers with bricks and blocks. CONSTRUCTION AND BUILDING MATERIALS, 190:593-611.

[C.9] Mazzoni S, Castori G, Galasso C, Calvi P, Dreyer R, Fischer E, Fulco A, Sorrentino L, Wilson J, Penna A, Magenes G (2018) 2016-17 Central Italy Earthquake Sequence: Seismic Retrofit Policy and Effectiveness, EARTHQUAKE SPECTRA, 34(4): 1671-1691.

[C.10] Sorrentino L, da Porto F, Magenes G., Penna A (2018) Seismic behaviour of ordinary masonry buildings During the 2016 Central Italy Earthquakes, BULLETIN OF EARTHQUAKE ENGINEERING, doi: 10.1007/s10518-018-0370-4

[C.11] Tomassetti U, Graziotti F, Penna A, Magenes G (2018) Modelling one-way out-of-plane response of single-leaf and cavity walls, ENGINEERING STRUCTURES 167:241-255

[C.12] Rosti A, Rota M, Penna A (2018) Damage classification and derivation of damage probability matrices from L’Aquila (2009) post-earthquake survey data, BULLETIN OF EARTHQUAKE ENGINEERING

[C.13] Malomo D, Pinho R, Penna A (2018) Using the Applied Element Method for Modelling Calcium-Silicate Brick Masonry Subjected to In-Plane Cyclic Loading, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS 47(7):1610-1630

[C.14] Kallioras S, Guerrini G, Tomassetti U, Marchesi B, Penna A, Graziotti F, Magenes G (2018). Experimental Seismic Performance of a Full-Scale Unreinforced Clay-Masonry Building with Flexible Timber Diaphragms, ENGINEERING STRUCTURES 161:231-249

[C.15] Vanin F, Zaganelli D, Penna A, Beyer K (2017) Estimates for the stiffness, strength and drift capacity of stone masonry walls based on 123 quasi-static cyclic tests reported in the literature, BULLETIN OF EARTHQUAKE ENGINEERING, doi:10.1007/s10518-017-0188-5.

[C.16] Graziotti F, Tomassetti U, Kallioras S, Penna A, Magenes G (2017) Shaking table test on a full scale URM cavity wall building, BULLETIN OF EARTHQUAKE ENGINEERING, doi:10.1007/s10518-016-9896-5.

[C.17] Guerrini G, Graziotti F, Penna A, Magenes G (2017). Improved evaluation of inelastic displacement demands for short-period masonry structures, EARTHQUAKE ENGINEERING AND STRUCTURAL DYNAMICS, 46(9), pp. 1411–1430

[C.18] Kouris LAS, Penna A, Magenes G (2017) Seismic damage diagnosis of a masonry building using short-term damping measurements, JOURNAL OF SOUND AND VIBRATION, 394, 366-391

[C.19] Mendes, N., Costa, A.A., Lourenço, P.B., Bento, R., Beyer, K., de Felice, G., Gams, M., Griffith, M.C., Ingham, J.M., Lagomarsino, S., Lemos, J.V., Liberatore, D., Modena, C., Oliveira, D.V., Penna, A., Sorrentino, L. (2017) Methods and Approaches for Blind Test Predictions of Out-Of-Plane Behavior of Masonry Walls: A Numerical Comparative Study, INTERNATIONAL JOURNAL OF ARCHITECTURAL HERITAGE, 11, 59-71.

[C.20] Graziotti, F., Tomassetti, U., Penna, A., Magenes, G. (2016) Out-of-plane shaking table tests on URM single leaf and cavity walls, ENGINEERING STRUCTURES, 125, pp. 455-470.

[C.21] Bracchi S., Rota M., Penna A., Magenes G. (2016) Seismic assessment of masonry buildings accounting for limited knowledge on materials by Bayesian updating, BULLETIN OF EARTHQUAKE ENGINEERING, 14(8), 2273-2297.

[C.22] Graziotti F., Penna A., Magenes G. (2016) A nonlinear SDOF model for the simplified evaluation of the displacement demand of low-rise URM buildings, BULLETIN OF EARTHQUAKE ENGINEERING, doi: 10.1007/s10518-016-9896-5

[C.23] Rosti A., Penna A., Rota M., Magenes G. (2016) In-plane cyclic response of low-density AAC URM walls, MATERIALS AND STRUCTURES, doi: 10.1617/s11527-016-0825-5

[C.24] Penna A. Senaldi I., Galasco A., Magenes G. (2016). Numerical simulation of shaking table tests on full-scale stone masonry buildings, INTERNATIONAL JOURNAL OF ARCHITECTURAL HERITAGE, 10 (2-3): 146-163

[C.25] Costa, A.A., Penna, A., Arêde, A., Costa, A. (2015). Simulation of masonry out-of-plane failure modes by multi-body dynamics, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS, 44(14): 2529-2549.

[C.26] Bracchi S., Rota M., Penna A., Magenes G. (2015), "Consideration of modelling uncertainties in the seismic assessment of masonry buildings by equivalent-frame approach", BULLETIN OF EARTHQUAKE ENGINEERING, 13(11): doi:10.1007/s10518-015-9760-z.

[C.27] Penna, A., Mandirola, M., Rota, M., & Magenes, G. (2015). Experimental assessment of the in-plane lateral capacity of autoclaved aerated concrete (AAC) masonry walls with flat-truss bed-joint reinforcement. CONSTRUCTION AND BUILDING MATERIALS, 82, 155-166.

[C.28] Penna, A. (2015). Seismic assessment of existing and strengthened stone-masonry buildings: critical issues and possible strategies. BULLETIN OF EARTHQUAKE ENGINEERING, 13(4), 1051-1071.

[C.29] Penna, A., Magenes, G., Rota, M., Mandirola, M. and Rosti, A. (2015), Experimental-numerical research on the seismic performance of URM buildings made of lightweight AAC blocks / Experimentell-numerische Untersuchung zum seismischen Verhalten von unbewehrten Mauerwerksgebäuden aus Porenbetonblöcken. MAUERWERK, 19: 130–143.

