

# Seismic Vulnerability Assessment of Hospitals in Nepal

NSET Information Kit | 011 | 2011



## INTRODUCTION

National Society for Earthquake Technology-Nepal (NSET) implemented a project “Structural Assessment of Hospitals and Health Institutions of Kathmandu Valley” with WHO-Nepal and the Ministry of the Health, Government of Nepal in 2003. Seismic vulnerability of 14 major hospitals in Kathmandu Valley was assessed. The assessment estimated that most of the hospitals would withstand the occasional earthquake of MMI VII without collapsing, but 10% of the hospitals might be functional, 30 % partially functional, and 60% out of service in case of a major earthquake shaking of intensity IX MMI. The major cause of possible functional loss was considered to stem from non-structural damage and one of the recommendations of the project was to conduct detailed non-structural assessment of major hospitals.

As a recommended follow-up of the aforementioned study, another study called “Non-structural Vulnerability Assessment of Hospitals in Nepal” was carried out in 2004 by NSET with support from WHO-Nepal. The study covered structural and non-structural vulnerability assessment of 9 major hospitals of Nepal: 4 within Kathmandu Valley and 5 outside Kathmandu. Both studies were envisaged by the Health Sector Emergency Preparedness & Disaster Response Plan Nepal prepared by the Disaster Health Working Group, Epidemiology and Disease Control Division (EDCD), Department of Health Services (DHS), the Ministry of Health and WHO-Nepal.

## OBJECTIVES

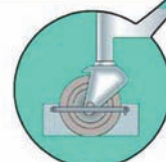
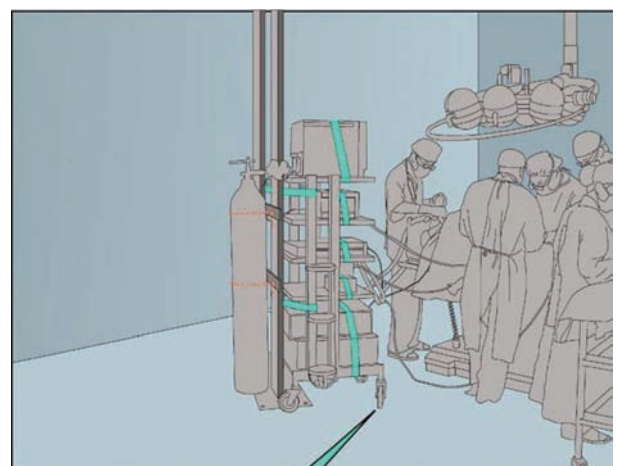
- Development of a systematic approach towards assessment of structural vulnerability of hospital buildings and health institutions of Nepal by way of implementation of such assessment for hospitals in Kathmandu Valley
- Identification of appropriate measures for improving earthquake resilience of the existing health infrastructure
- Transfer of Technology and development of local capacity for such work in the country
- Dissemination of the findings for facilitating implementation of the identified earthquake risk reduction measures.

## ACTIVITIES

**Collection and Review of Pertinent Secondary Data and Information** for familiarization of the current situation of the health facilities, identification of the requirements of the assessment methodology, identification of the target hospitals and their buildings for the assessment, and detailing of the work plan.

**Development of Methodology and formats for assessment**

**Survey of the Hospitals** – for both structural and non structural aspects, for collection of all pertinent parameters for the analysis of the structural strength of the building components, the stability of the buildings and further Identifying Critical Systems and Facilities



Ministry of Health



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**Survey Data Analysis** – For both Structural Vulnerability Assessment and Non-Structural Vulnerability Assessment

**Preparation of Report and Presentation in a Public Workshop** - A one-day Public Workshop was organized for presenting the Project findings to the stakeholders.

## PROJECT OUTPUTS

- Performance Assessment of Hospital

Based upon the structural and non-structural vulnerability assessment of the hospital buildings and different critical systems and facilities, the functional assessment of the hospitals was made for two different scenario earthquakes.

- Identification of Vulnerability Reduction Measures

Considering the opportunity of immediate implementation of non-structural risk mitigation measures, some examples of mitigation options to solve the problems were developed to guide the hospital maintenance division to start implementation. For e.g. Improving Safety of Operation Theatres

- 80% of the hospitals assessed falls in the unacceptable performance area for new construction i.e. they are in the situation beyond the Collapse Prevention Building Performance Level, in severe earthquake and remaining 20% of the hospitals pose life safety to collapse prevention performance level. The result shows an alarming situation and demanded immediate reconstruction or retrofitting of most of the hospital buildings to achieve standard acceptable level of safety
- Systematic approach towards assessment of structural and non-structural vulnerability of hospitals in Nepal was developed through implementation of such assessment work in about 20 major selected hospitals during the study. Appropriate measures for improving seismic performance of the selected hospitals were identified and the findings were disseminated in order to facilitate the implementation of the identified earthquake risk reduction measures.

