XP-resilience

EXTREME LOADING ANALYSIS OF PETROCHEMICAL PLANTS AND DESIGN OF METAMATERIAL-BASED SHIELDS FOR ENHANCED RESILIENCE
http://r.unitn.it/en/dicam/xp-resilience

University of Ljubljana
Faculty of Civil and Geodetic Engineering
Institute of Structural Engineering Earthquake Engineering and Construction IT

Workshop Announcement

27th and 28th of October 2017, Faculty of Civil and Geodetic Engineering, Jamova 2, SI1000 Ljubljana, Slovenia

Risk-targeted seismic design: GMPEs, data-driven nonlinear modelling of steel components, practice-oriented design checks

Abstract

Design for a target seismic risk is rare in practice since it requires new way of thinking and additional knowledge of engineers and it can quickly become too complex. Thus the aim of the two-day workshop is to provide basic insight into practice-oriented risk-targeted design. The emphasis will be given on the GMPEs, which are important component of seismic hazard analysis, the modelling of steel structures based on experimental databases and practice-oriented risk-targeted design checks. In the second day, the participants will have opportunity to work on some practical examples in order to select hazard-consistent set of ground motions which can be used for risk-targeted design check or to calculate risk-targeted importance or behaviour factor.

Workshop schedule on 27th October

8:00-8:30		Registration, welcome and overview
8:30-10:30	Sinan Akkar	Basics of Ground Motion Predictive Models
10:30-12:30	Sinan Akkar	Implementation of GMPMs to Earthquake Engineering Design and Assessment
12:30-13:30		Lunch
13:30-15:30	Matjaž Dolšek	Practice-oriented risk-targeted design checks using linear elastic or nonlinear analysis
15:30-17:30	Dimitrios G. Lignos	Data-driven framework for nonlinear modelling of steel components subjected to seismic loading
19:30		Dinner

* 45 min of effective lectures per hour

Workshop schedule on 28th October

9:00-16:00	Early stage researchers Assistants at UL and lecturers	Presentation of research performed by ESRs (10-15 min) Discussion Exercises from risk-targeted design

The workshop is organised by the XP-RESILIENCE research group
http://r.unitn.it/en/dicam/xp-resilience and by Research Project Seismic Stress Test of Built Environment, Local Organizer: Matjaž Dolšek

Short Biography of lecturers and abstract of lectures

Sinan Akkar	**Professor of Earthquake Engineering at Kandilli Observatory and Earthquake Research Institute, Bogazici University, Istanbul, Turkey**
	Expertise of Prof. Akkar is engineering seismology with an emphasis on development of ground-motion predictive models, ground-motion characterization for site-specific and regional PSHA, and strong-motion database development. He is also interested in probabilistic damage assessment methods considering conventional and Monte Carlo based simulation techniques. He has participated in several European projects (SHARE, NERA, SIGMA, STREST, SERA) and was the project leader of update of seismic hazard maps in Turkey and compilation of national strong-motion database. He is one of the Executive Board members of Turkey Earthquake Foundation and he is the head of National Earthquake Engineering Committee. Prof. Akkar organized several international workshops on database compilation and ground-motion predictive model development and is the (co)author of more than 150 publications in peer reviewed Journal or Conference proceedings. He participated national and international consultancy projects including probabilistic seismic hazard assessment of nuclear power plants, dams, health centers etc.
Basics of Ground Motion Predictive Models and Their Implementation to Earthquake Engineering Design and Assessment	The aim of the lecture is to provide basic knowledge about GMPMs to structural/mechanical engineers. The GMPMs have significant impact on probabilistic seismic hazard analysis and consequently on the design seismic action of structures. Insight into the GMPMs can help engineer to define hazard-consistent seismic actions for design and assessment of structures. The emphasize will be given on the following topics: - Basic concepts of ground-motion predictive models: why are they called as predictive models? - How do we develop ground-motion predictive models? Regression procedures - Important global GMPEs - NGA-West1 and NGA-West2 projects - Important pan-European GMPEs