[C.30] Araújo, A.S., Oliveira, D.V.,Lourenço, P.B., Magenes, G., Penna, A. (2014). In-Plane Shear Behaviour of Stone Masonry Piers: A Numerical Study, Proceedings of the Twelfth International Conference on Computational Structures Technology, CIVIL-COMP PROCEEDINGS, 106.

[C.31] Penna A., Morandi P., Rota M., Manzini C.F., da Porto F., Magenes G. (2014). Performance of masonry buildings during the Emilia 2012 earthquake, BULLETIN OF EARTHQUAKE ENGINEERING. 12(5): 2255-2273.

[C.32] Mouyiannou A., Rota M., Penna A., Magenes G. (2014). Implications of cumulated seismic damage on the seismic performance of unreinforced masonry buildings, BULLETIN OF THE NEW ZEALAND SOCIETY FOR EARTHQUAKE ENGINEERING. 47(2): 157-170.

[C.33] Senaldi I., Magenes G., Penna A., Galasco A., Rota M. (2014). The Effect of Stiffened Floor and Roof Diaphragms on the Experimental Seismic Response of a Full-Scale Unreinforced Stone Masonry Building, JOURNAL OF EARTHQUAKE ENGINEERING. 18(3): 407-443.

[C.34] Rota M., Penna A., Magenes G. (2014). A framework for the seismic assessment of existing masonry buildings accounting for different sources of uncertainty, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS. 43(7): 1045-1066.

[C.35] Mouyiannou A., Rota M., Penna A., Magenes G. (2014). Identification of suitable limit states from nonlinear dynamic analyses of masonry structures, JOURNAL OF EARTHQUAKE ENGINEERING. 18(2): 231-263.

[C.36] Magenes G., Penna A., Senaldi I., Galasco A., Rota M. (2014). Shaking table test of a strengthened full-scale stone masonry building with flexible diaphragms, INTERNATIONAL JOURNAL OF ARCHITECTURAL HERITAGE. 8(3): 349-375.

[C.37] Penna A., Lagomarsino S., Galasco A. (2014). A nonlinear macroelement model for the seismic analysis of masonry buildings, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS. 43(2): 159-179.

[C.38] Lagomarsino S., Penna A., Galasco A., Cattari S. (2013). TREMURI Program: An equivalent frame model for the nonlinear seismic analysis of masonry buildings, ENGINEERING STRUCTURES. 56(11): 1787-1799.

[C.39] Costa A.A., Arede A., Penna A., Costa A. (2013). Free rocking response of a regular stone masonry wall with equivalent block approach: Experimental and analytical evaluation, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS. 42(15): 2297-2319.

[C.40] Costa A.A., Arede A., Campos Costa A., Penna A., Costa A. (2013). Out-of-plane behaviour of a full scale stone masonry façade. Part 2: shaking table tests, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS. 42(14): 2097-2111.

[C.41] Costa A.A., Arede A., Campos Costa A., Penna A., Costa A. (2013). Out-of-plane behaviour of a full scale stone masonry façade. Part 1: specimen and ground motion selection, EARTHQUAKE ENGINEERING & STRUCTURAL DYNAMICS. 42(14): 2081-2095.

[C.42] Rota M., Zuccolo E., Taverna L., Corigliano M., Lai C.G., Penna A. (2012). Mesozonation of the Italian territory for the definition of real spectrum-compatible accelerograms, BULLETIN OF EARTHQUAKE ENGINEERING. 10(5): 1357-1375.

[C.43] Tondelli M., Rota M., Penna A., Magenes G. (2012). Evaluation of Uncertainties in the Seismic Assessment of Existing Masonry Buildings, JOURNAL OF EARTHQUAKE ENGINEERING. 16(Suppl. 1): 36-64.

[C.44] Rota M., Penna A., Strobbia C., Magenes G. (2011). Typological seismic risk maps for Italy, EARTHQUAKE SPECTRA, 27 (3): 907-926.

[C.45] Costa, A. A., Penna, A., & Magenes, G. (2011). Seismic performance of autoclaved aerated concrete (AAC) masonry: from experimental testing of the in-plane capacity of walls to building response simulation. JOURNAL OF EARTHQUAKE ENGINEERING, 15(1), 1-31.

[C.46] Rota M., Penna A., Magenes G. (2010). A methodology for deriving analytical fragility curves for masonry buildings based on stochastic nonlinear analyses, ENGINEERING STRUCTURES, 32 (5): 1312-1323.

[C.47] Senaldi I., Magenes G., Penna A. (2010). Numerical Investigations on the Seismic Response of Masonry Building Aggregates, ADVANCED MATERIALS RESEARCH, 133-134: 715-720, doi:10.4028/www.scientific.net/ AMR.133-134.715

[C.48] Rota M., Penna A., Strobbia C.L. (2008). Processing Italian Damage Data to Derive Typological Fragility Curves, SOIL DYNAMICS AND EARTHQUAKE ENGINEERING, 28 (10-11): 933-947.

[D] Articles in national journals

[D.1] Fragomeli A., Galasco A., Graziotti F., Guerrini G., Kallioras S., Magenes G., Malomo D., Mandirola M., Manzini C.F., Marchesi B., Milanesi R.R., Morandi P., Penna A., Rossi A., Rosti A., Rota M., Senaldi I.E., Tomassetti U., Cattari S., da Porto F., Sorrentino L. (2017), Comportamento degli edifici in muratura nella sequenza sismica dell'Italia centrale del 2016 - Parte 2: Esempi di centri colpiti, PROGETTAZIONE SISMICA, 8(3), 75-98.

[D.2] Fragomeli A., Galasco A., Graziotti F., Guerrini G., Kallioras S., Magenes G., Malomo D., Mandirola M., Manzini C.F., Marchesi B., Milanesi R.R., Morandi P., Penna A., Rossi A., Rosti A., Rota M., Senaldi I.E., Tomassetti U., Cattari S., da Porto F., Sorrentino L. (2017), Comportamento degli edifici in muratura nella sequenza sismica dell'Italia centrale del 2016 - Parte 1: Quadro generale, PROGETTAZIONE SISMICA, 8(2), 49-77.

[D.3] Penna A. (2015). Comportamento delle pareti di tamponamento sotto l'azione del sisma, METROCUBO, 109, 32-34.

