

CURRICULUM VITAE
of
Emmanouil Rovithis, M.Sc., Ph.D.

Researcher

Institute of Engineering Seismology and Earthquake Engineering (ITSAK – EPPO), Greece

1. PERSONAL INFORMATION

<i>Full Name</i>	Emmanouil Rovithis
<i>Gender</i>	Male
<i>Date of Birth</i>	13 August 1978
<i>Place of Birth</i>	Chania, Crete, Greece
<i>Marital status</i>	Married (1 child)
<i>Military service</i>	Fulfilled (05/2008-05/2009)
<i>Languages</i>	Greek (native) English (fluent)
<i>Office address</i>	EPPO- ITSAK Institute of Engineering Seismology and Earthquake Engineering Dasiliou Street, Eleones, 55535 Pylaia, Thessaloniki, Greece Phone: (+30) 2310 – 476081; Fax: 476085 Postal Address: P.O. Box 53, 55102, Finikas, Thessaloniki, Greece
<i>Home address</i>	Selefkou 14, 55535, Pylaia, Thessaloniki, Greece
<i>Cell phone:</i>	(+30) 6973 989376
<i>E-mail</i>	rovithis@itsak.gr
<i>Webpage</i>	http://www.itsak.gr/en/people/people/cv/37
<i>Links</i>	ResearchGate , ORCID , Google Scholar , Scopus , Loop

2. RESEARCH INTERESTS

- Earthquake Geotechnical Engineering
- Soil Mechanics and Dynamics
- Static and Dynamic Soil – Foundation - Structure Interaction (emphasis on pile foundations)
- Wave Propagation
- Ground improvement
- Rehabilitation of historical monuments and structures
- Seismic design of foundations and geotechnical structures
- Experimental and numerical modeling and analysis of structures and geotechnical systems
- Monitoring of structures and soil-structure interaction systems response under earthquake action

3. WORK INFORMATION - EDUCATION

Institute of Engineering Seismology and Earthquake Engineering, Thessaloniki, Greece
Researcher **2010-present***
 Soil Dynamics Division

Aristotle University of Thessaloniki, Greece
Post-doctoral research associate **2009-2010**
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake
 Engineering, Research Unit of Geotechnical Earthquake Engineering and
 Soil Dynamics, Department of Civil Engineering

Aristotle University of Thessaloniki, Greece
Doctorate in Earthquake Geotechnical Engineering **2003-2008**
 Ph.D Thesis: "Dynamic Analysis of Coupled Soil-Pile-Structure Systems"
 Research Advisor: Professor Kyriazis Pitilakis
 Grade: Excellent (10/10)

Aristotle University of Thessaloniki, Greece
M.Sc. in Earthquake Engineering **2002-2003**
 M.Sc. 1-year program: "ASTE – Antiseismic (i.e. Earthquake Resistant)
 Design of Structures and civil works"
 Grade: Excellent (8.57/10)
 M.Sc. Thesis: "Effect of foundation soil interventions on the dynamic
 response of R/C buildings"
 Supervisor: Professor Kyriazis Pitilakis
 Grade: 10/10

Aristotle University of Thessaloniki, Greece
MEng in Civil/Structural Engineering **1997-2002**
 Grade: Very Good (7.60/10)
 Diploma Thesis: "Implementation of Greek Seismic Code by means of ADINA
 FE code"
 Supervisors: Prof. I. Avramidis and Assoc. Prof. A. Athanatopoulou
 Grade: 10/10

** On August 2011, ITSAK was merged with the Earthquake Planning and Protection Organization (EPPO) under the Greek law N.4002/2011. So far, no progression of researchers was feasible solely due to administrative reasons, following the above action.*

4. DISTINCTIONS AND RECOGNITION OF SCIENTIFIC WORK

- Ph.D. Scholarship in Earthquake Geotechnical Engineering by the National Fellowship Foundation (IKY): 2004-2007 (after written examinations)
- Nominated participant representing Greece for the 21th EYGEC European Young Geotechnical Engineers Conference, 4-7 September 2011, Rotterdam, The Netherlands.
- Technical Secretary: XV European Conference of Soil Mechanics: “Geotechnics of hard soils-weak rocks” (Session 5 “Excavations and Tunneling”), Athens, Greece, 12-15 September 2010
- Chair of the Special Session "Monitoring of Natural Hazards in urban sites: New advances and applications", 1st International Geomatics Application Conference (GEOMAPPLICA), 8-10 September 2014, Skiathos Island, Greece.
- Organizer of the Minisymposium “Instrumentation of structures and SSI systems under dynamic excitations”, 6th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering - COMPDYN2017, 15-17 June 2017, Rhodes Island, Greece.
- Chair of the Special Session “Soil-Foundation-Structure Interaction”, 16th European Conference on Earthquake Engineering (16ECEE), 18-21 June 2018, Thessaloniki, Greece.
- Organizer of the Minisymposium “Dynamic Soil-Structure Interaction: Recent advances and challenges”, 7th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering - COMPDYN2019, 24-26 June 2019, Crete, Greece.
- Member of the organizing and/or scientific committees of International and European Conferences on Geotechnical Engineering, Structural Dynamics, Remote Sensing and Earthquake Engineering (4ICEGE2007 - Thessaloniki, EURODDYN2011 - Leuven, GEOMAPPLICA2014 – Skiathos, 16ECEE2018 - Thessaloniki)
- More than 30 invited lectures and oral presentations in International and National Conferences and Workshops/Seminars.
- Reviewer in nineteen (19) International Journals (Outstanding Reviewer Status achieved in 2017 for the International Journals *Soil Dynamics and Earthquake Engineering* and *Journal of Rock Mechanics and Geotechnical Engineering*).
- 269 true citations in Referred Journals, Conferences’ Proceedings, Dissertations and Reports.

5. REVIEWER

5.1 International Journals (more than 60 reviews)

- Frontiers in Earthquake Engineering (Review Editor)
- Bulletin of Earthquake Engineering
- Computers and Structures
- Earthquake Engineering and Engineering Vibration
- Engineering Structures
- European Journal of Environmental and Civil Engineering
- Geomechanics and Engineering, An international Journal
- Geosciences
- Géotechnique
- Italian Geotechnical Journal
- Journal of Civil Engineering and Management

- Journal of Geotechnical and Geoenvironmental Engineering, ASCE
- Journal of Rock Mechanics and Geotechnical Engineering
- Natural Hazards
- Natural Hazards and Earth System Sciences
- Soil Dynamics and Earthquake Engineering
- Soils and Foundations
- Structural Engineering and Mechanics, An international Journal
- Structural Engineering International (IABSE)

5.2 International Conferences

- 4th International Conference on Earthquake and Geotechnical Engineering (4ICEGE), Thessaloniki, Greece, 25–28 June 2007.
- 8th International Conference on Structural Dynamics, EURODDYN2011, Leuven, Belgium, 4-6 July 2011.
- 1st International Geomatics Application Conference, GEOMAPPLICA, Skiathos, 8-10 September 2014.
- 6th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN2017, 15-17 June 2017, Rhodes Island, Greece
- 16th European Conference on Earthquake Engineering, 16ECEE, Thessaloniki, 18-21 June 2018.
- 7th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN2019, Crete, Greece, 24-26 June 2019.

6. PROFESSIONAL EXPERIENCE

6.1 Professional and administrative affiliations

- Member, Technical Chamber of Greece
- Member, Hellenic Society of Earthquake Engineering (HSEE-ETAM)
- Member, Hellenic Society of Soil Mechanics and Geotechnical Engineering (HSSMGE)
- Member, International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE)
- Member, International Society of Rock Mechanics (ISRM)
- Member, Scientific Committee for the Seismic Resilience of Bridges (Earthquake Planning and Protection Organization)
- Chair, Research Staff Committee of I.T.S.A.K. (2018-2019)

6.2 Professional Projects

- **Debosset bridge, Greece (2003-2006)**

Core member of the analysis and design team for the assessment of static and seismic performance and the rehabilitation of the historical stone bridge including investigation of: (a) local site effects on seismic motion (b) soil-structure interaction between the massive stone bridge and the deformable foundation soil and (c) seismic performance upgrade by novel intervention techniques combining foundation soil improvement and bridge strengthening.

- **Venizelou Metro Station, Greece (2007)**

Participation in the analysis team for the study of the underground structure – soil interaction by means of simple Winkler models (K. Pitilakis and associates).

7. LABORATORY AND FIELD TESTING EXPERIENCE

- **Centrifuge experiments in Schofield Centre facilities, Cambridge, COSMO TA project (2018-2019)**

Core member of Users Team of the ongoing Transnational Access (TA) project “*Change Of Seismic Motion due to pile-soil kinematic interaction*” (COSMO) (<https://sera-ta.eucentre.it/index.php/sera-ta-project-25/>) within SERA research project. Cooperation with the University of Napoli ‘Parthenope’ (Team Leader), the University of Calabria, the University of Campania ‘Luigi Vanvitelli’ and the University of Liverpool. Participation in the design and the compilation of the centrifuge tests referring to single piles and pile groups in soft clay, as a visiting researcher in the Schofield Centre during March 2019.

