



# COLLABORATIVE RESEARCH AND DEVELOPMENT PROJECT FOR DISASTER MITIGATION IN EARTHQUAKE PRONE AREAS IN ASIA

## Tokyo International Video Workshop 2006 on EARTHQUAKE DISASTER MITIGATION FOR SAFER HOUSING

Tokyo-Islamabad-Istanbul-Jakarta-Kathmandu  
22 November 2006

Organized Jointly by  
**BRI, NIED, GRIPS, MIE UNIVERSITY**

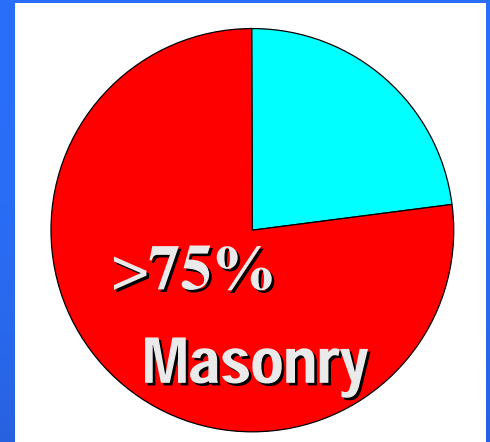
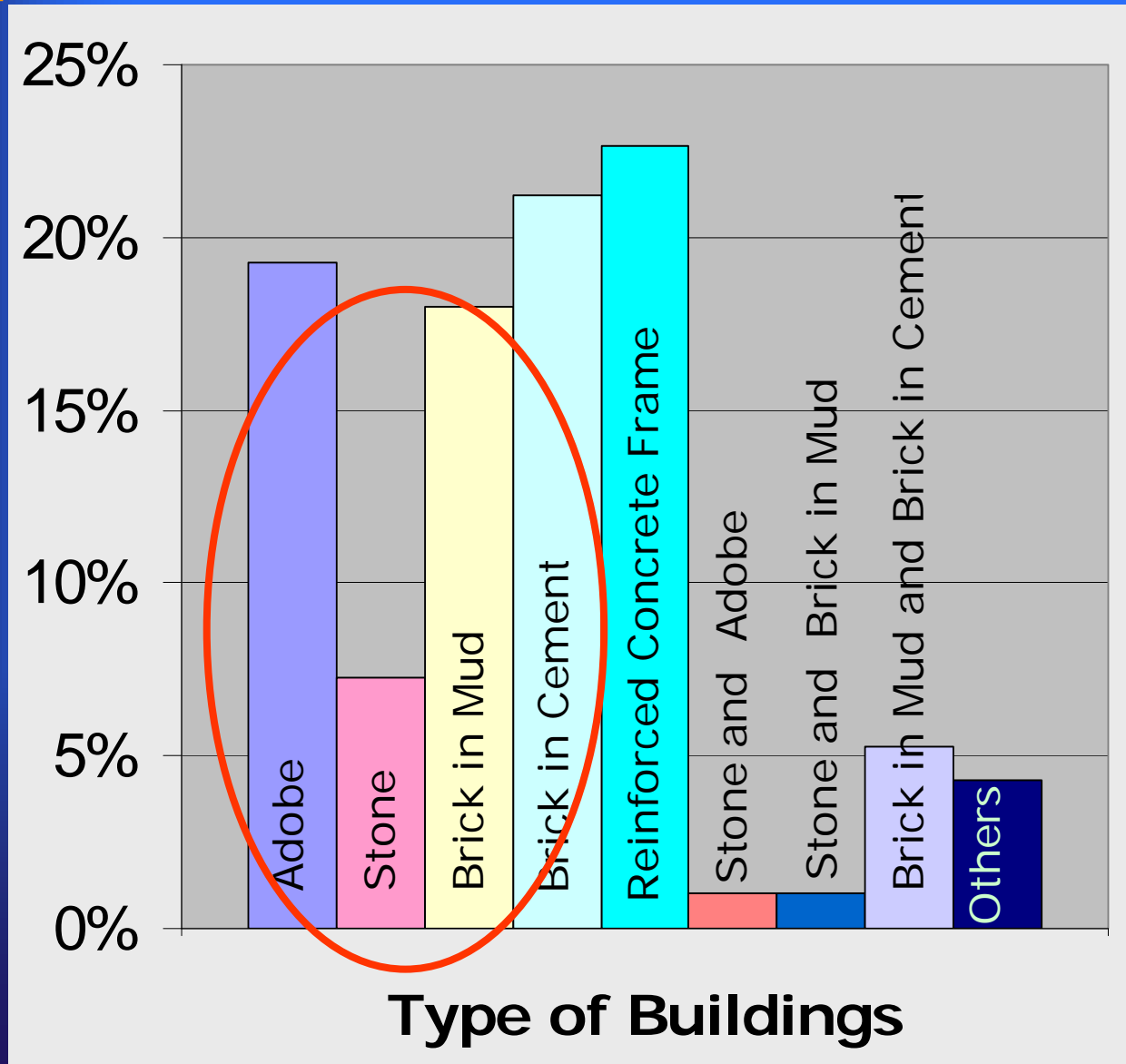
### The Importance of a Joint Research on Earthquake-resistance of Nepalese Building Typology

