

# **Support Action for Strengthening PAlestine capabilities for seismic Risk Mitigation SASPARM 2.0**

**DH5 – Scientific papers submitted to conferences**



**INDEX**

Index.....i

1 Introduction..... 1

2 Conferences ..... 1

    2.1 VII European Congress on Computational Methods in 5 Applied Sciences and Engineering – Crete Island, Greece, -10<sup>TH</sup> June 2016. .... 1

    2.2 World Multidisciplinary Civil Engineering – Architecture – Urban Planning Symposium – Prague, Czech Republic, 13-17<sup>TH</sup> June 2016. .... 1

    2.3 1<sup>st</sup> International Conference on Natural Hazards and Infrastructure, Chania, Crete Island, Greece, 28-30<sup>TH</sup> June 2016 ..... 2

    2.4 1<sup>st</sup> IFIP Conference on Information Technology in Disaster Risk Reduction, Sofia, Bulgaria, 16-18<sup>TH</sup> November 2016 ..... 3

3 Workshops ..... 3

    3.1 The XXXVI International Workshop on Seismicity and Earthquake Engineering in the Extended Mediterranean Region, Ravenna 26-29<sup>TH</sup> October 2015. .... 3

    3.2 UNISDR Science and Technology Conference on the implementation of the Sendai Framework for Disaster Reduction 2015-2030, Switzerland 27-29<sup>TH</sup> January 2016..... 4

    3.3 International Workshop on Mitigation of Disasters due to Severe Climate Events: From Policy To Practice, Colombo, Sri Lanka, 10-13<sup>TH</sup> March 2016..... 4



## 1 INTRODUCTION

Several scientific papers have been proposed and accepted in international conferences and workshops to disseminate results and promote inter-disciplinary technological transfer. The present report collects the abstracts of all papers that have been sent. For each abstract, corresponding event and authors are indicated.

1

## 2 CONFERENCES

### 2.1 VII European Congress on Computational Methods in 5 Applied Sciences and Engineering – Crete Island, Greece, -10<sup>TH</sup> June 2016.

**Title:** Towards integrated seismic risk assessment in Palestine – Application to the city of Nablus

**Authors:** R. Monteiro, P. Ceresa, V. Cerchiello, Jamal Dabeek, A. Di Meo, and B. Borzi

**Abstract:** Using large-scale seismic risk assessment studies for reduction of potential losses is becoming an evermore popular trend around the globe. Accordingly, a number of different models and techniques for the characterization of the different risk variables have proliferated in the recent years. Furthermore, the quality, or accuracy, of risk estimates will be certainly higher when a truly integrative model is employed, characterizing hazard, (physical and social) vulnerability and exposure in the most complete as possible manner. Regions with a large percentage of non-seismically designed buildings are particularly vulnerable to seismic events and are those that can benefit the most from risk assessment studies for decision making. As such, the main purpose of this study is to propose a framework for integrated seismic risk assessment in Palestine, where earthquake induced risk awareness is still at an early stage. A methodology to combine an existing state-of-the-art hazard model with new vulnerability and exposure models, specifically built upon local field surveys and national data collection, is proposed. The outcome of the study will enable the identification of the region that are more vulnerable to earthquakes and future rapid loss assessment at regional scale.

### 2.2 World Multidisciplinary Civil Engineering – Architecture – Urban Planning Symposium – Prague, Czech Republic, 13-17<sup>TH</sup> June 2016.