- **Soil-structure interaction field experiments in Euroseistest, research projects SERIES (2010- 2013) and SERA (2017-2020)**

Core member of the research team involved in the design, construction, compilation and analysis of large experimental campaigns for field investigation of soil-structure interaction and wave propagation in the experimental facility of EUROSEISTEST within JRA1 action “*Testing Techniques for Soil Structure Interaction (SSI) and Wave Propagation*” of the project SERIES and within ongoing TA projects of the SERA project related to EUROPROTEAS testing facility (<http://euroseisdb.civil.auth.gr/sfsis>). The experimental series include both free- and forced-vibration tests of a real-scale SDOF structure (*EUROPROTEAS*) with outer dimensions 3x3x5m founded on soft soil. Among the innovative aspects of the field tests is the design and deployment of a particularly dense and integrated recording system consisting of surface and borehole accelerometric stations, seismometers and Shape Acceleration Arrays (SAAR) (60 recording stations in total) to monitor soil and structural response in real soil conditions.

- **Urban Accelerometric network for Soil-Structure Interaction studies in real-scale urban areas, INDES-MUSA project (2013 – 2015)**

Scientific responsible of an urban accelerometric network including seven REFTEK SMA-130 accelerometric stations installed within the complex urban area of Kalochori, west of Thessaloniki in Greece, as part of a multi-sensor network for monitoring seismic motion and ground subsidence within the project INDES-MUSA (www.indes-musa.gr). The network aims at investigating soil-structure interaction and urban effects on seismic motion by pairs of accelerometric stations mounted on top of representative structures (2-storey R/C building of industrial type, 2-storey masonry structure and a water tank) and on urban free-field conditions. A reference station in free-field conditions away from the built environment complements the accelerometric network developed for the INDES-MUSA project. The Kalochori Accelerometric Network has been established with a particular DOI of the recorded data acquired from a large set of earthquakes (see publication J.16) and a dedicated freely available Web-GIS platform (<http://apollo.itsak.gr/apollo-portal/ApolloPro.aspx>) has been designed for data dissemination.

- **Centrifuge experiments in IFSTTAR facilities, Nantes, DRESBUS II TA project (2012)**

Lead User of the Transnational Access project (http://www.series.upatras.gr/DRESBUS_II) “*Investigation of the seismic behaviour of shallow rectangular underground structures in soft soils using centrifuge experiments*” within SERIES research project. Cooperation with the Institut Français des Sciences et Technologie des Transports, de l’Amménagement et des Réseaux (IFSTTAR) and the Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering of Aristotle University of Thessaloniki (AUTH). Participation in the design and the compilation of the centrifuge tests as a visiting researcher in the IFSTTAR Centrifuge Facilities during December 2011.

- **Greek National Accelerometric Network**

Participation in the installation of over 20 permanent strong motion accelerometric stations of Guralp CMG-5TDE type equipped with broadband accelerometers, 24 bits digitizers and GPS, in selected locations in Greece, as part of the Greek National Accelerometric Network (consisting of more than 200 stations in total maintained by EPPO-ITSAK).

- **Geophysical field surveys**

Participation as a member of the scientific team in geophysical surveys (single station ambient noise measurements and microtremor array measurements) during field tests in various sites around Greece (e.g. Serres, Kalochori and Thrace). The above field tests were part of the research actions performed in SeiVAS, INDES-MUSA and SciNetNatHaz projects, respectively.

- **Post-earthquake reconnaissance field campaigns**

Participation as a member of ITSAK teams in post-earthquake reconnaissance surveys and deployment of temporary seismic network in earthquake affected areas (Cephalonia Island 2014, Ioannina – West Greece 2016, Lesvos Island 2017).

8. ACADEMIC/TEACHING EXPERIENCE

Aristotle University of Thessaloniki, Department of Civil Engineering

- Teaching assistant in the post-graduate course ASTE-05 “Earthquake-Resistant Design of Foundations, Retaining Walls and Earth Structures”. M.Sc. program “ASTE – Antiseismic (i.e. Earthquake Resistant) Design of Structures and civil works”
- Participation in the advisory of four (4) undergraduate and three (3) post-graduate theses in the Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering (Supervisor: Prof. K. Pitilakis):

Armeni M. “Finite-element analysis of soil-foundation systems”, Diploma Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2013.

Trevlopoulos K. “Dynamic response of simple structures founded on improved soil”, M.Sc. Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2008.

Palasopoulos K and Tsirantonakis N. “Topography and soil-structure interaction effects on the seismic response of structures”, Diploma Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2008.

Palaskas G. and Zapartas P. “Soil- foundation - structure interaction of a bridge pier founded on improved soil”, M.Sc. Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2006.

Senetakis K. “Soil liquefaction analysis in specific case studies”, Diploma Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2005.

Trevlopoulos K. “Effect of foundation soil interventions on soil-structure interaction”, Diploma Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2005

Fasoula V. “Investigation of potential seismic risk mitigation at structures by implementing foundation subsoil interventions”, M.Sc. Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2005

Institute of Engineering Seismology and Earthquake Engineering, EPPO-ITSAK

- Participation in the advisory of three undergraduate theses and contribution in one PhD thesis during a practice period in the premises of ITSAK:

Armeni M Finite-element analysis of soil-foundation system, Diploma Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki, 2013 (Supervisors: Prof. A. Modaresi, Prof. K. Pitilakis)

Koskosidi A. Dynamic soil-foundation-structure interaction: Comparison of numerical results with experimental data, Diploma Thesis, 2013 (Supervisor: Asc. Prof. D. Pitilakis)

Mpefas S. Seismic response of soils and classification from typical soil models referring to EC8, Greek instrumented sites. Diploma Thesis, 2013 (Supervisor: Asc. Prof. A. Anastasiadis)

Sotiriadis D. Effect of soil-structure interaction on earthquake recordings from instrumented buildings. PhD Thesis, ongoing (Supervisors: Asc. Prof. N. Klimis, DUTH, Research Director B. Margaris ITSAK, Prof. A. Sextos, University of Bristol)

Aristotle University of Thessaloniki, Department of Geology

- Participation in teaching of the course “Soil Dynamics” in the Postgraduate Programme “Applied and Environmental Geology” (academic years 2014-2015, 2015–2016, 2016-2017, 2017-2018, 2018-2019) (**Teaching Hours: 35** in total)

University of Thessaly, Department of Civil Engineering

- Full teaching assignment of the course "Foundations and Retaining Structures" (undergraduate level), academic year 2014-2015 (**Teaching Hours: 40**)
- Full teaching assignment of the course "Soil-Structure Interaction" in the Postgraduate Programme “Analysis and Design of Energy Infrastructures ”, academic year 2016-2017 (**Teaching Hours: 40**)

9. RESEARCH EXPERIENCE AND NETWORKING

9.1 Participation in Funded Research Projects [as Scientific Responsible (SR) of the Project or Principal Investigator (PI) for ITSAK]

University of Napoli “Parthenope”, Department of Engineering

COSMO: Change Of Seismic Motion due to pile-soil kinematic interaction **2018-2019**

<https://sera-ta.eucentre.it/index.php/sera-ta-project-25/>

TA Action of SERA project

Budget € 5.000

European Commission – Horizon2020

Role: PI for ITSAK

Technological Institute of Central Macedonia (TICM)

Dynamic characteristics of instrumented steel tanks **2018-2019**

Budget € 2.000

Internal call of the Research Committee of TICM

Role: PI for ITSAK

Institute of Engineering Seismology and Earthquake Engineering (ITSAK)

INDES-MUSA: Innovative multi-sensor Network for DEformation and Seismic Monitoring of Urban Subsidence-prone Areas. **2013-2015**

www.indes-musa.gr

Budget € 400.000 (€131.000 for ITSAK)

2012-2014 Greek-Chinese academia-industry collaboration call

Greek General Secretariat for Research and Technology (G.S.R.T.)

Role: SR of the Project and PI for ITSAK

Institute of Engineering Seismology and Earthquake Engineering (ITSAK)
DRESBUS II: Investigation of the seismic behavior of shallow rectangular underground structures in soft soils using centrifuge experiments 2011 - 2012
http://www.series.upatras.gr/DRESBUS_II
 TA Action of SERIES project
 Budget € 7.000
 European Commission – FP7
Role: SR of the Project and PI for ITSAK

9.2 Participation in Funded Research Projects (as a core member of the research team)

ETHzurich
SERApplus: Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe - Plus Under evaluation
 (PI for ITSAK: Dr. N. Theodoulidis)
 Horizon 2020-INFRAIA-2018-2020

Technical University of Crete (TUC)
GreatSea: Seismic Design Actions for Great Subduction Earthquakes in the Hellenic Arc Under evaluation
 (PI for ITSAK: Dr. B. Margaris)
 Hellenic Foundation for Research and Innovation
 Greek General Secretariat for Research and Technology (G.S.R.T.)

National Observatory of Athens – Institute of Geodynamics
HELPOS: HELenic Plate Observing System 2017 – 2020
 (PI for ITSAK: Dr. Ch. Papaioannou)
 National Strategic Reference Framework (New Programming period 2014-2020)
 Greek General Secretariat for Research and Technology (G.S.R.T.)