[D.4] Taverna L., Zuccolo E., Corigliano M., Rota M., Lai C.G., Penna A. (2013). Definizione di accelerogrammi reali spettro-compatibili per l'intero territorio nazionale, PROGETTAZIONE SISMICA. 4(2): 63-79.

[D.5] Bracchi S., da Porto F., Galasco A., Graziotti F., Liberatore D., Liberatore L., Magenes G., Mandirola M., Manzini C.F., Masiani R., Morandi P., Palmieri M., Penna A., Rosti A., Rota M., Sorrentino L., Tondelli M. (2012). Comportamento degli edifici in muratura nella sequenza sismica del 2012 in Emilia, PROGETTAZIONE SISMICA. 3(3): 141-161.

[D.6] Morandi P., Magenes G., Penna A. (2011). Costruzioni in muratura di laterizio. La progettazione sismica secondo le NTC 2008, STRUCTURAL-L'EDILIZIA, N. 167, pp. 23-36, ISSN 1593-3970.

[D.7] Penna A. (2010). Vantaggi della muratura armata nella progettazione antisismica, IL GIORNALE DELL'INGEGNERE, N. 17, ottobre 2010.

[D.8] Penna A. (2009). Armatura a traliccio nei giunti di malta: una soluzione efficace per incrementare le prestazioni sismiche degli elementi in muratura, IL GIORNALE DELL'INGEGNERE, N. 13, luglio 2009.

[D.9] Bonett R.L., Barbat A., Pujades L., Lagomarsino S., Penna A. (2006). Performance Assessment for Unreinforced Masonry Buildings in Low Seismic Hazard Areas, REVISTA INGENIERIAS (Universidad de Medellin), Vol. 5. No. 8, ISSN 1692-3324.

[D.10] Bonett R., Penna A., Lagomarsino S., Barbat A., Pujades L., Moreno R. (2003). Evaluación de la vulnerabilidad sísmica de estructuras de mampostería no reforzada. Aplicación a un edificio de la zona de l'Eixample en Barcelona (España). REVISTA INTERNACIONAL DE INGENIERÍA DE ESTRUCTURAS. Escuela Politécnica del Ejército, Ecuador, 8, 2: 91–120, ISSN 1390-0315.

[E] Papers in proceedings of international conferences

[E.1] Albanesi L., Morandi P., Graziotti F., Li Piani T., Penna A., Magenes G. (2018) "Database collecting in-plane test results of URM piers with bricks and blocks", Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, 18-21 June 2018.

[E.2] Albanesi, L., Morandi, P., Graziotti, F., Li Piani, T., Penna, A., Magenes, G. (2018) "Lateral strength of URM piers: comparison between codified criteria and in-plane test results", Proceedings 10th International Masonry Conference, July 9-11 2018, Milano, Italy.

[E.3] Bracchi S., Galasco A., Penna A., Magenes G. (2018) "An improved macroelement model for the nonlinear analysis of masonry buildings", 10th Australasian Masonry Conference, Sydney, Australia.

[E.4] Correia A. A., Tomassetti U., Campos Costa A., Penna A., Magenes G., Graziotti F. (2018) "Collapse shake-table test on URM-timber roof substructure", Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, 18-21 June 2018.

[E.5] Graziotti F., Tomassetti U., Grottoli L., Penna A., Magenes G. (2018) "Full-scale out-of-plane shaking table tests of URM walls in two-way bending", Proceedings of the 10th Australasian Masonry Conference, 11-14 February 2018, Sydney, Australia.

[E.6] Guerrini G., Senaldi I., Comini P., Kallioras S., Vanin F., Godio M., Graziotti F., Magenes G., Beyer K., Penna A. (2018) "Experimental and Numerical Assessment of The Seismic Performance of a Half-Scale Stone Masonry Building Aggregate", Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, June 18-21

[E.7] Guerrini G., Senaldi I., Di Santo F., Tomassetti U., Graziotti F., Magenes G., Beyer K., Penna A. (2018) "Experimental Seismic Response of a Half Scale Natural Stone Masonry Building Aggregate", Proc. 10th International Masonry Conference, Milan, 9-11 July 2018

[E.8] Kallioras S., Morandi P., Penna A., Magenes G. (2018) "Seismic performance assessment of three modern masonry buildings struck by the 2012 Emilia earthquake". Proceedings of the 10th International Masonry Conference, Milan, Italy.

[E.9] Malomo D., Comini P., Pinho R., Penna A. (2018) "The Applied Element Method and the modelling of both in-plane and out-of-plane response of URM walls," Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, June 18-21.

[E.10] Malomo D., Pinho R., Penna A. (2018) "Using the Applied Element Method to simulate the dynamic response of full-scale URM houses tested to collapse or near-collapse conditions," Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, June 18-21.

[E.11] Malomo D., DeJong M.J., Penna A. (2018). "Distinct Element modelling of the in-plane failure mechanisms of URM walls". Proceedings 10th International Masonry Conference, Milan, Italy.

[E.12] Milanesi R.R., Morandi P., Penna A., Magenes G. (2018) "Seismic performance of AAC masonry infill from traditional systems to innovative solutions", Proceedings of the 6th International Conference of AAC, Potsdam, Germania, 3-6 September 2018.

[E.13] Rosti A., Rota M., Penna A. (2018) "Exploring the effect of different damage definitions on the empirical building vulnerability," Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, June 18-21.

[E.14] Rota M., Rosti A., Penna A., Fiorini E., Magenes G. (2018) "A multi-scale methodology to compare seismic hazard results with historical macroseismic observations," Proceedings 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, June 18-21.

[E.15] Senaldi I., Guerrini G., Scherini S., Morganti S., Magenes G., Beyer K., Penna A. (2018) "Natural Stone Masonry Characterization for The Shaking-Table Test of A Scaled Building Specimen", Proc. 10th International Masonry Conference, Milan, 9-11 July 2018

[E.16] Beyer K, Penna A, Wenk T (2017) Erdbebenüberprüfung von Natursteinmauerwerksgebäuden – das Basel-Projekt, D-A-CH Tagung: Erdbebeningenieurwesen und Baudynamik 2017, Weimar, Germany. Invited plenary lecture.

