# Earthquake Risk Perception in Padang : Government officers, house owners and builders views

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## Introduction

- The Sept. 30th,2009, M 7.6 earthquake had caused 1,117 deaths, 2,902 injured, damaged more than 120.000 building and houses and major infrastructures
- "Build back better" approach adopted in the rehabilitation and reconstruction process, to reduce the risk of future seismic events
- Cost estimate for R & R : Rp 6.417 billion (approx. USD 713

*M 7,6 Earthquake, Wed. (30/9) at 17.16 WIB. in West Sumatera*

*(0.73 S-99.96 E, D 83 km, USGS)*

# Building Damage Assessment
## (Fauzan,2011)

| | District/City | Damage Level | | | Total Damaged |
|---|---|---|---|---|---|
| | | Heavy | Medium | Light | |
| 1 | Padang City | 9.635 | 16.544 | 23.314 | 49.493 |
| 2 | Pariaman City | 5.478 | 3.717 | 4.382 | 13.577 |
| 3 | District of Padang Pariaman | 31.113 | 7.719 | 6.210 | 45.042 |
| 4 | District of Agam | 2.112 | 1.908 | 1.722 | 5.742 |
| 5 | Kabupaten Solok | 39 | 51 | 175 | 265 |
| 6. | District of Pasaman Barat | 1070 | 667 | 925 | 2.662 |
| 7 | District of Pesisir Selatan | 678 | 1.623 | 5.195 | 7.496 |
| TOTAL | | 50.125 | 32.229 | 41.923 | 124.277 |

# Typical housing damage
## (Fauzan,2011)

## Mechanism of post 30 September 2009 earthquake rehabilitation and reconstruction in housing sector for West Sumatra Province


# Introduction

- Need to assess risk perception of actors within institutions and communities for better risk communication in view of "Build back better" approach
- A perception survey on earthquake risk and on safer housing construction as one component of data collection of non-engineered construction in Padang City has been conducted by CDM ITB, UNAND, GRIPS supported by BRI of Japan in 2010-2011
- Similar surveys have been conducted in Yogyakarta and Bandung, Indonesia by GRIPS and CDM ITB on 2007 and 2008
- Targeted respondents : government officers (province and city level), house owners and house builders/head masons

## Objectives

- To better understand how the local government officials, house owners and builders in Padang City perceive seismic risk and earthquake safer housing.
- To find the most effective recommendations for disseminating and supporting the earthquake safer housing in Padang City, in view of "build back better" approach implementation

## Survey Implementation

- The surveys were conducted in Padang during the period of 15 to 27 December 2010.
- Method of Survey:
  - *Provincial Government Officers : Direct Interview*
  - *Local Government Officers : Interview and Questionnaire (conducted by UNAND and ITB)*
  - *House Owners : Interview on location*
  - *Housing Builders/Head Masons : Interview on location*
- Collected responses:
  - *Provincial Government Officers : 15 respondents*
  - *Local Government Officers : 15 respondents*
  - *House Owners: 31 respondents*
  - *Housing Builders/Head Masons : 75 respondents*

# Respondents' Profile

- Provincial Government Officers :
  - *TPT (Technical Supporting Team), Regional Development Planning Agency (BAPPEDA), Residential and Spatial Plan Agency (Dinas Tarkim), Social Agency, Agency for Community Empowerment- Civil Protection Division (Kesbangpol & Linmas Prop. Sumbar), Regional Disaster Management Agency (BPBD Prov. Sumbar)*
- Local Government Officers (*head of office/secretary level*):
  - *Public Work Agency*
  - *Education Agency*
  - *Agency for Community Empowerment- Civil Protection Division*
  - *Local Development Planning Agency*
  - *Disaster Management Agency (BPBD at City Level)*
  - *Residential and Spatial Plan Agency (Dinas Tarkim)*
- House Owners
- House Builders/Head Masons

# Survey Implementation






# Findings and Discussion

## Provincial Government Officers View

## Provincial Government Officers Views

- West Sumatra is prone to earthquakes as well as to tsunamis, floods, landslides and volcanoes.
- Earthquake is an unpredictable hazard and also an important issue but not the only main problem in West Sumatra (WS) and it need to be managed.
- Considering the limitation of human resources and existing seismic risk in WS, DRR initiatives need to be prioritized instead of emergency response
- earthquake safer housing needs to be covered in Regional Regulation.