Technological Educational Institute of Central Macedonia, Greece
SciNetNatHazPrev:A Scientific Network for Earthquake, Landslide and Flood Hazard Prevention 2013 – 2015
 (PI for ITSAK: Dr. B. Margaris)
 Black Sea Basin Joint Operational Programme 2007-2013

Technological Educational Institute of Serres, Greece
SeiVAS: Seismic Vulnerability Assessment of the city of SERRES 2012 – 2015
 (PI for ITSAK: Dr. N. Theodoulidis)
 Greek Ministry of Education and Religious Affairs (“ARCHIMEDES III” research program)

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering,
SERIES: Seismic engineering research infrastructures for European synergies. 10/2009 – 07/2013
 (PI: Prof. K. Pitilakis)
 European Commission – FP7

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering
SYNER-G: Systemic seismic vulnerability and risk analysis for buildings, lifeline networks and infrastructures safety gain. **09/2010 – 04/2011**
 (PI: Prof. K. Pitilakis)
 European Commission – FP7

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering
SAFELAND: Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies. **01/2010 – 04/2010**
 (PI: Prof. K. Pitilakis)
 European Commission – FP7

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering
LESSLOSS: Risk Mitigation for Earthquakes and Landslides **08/2006 – 08/2007**
 (PI: Prof. K. Pitilakis)
 European Commission – FP6

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering
X-SOILS: Foundation of Structures in Seismically Hazardous Soil Conditions **03/2004 – 12/2006**
 (PI: Prof. K. Pitilakis)
 Greek General Secretariat for Research and Technology (G.S.R.T.)

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering
DEBOSSET: Assessment of structural integrity and rehabilitation of Debosset bridge in Argostoli **09/2004 – 09/2006**
 (PI: Prof. K. Pitilakis)
 Greek Ministry of Culture

Aristotle University of Thessaloniki, Department of Civil Engineering
 Laboratory of Soil Mechanics, Foundations & Geotechnical Earthquake Engineering
NEMISREF: New methods for Mitigation of Seismic Risk of Existing Foundations **10/2003 – 02/2005**
 (PI: Prof. K. Pitilakis)
 European Commission – FP5

9.3 Main National and International Collaborations in Research (R) and Teaching (T)

- Aristotle University of Thessaloniki, Department of Civil Engineering [GREECE] (Prof K. Pitilakis, Asc. Prof. A. Anastasiadis, Ass. Prof. D. Pitilakis, Dr. Anna Karatzetzou, Dr. Grigorios Tsiniidis) - *Field experiments and analysis of soil-foundation-structure systems, Soil Dynamics, Seismic design of foundations and geotechnical structures, Rehabilitation of historical monuments* (R&T)

- Aristotle University of Thessaloniki, Department of Geology [GREECE] (Prof. C. Papazachos, Prof. V. Marinou) - *Soil Dynamics (T), analysis of real case studies following strong earthquakes (R)*
- University of Thessaly, Department of Civil Eng. [GREECE] (Prof. Ai. Komodromos, Prof. P. Dakoulas)- *Design of Foundations and Retaining Structures, Soil-Structure Interaction (T)*
- University of Thrace, Department of Civil Eng. [GREECE] (Prof. N. Klimis, Ass. Prof. G. Papathanasiou) - *Soil response under cyclic and seismic loading (R&T)*
- Technological Educational Institute of Central Macedonia [GREECE] (Prof. Emm. Kirtas) - *Various topics on soil-foundation-structure interaction, Dynamic response of tanks, Interpretation of real earthquake data (R)*
- National Observatory of Athens, Institute of Geodynamics [GREECE] (Dr. A. Ganas) - *Urban monitoring Networks for seismic motion and ground deformations (R)*
- Geosystems Hellas SA [GREECE] (CEO B. Charalampopoulou) - *Remote Sensing Applications, Web-GIS applications, data fusion (R)*
- Satways Satcom & Telematics SA [GREECE] (CEO Dr. D. Diagourtas) - *Installation and maintenance of accelerometric networks (R)*
- University of Campania ‘Luigi Vanvitelli’ [ITALY] (Asc. Prof. Raffaele Di Laora) - *Dynamic and seismic response of piles in inhomogeneous media, kinematic soil-pile interaction (R)*
- University of Napoli ‘Parthenope’ [ITALY] (Prof. Luca de Sanctis) - *Dynamic and seismic response of piles in inhomogeneous media, kinematic soil-pile interaction (R)*
- University of Calabria [ITALY] (Prof. Roberto Cairo) - *Numerical and analytical solutions for soil-pile-structure interaction analysis (R)*
- Università degli Studi di Roma Niccolò Cusano [ITALY] (Asc. Prof. Riccardo Conti) - *Soil-structure Interaction, kinematic response of embedded foundations (R)*
- University of Bristol [UK] (Prof. G. Mylonakis, Chair in Geotechnics and Soil-Structure Interaction) - *Wave propagation, Soil dynamics, piles response in inhomogeneous media (R)*
- University of Cambridge [UK] (Prof. G. Madabhushi, Dr. Stuart Heigh, Prof. G. Viggiani) - *Centrifuge experiments on single piles and pile groups in soft clay, seismic response of surface foundations (R)*
- University of Leeds [UK] (Prof. L. Di Sarno) - *Numerical and analytical solutions for soil-pile-structure interaction analysis (R)*
- Institut Français des Sciences et Technologie des Transports, de l'Aménagement et des Réseaux (IFSTTAR), Nantes [FRANCE] (Dr. S. Escoffier) - *Centrifuge experiments on tunnels in dry and saturated sand (R)*

10. INVITED LECTURES – CONFERENCE PRESENTATIONS - SEMINARS

10.1 Invited lectures

- “Soil-structure interaction under seismic loading: Field observations and urban-scale applications”, Seminar on Local site effects on ground motion and soil-foundation-structure interaction, HELPOS – Hellenic System for Lithosphere Monitoring research program, Aristotle University of Thessaloniki, 05 December 2018, Thessaloniki, Greece.
- “Evidence of dynamic soil-structure interaction based on theoretical models and full-scale experimental data”, Università degli Studi di Napoli “Parthenope”, Corso di Dottorato in Fenomeni e Rischi Ambientali (FERIA), 08 July 2016, Naples, Italy.

10.2 Presentations in Conference (selected list)

- “Dynamic response characteristics of an instrumented steel water tank in Kalochori, N. Greece”, 16th European Conference on Earthquake Engineering, 16ECEE, 18-21 June 2018, Thessaloniki, Greece.
- “Reduction of seismic loading on structures induced by piles in inhomogeneous soil”, 6th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN 2017, Rhodes Island, June 2017.
- “Airborne LiDAR and field data combination towards SSI applications at large-scale: The case of the Kalochori urban area in Greece”, 1st ICONHIC Conference, June 2016, Chania, Greece.
- “The accelerometric network of the INDES-MUSA project in the Kalochroi area: Configuration, Documentation and preliminary data interpretation”, 14th International Congress of the Geological Society of Greece, May 2016, Thessaloniki, Greece.
- "Multi-sensor network for monitoring subsidence and seismic motion in Kalochori urban site, N. Greece", 1st GEOMAPPLICA Conference, September 2014, Skiathos, Greece.
- "INDES-MUSA Project - Integrated monitoring of subsiding coastal areas prone to large earthquakes: the case of Kalochori in Greece", 2nd ECEES, August 2014, Istanbul.
- “Kinematic bending of fixed-head piles in nonhomogeneous soil”, IARG2014, July 2014, Chieti, Italy
- “DE BOSSET monumental stone bridge in Cephalonia: Strengthening measures and seismic response under the earthquakes of 26/01/2014 and 03/02/2014”, 2nd IBSBI, October 2014, Athens.
- “Inertial and kinematic response of piles in layered inhomogeneous soil: Winkler analysis”, 2nd PBD, May 2012, Taormina.
- “Dynamic stiffness and kinematic response of piles in inhomogeneous soil”, 1st HSEE Workshop, December 2012, Thessaloniki.
- “Physical modeling for the evaluation of the seismic behavior of underground structures. 3rd International Workshop “Role of research infrastructures in seismic rehabilitation”, SERIES-Seismic Engineering Research Infrastructures for European Synergies, February 2012, Istanbul.
- “Pseudo-Natural SSI frequency of coupled soil-pile-structure systems”, 21st EYGEC, September 2011, Rotterdam.
- “1D seismic response of soil: Continuously inhomogeneous vs equivalent inhomogeneous soil”, *COMPDYN 2011*, May 2011, Corfu.
- “1D seismic response of layered inhomogeneous soil: A closed form solution”, 9th HSTAM Congress, July 2010, Limassol.
- “Experimental p-y loops for estimating seismic soil-pile interaction“, 6th Greek CGGE, September 2010, Volos.
- “Effect of superstructure rotation on the dynamic response of coupled soil-pile-structure systems“, 6th Greek CGGE, September 2010, Volos.

- “Evaluation of Dynamic soil-pile interaction based on back-calculated P-Y curves”, 4th ICEGE, June 2007, Thessaloniki.
- “Insight into soil-pile-structure interaction mechanism including inertial and kinematic effects”, 4th ICEGE, June 2007, Thessaloniki.
- “Rehabilitation of the historical bridge Debosset in Argostoli”, 1st National Conference of ETEPAM, June 2006, Thessaloniki.
- “Debosset bridge: Assessment of structural performance and strengthening interventions”, Workshop on Seismic interventions in Monuments and Historical centers, Earthquake Planning and Protection Organization, February 2006, Athens.