Amod Mani Dixit, Executive Director, NSET

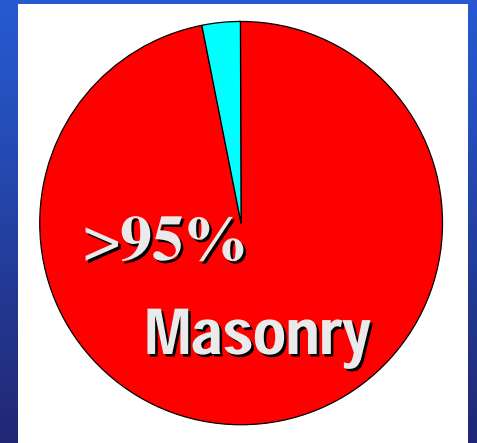


NSET

# Building Typology of Kathmandu Valley (KV)



**KV Total**



**KV Rural Area**

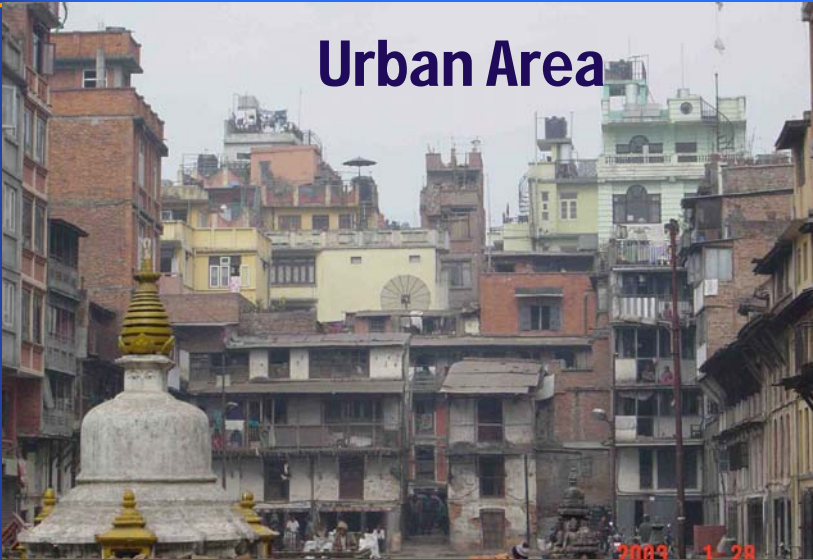
(Source: NSET)