## Provincial Government Officers Views

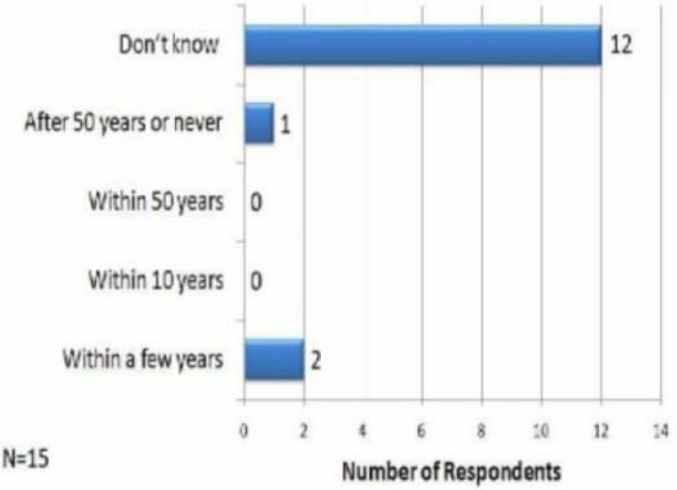
- constructing earthquake safer house is worthy to implement considering the severity of earthquake hazard in the region , but it is probably unaffordable for low-middle income households.
- the current monitoring and control of earthquake resistant building works is not effective, except for government building projects, however situation improves after the 30 September 2009 earthquake.
- Need efforts in order to implement building regulation effectively, such as socialization, monitoring , establishment of building expert teams, and reintroducing traditional house model (*rumah minang*) to the community

## Findings and Discussion

## Local Government Officers View

# Earthquake hazard

**Question 4** : *Do you think that your city will be severely hit by a big earthquake in near future?*

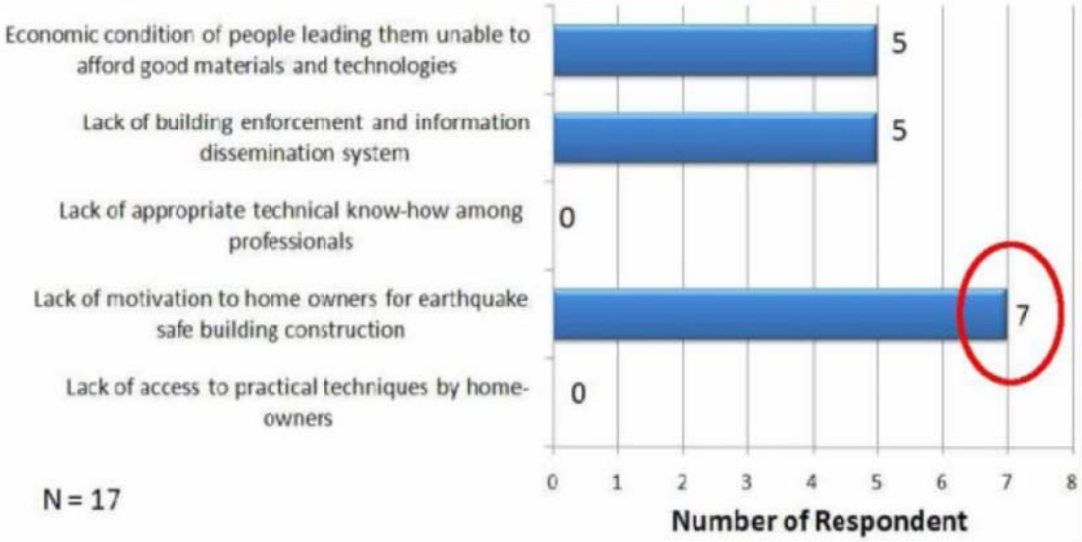



Local government officers' perception :

*"mostly do not know whether a big earthquake will severely hit the city in near future"*

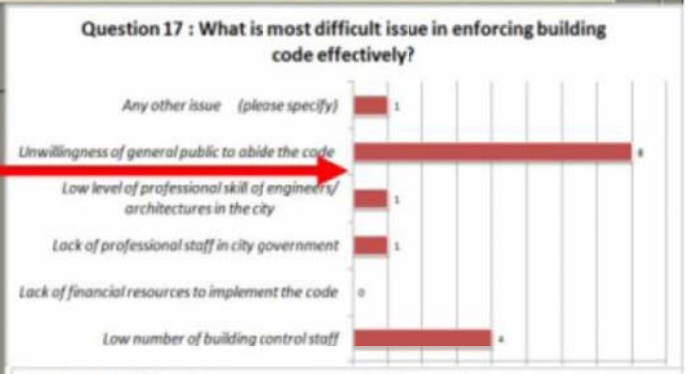
# What local government officers think about vulnerability root cause(s)?