10.3 Seminars / Workshops attended

- *Seminar: “The Macroelement concept for shallow and deep Foundations: Efficient tool for the analysis of SFSI problems”* delivered by Prof. C. Tamagnini, 21 March 2019, Darwin College, Cambridge, UK.
- *59th Rankine lecture: “Benefits of Unconventional Seismic Foundation Design”*, delivered by Prof. G. Gazetas, 20 March 2019, British Geotechnical Association, Imperial College London, London, UK.
- *Workshop: SERA NA5 / JRA4 Joint Site Characterization*, 6-7 December, Thessaloniki, Greece.
- *Workshop: SINAPS@ project Cephalonia-ARGONET test-site: outcomes and perspectives*, 25-26 September 2018, Argostoli, Cephalonia, Greece. [Including the lecture: **Rovithis Emm.** and Makra K. “The Kalochoi Accelerometric Network: Configuration, available recordings and features of the dataset”].
- *Workshop: Landslides*, Technical Chamber of Greece, December 2015, Thessaloniki, Greece. [Including the lecture: Makra K. and **Rovithis Emm.** “Earthquake-induced damages on slopes, embankments and retaining structures in the Ionian Islands – Effects on the road network” (in Greek)].
- *Open seminar: “Multi-Sensor ground- and airborne- based Monitoring of Urban Areas”* organized in the framework of the INDES-MUSA project, November 2015, Athens, Greece. [Including the lectures: **Rovithis Emm.** et al. “Accelerometric network in the urban area of Kalochoi: Installation, configuration and data acquisition”, and **Rovithis Emm.** et al. “Soil-structure interaction at urban scale by means of LiDAR technology” (in Greek)].
- *Final Workshop of the INDES-MUSA project*, September 2015, Thessaloniki, Greece. [Including the lecture **Rovithis Emm.** et al. “INDES-MUSA research project in Kalochoi: General description and project results” (in Greek)].
- *European Space Expo Athens on Space data for natural disasters mitigation: Copernicus and Galileo applications*, April 2015, Athens, Greece.
- *Workshop: Lessons learnt from the Cephalonia earthquakes of 2014*, Co-organized by the Technical Chamber of Greece, the Earthquake Planning and Protection Organization and the Hellenic Society of Earthquake Engineering, July 2014, Thessaloniki, Greece. [Including the lecture: Pitolakis K. and **Rovithis Emm.** “The historic bridge Debosset: Seismic performance under large earthquakes” (in Greek)].
- *Workshop: The Cephalonia Earthquakes 2014*, Technological Institute of Ionian Islands, June 2014, Argostoli, Greece. [Including the lecture: **Rovithis Emm.** “Debosset bridge in Argostoli: Retrofitting measures and seismic response under the strong Cephalonia earthquakes of 26/01/2014 and 03/02/2014” (in Greek)].
- *Workshop on Space and Security*, 20 June 2014, Athens, Greece.

- *Greece – China Workshop on Marine Science and Technology*, Internal workshop organized within the INDES-MUSA project, 19 June 2014, Athens, Greece. [Including the lecture: Charalampopoulou B. and **Rovithis Emm.** “Innovative multi-sensor monitoring scheme for subsidence- and earthquake-prone coastal areas”].
- *Workshop: The Cephalonia Earthquakes: Preliminary findings*, Co-organized by the Technical Chamber of Greece, the Earthquake Planning and Protection Organization and the Hellenic Society of Earthquake Engineering, April 2014, Athens. [Including the lecture: Pitilakis K., **Rovithis Emm.**, Vlachoulis Th., Karani I., Chorafa E., Zarogianni E. “The historical bridge of Debosset: 1811 – 2014” (in Greek)].
- *Final Workshop of the DRESBUS-II project*, February 2013, Thessaloniki, Greece. [Including the lecture: **Rovithis Emm.** “DRESBUS II TA project: Seismic response of rectangular underground structures using centrifuge experiments, Project description and objectives”].
- *SERIES Concluding Workshop - Joint with US-NEES Earthquake Engineering Research Infrastructure*, May 2013, Ispra, Italy. [Including the lecture: Pitilakis D., **Rovithis Emm.**, Anastasiadis A. Tsinidis G. and Pitilakis K. “EuroProteas: A full-scale experimental facility for soil-foundation-structure interaction studies”].
- *Workshop: The protection of monuments under seismic actions*, Earthquake Planning and Protection Organization (EPPO) and European Centre on Prevention & Forecasting of Earthquakes of the Council of Europe (E.C.P.F.E), November 2011, Thessaloniki.
- *Workshop: EC8 applications on design and assessment of civil works*, Hellenic Society of Earthquake Engineering (HSEE-ETAM), December 2011, Thessaloniki.

11. SCIENTIFIC PUBLICATIONS

11.1 Dissertations

- D1. **Rovithis Emm.** (2007) “Dynamic Analysis of Coupled Soil-Pile-Structure Systems”, Ph.D. Dissertation, Department of Civil Engineering, Aristotle University of Thessaloniki. (in Greek with English abstract)
- D2. **Rovithis Emm.** (2003) “Effect of foundation soil interventions on the dynamic response of R/C buildings”, M.Sc. Dissertation, Department of Civil Engineering, Aristotle University of Thessaloniki. (in Greek with English abstract)
- D3. **Rovithis Emm.** and Papamiltiadis V. (2002) “Implementation of Greek Seismic Code using ADINA FE platform”, Diploma Thesis, Department of Civil Engineering, Aristotle University of Thessaloniki. (in Greek)

11.2 Book Chapters

- BC.03 Limongelli M.P., Dolce M., Spina D., Guéguen P., Langlais, Wolinieck D., Maufroy E., Karakostas Ch., Lekidis V., Morfidis K., Salonikios T., **Rovithis Emm.**, Makra K., Masciotta M.- G., Lourenço P. “S2HM in some European countries”, Chapter in “Seismic Structural Health Monitoring”, Springer Tracts in Civil Engineering (accepted for publication).
- BC.02 Tsinidis G., **Rovithis Emm.**, Pitilakis K. and Chazelas J-L (2015) “Dynamic Response of Shallow Rectangular Tunnels in Sand by Centrifuge Testing”, Chapter No.30 in *Experimental Research in Earthquake Engineering*, Taucer F. and Apostolska R. (eds), Geotechnical, Geological and Earthquake Engineering, Vol. 35, Springer, pp. 493 – 507.
- BC.01 Mylonakis G., **Rovithis Emm.** and Paraschakis H (2013) “1D harmonic response of layered inhomogeneous soil: Exact and approximate analytical solutions”, Chapter No.1 in *Computational*

Methods in Earthquake Engineering - Vol. 2, Papadarakakis M., Fragiadakis M. and Plevris V. (eds), Vol.2 Springer, pp. 1-32

11.3 Peer-Reviewed International Journals

- J.18 Iovino M., Di Laora R., **Rovithis Emm.** and de Sanctis L. “The beneficial role of piles on the seismic loading of structures”, *Earthquake Spectra* (accepted for publication).
- J.17 Pitilakis D., **Rovithis Emm.**, Anastasiadis A., Vratsikidis A. and Manakou M. (2018) “Field evidence of SSI from full-scale structure testing”, *Soil Dynamics and Earthquake Engineering*, 112: 89 - 106.
- J.16 **Rovithis Emm.**, Makra K., Kirtas Emm., Manesis Ch., Bliziotis D., and Konstantinidou K. (2018) “Field monitoring of strong ground motion in urban areas: the Kalochori Accelerometric Network (KAN), database and Web-GIS portal”, *Earthquake Spectra*, 34(2): 471-501.
- J.15 Conti R., Morigi M., **Rovithis Emm.**, Theodoulidis N. and Karakostas Ch. (2018) “Filtering action of embedded massive foundations: New analytical expressions and evidence from 2 instrumented buildings”, *Earthquake Engineering and Structural Dynamics*, 1-21: <https://doi.org/10.1002/eqe.3014>
- J.14 **Rovithis Emm.**, Kirtas Emm., Bliziotis D., Maltezos E., Pitilakis D., Makra K., Savvaidis A., Karakostas Ch., Lekidis V. (2017) “A LiDAR-aided urban-scale assessment of soil-structure interaction effects: The case of Kalochori residential area (N. Greece)” *Bulletin of Earthquake Engineering*, 15(11): 4821-4850.
- J.13 **Rovithis Emm.**, Makra K., Savvaidis A., Kirtas Emm. (2016) “The accelerometric network of the INDES-MUSA project in the Kalochori area: Configuration, documentation and preliminary data interpretation” *Bulletin of the Geological Society of Greece*, 50: 1100 – 1119.
- J.12 Tsinidis G., **Rovithis Emm.**, Pitilakis K. & Chazelas J-L (2016) “Seismic Response of Box-Type Tunnels in Soft Soil: Experimental and Numerical Investigation” *Tunneling and Underground Space Technology*, 59: 199-214.
- J.11 Kirtas Emm., Koliopoulos P., Panagopoulos G., Mouratidis E., Sous I., Kappos A., Theodoulidis N., Savvaidis A., Margaris B., **Rovithis Emm.** (2016) “Identification of earthquake ground motion using site effects analysis in the case of Serres city, Greece”, *International Journal of Civil Engineering and Architecture*, 2(1): 20-27.
- J.10 **Rovithis Emm.** and Pitilakis K. (2016) Seismic assessment and retrofitting measures of a historic stone masonry bridge, *Earthquakes and Structures*, 10(3): 645-667.
- J.09 Di Laora R. and **Rovithis Emm.** (2016) “Closure to “Kinematic Bending of Fixed-Head Piles in Nonhomogeneous Soil” by Raffaele Di Laora and Emmanouil Rovithis”, *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, 142(2), 07015043.
- J.08 Theodoulidis N., Karakostas Ch., Lekidis V., Makra K., Margaris B., Morfidis K., Papaioannou Ch., **Rovithis Emm.**, Salonikios T. and Savvaidis A. (2015) “The Cephalonia, Greece, January 26 (M6.1) and February 3, 2014 (M6.0) earthquakes: near-fault ground motion and effects on soil and structures”, *Bulletin of Earthquake Engineering*, 14(1): 1-38.
- J.07 Di Laora R. and **Rovithis Emm.** (2014) “Kinematic bending of fixed-head piles in nonhomogeneous soil”, *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, 141(4), 04014126.
- J.06 **Rovithis Emm.**, Mylonakis G. and Pitilakis K. (2013) “Dynamic stiffness and kinematic response of single piles in inhomogeneous soil”, *Bulletin of Earthquake Engineering*, 11(6): 1949-1972
- J.05 **Rovithis Emm.**, Paraschakis Ch. and Mylonakis G. (2011) “1D harmonic response of layered inhomogeneous soil: analytical investigation”, *Soil Dynamics and Earthquake Engineering*, 31(7): 879 - 890.
- J.04 **Rovithis Emm.**, Pitilakis K. and Mylonakis G. (2011) “A note on a pseudo-natural SSI frequency for coupled soil-pile-structure systems”, *Soil Dynamics and Earthquake Engineering*, 31(7): 873- 878.