**Title:** Development of a fragility and exposure model for Palestine – application to the city of Nablus

**Authors:** I. Grigoratos, Jamal Dabeek, M. Faravelli, A. Di Meo, V. Cerchiello, B. Borzi, R. Monterio, and P. Ceresa



**Abstract:** Earthquakes are highly catastrophic natural events, in terms of casualties and economic losses. Regions with a large percentage of non-seismically designed buildings and reduced urban planning are particularly vulnerable to seismic events. In such regions, it is nevertheless possible to mitigate seismic risk, given by the convolution of hazard, exposure and vulnerability. The goal of this study is to propose simplified fragility and exposure models for the Palestinian region, specifically built upon local field surveys and data collection, whereas an existing state-of-the-art hazard model, specific for the Middle East region, was selected. The city of Nablus, a Palestinian commercial and cultural centre in the northern West Bank, was chosen as case-study. Special attention has been paid to the local construction practice of RC buildings, for different time periods. The identification of building types and their relative percentages within the in-built has been conducted, leading to a preliminary taxonomy able to classify the most common structural systems. The outcome of this study enables the assessment of earthquake risk and rapid loss assessment at city and regional scale.

### 2.3 1<sup>st</sup> International Conference on Natural Hazards and Infrastructure, Chania, Crete Island, Greece, 28-30<sup>TH</sup> June 2016

**Title:** Definition of Fragility Curves for Frame Buildings in Nablus - Palestine

**Authors:** B. Borzi, A. Di Meo, M. Faravelli, R. Monteiro, P. Ceresa, and J. Dabeek

**Abstract:** In this paper, we further investigate the application of SP-BELA (Simplified Pushover-Based Earthquake Loss Assessment) method to different structural building types. SP-BELA represents a simplified mechanics-based method to determine the structural capacity of a building using nonlinear static analysis. The methodology allows to modify the input parameters, such as geometry, loads and mechanics-based characteristics of materials. The paper explores the versatility of this method and illustrates its capacity to adequately reproduce the behaviour of buildings. In particular, the procedure has been applied to obtain fragility curves of reinforced concrete (RC) frame buildings that can represent the building typologies of the city of Nablus in Palestine. To highlight the vulnerability of Nablus buildings, the resulting fragility curves have been compared with SP-BELA fragility curves for RC frame Italian buildings and HAZUS (1999) fragility curves for unreinforced masonry infill walls (Pre-Code).

**Title:** Extending the applicability of simplified pushover-based vulnerability assessment methods to irregular RC buildings

**Authors:** I. Grigoratos, P. Ceresa, R. Monteiro, and B. Borzi

Analytical tools for large-scale assessment of the seismic vulnerability of reinforced concrete (RC) buildings have recently become very popular due to a combination of advancements in the field of seismic hazard assessment and structural response analysis. Simplified methods present satisfying accuracy for regular RC structures but have limited applicability to irregular frame systems with significant stiffness/strength or mass eccentricities. The present study focuses on reducing this shortcoming by extending the applicability of simplified pushover-based seismic assessment models to irregular, yet common, structural configurations that characterise the building taxonomy of a certain region.



The large-scale assessment method used as reference is SP-BELA (simplified pushover and displacement-based procedure) and the region of interest is the Nablus municipality in Palestine. The paper examines two irregular RC prototype buildings, representative of the common design practice in Nablus and other Mediterranean cities. The seismic assessment is carried out through inelastic time history analyses, with a suitable set of scaled ground motion records that were selected using a recent state-of-the-art hazard model, specific for the Middle East region. The results were used to derive suitable building-class-specific correction factors that would enable a simplified pushover procedure to be applicable to a larger population of buildings.

## 2.4 1<sup>st</sup> IFIP Conference on Information Technology in Disaster Risk Reduction, Sofia, Bulgaria, 16-18<sup>TH</sup> November 2016

**Title: Using the scorecard approach to measure seismic social resilience in Nablus, Palestine**

**Authors: V. Cerchiello, P. Ceresa, and R. Monteiro**

Social vulnerability helps to explain why communities experience the consequences of an earthquake differently, even though they are subjected to similar levels of ground shaking. The differential impacts of an earthquake can be a consequence of social vulnerability and, for this reason, it is a critical element for fostering mitigation plans and developing policies to reduce earthquake risk. Measuring resilience is not an easy task and, in this study, is performed through the Scorecard Approach. The latter is a self-assessment and participatory tool that measures resilience with qualitatively derived information at two different urban levels: population and local administration. The case study is the city of Nablus in the Palestinian region which is not only affected by seismic events but also by political conflicts. The provided results enable the resilience assessment of different districts of Nablus concerning several themes of disaster risk reduction. These will help to better understand how different variables – such as gender, age, educational level, monthly income and membership neighbourhood influence the vulnerability assessment.