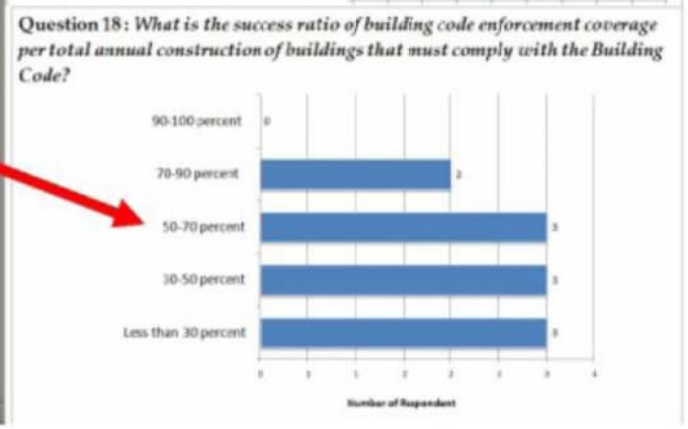
**Question 10** : *What is the most critical root cause of the vulnerability in building construction system?*



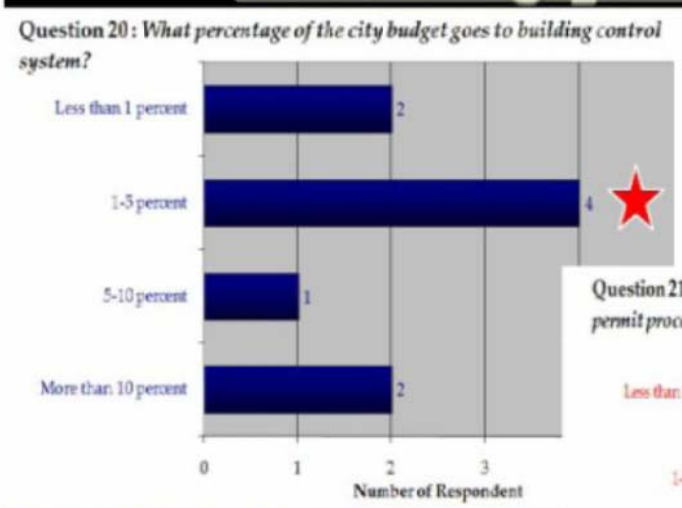
# Building Code enforcement

- most difficult issue : unwillingness of general public to abide the code
- existing earthquake building code not well socialized, lack of building control system due to lack of staffs and resources.
- Success ratio of building code enforcement : respondents think less than 70%
- Need to increase public awareness activities for building safety to increase the success ratio of building code enforcement