- J.03 **Rovithis Emm.**, Pitilakis K. and Mylonakis G. (2009) “Seismic analysis of coupled soil-pile-structure systems leading to the definition of a pseudo natural SSI frequency”, *Soil Dynamics and Earthquake Engineering*, 29(6): 1005-1015. [Listed among the 25 most downloaded articles of the Journal for a full academic year: October 2009 – September 2010]
- J.02 **Rovithis Emm.**, Kirtas E. and Pitilakis K. (2009) “Experimental p-y loops for estimating seismic soil-pile interaction”, *Bulletin of Earthquake Engineering*, 7(3): 719-736.
- J.01 Kirtas E., **Rovithis Emm.**, Pitilakis K. (2009) “Subsoil Interventions Effect on Structural Seismic Response. Part I: Validation of Numerical Simulations”, *Journal of Earthquake Engineering*, 13: 155-169.

11.4 International Conference Proceedings

- IC.40 **Rovithis Emm.**, Di Laora R., Iovino M. and de Sanctis L. (2019) “Filtering effect of piles in very soft clays: Analysis of a real case study”, 7th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN2019 (*accepted for presentation*)
- IC.39 Karakostas Ch., **Rovithis Emm.**, Morfidis K., Chatzistefanou G., Lekidis V., Theodoulidis N. and Makarios T. (2018) “Investigation of the Dynamic Response and SSI effects of the Instrumented Municipality Building in Lefkas, Greece”, Proceedings of the 16th European Conference on Earthquake Engineering (16ECEE), 18-21 June, Thessaloniki, Greece, paper No. 11461.
- IC.38 Makra K., Savvaidis A. and **Rovithis Emm.** (2018) “Site Response Characteristics Of A Deep Sedimentary Basin. The Case Of Kalochori, N. Greece”, Proceedings of the 16th European Conference on Earthquake Engineering (16ECEE), 18-21 June, Thessaloniki, Greece, paper No. 11322.
- IC.37 Kirtas Emm., **Rovithis Emm.**, Makra K., and Papaevangelou I. (2018) “Dynamic response characteristics of an instrumented steel water tank in Kalochori, N. Greece”, Proceedings of the 16th European Conference on Earthquake Engineering (16ECEE), 18-21 June, Thessaloniki, Greece, paper No. 11167.
- IC.36 Papaioannou Ch., Karakostas Ch., **Rovithis Emm.**, Salonikios T., Theodoulidis N., Makra K., Lekidis V., Margaris V., Zacharopoulos S. and Morfidis K. (2018) “The June-July, 2017 Earthquake Sequences in Eastern Aegean Sea: Ground Motions, Geotechnical Ground Failures and Structural Response”, Proceedings of the 16th European Conference on Earthquake Engineering (16ECEE), 18-21 June, Thessaloniki, Greece, paper No. 12192.
- IC.35 Papaioannou Ch., Karakostas Ch., Makra K., Lekidis V., Margaris V., Morfidis K., Theodoulidis N., Salonikios T., **Rovithis Emm.**, Zacharopoulos S. (2018) “The November 17, 2015 M6.4 Lefkas, Greece Earthquake: Source Characteristics, Ground Motions, Ground Failures and Structural Response”, Proceedings of the 16th European Conference on Earthquake Engineering (16ECEE), 18-21 June, Thessaloniki, Greece, paper No. 12192.
- IC.34 Morigi M., Conti R., **Rovithis Emm.**, Theodoulidis N. and Karakostas Ch. (2017) “Analisi del comportamento sismico di fondazioni interrate: Previsioni teoriche e osservazioni su strutture esistenti”, Proceedings of Incontro Annuale dei Ricercatori di Geotecnica (IARG2017), 5-7 July, Matera, Italy.
- IC.33 **Rovithis Emm.**, Di Laora R., Iovino M., de Sanctis L. (2017) “Reduction of seismic loading on structures induced by piles in inhomogeneous soil”, Proceedings of the 6th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN2017, Papadrakakis M, Fragiadakis eds, 15-17 June, Rhodes Island, Greece, paper No. 18333.
- IC.32 Conti R., Morigi M., Viggiani G., **Rovithis Emm.**, Theodoulidis N. and Karakostas Ch. (2017) “Quasi-kinematic response of embedded foundations: Evidence of foundation mass effect from numerical analyses and instrumented structures”, Proceedings of the 6th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN2017, Papadrakakis M, Fragiadakis eds, 15-17 June, Rhodes Island, Greece, paper No. 17424.

- IC.31 Karakostas Ch., Kontogiannis G., Morfidis K., **Rovithis Emm.**, Manolis G. and Theodoulidis N. (2017) "Effect of soil-structure interaction on the seismic response of an instrumented building during the Cephalonia, Greece earthquake of 26-1-2014", Proceedings of the 6th ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, COMPDYN2017, Papadrakakis M, Fragiadakis eds, 15-17 June, Rhodes Island, Greece, paper No. 17182.
- IC.30 **Rovithis Emm.**, Kirtas Emm., Bliziotis D., Maltezos E., Pitilakis D., Makra K., Savvaidis A., Karakostas Ch., Lekidis V. (2016) "Airborne LiDAR and field data combination towards SSI applications at large-scale: The case of the Kalochoi urban area in Greece", Proceedings of the 1st International Conference on Natural Hazards and Infrastructure (ICONHIC2016), 28-30 June, Chania, Greece, paper No. 79.
- IC.29 **Rovithis Emm.**, Kirtas Emm., Marini E., Bliziotis D., Maltezos E., Pitilakis D., Makra K., Savvaidis A. (2016) "Assessment of seismic loading on structures based on airborne LiDAR data from the Kalochoi urban area (N. Greece)", Proceedings SPIE 9688, 4th International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2016), 96880M (August 12, 2016); doi:10.1117/12.2241746.
- IC.28 **Rovithis Emm.**, Di Laora R. and de Sanctis L. (2015) "Foundation motion filtered by piles: effect of soil inhomogeneity", XVI European Conference on Soil Mechanics and Geotechnical Engineering (XVI ECSMGE), September 13-17, Edinburgh, pp. 1169-1174.
- IC.27 Pitilakis D., **Rovithis Emm.**, Massimino M.R., Gatto M.P.A (2015) "Numerical simulation of large-scale soil-foundation-structure interaction experiments in the EuroProteas facility", 6th International Conference on Earthquake Geotechnical Engineering (6ICEGE), November 1-4, Christchurch, New Zealand.
- IC.26 Tsinidis G., **Rovithis Emm.**, Pitilakis K. & Chazelas J-L, (2015) "Seismic response of rectangular tunnels by centrifuge testing and numerical analysis", SECED 2015 Conference: Earthquake Risk and Engineering towards a Resilient World, July 9-10, Cambridge UK.
- IC.25 **Rovithis Emm.**, Pitilakis K., Vlachoulis T., Karani I., Chorafa E. and Zarogiani E. (2014) "DE BOSSET monumental stone bridge in Cephalonia: Strengthening measures and seismic response under the earthquakes of 26/01/2014 and 03/02/2014", 2nd International Conference on "Innovations on Bridges and Soil-Bridge Interaction, October 16-18, Athens, pp. 111-118.
- IC.24 Charalampopoulou B., Manesis Ch., Tsivikis K., Savvaidis A., Makra K., Ganas A., **Rovithis Emm.** (2014), "3D city model using LiDAR & digital color imagery in Kalochoi region", 1st International Geomatics Application Conference (GEOMAPPLICA), Skiathos, September 08-10, pp. 72-81.
- IC.23 Theodoulidis N., Margaris B., Savvaidis A., Kirtas Emm., **Rovithis Emm.** (2014) "Defining shallow structure properties by composing ambient noise and geological data for seismic risk mitigation: The case of Serres city (northern Greece)", 1st International Geomatics Application Conference (GEOMAPPLICA), Skiathos, September 08-10, pp. 52-58.
- IC.22 **Rovithis Emm.**, Savvaidis A., Makra K., Ganas A., Loupasakis C., Kirtas Emm., Charalampopoulou B. (2014), "Multi-sensor network for monitoring subsidence and seismic motion in Kalochoi urban site, N. Greece", 1st International Geomatics Application Conference (GEOMAPPLICA), Skiathos, September 08-10, pp. 36-43.
- IC.21 Tsinidis G., **Rovithis Emm.**, Pitilakis K. & Chazelas J-L, (2014) "Dynamic centrifuge testing of rectangular tunnels in soft soils", 2nd European Conference on Earthquake Engineering and Seismology (2ECEES), 25-29 August, Istanbul, paper No. 632.
- IC.20 Pitilakis D., Lamprou D., Manakou M., **Rovithis Emm.** and Anastasiadis A. (2014) "System identification of soil-foundation-structure systems by means of ambient noise records: The case of Europroteas model", 2nd European Conference on Earthquake Engineering and Seismology (2ECEES), 25-29 August, Istanbul, paper No. 1361.