Dimitrios G. Lignos	**Associate Professor of Structures and Materials** **École Polytechnique Féderale de Lausanne (EPFL),** **Switzerland**
	Dr. Lignos joined the École Polytechnique Féderale de Lausanne (EPFL) in 2016 from McGill University where he was a tenured Associate Professor and a William Dawson Scholar for Infrastructure Resilience. He holds a diploma (National Technical University of Athens, NTUA, 2003), M.S. (Stanford University, 2004) and Ph.D. (Stanford University, 2008). He was a post-doctoral scientist at Stanford University (2009) and in Kyoto University (2010). His research involves integrated computational modeling and large-scale experimentation for the fundamental understanding and simulating structural collapse of steel structures under extreme loading as well as the development of metrics and technologies that promote resilient-based design. Dr. Lignos teaches graduate and undergraduate courses in seismic design, nonlinear behavior and analysis of steel structures. In 2011, he was honored with the Outstanding Teaching Award from the Faculty of Engineering at McGill University. He was also honored with the 2012 and 2013 Outstanding Reviewer Award from the American Society of Civil Engineers (ASCE) Journal of Structural Engineering. In 2013, he was awarded the ASCE State-of-the-Art in Civil Engineering Award for rationalizing the collapse estimation for steel moment frames under seismic loading. Dr. Lignos is also the recipient of the 2014 Christophe Pierre Award for Research Excellence - Early Career. Professor Lignos jointed the Editorial Board of the ASCE Journal of Structural Engineering as an Associate Editor for Metal Structures and Seismic Effects. He serves as an acting member in various national and international technical committees for the further development of the seismic design provisions and the nonlinear modeling guidelines for steel structures in Europe, North America and Asia. Just recently, he became a member of Project Team 2 (CEN/TC250/SC8.T2) who is drafting a second generation of standard for earthquake-resistant design of structures – Eurocode 8.
Data-Driven Framework for Nonlinear Modeling of Steel Components Subjected to Seismic Loading	This presentation discusses the state-of-the-art on nonlinear modeling of structural steel components for earthquake-induced risk assessment of steel structures. In particular, modeling recommendations are presented based on a coordinated experimental and numerical framework that utilizes computationally effective simulation tools implemented in the open system for earthquake engineering simulation platform (OpenSees). The presentation covers the modeling of all the structural steel components including guidance on the calibration approaches as well as the level of model complexity needed depending on the seismic performance level of interest. The presentation emphasizes on representative simulation models that are able to capture complex deteriorating phenomena associated with geometric and material instabilities that are deemed to be critical for simulating ultimate limit states including earthquake-induced structural collapse. The utilization of structural performance databases and interactive tools developed by the author during the last decade is also demonstrated for the simulation model development, refinement, calibration and validation. The presentation also illustrates the effective use of simulation models in predicting the seismic response of representative building portfolios some of which have been tested on a shake table. Finally, the influence of modeling uncertainties on the accurate simulation of the structural response is discussed.

Matjaž Dolšek	**Professor of Civil and Environmental engineering at Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia**
	Matjaž Dolšek is Professor of Civil Engineering and Environmental Engineering at Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia, and member of research program Earthquake Engineering. He is an expert for performance assessment and design of structures with an emphasis on earthquake engineering. His current research is focused on the development of methods and tools for the design of structures for target seismic risk (www.smartengineering.si). He has participated in several European projects (SPEAR, LESSLOSS, SERIES, STREST, NEWREBAR, XP-RESILIENCE) and was the project leader of three national basic research projects. He is project leader of research project Seismic stress test of built environment. He is a member of the Slovenian Chamber of Engineers, a member of the Slovenian and the European Association for Earthquake Engineering. He is a member of Project Team 1 (CEN/TC250/ SC8-PT1) who is drafting a second generation of standard for earthquake-resistant design of structures - Eurocode 8 and a member of technical committees of Slovenian Institute for Standardization. He organized an international workshop on Protection of Built Environment Against Earthquakes and is the (co)author of more than 100 publications in peer reviewed Journal or Conference proceedings. He participated in around 30 consulting projects in the field of evaluation of the seismic resistance of structures, determination of earthquake parameters for design of structures and fragility analysis including for structures important for nuclear safety.
Practice-oriented risk-targeted seismic design: importance factor and behaviour factor	Practice-oriented risk-targeted seismic design can be applied in the case of force-based design, which rely on linear elastic analysis, or in the case of performance based design which requires seismic performance of a structure by nonlinear analysis. Both procedures will be briefly presented. The emphasis will be on the prevention of the collapse using a simple risk measure (i.e. probability of collapse). The participants will get an insight into calculation of risk-targeted importance factor and risk-targeted behavior factor which are essential parameters of risk-targeted force-based design. It will also be shown how these parameters are related to each other. In addition, a practice-oriented design check for a target risk will be introduced through explanation of 3R method (record selection, response analysis, risk-based decision making. The method requires the use of nonlinear analysis, but seismic response of a structure can be checked only by a single level of seismic intensity. If the pushover analysis is performed prior to the nonlinear dynamic analysis, design check can be based on only few, so-called, characteristic ground motions.