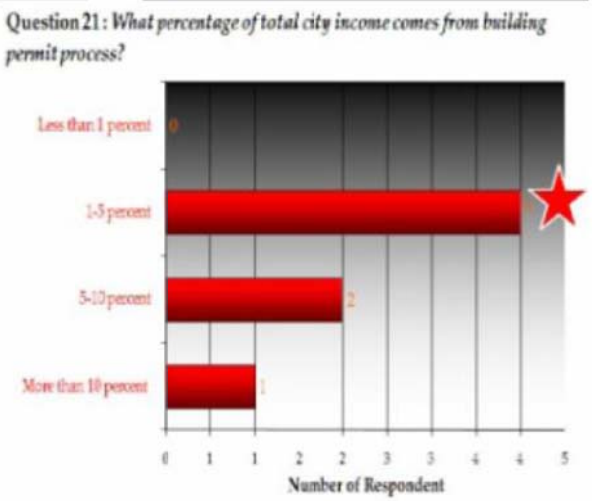



# Building permit system



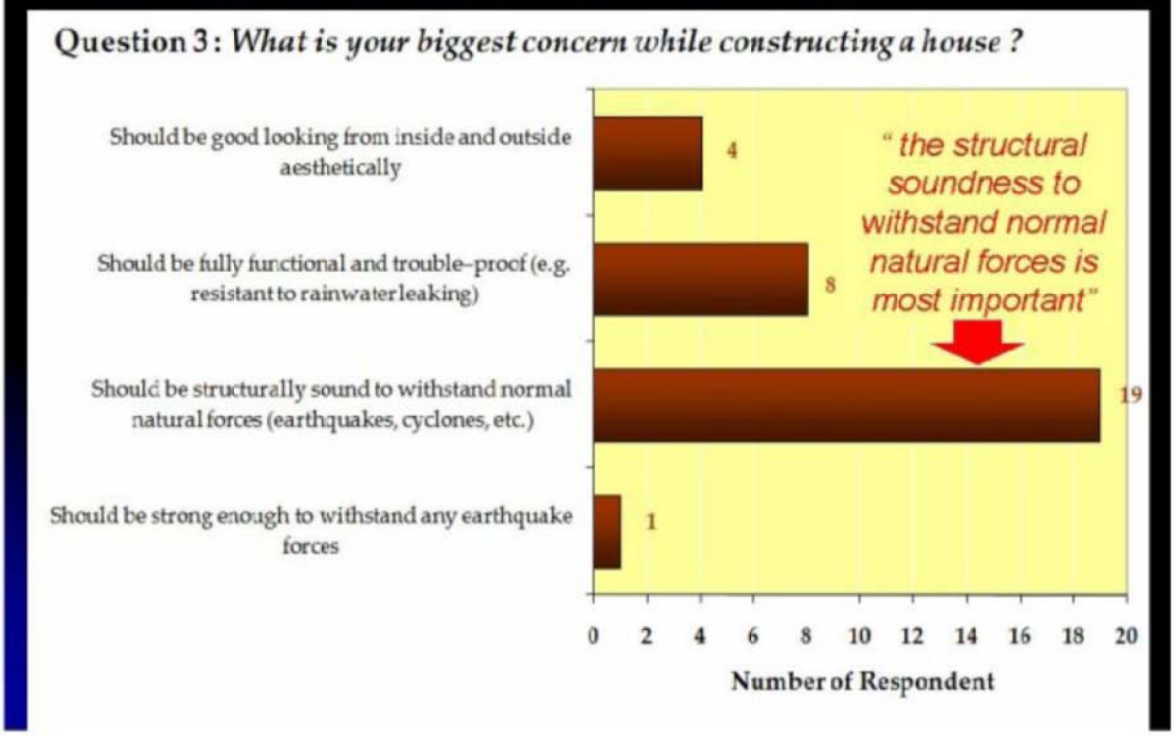

Building permit system is considered as source of income for the city rather than as an effective building control tool, run on a cost recovery basis



# Findings and Discussion

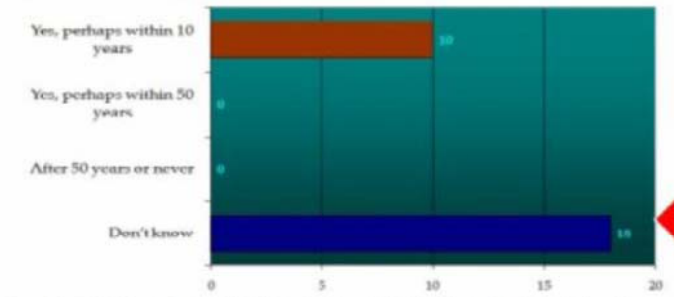
## House builders/masons view

# House builders/head masons' biggest concern for house construction



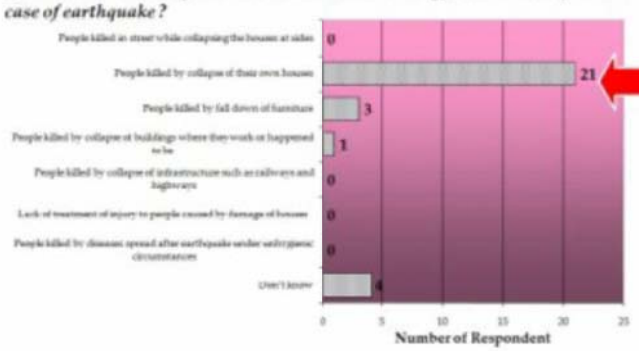
# Builders/masons' perception on earthquake hazard