- IC.19 Di Laora R. and **Rovithis Emm.** (2014) “Kinematic bending of fixed-head piles in nonhomogeneous soil”, *2nd European Conference on Earthquake Engineering and Seismology (2ECEES)*, 25-29 August, Istanbul, paper No. 1343.
- IC.18 Tsinidis G., **Rovithis Emm.**, Ptilakis K. & Chazelas J-L, (2014) “Dynamic Response of Square Tunnels: Centrifuge Testing and Validation of Existing Design Methodologies” *2nd Eastern European Tunneling Conference: “Tunneling in a Challenging Environment”*, 28 September - 01 October, Athens, paper No.049
- IC.17 Di Laora R. and **Rovithis Emm.** (2014) “Kinematic bending of fixed-head piles in nonhomogeneous soil”, *Incontro Annuale dei Ricercatori di Geotecnica (IARG)*, Chieti e Pescara, 14-16 July
- IC.16 Ptilakis K., Anastasiadis A., Ptilakis D., **Rovithis Emm.** (2013) “Full-scale testing of a model structure in EUROSEISTEST to study soil-foundation-structure interaction”, *4th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPdyn)*, Kos, 12-14 June, paper No. 1546.
- IC.15 **Rovithis Emm.**, Mylonakis G.E., and Ptilakis K. (2012) “Inertial and kinematic response of piles in layered inhomogeneous soil: Winkler analysis”, *2nd International Conference on Performance-Based Design in Earthquake Geotechnical Engineering*, Taormina, May 25-28, paper No. 11.21.
- IC.14 Mylonakis G.E, **Rovithis Emm.** and Paraschakis (2011). “1D seismic response of soil: Continuously inhomogeneous vs equivalent inhomogeneous soil”, *III ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPdyn)*, May 26-28, Corfu, paper No. 204.
- IC.13 **Rovithis Emm.** and Ptilakis K. (2011) “Seismic performance and rehabilitation of old stone bridges in earthquake-prone areas: The case of DeBosset in Greece”, *International Conference on “Innovations on Bridges and Soil-Bridge Interaction*, October 13-15, Athens, pp. 311-318.
- IC.12 **Rovithis Emm.**, Ptilakis K. and Mylonakis G. (2011) “Pseudo-Natural SSI frequency of coupled soil-pile-structure systems”, *21st European Young Geotechnical Engineers Conference*, September 4-7, Rotterdam, pp. 150-155.
- IC.11 Paraschakis Ch., **Rovithis Emm.** and Mylonakis G. (2010) “1D seismic response of layered inhomogeneous soil: A closed form solution”, *9th HSTAM International Congress on Mechanics*, Limassol, July 12-14, pp. 639-647.
- IC.10 Ptilakis K., Kirtas E. & **Rovithis Emm.** (2009) “Effect of Foundation Soil Interventions to the Seismic Response of MDOF Structures”, *3rd Greece-Japan Workshop on Seismic Design, Observation and Retrofit of Foundations*, September 22-23, Santorini, 11 pages in Proceedings Vol.
- IC.09 Kirtas E., Trevelopoulos K., **Rovithis Emm.**, Ptilakis K. (2007) “Fundamental period of SDOF systems including soil-structure interaction and soil improvement”, *2nd Japan-Greece Workshop on Seismic Design, Observation and Retrofit of Foundations*, April 3-4, Tokyo, pp. 225-237.
- IC.08 **Rovithis Emm.**, Kirtas E. and Ptilakis K., (2007) “Effect of the natural frequencies of the coupled Soil-Pile-Structure system on pile dynamic response”, *2nd Japan-Greece Workshop on Seismic Design, Observation and Retrofit of Foundations*, April 3-4, Tokyo, pp. 344-356.
- IC.07 **Rovithis Emm.**, Kirtas E. and Ptilakis K., (2007) “Utilization of P-Y curves for estimating soil-pile interaction under seismic loading”, *2nd Japan-Greece Workshop on Seismic Design, Observation and Retrofit of Foundations*, April 3-4, Tokyo, pp. 357-368.
- IC.06 Kirtas E., Trevelopoulos K., **Rovithis Emm.**, Ptilakis K. (2007) “Discussion of the fundamental period of SDOF systems including soil-structure interaction”, *4th International Conference on Earthquake Geotechnical Engineering*, June 25-28, Thessaloniki, paper No.1692.

- IC.05 **Rovithis Emm.**, Kirtas E. and Pitilakis K. (2007) “Evaluation of Dynamic soil-pile interaction based on back-calculated P-Y curves”, *4th International Conference on Earthquake Geotechnical Engineering*, June 25-28, Thessaloniki, paper No.1694.
- IC.04 **Rovithis Emm.**, Kirtas E. and Pitilakis K. (2007) “Insight into soil-pile-structure interaction mechanism including inertial and kinematic effects”, *4th International Conference on Earthquake Geotechnical Engineering*, June 25-28, Thessaloniki, paper No.1695.
- IC.03 Kirtas E., **Rovithis Emm.** and Pitilakis K. (2006) “Numerical Investigation of subsoil Interventions towards Structural Seismic Risk Mitigation”, *1st European Conference on Earthquake Engineering and Seismology*, September 3-8, Geneva, paper No.953.
- IC.02 Kirtas E., **Rovithis Emm.**, Pitilakis K. and Sextos A. (2006) “Numerical Investigation of Potential Foundation Intervention as a means for Mitigating Seismic Risk”, *8th U.S. National Conference on Earthquake Engineering*, April 18-22, San Francisco, paper No.833.
- IC.01 Pitilakis K., Kirtas E., **Rovithis Emm.** (2005) “Is it possible to improve the seismic structural behaviour with intervention to Subsoil and Foundation Conditions?”, *1st Greece – Japan Workshop on Seismic Design, Observation and Retrofit of Foundations*, October 11-12, Athens, 18 pages in Proceedings Vol.

11.5 Greek Conference Proceedings

- GC.13 Charalampopoulou V., Manesis CH., Tsvikis K., Savvaidis A., Makra K., Ganas A. and **Rovithis Emm.** (2014) “3D city model by airborne LiDAR & RGB Color imagery in the area of Kalochori (INDES-MUSA project, www.indes-musa.gr)”, In Proceedings of the 4th National Conference of Rural and Surveying Engineering, October 2014, Thessaloniki (in Greek).
- GC.12 Pitilakis D., **Rovithis Emm.** and Anastasiadis A. (2014) “Experimental investigation of dynamic soil-structure interaction in the real-scale model of Europroteas”, In Proceedings of the 7th National Conference of Geotechnical Engineering, Athens, Session XVI, paper No. 13 (in Greek).
- GC.11 Tsinidis G., **Rovithis Emm.**, Pitilakis K. and Chazelas J-L (2014) “Dynamic response of box-type tunnels in alluvial deposits: Experimental and numerical investigation”, In Proceedings of the 7th National Conference of Geotechnical Engineering, Athens, Session XV, paper No. 12 (in Greek).
- GC.10 **Rovithis Emm.**, Mylonakis G. and Pitilakis K. (2014) «Impedance functions and kinematic interaction factors of single piles in inhomogeneous soil», In Proceedings of the 7th National Conference of Geotechnical Engineering, Athens, Session XI, paper No. 10 (in Greek).
- GC.09 **Rovithis Emm.** and Mylonakis G. (2012) “Dynamic stiffness and kinematic response of piles in inhomogeneous soil”, *1st Young Researchers Earthquake Engineering Workshop of the Hellenic Society of Earthquake Engineering*, December 7, Thessaloniki, 8 pages in CD-ROM proceedings (in Greek)
- GC.08. **Rovithis Emm.**, Pitilakis K. and Kirtas Em. (2010) “Experimental p-y loops for estimating seismic soil-pile interaction”, *6th Greek Conference in Geotechnical and Geoenviromental Engineering*, September 9 – October 1, Volos, Vol. I, pp. 613-620 (in Greek)
- GC.07 **Rovithis Emm.**, Pitilakis K. and Mylonakis G. (2010) “Effect of superstructure rotation on the dynamic response of coupled soil-pile-structure systems”, *6th Greek Conference in Geotechnical and Geoenviromental Engineering*, September 9 – October 1, Volos, Vol. I, pp. 621-628 (in Greek)
- GC.06 Kirtas Em., **Rovithis Emm.**, Pitilakis K. (2010) “Numerical investigation of subsoil intervention’s effect on the seismic response of multistory frame structures”, *6th Greek Conference in Geotechnical and Geoenviromental Engineering*, September 9 – October 1, Volos, Vol. I, pp. 337-344 (in Greek)
- GC.05 Trevlopoulos K., **Rovithis Emm.**, Anastasiadis A. and Pitilakis K. (2010) “Study of the Dynamic Response of Structures on Improved Soil”, *6th Greek Conference in Geotechnical and Geoenviromental Engineering*, September 9 – October 1, Volos, Vol. I, pp. 597-604 (in Greek)

