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Integrated seismic risk in developing countries: the case-studies of Palestine and Algeria

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1 Abstract

This paper presents dedicated frameworks, developed within European-funded projects, to create integrated seismic risk models from scratch for developing countries and raise the awareness of the general society. Focusing on the case-studies of Nablus in Palestine and Blida in Algeria, the different components of the risk model (hazard, exposure and vulnerability) are described. In specific, details are provided on: improved Hazard models (considering historical and instrumental catalogues for the West Bank and Northern Algeria); the collection of exposure and fragility data on buildings and bridges throughout the case-study regions, used to develop specific exposure and vulnerability models; the definition of social vulnerability models through census-based and scorecard approaches. Subsequently, the integration of the different components is carried out towards the calculation of integrated risk and considerations on the specificities surrounding developing countries are made. The final products of the seismic risk models can be used by different stakeholders to quantify risk and plan mitigation measures.

Keywords: Seismic Hazard; Residential Buildings; Middle-East; North Africa; Integrated Risk.

2 Introduction

Following major disasters, it is evermore recognized that while their occurrence is often inevitable, reducing the associated risk through prevention measures should be a primary concern. Regions with a significant percentage of non-seismically designed buildings and where there is room for improvement in urban planning are particularly vulnerable to natural hazards. In this context, this paper presents an overview of two recent initiatives to assess integrated seismic risk in two developing areas of the world – Middle East (Palestine) and North Africa (Algeria).

2.1 Seismic Risk in Palestine

The seismic activity in Palestine is largely affected and controlled by geodynamic processes acting along the Dead Sea Transform (DST). Historically, estimated events reached up to IX in the Modified Mercalli Scale in the Dead Sea region. In the same area, the determinable magnitudes of the recorded earthquakes range between 1.0 and 7.0 on the local magnitude Richter scale. Together with observed seismicity, the Palestinian region faces important issues related to structural and societal factors. First, a high vulnerability, as a direct result of a high percentage of weak buildings not complying with

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