**Question 4:** *Do you think that buildings your have been constructing will face a severe earthquake in near future ?*




"Mostly do not know whether severe earthquake will strike in near future"

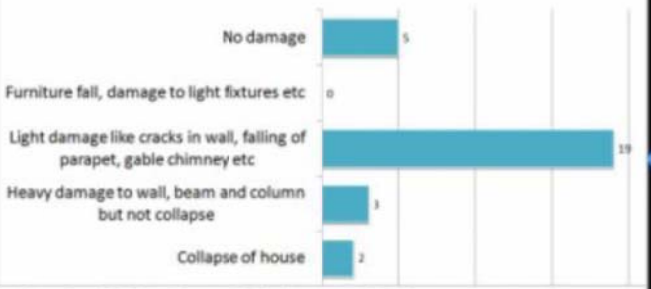
**Question 5:** *What do you think the most contributing factor to loss of lives in case of earthquake ?*




"collapse of own house as most contributing factor to loss of lives"

# Effect of earthquake, critical component, vulnerability factor

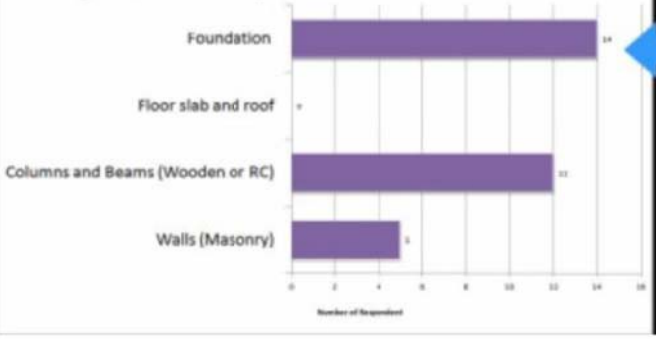
**Question 6:** *How do you think a big earthquake will affect the houses you*




Most builders/ masons think :

"only light damage will occur to houses that I built"

**Question 7:** *What do you think the most critical component to make building withstand the earthquake ?*

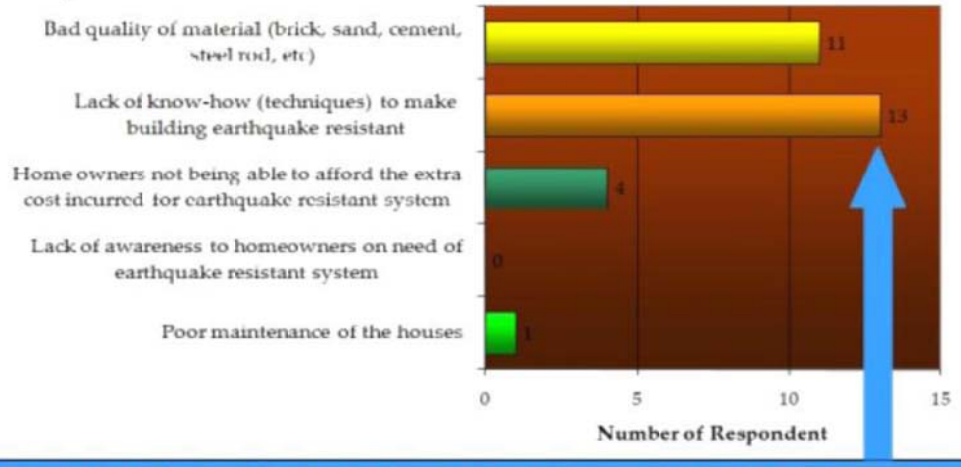



Most builders/ masons think :

"Foundation is the most critical component to make building withstand earthquake"