- GC.04 **Rovithis Emm.**, Pitilakis K. and Mylonakis G. (2008) "Seismic Analysis of Coupled Soil-Pile-Structure Systems", *3rd Greek Conference on Earthquake Engineering and Engineering Seismology*, November 5-7, Athens, paper No. 2007. (in Greek)
- GC.03 **Rovithis Emm.**, Pitilakis K. and Apostolidis P. (2006) "Rehabilitation of the historical bridge Debosset in Argostoli", *1st National Conference of the Hellenic Society for Research and Promotion of the Scientific Rehabilitation of Monuments*, June 14-17, Thessaloniki, 12 pages in Proceedings Vol., (in Greek)
- GC.02 **Rovithis Emm.**, Pitilakis K., Kirtas Em. (2006) "Seismic response of piled foundations on soft soil", *5th Greek Conference in Geotechnical and Geoenvironmental Engineering*, May 31 – June 2, Xanthi, Vol. II, pp. 433-440. (in Greek)
- GC.01 Kirtas Em. Pitilakis K., **Rovithis Emm.** (2006) "Numerical investigation of potential seismic risk mitigation at structures implementing foundation soil interventions", *5th Greek Conference in Geotechnical and Geoenvironmental Engineering*, May 31 – June 2, Xanthi, Vol. II, pp. 231-238. (in Greek)

11.6 Extended Abstracts

- EA.06 Chatzis N., Kkallas Ch., Papazachos C., Anthymidis M., **Rovithis Emm.**, Karakostas Ch., Papaioannou Ch., (2019) " Stochastic Simulation of Seismic Motion and Site-Effects Studies of Ambient Noise and Seismic Data: The Case of the Vrisa Settlement and the 2017 M=6.3 Lesvos Earthquake ", *15th International Congress of the Geological Society of Greece*, 22-24 May, Athens (*accepted for presentation*)
- EA.05 Kkallas Ch., Papazachos C., **Rovithis Emm.**, Karakostas Ch., Papaioannou Ch., Anthymidis M. and Chatzis N. (2018) "Stochastic ground motion simulation of the 2017 M=6.3 Lesvos earthquake: Explaining the damage pattern of the historical Vrisa settlement", *The European Seismological Commission 36th General Assembly*, 2-7 September, Malta, paper No. 526.
- EA.04 Chatzis N., Papazachos C., Anthymidis M., Kkallas Ch., **Rovithis Emm.**, Karakostas Ch., and Papaioannou Ch. (2018) "Spatial variations of site-effects recovered from a 3D V_s -model based on the joint inversion of MASW and ambient data, and their correlation with damage from strong earthquakes: The case of the Vrisa settlement and the 2017 M=6.3 Lesvos earthquake", *The European Seismological Commission 36th General Assembly*, 2-7 September, Malta, paper No. 849.
- EA.03 Papazachos C., Chatzis N., Kkallas Ch., Anthymidis M., **Rovithis Emm.**, Karakostas Ch., and Papaioannou Ch. (2018) "How does local faulting and geology control the earthquake damage distribution? The Lesvos 2017 earthquake case", *9th International INQUA Meeting on Paleoseismology, Active Tectonics and Archeoseismology (PATA)*, 25 – 27 June 2018, Possidi, Greece, paper No. 99.
- EA.02 **Rovithis Emm.**, Charalampopoulou B., Ganas A., Savvaidis A., Makra K., Konstantinidou K., Kirtas Emm., Karakostas Ch., Lekidis V., Pitilakis D., Loupasakis C., Tsimi Ch. and Manesis Ch. (2014) "INDESMUSA Project - Integrated monitoring of subsiding coastal areas prone to large earthquakes: the case of Kalochori in Greece", *2nd European Conference on Earthquake Engineering and Seismology (2ECEES)*, 25-29 August, Istanbul, paper No. 2739.
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11.7 Other publications (Research reports, field reconnaissance reports, Web articles etc)

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12. COMPUTER SKILLS & CODE DEVELOPMENT

Engineering Software: ANSYS, SAP2000, Cyberquake, SHAKE2000, DEEPSOIL, EERA

Engineering Design: AutoCAD

Programming Languages: Matlab

Signal Processing: Seismosignal, Scream, ART, Compass, REXEL

- **Development of various Matlab scripts and codes (selected list)**

Seismic soil-pile interaction analysis

The code computes dynamic Winkler springs and dashpots of single piles based on back-calculated p-y loops. Input data may refer to real earthquake or experimental bending moments recorded on head-loaded or seismically excited piles.

Pile response in inhomogeneous soil

The code computes dynamic stiffness and kinematic response factors of single piles in continuously inhomogeneous soil by means of the Haskell-Thompson technique. Different pile-head and pile-tip conditions are encountered. Shear force, axial force and bending moment's diagrams along the pile may be calculated (under development)

Harmonic response of flexible-base SDOF structures

The script computes the elastodynamic response of flexible-base structures (including SSI effect) under forced harmonic loading imposed at the top of the structure. Both surface footings and single pile foundations may be encountered by means of analytical solutions for dynamic impedances that are available in the literature.

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14. PUBLICATIONS ABSTRACTS (selected list)

Iovino M., Di Laora R., **Rovithis Emm.** and de Sanctis L. “The beneficial role of piles on the seismic loading of structures”, *Earthquake Spectra* (accepted for publication).

Abstract: We examine the kinematic response of fixed-head vertical floating piles embedded in continuously nonhomogeneous soils and subjected to upward propagating seismic waves. The problem is explored numerically by means of a rigorous FE model of the soil-pile system to quantify the kinematically-induced reduction of the horizontal free-field spectral acceleration. Soil stiffness is assumed to vary continuously with depth according to a generalized power law function. We show that kinematic pile response in the harmonic regime is controlled by a unique dimensionless frequency parameter involving the active pile length in a generalized nonhomogeneous soil. A new simplified expression for the horizontal kinematic interaction factor I_u is proposed for practical time-domain applications while a novel physical interpretation of the filtering action of piles is also reported by introducing the role of pile stiffness in averaging soil motion over an effective pile length. Following a parametric study under transient motion, we propose a set of novel, ready-to-use formulae for a rapid assessment of the pile-induced filtering action. An application of the proposed formulae to clayey soils is finally presented, leading to useful indications for the selection of pile diameter associated with the maximum filtering potential.

Conti R., Morigi M., **Rovithis Emm.**, Theodoulidis N. and Karakostas Ch. (2018) “Filtering action of embedded massive foundations: New analytical expressions and evidence from 2 instrumented buildings”, *Earthquake Engineering and Structural Dynamics*, 1-21: <https://doi.org/10.1002/eqe.3014>

Abstract: This paper deals with the effect of the foundation mass on the filtering action exerted by embedded foundations. The system under examination comprises a rigid rectangular foundation embedded in a homogeneous isotropic viscoelastic half-space under harmonic shear waves propagating vertically. The problem is addressed both theoretically and numerically by means of a hybrid approach, where the foundation mass is explicitly included in the kinematic interaction between the foundation and the surrounding soil, thus referring to a “quasi-kinematic” interaction problem. Based on the results of an extensive parametric study, it is shown that the filtering problem depends essentially on three dimensionless parameters, i.e.: the dimensionless frequency of the input motion, the foundation width-to-embedment depth ratio, and the foundation-to-soil mass density ratio. In complements to the translational and rotational kinematic interaction factors that are commonly adopted to quantify the filtering effect of rigid massless foundations on the free-field motion, an additional kinematic interaction factor is introduced, referring to the horizontal motion at the top of a rigid massive foundation. New analytical expressions for the above kinematic interaction factors are proposed and compared with foundation-to-free-field transfer functions computed from available earthquake recordings on two instrumented buildings in LA (California) and Thessaloniki (Greece). Results indicate that the foundation mass can have a strong beneficial effect on the filtering action with increasing foundation-to-soil mass density and foundation width-to-embedment depth ratios.

Rovithis Emm., Kirtas Emm., Bliziotis D., Maltezos E., Pitilakis D., Makra K., Savvaidis A., Karakostas Ch., Lekidis V. (2017) “A LiDAR-aided urban-scale assessment of soil-structure interaction effects: The case of Kalochori residential area (N. Greece)” *Bulletin of Earthquake Engineering*, 15(11): 4821-4850.