Registration

Please register by sending email to mdolsek@fgg.uni-lj.si. The deadline for the registration is 7th of October 2017. Upon registration, a registration fee of 180 EUR will be required by sending proforma invoice to registered participants.

Information about the venue and accommodation

Venue

The meeting and the workshop will be held at **Faculty of Civil and Geodetic Engineering** (see Figure 1). It is located on **Jamova cesta 2, Ljubljana (46.0457525, 14.4949470)**, about 20 minutes walking from Grand Hotel Union. For instructions click here (see also Figures 2 and 3).

Figure 1: Faculty of Civil and Geodetic Engineering

It is recommended that you arrive from Jamova cesta as indicated on Figures 2 and 3. In this case you will see the building of the Faculty on your right hand side (as shown in Figure 1). The meeting will take place in the room II/3-A on the II. floor (not 2nd).

Parking

If you arrive by car, a few parking places will be available at the Faculty (ring the bell in front of the entrance to the parking and say that you are coming to the NEWREBAR Meeting). In case there is no place left, there is a public parking lot 100 m north from the Faculty building (Figure 2).

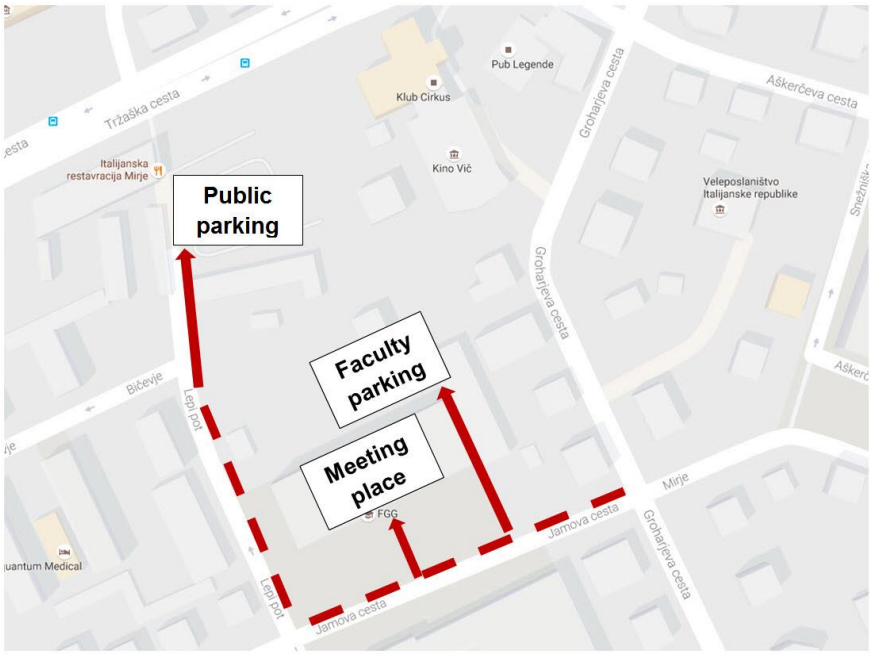

Figure 2: The Meeting place and possible parking places

Accommodation

There are plenty hotels downtown of Ljubljana, which is a walking distance to the Faculty. However, it is advised that participants book the accommodation far in advance since the prices can increase highly if booking will be made less than couple of weeks before arrival. Perhaps good option is to look on Airbnb in addition to booking and other providers for hotels. Please do not hesitate to contact us if you need further advice.

From airport to downtown

Upon your arrival at Ljubljana Jože Pučnik Airport you can reach your hotel either by using a public bus service, a shuttle or by taxi. The bus has frequent itineraries every hour from 5 am to 8 pm, takes about 45 minutes to the bus station (J at Figure 2), which is a ten-minute walk from the centre of the city, and costs about 4 Euros. The shuttle ("MARKUN shuttle") takes you anywhere in the centre of Ljubljana for 9 Euros. Taxi service is available on a 24-hour base (probably the most convenient). A 30-minute drive costs approximately 30-40 Euros.

There are possibilities to fly to Trieste, Zagreb or perhaps Venice. In this case you will need shuttle service for traveling to Ljubljana (e.g. www.GoOpti.com).

Other general information for the city of Ljubljana could be retrieved from:
https://www.visitljubljana.com/en/visitors/
http://www.ljubljana.info/

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Please do not hesitate to contact us if you need some other information