# Effect of earthquake, critical component, vulnerability factor

**Question 8:** ***What is the main causative factor to make buildings vulnerable to earthquakes?***

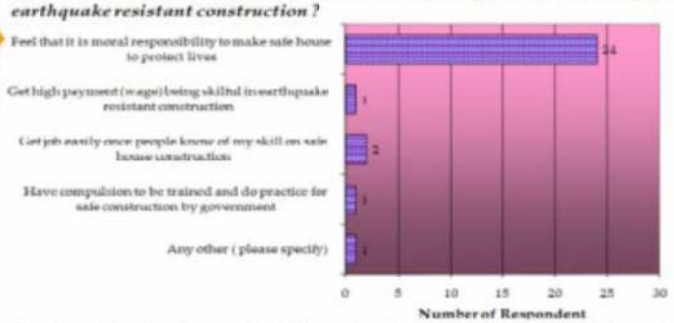



*"Lack of knowledge of earthquake resistant building is main cause factor for vulnerability of a house"*

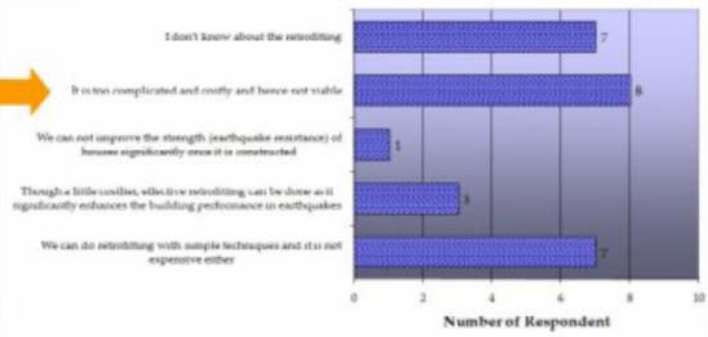
# Motivation for EQ resistant construction, viability of retrofitting

- Moral responsibility is my main motive for EQ resistant construction
- retrofitting is too complicated and costly, I can do only retrofitting with simple, not so expensive technique

**Question 20:** ***What is (would be) the most motivating factor for you to go for earthquake resistant construction?***