Abstract: We present a methodology for a large-scale assessment of soil-structure interaction (SSI) effects on the vibrational characteristics and the seismic loading of structures in a real urban fabric by combining airborne monitoring techniques, field surveys and simple calculations of structural and geotechnical dynamics. The proposed procedure utilizes geometrical features of the building stock acquired from a LiDAR-based 3D city model, material and typology data of structures from in-situ inspections in representative building blocks, geotechnical data of the local soil deposits from field surveys and strong ground motion data from seismic hazard and site effects analyses. The integrated data is employed to compute at a first stage the fundamental period of each building in the urban area using code-defined formulas for both fixed- and flexible-base conditions, thus considering soil-structure interaction effects in a simplified way. The seismic action in terms of spectral acceleration at the fundamental period of fixed- and flexible-base structures is then computed, following a series of 1D site-specific analyses of soil response under different seismic scenarios. Spatially distributed ratios of structural fundamental periods and spectral accelerations, corresponding to flexible- over fixed-base conditions of buildings, are mapped in GIS environment as an index of SSI effects at large-scale. The methodology is implemented in the urban area of Kalochori municipality located west of Thessaloniki in Greece. Results of the examined case study demonstrate that SSI may be significant even for a low amplitude motion and may lead to higher seismic forces compared to the fixed-base case, depending on the dynamic characteristics of the structures, the soil conditions and the shape of the response spectrum. The above may be of

importance in microzonation and seismic vulnerability studies at urban-scale where a building-by-building assessment is not feasible and SSI effects are too important to be ignored.

Tsinidis G., Rovithis Emm., Pitilakis K. & Chazelas J-L (2016) "Seismic Response of Box-Type Tunnels in Soft Soil: Experimental and Numerical Investigation" Tunneling and Underground Space Technology, 59: 199-214.

Abstract: A series of dynamic centrifuge tests were carried out at the geotechnical centrifuge facility of IFSTTAR in Nantes, to investigate the response of box-type tunnels embedded in dry sand under sinusoidal and seismic excitation, as affected by soil-tunnel relative flexibility and soil-structure interface rugosity. The system under investigation was analyzed by means of full dynamic time history analyses, implementing rigorous finite element models. The numerical models were calibrated on the basis of back analysis of tests, while the numerical predictions were compared with experimental data, in terms of soil and tunnel horizontal acceleration, soil shear strains and tunnel deformations. The validated numerical models were then employed to further investigate several aspects of the system seismic response. Results indicate a rocking deformation mode coupled with the well-known racking distortion of box-type tunnels under seismic shaking. The effect of the soil-tunnel interface characteristics and soil yielding on the racking deformation of the tunnel, the dynamic earth pressures and shear stresses around the tunnel, as well as on dynamic lining forces is also reported. Soil yielding leads to post-shaking, residual, dynamic earth pressures, shear stresses and lining forces, especially in the case of flexible tunnels, while interface characteristics affect the distributions of these response parameters around the perimeter of the tunnel section. The ability of simplified seismic design methods for tunnels to predict the response is finally discussed, by comparing their predictions with the recorded data and the numerical results.

Rovithis Emm. and Pitilakis K. (2016) Seismic assessment and retrofitting measures of a historic stone masonry bridge, Earthquakes and Structures, 10(3): 645-667.

Abstract: The 750 m long "De Bosset" bridge in the Cephalonia Island of Western Greece, being the area with the highest seismicity in Europe, was constructed in 1830 by successive stone arches and stiff blocktype piers. The bridge suffered extensive damages during past earthquakes, such as the strong M7.2 earthquake of 1953, followed by poorly-designed reconstruction schemes with reinforced concrete. In 2005, a multidisciplinary project for the seismic assessment and restoration of the "De Bosset" bridge was undertaken under the auspices of the Greek Ministry of Culture. The proposed retrofitting scheme combining soil improvement, structural strengthening and reconstruction of the deteriorated masonry sections was recently applied on site. Design of the rehabilitation measures and assessment of the pre- and post-interventions seismic response of the bridge were based on detailed in-situ and laboratory tests, providing foundation soil and structural material properties. In-situ inspection of the rehabilitated bridge following the strong M6.1 and M6.0 Cephalonia earthquakes of January 26th and February 3rd 2014, respectively, revealed no damages or visible defects. The efficiency of the bridge retrofitting is also proved by a preliminary performance analysis of the bridge under the recorded ground motion induced by the above earthquakes.

Di Laora R. and Rovithis Emm. (2014) "Kinematic bending of fixed-head piles in nonhomogeneous soil", Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 141(4), 04014126.

Abstract: Kinematic bending of elastic single fixed-head piles in continuously inhomogeneous soil is explored in both static and dynamic regime. A generalized parabolic function is employed to describe the variable shear modulus in the inhomogeneous stratum, which can simulate both cohesive and cohesionless soil deposits. The problem is treated numerically by means of rigorous elastodynamic finite-element analyses and simplified beam-on-dynamic-Winkler-foundation (BDWF) formulations. A novel expression is proposed for the active length of a pile in inhomogeneous soil, by means of kinematic interaction considerations. This allows an alternative interpretation of kinematic soil-pile interaction along an effective depth, contrary to existing definitions in which soil response is evaluated at a specific location. Following this interpretation, a design formula for kinematic pile-head moments is derived for both static and dynamic loading. A new dimensionless parameter is identified to govern dynamic pile bending, which allows a straightforward assessment of frequency effects in pile design.

Rovithis Emm., Paraschakis Ch. and Mylonakis G. (2011) "1D harmonic response of layered inhomogeneous soil: analytical investigation", Soil Dynamics and Earthquake Engineering, vol. 31(7), pp. 879 - 890.

Abstract: The seismic response of inhomogeneous soil deposits is explored analytically by means of one-dimensional viscoelastic wave propagation theory. The problem under investigation comprises of a continuously inhomogeneous stratum over a homogeneous layer of higher stiffness, with the excitation defined in terms of vertically propagating

harmonic S waves imposed at the base of the system. A generalized parabolic function is employed to describe the variable shear wave propagation velocity in the inhomogeneous layer. The problem is treated analytically leading to an exact solution of the Bessel type for the natural frequencies, mode shapes and base-to-surface response transfer function. The model is validated using available theoretical solutions and finite-element analyses. Results are presented in the form of normalized graphs demonstrating the effect of salient model parameters such as layer thickness, impedance contrast between surface and base layer, rate of inhomogeneity and hysteretic damping ratio. Equivalent homogeneous soil approximations are examined. The effect of vanishing shear wave propagation velocity near soil surface on shear strains and displacements is explored by asymptotic analyses.

Rovithis Emm., Pitilakis K. and Mylonakis G. (2009) “*Seismic analysis of coupled soil-pile-structure systems leading to the definition of a pseudo natural SSI frequency*”, *Soil Dynamics and Earthquake Engineering*, vol. 29(6), pp. 1005-1015.

Abstract: The elastodynamic response of coupled soil-pile-structure systems to seismic loading is studied using rigorous 3D finite element models. The system under investigation comprises of a single pile supporting a SDOF structure founded on a homogeneous viscoelastic soil layer over rigid rock. Parametric analyses are carried out in the frequency domain, focusing on the dynamic characteristics of the structure, as affected by typical foundation properties such as pile slenderness and soil-pile relative stiffness. Numerical results demonstrate the strong influence on effective natural SSI period of the foundation properties and the crucial importance of cross swaying-rocking stiffness of the pile. Furthermore, the notion of a pseudo natural SSI frequency is introduced, as the frequency where pile head motion is minimized with respect to free field surface motion. Dynamic pile bending is examined and the relative contributions of kinematic and inertial interaction, as affected by the frequency content of input motion, are elucidated.

Rovithis Emm., Kirtas E. and Pitilakis K. (2009) “*Experimental p-y loops for estimating seismic soil-pile interaction*”, *Bulletin of Earthquake Engineering*, vol. 7(3), pp. 719-736.

Abstract: Seismic soil-pile interaction is evaluated in this study based on back-calculated p-y loops constructed from sampled data of pile bending moments. Fundamental properties of p-y loops are implemented to derive distributed springs and dashpots, thereby quantifying soil-pile interaction in the realm of a Beam on Dynamic Winkler Foundation modeling. The procedure is validated by means of well-documented centrifuge tests of a single pile supported structure founded on a two-layer soil profile that comprises of soft clay overlying dense sand. Two shaking levels of a real earthquake motion applied at the base of the soil profile were examined and the generated seismic p-y loops were compared to cyclic p-y curves commonly used in pile design practice. The results demonstrate the strong influence of intensity of the input motion on seismic p-y loops while cyclic p-y curves established for soft clays tend to overestimate soil stiffness under strong excitation. Typical sets of recorded and computed structural response are presented, denoting the ability of the BDWF model related to p-y loops in reproducing adequately fundamental aspects of seismic soil-pile interaction.

Kirtas E., Rovithis Emm., Pitilakis K. (2009) “*Subsoil Interventions Effect on Structural Seismic Response. Part I: Validation of Numerical Simulations*”, *Journal of Earthquake Engineering*, vol. 13, pp. 155-169.

Abstract: Subsoil interventions to enhance the static soil resistance and reduce deformations may alter significantly the seismic response of the complex soil-foundation-structure system. The aim of this article is to have an insight in the physics of the problems encountered and to validate an adequate numerical modeling procedure to study these effects of the intervention in the global response of the system. Validation concerns wave propagation, site effects, and dynamic soil-structure-interaction issues including the intervention beneath the foundation. Theoretical models-expressions and experimental results from centrifuge tests have been used. The proposed numerical model is proven very efficient to describe the complex dynamic phenomenon and anticipate the seismic response after the employment of subsoil interventions.