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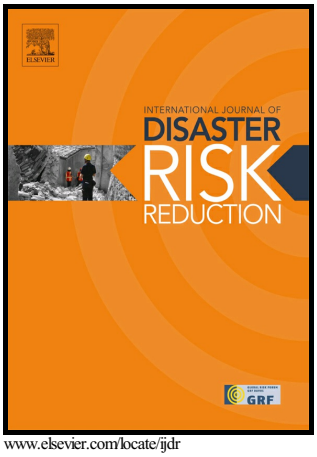

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PII: S2212-4209(16)30147-9
DOI: http://dx.doi.org/10.1016/j.ijdrr.2016.11.010
Reference: IJDRR453

To appear in: *International Journal of Disaster Risk Reduction*

Received date: 5 April 2016
Revised date: 16 November 2016
Accepted date: 16 November 2016

Cite this article as: Annibale Vecere, Ricardo Monteiro, Walter J. Ammann, Sonia Giovinazzi and Raquel H. Melo Santos, Predictive models for post disaste shelter needs assessment, *International Journal of Disaster Risk Reductior* http://dx.doi.org/10.1016/j.ijdrr.2016.11.010

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Predictive models for post disaster shelter needs assessment

Annibale Vecere[1], Ricardo Monteiro[1], Walter J. Ammann[2], Sonia Giovinazzi[3], Raquel H. Melo Santos[4]

[1]*Scuola Superiore Universitaria IUSS Pavia, Italy*

[3]*Global Risk Forum GRF Davos, Davos, Switzerland*

[3]*University of Canterbury, Christchurch, New Zealand*

[4]*National Institute for Space Research, São Paulo, Brazil*

Abstract

The assessment of shelter needs of displaced people in the aftermath of major earthquake events is one the main challenges that emergency responders currently have to face. Based on the scale of the disaster, the short-term shelter demand can turn into a temporary housing need for displaced population, which is a local government responsibility. The study presented in this paper is focused on a critical review of currently available methodologies and corresponding software packages that were developed specifically for estimating the number of displaced people and those who will most likely seek public sheltering and will need temporary housing. The main features and shortcomings of such tools are highlighted and interpreted with a view to future improvement and application in the disaster management field. Two software tools, ERGO-EQ and HAZUS-MH, have been identified as more exhaustive in considering all the different variables involved in the shelter needs estimation. For this reason, this study also includes a full application of those two software tools to a real case study. Specifically, the modelling of the February 22nd, 2011 Christchurch earthquake is presented, in which hazard, vulnerability and exposure (both physical and social) were characterized over a specific area of Christchurch urban area as input to the aforementioned software tools. The employed tools yielded different results in terms of dislocated people and shelter needs estimates, for which a brief discussion is presented on possible ways to improve and to better reflect the local conditions, in order to produce more realistic outputs.

Keywords: *Seismic risk; Short-term shelter needs; Predictive models; Temporary housing software tools; 22nd February 2011 Christchurch earthquake.*

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1 INTRODUCTION

Besides human casualties, one of the most visible and striking effects of any major disaster is the destruction of houses and the displacement of people [Barenstein, 2006]. Large-scale disasters caused by natural hazard are a constant reminder that shelter for the displaced population is one of the first response priorities and, as such, it must be addressed in a quick and safe manner [Wright et al., 2010]. Families from damaged homes find themselves in urgent need of temporary housing arrangements and the lack of a well-planned mechanism to provide alternative housing can result in a major housing crisis or induce further social disruption, which may undermine the efforts of disaster recovery [Comerio, 1997; El-Anwar

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