[E.17] Beyer K, Penna A, Vanin F, Senaldi I, Godio M, Guerrini G, Tomassetti U (2017) Seismic retrofit of cultural heritage buildings – when less is more, SMAR 2017 – Fourth Conference on Smart Monitoring, Assessment and Rehabilitation of Civil Structures, Zurich, Switzerland. Keynote lecture.

[E.18] Kallioras S, Graziotti F, Penna A, Magenes G (2017). Numerical Modeling of Cavity-Wall URM Buildings, Proceedings of 13th Canadian Masonry Symposium, Halifax, Canada

[E.19] Guerrini G, Graziotti F, Penna A, Magenes G (2017). Dynamic shake-table tests on two full-scale, unreinforced masonry buildings subjected to induced seismicity, 7th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, San Diego, California, United States

[E.20] Tomassetti U, Graziotti F, Penna A, Magenes G (2017). Energy dissipation involved in the out-of-plane response of unreinforced masonry walls, Proc. 6th ECCOMAS COMPDYN Conference, Rhodes Island, Greece

[E.21] Rosti A, Rota M, Penna A, Magenes G (2017). Statistical treatment of empirical damage data collected after the main Italian seismic events (1980-2009), 16th World Conference on Earthquake Engineering, Santiago, Chile

[E.22] Rosti A, Rota M, Penna A, Magenes G (2017). A method for comparing PSHA results to historical observations using fragility curves, 16th World Conference on Earthquake Engineering, Santiago, Chile

[E.23] Bracchi S, Galasco A, Penna A (2017). An improved macroelement model accounting for energy dissipation in in-plane flexural behaviour of masonry walls, 16th World Conference on Earthquake Engineering, Santiago, Chile

[E.24] Camilletti D, Cattari S, Lagomarsino S, Bonaldo D, Guidi G, Bracchi S, Galasco A, Magenes G, Manzini CF, Penna A, Rota M (2017). RINTC project: nonlinear dynamic analyses of Italian code-conforming URM buildings for collapse risk assessment, 6th ECCOMAS COMPDYN Conference, Rhodes Island, Greece

[E.25] Kouris LA, Penna A, Magenes G (2016). Damage detection of an unreinforced stone masonry two storeys building based on damping estimate, Proceedings 16th International Brick and Block Masonry Conference, Padua, Italy

[E.26] Graziotti F, Rossi A, Mandirola M, Penna A, Magenes G (2016). Experimental characterisation of calcium-silicate brick masonry for seismic assessment, Proceedings 16th International Brick and Block Masonry Conference, Padua, Italy

[E.27] Oliveira DV, Araujo AS, Lourenço PB, Magenes G, Penna A (2016). Modelling of the in-plane behaviour of stone masonry panels, 10th International Conference on Structural Analysis of Historical Constructions. p. 265-271

[E.28] Lu S, Beyer K, Bosiljkov V, Butenweg C, D'Ayala D, Degee H, Gams M, Klouda J, Lagomarsino S, Penna A, Mojsilovic N, da Porto F, Sorrentino L, Vintzileou E (2016). Next generation of Eurocode 8, masonry chapter, Proceedings 16th International Brick and Block Masonry Conference, Padua, Italy

[E.29] Mandirola M, Galasco A, Penna A, Magenes G (2016). Nonlinear macroelement modelling of experimental tests on masonry buildings with rigid diaphragms, Proceedings 16th International Brick and Block Masonry Conference, Padua, Italy

[E.30] Tomassetti U, Graziotti F, Penna A, Magenes G (2016). Out-of-plane shaking table tests on URM cavity walls, Proceedings 16th International Brick and Block Masonry Conference, Padua, Italy

[E.31] Penna A, Magenes G, Rosti A, Mandirola M, Rota M (2016). Seismic assessment of innovative AAC masonry solutions, Proceedings 16th International Brick and Block Masonry Conference, Padua, Italy

[E.32] Bracchi S., Rota M., Penna A., Magenes G. (2015). Definition of mechanical properties of existing masonry accounting for experimental knowledge by Bayesian updating, 5th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, Crete Island, Greece.

[E.33] Mouyiannou, A., Rota, M., Penna, A., Magenes, G. (2015). Estimation of cumulative seismic damage to URM buildings during earthquake sequences, 5th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, Crete Island, Greece.

[E.34] Rosti A., Rota M., Penna A., Fiorini E., Magenes G. (2015). Comparison of PSHA results with historical macroseismic observations in South-East France. Proceedings of CSNI Workshop on "Testing PSHA Results and Benefit of Bayesian Techniques for Seismic Hazard Assessment", 4-6 February 2015, Pavia, Italy.

[E.35] Penna, A., Galasco, A., Magenes, G. (2015). Macro-element modelling of earthquake-induced local failure modes in existing masonry buildings, SECED 2015 Conference, 9-10 July 2015, Cambridge (UK).

[E.36] Rota M., Penna A., Bracchi S., Magenes G. (2014). Seismic assessment of masonry buildings considering different uncertainties, Proc. 9th International Conference on Structural Analysis of Historical Constructions, Mexico City.

[E.37] Penna, A., Magenes, G., Senaldi, I., Galasco, A. (2014). Equivalent-frame macro-element simulation of shaking table tests on unreinforced stone masonry buildings with strengthening interventions, Proc. 9th International Conference on Structural Analysis of Historical Construction, Mexico City, Mexico.

[E.38] D'Andrea M., Besana D., Penna A (2014). Different analysis strategies in the structural assessment of the St. Anne of Pietra Perduca oratory, Proc. SAHC2014 – 9th International Conference on Structural Analysis of Historical Constructions, Mexico City, Mexico.

[E.39] Penna, A., Senaldi, I., Galasco, A., Magenes, G. (2014). Numerical simulation of the experimental seismic response of unreinforced stone masonry buildings with stiffened diaphragms and improved wall-to-diaphragm connections, Proc. 9th International Masonry Conference, Guimaraes, Portugal.

[E.40] Graziotti F, Penna A, Magenes G (2014). Influence of timber lintels on the cyclic behaviour of stone masonry spandrels, Proc. 9th International Masonry Conference, Guimaraes, Portugal.

