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Title

Risk Analysis and Safety Assessment of Kerman City Educational Hospitals in Structural, Non-Structural and Functional Dimensions against Natural and Man Made Disasters and Developing Remedies

By

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Abstract

Introduction: Every year, natural and man-made disasters inflict heavy casualties and financial losses on governments and nations. Vital Installations are essential for a society that damage to them can lead to much more severe crises in society. So monitoring and analysis of their resilience against all kinds of hazards, as well as their retrofitting, is vital and necessary. Health has a special place in disaster management; because the first and most important demand and concern of people in disasters is health. The existence of health centers is one of the basic needs of human societies at all times, especially during natural disasters such as volcanoes, storms, floods and earthquakes. The continuous operation of a hospital before and after the earthquake is one of the most prominent problems that all members of society should pay attention to.

Methods: The present research is a descriptive-analytical study that has been done quantitatively and qualitatively in 6 steps. First, using systematic review, general information about risk analysis and safety of hospitals in the world was obtained. After that, harmful hazards to hospitals in Kerman were identified and then risk analysis was performed on them and finally high priority hazards were identified. Then, the safety status of Kerman teaching hospitals in structural, non-structural and functional dimensions were evaluated and finally, based on the results of risk analysis and safety assessment, retrofitting requirements were identified and remedies were proposed.

Findings: In the initial search, 3687 articles were obtained from English and Persian databases. Finally, 19 articles from the databases were included in the study. In addition, 3 studies were selected by searching the sources of selected articles and 2 studies were added to the study by searching in gray literatures. Findings are categorized based on research questions including risk analysis methods, type of disasters, safety assessment methods, components studied and key results. In the second step of the research, the hazards in Kerman were measured over a period of 20 years, which 249 major accidents were classified into 22 categories, which earthquake with 121 occurrence was more than others. In the third step of the research, risk analysis was performed, which based on the calculation of RPN coefficient, earthquake, disease epidemic, drought, traffic accidents, land subsidence, dust and security threat of infrastructure, respectively, had the highest priority. In the next step, the safety of the hospitals was assessed: Hospital A was at moderate level (B), Hospital B was at high level (A), Hospital C was at medium level (B) and Hospital D was at low level (C). In the fifth step of the research, it was found that Hospital D with a total risk of 56,133 units is more at risk than others and needs immediate attention. Finally, in the sixth step, the remedies of each hospital were determined based on their identified weaknesses, which in hospital D, the structural components have the most important weight of retrofitting.

Conclusion: The nature of disasters is a threat to life, property and people, and all kinds of natural and man-made disasters are always happening in all societies. In this situation, the protection of vital facilities and infrastructure becomes more important than ever, because the infrastructure guarantees the continuation of the activities of a community, and the absence of any of them can cause severe disruption in the community. Hospitals are one of the most important infrastructures of a society. In the present study, an analysis of the hazards in the city of Kerman was performed and also the status of each hospital in terms of safety and vulnerability against them was determined. Findings showed that all hospitals are exposed to different degrees of risk. However, on the one hand, a hospital in structural and non-structural dimensions was in a completely unsuitable condition and on the other hand, it was at risk of earthquakes and land subsidence. Thus, using the findings of this study, it is possible to plan and prioritize remedies to increase the resistance of hospitals to existing risks.

Keywords: Risk Analysis, Safety, Training Hospital, Structural Components, Non-Structural Components, Functional Components, Disasters