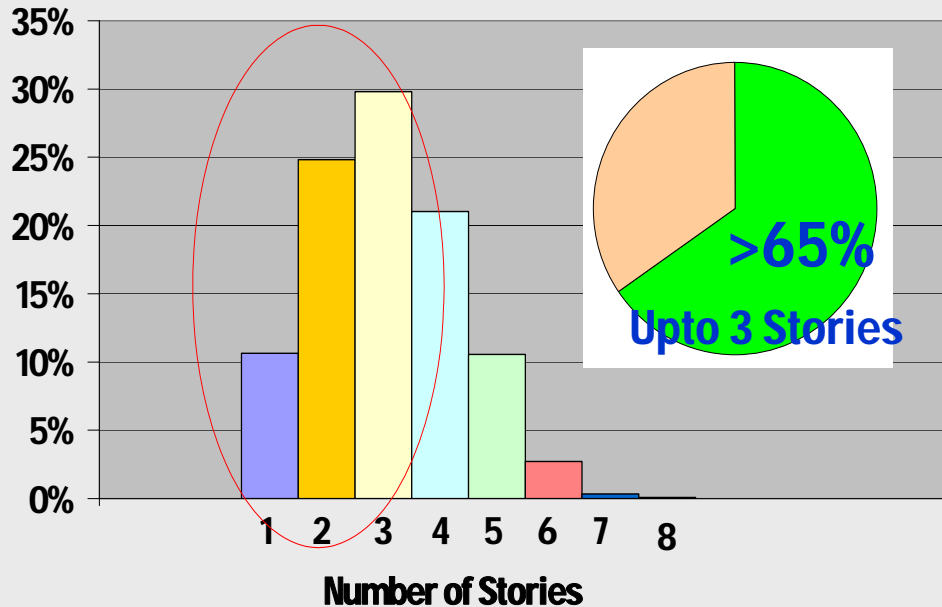
NSE

# Kathmandu Valley

## Urban Area



## Rural Area



**KVERMP Estimate for IX MMI  
Scenario Earthquake**

**Death: >40,000**

**Injury: >95,000**

**Building Collapse: >60%**

# Some Efforts of Retrofitting of Masonry Buildings in Developing Countries



**Need researches to a) better understand, b) improve the technology, and c) implement the construction Techniques for improving seismic performance**



# High Earthquake Risk in Nepal is a proven fact

## Sources of High Earthquake Risk in Nepal/ Kathmandu Valley

- 70%-80% Weak Buildings
- 20%-30% Other factors, mainly lack of Preparedness & Response (*GESI-2001, SEDM-JICA 2002*)

### Knowledge used for Building Construction

- Traditional Materials and Wisdom of construction (90%)
- Modern materials, Engineered design methods (10%)
- There is the obvious need to address both types, especially the non-engineered types





# NSET for Non-engineered Buildings

- ◆ Assess Vulnerabilities
- ◆ Determine Technologies for Intervention
- ◆ Quantify Vulnerability Reduction
- ◆ Propagate Implementation of Vulnerability Reduction measures
  - Risk as well as the mitigation measures need to be understood and internalized into the day to day practice/decision
- ◆ This is difficult task
  - Needs comprehensive approaches
  - Optimal solutions addressing the local conditions
  - Quantify improvements in Building resistance



# NSET's Programs Geared Towards Achieving This Task on Qualitative Terms

- ◆ EQ scenario & Action plan
- ◆ Demonstration projects, e.g SESP
- ◆ Municipal Eq. Risk Management (MERMP)
- ◆ Hospital ERM
- ◆ Awareness raising, e.g Shaking table demonstration etc
- ◆ Pre-positioning of supplies

**NEED sound and proven engineering and scientific methods, conclusions, recommendations and**

**We look this project in this perspective**



# What NSET Wants to Learn From Japanese Institutions?

- ◆ **NSET tries to learn the vast knowledge of Japan in seismology and earthquake engineering**
- ◆ **NSET also tries to learn from the rich experience in implementation of technologies in Japan**
- ◆ **NSET has been in close professional contacts and cooperation with several Japanese Institutions, Research stations, Universities and NGOs for mutual learning on aspects of earthquake risk management**
- ◆ **I am sure that the project will serve as a milestone in the process of such cooperation**





# The Project

- ◆ Because of wide Prevalence, NSET selected Stone Masonry as the object for the study under the Theme 2 (*asesimic construction*)
- ◆ We are interested also in other typologies, for example the RC-Brick hybrid Construction, which is getting more popular
  - Thus the entire Project Content will be Useful
- ◆ WE are keenly interested in risk mapping, development of aseismic technology and dissemination and propagation of it (all the three components of the research Project)



# Project Management (Nepal)

- ◆ NSET is the general co-coordinator for Nepal
- ◆ Thankful to our long term partners for their involvement in the project.
- ◆ From our experience, we can say
  - The concept and content of the project is within the general policies of academia i.e. NEC, GOVN and NSET in the mandate and strategic objectives of the institutions
  - NSET is the national centre for earthquake risk management activities in Nepal and works with close collaboration with the government and academic institutions as well as with the communities.



# Research Scope- our commitment

All three components of the program are equally important

- Component 1: System for Seismic Risk Assessment
  - Helps to understand the EQ vulnerability of our settlements and houses. I hope that the project will also come up with a cost-effective method of vulnerability assessment using the modern satellite technologies and ICT
- Component 2: Feasible and Affordable Seismic Constructions
  - Developing the appropriate technology for earthquake disaster mitigation for our specific types of buildings – stone masonry buildings
- Component 3: Feasible and cost-effective way of Dissemination for effective implementation
- ◆ Collectively, the Project will help in improving the seismic performance of the stone-masonry type of Buildings which are prevalent Nepal and also in the entire Himalayan Region
- ◆ We will also learn also from other types of buildings



# Project Management (Nepal)

- ◆ In Fact NSET has already started to explore the best ways for disseminating the optimum technologies which will come out as the project outcome
- ◆ We are working closely with Prof. Okazaki (GRIPS) under the Component III