[E.41] Palmieri M., Penna A, Magenes G (2014). Experimental investigation of the seismic response of a multi-drum stone column, Proc. 9th International Masonry Conference, Guimaraes, Portugal.

[E.42] Penna, A., Senaldi, I., Magenes, G., Galasco, A. (2014). Pushover analysis of unreinforced masonry buildings with different levels of diaphragm stiffness, Proc. 2nd European Conference on Earthquake Engineering and Seismology, Istanbul, Turkey.

[E.43] Graziotti F, Penna A, Magenes G (2014). A direct method to compute the inelastic displacement demand of masonry structures, Proc. 2nd European Conference on Earthquake Engineering and Seismology, Istanbul, Turkey.

[E.44] Graziotti F, Penna A, Bossi E, Magenes G (2014). Evaluation of displacement demand for unreinforced masonry buildings by equivalent SDOF systems, Proc. EURODYN 2014, Porto.

[E.45] Penna A., Rota M., Mouyiannou A., Graziotti F., Magenes G. (2013). An analytical procedure for the derivation of state-dependent fragility curves for masonry buildings, Proc. Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics 2013 (VEESD 2013). Vienna, Austria.

[E.46] Penna A. (2013). Seismic assessment and strengthening of stone masonry buildings: recent experimental results, analysis methods and code procedures, Proc. Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics 2013 (VEESD 2013). Vienna, Austria.

[E.47] Graziotti F., Penna A., Magenes G. (2013). Use of equivalent SDOF systems for the evaluation of displacement demand for masonry buildings, Proc. Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics 2013 (VEESD 2013). Vienna, Austria.

[E.48] Penna A., Galasco A. (2013). A macro-element model for the nonlinear analysis of masonry members including second order effects, Proc. 4th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2013). Kos Island, Grecia.

[E.49] Rota M., Bracchi S., Penna A., Magenes G. (2013). Evaluation of the effect of modeling uncertainties on the seismic response of existing masonry buildings, Proc. 4th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2013). Kos Island, Grecia.

[E.50] Penna A., Mouyiannou A., Rota M., Magenes G. (2013). Issues on the use of time-history analysis for the design and assessment of masonry structures, Proc. 4th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2013). Kos Island, Grecia.

[E.51] Magenes G., Penna A., Senaldi I., Galasco A., Rota M. (2013). Experimental investigation on the effect of diaphragm in-plane stiffness on the seismic response of masonry buildings, Proc. 12th Canadian Masonry Symposium. Vancouver, Canada.

[E.52] Rosti A., Penna A., Rota M., Magenes G. (2013). In-plane cyclic testing of low-density AAC masonry walls, Proc. 12th Canadian Masonry Symposium. Vancouver, Canada.

[E.53] Magenes G., Penna A., Senaldi I., Rota M., Galasco A. (2013). Seismic Response of a Full Scale Unreinforced Stone Masonry Building with Stiffened Diaphragms, Proc. International Conference on Rehabilitation and Restoration of Structures. Chennai, India.

[E.54] Palmieri M., Magenes G., Lai C.G., Penna A., Bozzoni F., Rota M., Macchi G., Auricchio F., Mangriotis M.D., Menon A., Meher P., Murty C.V.R. (2012). Reduction of seismic risk of Roman and Hindu temples, Proc. 8th International Conference of Structural Analysis of Historical Constructions, WIADOMOŚCI KONSERWATORSKIE, 2: 1674-1681, *DWE*. Wroclaw, Polonia.

[E.55] Magenes G., Penna A., Rota M., Galasco A., Senaldi I. (2012). Shaking table test of a strengthened full scale stone masonry building with flexible diaphragms, Proc. 8th International Conference of Structural Analysis of Historical Constructions, WIADOMOŚCI KONSERWATORSKIE, 2: 1621-1629, DWE, Wroclaw, Polonia.

[E.56] Dell'Acqua F., Riedel I., Rodriguez L.E., Penna A., Senaldi I. (2012). Crowdsourcing as a seismic damage assessment tool: a case study on 2011 Christchurch earthquakes., Proc. of the 10th International Workshop on Remote Sensing for Disaster Management. Tohoku, Japan.

[E.57] Zuccolo E., Rota M., Lai C.G., Taverna L., Corigliano M., Penna A. (2012). Definition of Spectrum-Compatible Natural Records for the Italian Territory, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.58] Corigliano M., Lai C.G., Rota M., Penna A. (2012). Automatic definition of hazard-compatible accelerograms at non-rocky sites, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.59] Magenes G., Penna A., Rota M., Galasco A., Senaldi I. (2012). Shaking table test of a full scale stone masonry building with stiffened floor and roof diaphragms, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.60] Bosco B., Thiry J.M., Rota M., Penna A., Magenes G., Senfaute G., Martin C. (2012). A methodology for measuring the quality of probabilistic seismic hazard predictions in the SIGMA project framework, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.61] Graziotti F., Magenes G., Penna A. (2012). Experimental cyclic behaviour of stone masonry spandrels, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.62] Penna A., Magenes G., Rota M., Mandirola M. (2012). Enhancement of the seismic performance of AAC masonry by means of flat-truss bed-joint reinforcement, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.63] Costa A.A. Arede A., Campos Costa A., Penna A., Costa A. (2012). Out-of-Plane Shaking Table Test of a Full Scale Stone Masonry Façade, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.64] Costa A.A. Arede A., Penna A., Costa A. (2012). Free Rocking Tests on Stone Masonry Wallettes for Evaluation of the Coefficient of Restitution, Proc. 15th World Conference on Earthquake Engineering. Lisbona.

[E.65] Costa A.A., Arede A., Penna A., Costa A. (2012). Experimental evaluation of the coefficient of restitution value of rocking stone masonry façades, Proc. 15th International Brick and Block Masonry Conference. Florianopolis, Brasile.

[E.66] Costa A.A., Arede A., Campos Costa A., Penna A., Costa A. (2012). Shaking table test to assess the out-of-plane behaviour of a stone of masonry building, Proc. 15th International Brick and Block Masonry Conference. Florianopolis, Brasile.

