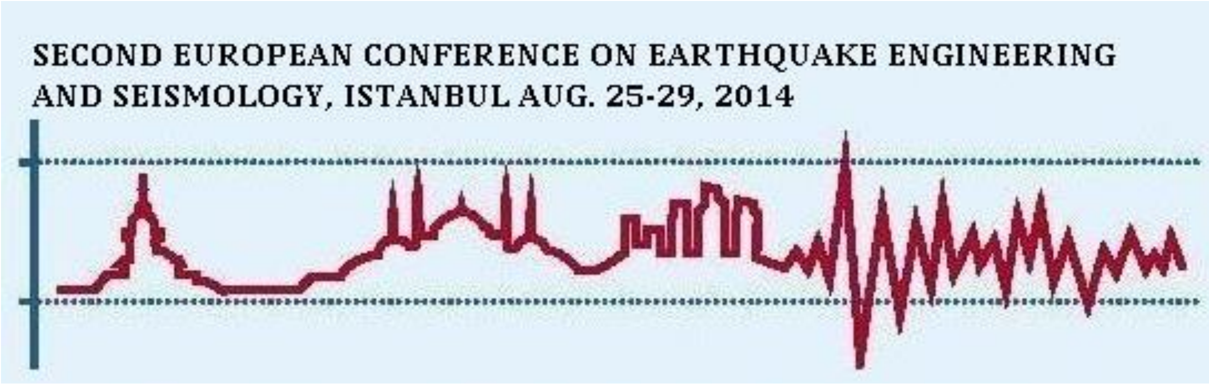

DISASTER PREVENTION STRATEGIES BASED ON THE LEVEL OF RISK

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Combining the risk evaluation and the consequent urban dysfunction (Disruption index (Ferreira et al., 2014)) with the need to find alternatives to reduce or to constrain the risk, we explored the risk-analysis field, which is greatly interrelated with our aim. To accomplish this goal, *risk importance measures* (Andrews and Moss, 2002; Apostolakis and Lemon, 2005; Michaud and Apostolakis, 2006; Patterson and Apostolakis, 2005; Vesely et al., 1983; Zio and Podofillini, 2003) are defined to evaluate the importance feature in further reducing the risk, and its importance in maintaining the present risk level.

One proposed *importance measure*, called the **risk reduction worth** (RRW), is useful for prioritising feature improvements that can mostly reduce the actual risk. The other proposed *important measure*, called the **risk achievement worth** (RAW), is useful for prioritising the most important features in reliability assurance and maintenance activities.

A *risk importance measure* gives an indication of the contribution of a certain component to the total risk. For the interpretation of these measures results we can obtain an importance-ranking of the various components and urban contributors not only with regard to risk reduction but also with regard to risk maintenance (or reliability assurance).

This paper will demonstrate how one of most frequently used importance measure (RRW, risk reduction worth) can be interpreted and applied to Algarve region in Portugal. The results obtained (Figure 1) indicate that the building stock availability is the most important to prevent a total urban disruption. The risk reduction ratios due to building stock improvement for DI and Housing are large (23%) and about 5% for Healthcare and 6% for Mobility and Education.

For each urban component, the risk reduction worth was calculated by re-evaluating the vulnerabilities of that component, for example for building stock considering the most vulnerable typology (VClass=0.767) which was retrofitted achieving a new vulnerability (VClassNEW=0.638). The new expected DI values were determined running the QuakeIST® simulator.

To perform the computation we used the area (km^2) limited by each DI contour value (I, II, III, IV or V).

In order to operationalize these concepts, we further need cost-benefit analysis. This is a detailed work of portfolios which needs the access to data-base with the values for each type of interventions and the respective gains. Transparent prioritisation, budgeting and resource allocation is made with multi-criteria decision analysis and decision conferencing.

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	I	II	III	IV	V
DI		**0.83**	**1.23**	**1.06**	
Environment		1.00			
Housing		0.83	1.23	1.06	
Security		1.00			
Healthcare		0.97	1.05		
Education			0.97	1.06	
Mobility		0.97	1.06		
Building stock	0.59	1.02	1.23	1.06	
Schools	1.00	1.00			
Healthcare fac.	1	1	1		
Electricity		1.00			
Telecom	1				

Figure 1. Risk reduction worth (RRW) for Algarve.

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