## 3 WORKSHOPS

### 3.1 The XXXVI International Workshop on Seismicity and Earthquake Engineering in the Extended Mediterranean Region, Ravenna 26-29<sup>TH</sup> October 2015.

**Title: Support Action for Strengthening Palestine capabilities for seismic Risk Mitigation (SASPARM 2.0)**

**Authors: J. Dabbeek, F. Germagnoli, B. Borzi, P. Ceresa, R. Monteiro, and S. Sader**

**Abstract: This presentation aims at introducing the SASPARM 2.0 Project which is co-funded by ECHO, and to disseminate the project objectives, plans, expected results and to share the experience of project partners in strengthening Palestine capabilities for seismic risk mitigation.**



### 3.2 UNISDR Science and Technology Conference on the implementation of the Sendai Framework for Disaster Reduction 2015-2030, Switzerland 27-29<sup>TH</sup> January 2016.

**Title:** Support Action for Strengthening Palestine capabilities for seismic Risk Mitigation (SASPARM 2.0)

4

**Authors:** J. Dabbeek, S. Sader, H. Yameen, B. Borzi, Fabio Germagnoli, P. Ceresa, and R. Monteiro.

**Abstract:** This presentation aims at introducing the SASPARM 2.0 Project which is co-funded by ECHO, and to disseminate the project objectives, plans, expected results and to share the experience of project partners in strengthening Palestine capabilities for seismic risk mitigation.

### 3.3 International Workshop on Mitigation of Disasters due to Severe Climate Events: From Policy To Practice, Colombo, Sri Lanka, 10-13<sup>TH</sup> March 2016

**Title:** Academic Hubs: Using Applied Research and Community Services to Build Resilience of Nations and Communities to Disasters

**Authors:** J. Dabbeek, H. Alwahsh, S.i Sader, A. H. Juhari, B. Borzi, F. Germagnoli, P. Ceresa, and R. Monteiro.

**Abstract:** To reach the desired progress in science and technology, disaster risk reduction (DRR) Innovations, building resilience of nations and communities', the following key-elements are needed: data-collection, assessment, management methods, disaster risk institutional arrangement, risk communication, knowledge-sharing and group-work innovations. Additionally, these elements enhance decision-makers managing DRs, implementing and monitoring particularly Sendai Framework for DRR 2015 - 2030.

Building resilience is a cross-cutting issue and a fundamental interdisciplinary concept, which requires natural and social sciences innovations. Building the resilience of nations and communities to disasters requires adopting holistic approaches concepts and tools.

An-Najah National University's Urban Planning and Disaster Risk Reduction Center (UPDRRC) brought players, using scientific knowledge and community services driving through change towards policy, preparedness and public awareness. UPDRRC, as an academic hub, has an important role in enhancing the Palestinian communities' disaster resilience, through adopting holistic approaches to DRR activities adopting scientific strategy drawing together decision-makers, practitioners and the public driving towards sustainable RR, exceeding traditional academic centers parameters. Based on networking and integration concepts and to achieve its goals and objectives, UPDRRC participated in and/or conducted several local, regional and international DRR projects



and activities in cooperation with UN organizations and other scientific research institutes, such as: EUCENTRE and IUSS in Italy, GFZ in Germany, USGS in USA, etc. This paper contains examples for several dissemination activities as well as a detailed case study for an important scientific project "Support Action for Strengthening Palestine capabilities for seismic Risk Mitigation - SASPARM2".