[E.67] Mandirola M., Penna A., Rota M., Magenes G. (2012). Experimental assessment of the shear response of autoclaved aerated concrete (AAC) masonry with flat truss bed-joint reinforcement, Proc. 15th International Brick and Block Masonry Conference. Florianopolis, Brasile.

[E.68] Magenes G., Penna A. (2011) Seismic design and assessment of masonry buildings in Europe: recent research and code development issues, Keynote paper, Proceedings of the 9th Australasian Masonry Conference, Queenstown, New Zealand, 585-603.

[E.69] Penna A. (2011). 3D Frame-Type Macro-Element Modeling for Seismic Analysis of Masonry Buildings, in G. De Roeck, G. Degrande, G. Lombaert, G. Muller (eds.), Proc. 8th Intl. Conf. Struct. Dyn., EURODYN 2011, Leuven, Belgium, 4-6 July 2011, ISBN 978-90-760-1931.

[E.70] Penna A., Menon A., Magenes G. (2010). Improving the seismic performance of masonry buildings by flat-truss bed-joint reinforcement, Proc. 8th International Masonry Conference, pap. N. 215, Dresden, Germany.

[E.71] Magenes G., Penna A., Galasco A., Da Paré M. (2010). In-plane cyclic shear tests of undressed double-leaf stone masonry panels, Proc. 8th International Masonry Conference, pap. N. 216, Dresden, Germany.

[E.72] Magenes G., Penna A., Galasco A., Rota M. (2010). Experimental characterisation of stone masonry mechanical properties, Proc. 8th International Masonry Conference, pap. N. 217, Dresden, Germany.

[E.73] Rota M., Penna A., Magenes G. (2010). Stochastic seismic assessment of unreinforced masonry buildings, Proc. 8th International Masonry Conference, pap. N. 218, Dresden, Germany.

[E.74] Penna A., Rota M., Magenes G., Frumento S. (2010). Seismic performance assessment of AAC masonry, Proc. 14th European Conference on Earthquake Engineering, pap. N. 1431, Ohrid, Macedonia.

[E.75] Magenes G., Penna A., Galasco A. (2010). A full-scale shaking table test on a two-storey stone masonry building, Proc. 14th European Conference on Earthquake Engineering, pap. N. 1432, Ohrid, Macedonia.

[E.76] Senaldi I.E., Magenes G., Penna A. (2010). Seismic analysis of masonry building aggregates, Proc. 14th European Conference on Earthquake Engineering, pap. N. 1433, Ohrid, Macedonia.

[E.77] Galasco A., Magenes G., Penna A., Da Paré M. (2010). In-plane cyclic shear tests of undressed double leaf stone masonry panels, Proc. 14th European Conference on Earthquake Engineering, pap. N. 1435, Ohrid, Macedonia.

[E.78] Rota M., Penna A., Magenes G. and Strobbia C.L. (2008). Observed Seismic Vulnerability of Italian Buildings, Seismic Engineering International Conference commemorating the 1908 Messina and Reggio Calabria Earthquake (MERCEA'08), AIP Conference Proceedings, 1020 (PART 1), pp. 1641-1648

[E.79] Rota M., Penna A., Strobbia C.L. and Magenes G. (2008). Direct derivation of fragility curves from Italian post-earthquake survey data, Proceedings of the 14th WCEE, Beijing, China, Paper No. 148.

[E.80] Rota M., Penna A. and Magenes G. (2008). A procedure for deriving analytical fragility curves for masonry buildings, Proceedings of the 14th WCEE, Beijing, China, Paper No. 149.

[E.81] Goretti A., Bramerini F., Di Pasquale G., Dolce M., Lagomarsino S., Parodi S., Iervolino I., Verderame G.M., Bernardini A., Penna A., Rota M., Masi A. and Vona M. (2008). The Italian contribution to the USGS pager project, Proceedings of the 14th WCEE, Beijing, China, Paper No. 21.

[E.82] Fusco E., Penna A., Prota A., Galasco A., Manfredi G. (2008). Seismic assessment of historical natural stone masonry buildings through non-linear analysis, Proceedings of the 14th WCEE, Beijing, China.

[E.83] Magenes G., Morandi P., Penna A. (2008). In-plane cyclic tests of calcium silicate masonry walls, Proc. 14th IB2MAC, Sydney, CD-ROM paper n. 193.

[E.84] Penna A., Magenes G., Calvi G.M., Costa A.A. (2008). Seismic performance of AAC infill and bearing walls with different reinforcement solutions, Proc. 14th IB2MAC, Sydney, CDROM pap n. 194.

[E.85] Costa A.A., Penna A., Magenes G., Galasco A. (2008). Seismic performance assessment of autoclaved aerated concrete (AAC) masonry buildings, Proceedings of the 14th WCEE, Beijing, China.

[E.86] Magenes G., Morandi P., Penna A. (2008). Experimental in-plane cyclic response of masonry walls with clay units, Proceedings of the 14th WCEE, Beijing, China, Paper No. 95, 8 p.

[E.87] Lagomarsino S., Galasco A., Penna A., (2007). Non Linear Macro-element Dynamic Analysis of Masonry Buildings, ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, M. Papadrakakis, D.C. Charmpis, N.D. Lagaros, Y. Tsompanakis (eds.) Rethymno, Crete, Greece, 13-16 June 2007.

[E.88] Galasco A., Lagomarsino S., Penna A., 2006. On the Use of Pushover Analysis for Existing Masonry Buildings, Proc. First European Conference on Earthquake Engineering and Seismology, 3-8 September 2006, Geneva, Switzerland – paper n. 1080, CD-ROM, ISBN 9782839901901

[E.89] Rota M., Penna A., Strobbia C., 2006. Typological Fragility Curves From Italian Earthquake Damage Data, Proc. First European Conference on Earthquake Engineering and Seismology, 3-8 September 2006, Geneva, Switzerland – paper n. 386, CD-ROM, ISBN 9782839901901.

[E.90] Javed M., Khan A. N., Penna A., Magenes G. (2006). Behaviour of Masonry Structures During the Kashmir 2005 Earthquake, Proc. First European Conference on Earthquake Engineering and Seismology, 3-8 September 2006, Geneva, Switzerland – paper n. 1077, CD-ROM, ISBN 9782839901901.

[E.91] Magenes G., Macchi G., Pavese A., Prasad A.M., Dodagoudar G.R., Mathews M.S., Menon D., Lai C., Penna A., Menon A. (2006). Indo-Italian Joint Research Programme on Seismic Vulnerability of Historical Centres in South India, V International Seminar on Structural Analysis of Historical Construction-Possibilities of Numerical and Experimental Techniques, New Delhi, 2006, Vol. 3, pp. 1667-1674.

[E.92] Lagomarsino S., Galasco A., Penna A., 2004, Pushover and dynamic analysis of URM buildings by means of a non-linear macro-element model, Proc. Int. Conf. Earthquake Loss Estimation and Risk Reduction edited by D.Lungu, F.Wenzel,P.Mouroux,I.Tojo, Independent Firm, Bucarest [invited lecture of S. Lagomarsino] ISBN 973-85112-9-1.

[E.93] Galasco A., Lagomarsino S., Penna A., Resemini S. [2004] Non-linear Seismic Analysis of Masonry Structures, Proc. 13th World Conference on Earthquake Engineering, Vancouver 1-6 August, paper n. 843, 15 p., ISBN 0-9685376-1-8.

[E.94] Bonett R., Barbat A., Pujades L., Lagomarsino S., Penna A. (2004). Performance Assessment for Unreinforced Masonry Building In Low Seismic Zones, Proc. 13th World Conference on Earthquake Engineering, Vancouver 1-6 August, paper n. 409, 15 p., ISBN 0-9685376-1-8.

[E.95] Penna, A., Cattari S., Galasco A., Lagomarsino S. (2004). Seismic Assessment of Masonry Structures by Non-linear Macro-element Analysis, IV International Seminar on Structural Analysis of Historical Construction-Possibilities of Numerical and Experimental Techniques, Padova, 2004, Vol. 2, pp.1157-1164, ISBN 04-1536-379-9.

[E.96] Lagomarsino S., Penna A. (2003). A Non-linear Model for Pushover and Dynamic Analysis of Masonry Buildings, International Conference on Computational & Experimental Engineering and Sciences - Analytical and Experimental Methods in Earthquake Structural Engineering Symposium, Corfu.

[F] Papers in proceedings of national conferences

[F.1] Guerrini G, Senaldi I, Scherini S, Morganti S, Magenes G, Beyer K, Penna A (2017) Material characterization for the shaking-table test of the scaled prototype of a stone masonry building aggregate. Proc. of the 17th ANIDIS Conference "L'Ingegneria Sismica in Italia", September 17-21, Pistoia, Italy.

[F.2] Senaldi I, Guerrini G, Graziotti F, Caruso M, Di Santo F, Comini P, Magenes G, Beyer K, Penna A (2017) Shaking-table test of a half-scaled natural stone masonry building aggregate with flexible

diaphragms. Proc. of the 17th ANIDIS Conference “L’Ingegneria Sismica in Italia”, September 17-21, Pistoia, Italy.

[F.3] Tomassetti U., Grottoli L., Penna A., Graziotti F., Magenes G. (2017) Two-way bending out-of-plane shaking table tests on urm walls subjected to seismic excitation, 4th Conference on Forensic Engineering IF-CRASC, Milan.

[F.4] Oliveira DV, Araujo AS, Lourenço PB, Magenes G, Penna A (2016) Análise numérica do comportamento ao corte de paredes de alvenaria, 10th Congresso Nacional de Sismologia e Engenharia Sísmica

[F.5] Penna A. (2015). Analysis issues in the seismic assessment of existing masonry buildings, Proc. 14th D-A-CH Tagung, Zurich (keynote lecture).

[F.6] Bracchi S., Rota M., Penna A., Magenes G. (2015a). Contributo alla revisione dei valori di riferimento delle proprietà meccaniche per la muratura in mattoni pieni e malta di calce, Atti del XVI Convegno Nazionale ANIDIS, L’Aquila.

[F.7] Bracchi S., Rota M., Penna A., Magenes G. (2015b). Definizione delle proprietà meccaniche della muratura esistente sulla base dei risultati sperimentali, Atti del XVI Convegno Nazionale ANIDIS, L’Aquila.

[F.8] Rosti A., Rota M., Penna A., Magenes G. (2015a). Analisi statistica dei dati di danno raccolti in seguito ai principali terremoti italiani (1980-2009), Atti del XVI Convegno Nazionale ANIDIS, L’Aquila.

[F.9] Rosti A., Rota M., Penna A., Magenes G. (2015b). Confronto dei risultati di studi di pericolosità sismica con osservazioni macrosismiche storiche, Atti del XVI Convegno Nazionale ANIDIS, L’Aquila.

[F.10] Senaldi I.E., Gosatti N., Galasco A., Penna A. (2015). Valutazione della vulnerabilità sismica di edifici esistenti in muratura: il complesso dell’ex-monastero di San Felice a Pavia, Atti del XVI Convegno Nazionale ANIDIS, L’Aquila.

[F.11] Tomassetti U., Graziotti F., Penna A., Magenes G. (2015). A Single Degree of Freedom Model for the Simulation of the Out-of-Plane Response of Unreinforced Masonry Walls, Atti del XVI Convegno Nazionale ANIDIS, L’Aquila.

[F.12] Magenes G., Penna A., Senaldi I., Rota M., Galasco A. (2013). Effetti di irrigidimento dei solai sulla risposta sismica di edifici in muratura di pietra, Atti del XV Convegno Nazionale ANIDIS, Padova.

[F.13] Bracchi S., Rota M., Penna A., Magenes G. (2013). Effetto delle incertezze di modellazione sulla valutazione della risposta sismica di edifici in muratura, Atti del XV Convegno Nazionale ANIDIS, Padova.

[F.14] Graziotti F., Magenes G., Penna A., Galasco A. (2013). Modello numerico semplificato ad un grado di libertà per l’interpretazione del comportamento dinamico di strutture in muratura, Atti del XV Convegno Nazionale ANIDIS, Padova.

[F.15] Tondelli M., Rota M., Penna A., Magenes G. (2012). Affidabilità dell'attuale procedura normativa per la verifica sismica di edifici esistenti in muratura, Atti del Convegno IF CRASC '12, Pisa.

[F.16] Graziotti F., Magenes G., Penna A., Galasco A. (2011). Comportamento ciclico sperimentale nel piano di fasce in muratura di pietra”, Atti del XIV Convegno Nazionale “L’Ingegneria sismica in Italia,” Bari.

[F.17] Liberatore L., Decanini L.D., Magenes G., Penna A., Liberatore D., Sorrentino L. (2011). Comportamento degli edifici in cemento armato ed in muratura e dei ponti in occasione del

terremoto del Cile del 27 febbraio 2010, Atti del XIV Convegno Nazionale “L’Ingegneria sismica in Italia,” Bari.

[F.18] Sorrentino L., Liberatore D., Penna A., Magenes G., Decanini L.D., Liberatore L. (2011). Vulnerabilità delle chiese colpite dal sisma del Cile del 2010, Atti del XIV Convegno Nazionale “L’Ingegneria sismica in Italia,” Bari.

[F.19] Rota M., Penna A., Magenes G. (2009). “Un approccio stocastico per l’analisi della vulnerabilità sismica degli edifici in muratura” Atti XIII Convegno Nazionale “L’Ingegneria Sismica in Italia”, Bologna.

[F.20] Galasco A., Magenes G., Da Paré M., Penna A. (2009). Risposta ciclica sperimentale di pannelli in muratura di pietra, Atti XIII Convegno Nazionale “L’Ingegneria Sismica in Italia”, Bologna.

[F.21] Magenes G., Galasco A., Penna A. (2009). Caratterizzazione meccanica di una muratura in pietra, Atti XIII Convegno Nazionale “L’Ingegneria Sismica in Italia”, Bologna.

[F.22] Rota M., Dall’Ara A., Strobbia C., Penna A. (2007). Mappe di rischio sismico tipologico per il costruito italiano, XII Convegno Nazionale “L’Ingegneria Sismica in Italia”, 10-14 giugno 2007, Pisa.

[F.23] Galasco A., Lagomarsino S., Penna A. (2007). Analisi pushover evolutiva di edifici in muratura, XII Convegno Nazionale “L’Ingegneria Sismica in Italia”, 10-14 giugno 2007, Pisa.

[F.24] Galasco A., Penna A. (2007). Valutazione della risposta sismica di edifici irregolari in muratura, XII Convegno Nazionale “L’Ingegneria Sismica in Italia”, 10-14 giugno 2007, Pisa.

[F.25] Penna A., Calvi G.M., Bolognini D. (2007). Design of masonry structures with bed joint reinforcement, Intl. Seminar "Paredes de Alvenaria. Inovaçao e possiblidades actuais" 15 novembre 2007, LNEC Lisbona.

[F.26] Cattari, S., Galasco, A., Lagomarsino, S., Penna, A. (2006). Aspetti critici nell’analisi sismica statica non lineare degli edifici esistenti in muratura in P. Spinelli (editor), Wondermasonry. Workshop on design for rehabilitation of masonry structures. Tecniche di modellazione e progetto per interventi sul costruito in muratura, Edizioni Polistampa, Firenze ISBN: 88-596-0145-2.

[F.27] Balbi A., Lagomarsino S., Frumento S., Penna A. (2005). Una procedura integrata per la valutazione della vulnerabilità sismica degli edifici scolastici, Atti del 11° Convegno Nazionale "L'ingegneria sismica in Italia", Genova ISBN 88-86281-98-6.

[F.28] Cattari S., Curti E., Giovinazzi S., Lagomarsino S., Parodi S., Penna A. (2005). Un modello meccanico per l'analisi di vulnerabilità del costruito in muratura a scala urbana, Atti XI Convegno Nazionale "L'ingegneria sismica in Italia", Genova ISBN 88-86281-98-6.

[F.29] Cattari S., Galasco A., Lagomarsino S., Penna A. (2005). Analisi non lineare di edifici in muratura con il programma TREMURI, Atti XI Convegno Nazionale "L'ingegneria sismica in Italia", Genova ISBN 88-86281-98-6.

[F.30] Curti E., Galasco A., Lagomarsino S., Parodi S., Penna A., Podestà S., Lazzari A., Picotto M. (2005). Il terremoto del 11 Aprile 2003 in Piemonte: un nuovo modello per la stima dei costi per il miglioramento sismico delle chiese, Atti XI Convegno Nazionale "L'ingegneria sismica in Italia", Genova ISBN 88-86281-98-6.

[F.31] Galasco A., Lagomarsino S., Penna A., Lamonaca G., Nicoletti M., Spina D., Margheriti C., Salcuni A. (2005). Identificazione ed analisi non lineare degli edifici in muratura dell’Osservatorio Sismico delle Strutture, Atti XI Convegno Nazionale "L'ingegneria sismica in Italia", Genova ISBN 88-86281-98-6.

[F.32] Calvi, G. M., Bolognini, D., & Penna, A. (2004). Seismic performance of masonry-infilled RC frames: Benefits of slight reinforcements. Invited lecture of G.M. Calvi to “Sísmica 2004”, 253-276, Lisbon.

[F.33] Galasco A., Lagomarsino S., Penna A. (2002). Analisi sismica non lineare a macroelementi dl edifici in muratura, Atti del 10° Convegno Nazionale "L'ingegneria sismica in Italia", Potenza-Matera.

[F.34] Lagomarsino S., Cavicchi A., Penna A. (2000). Structural identification by dynamic testing: the example of the building n°4 of the Fivizzano Hospital, Proc. Workshop on seismic design and retrofitting of hospitals in seismic areas, Firenze.

[F.35] Brencich, A., Penna, A. (1999). Una procedura a macroelementi per l’analisi sismica dl strutture in muratura con orizzontamenti in cemento armato, Atti del 9° Convegno Nazionale "L'ingegneria sismica in Italia", Torino.

[F.36] Lagomarsino S., Brun S., Giovinazzi S., Idri C., Penna A., Podestà S., Resemini S., Rossi B. (1999). Modelli di calcolo per il miglioramento sismico delle chiese. Atti del 9° Convegno Nazionale "L'ingegneria sismica in Italia", Torino.