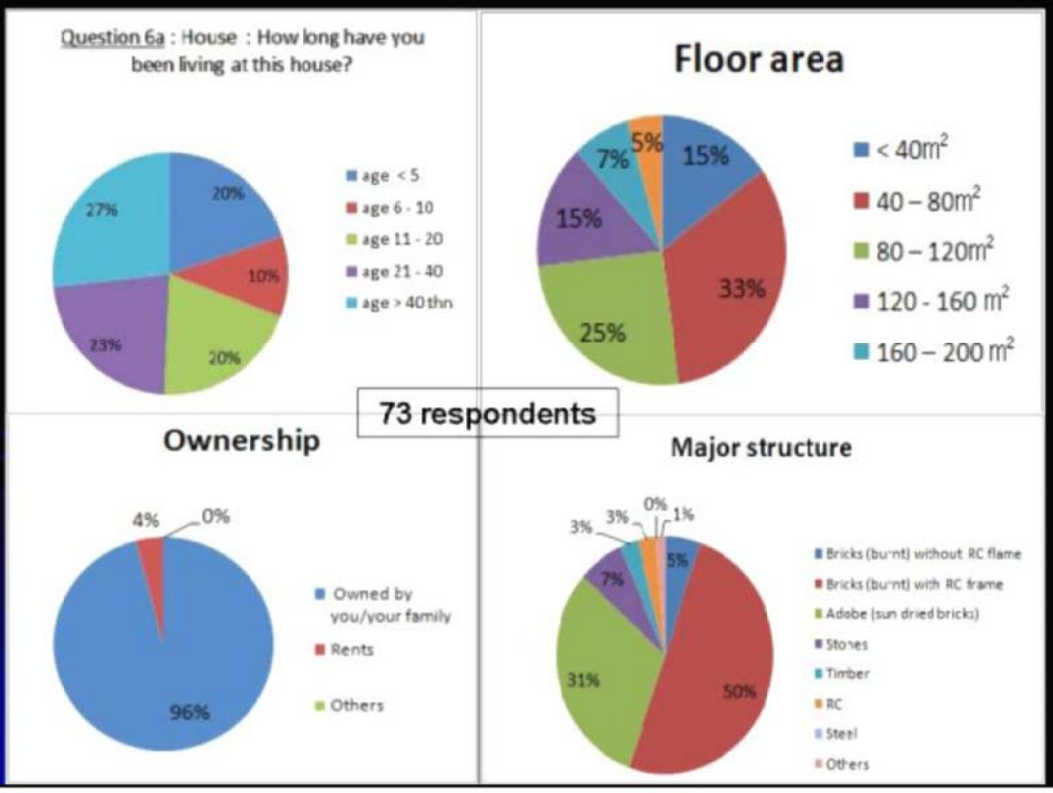

**Question 21:** ***How do you think that seismic retrofitting of existing houses is viable?***



# Findings and Discussion

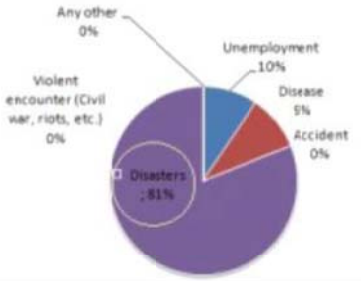
## House owners view

# Existing Condition of Housing in Padang

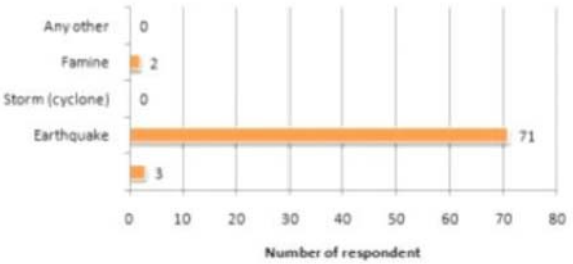


# House owners' perception

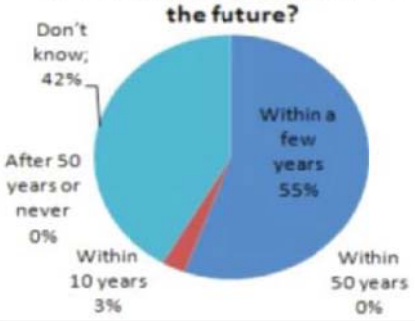
**What do you think will most severely affect your life?**



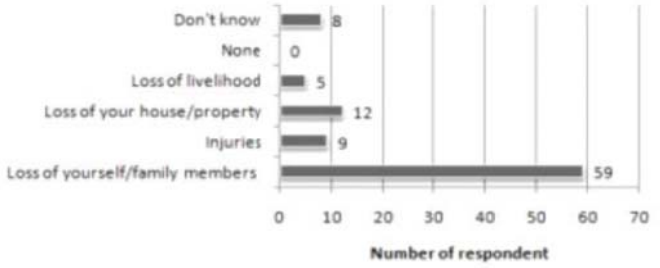

**What kind of disaster do you think will most affect your life?**



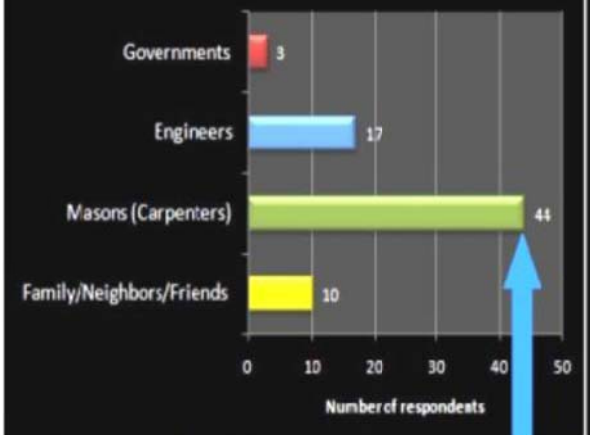

**Do you think a big earthquake will occur in your living area in the future?**



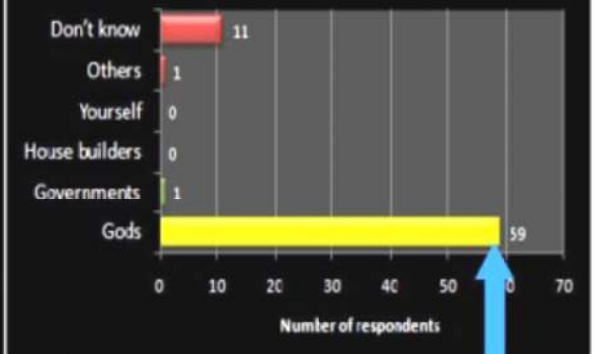

**What kinds of impacts do you anticipate due to a big earthquake?**




**Whom do you rely on for a safer house?**

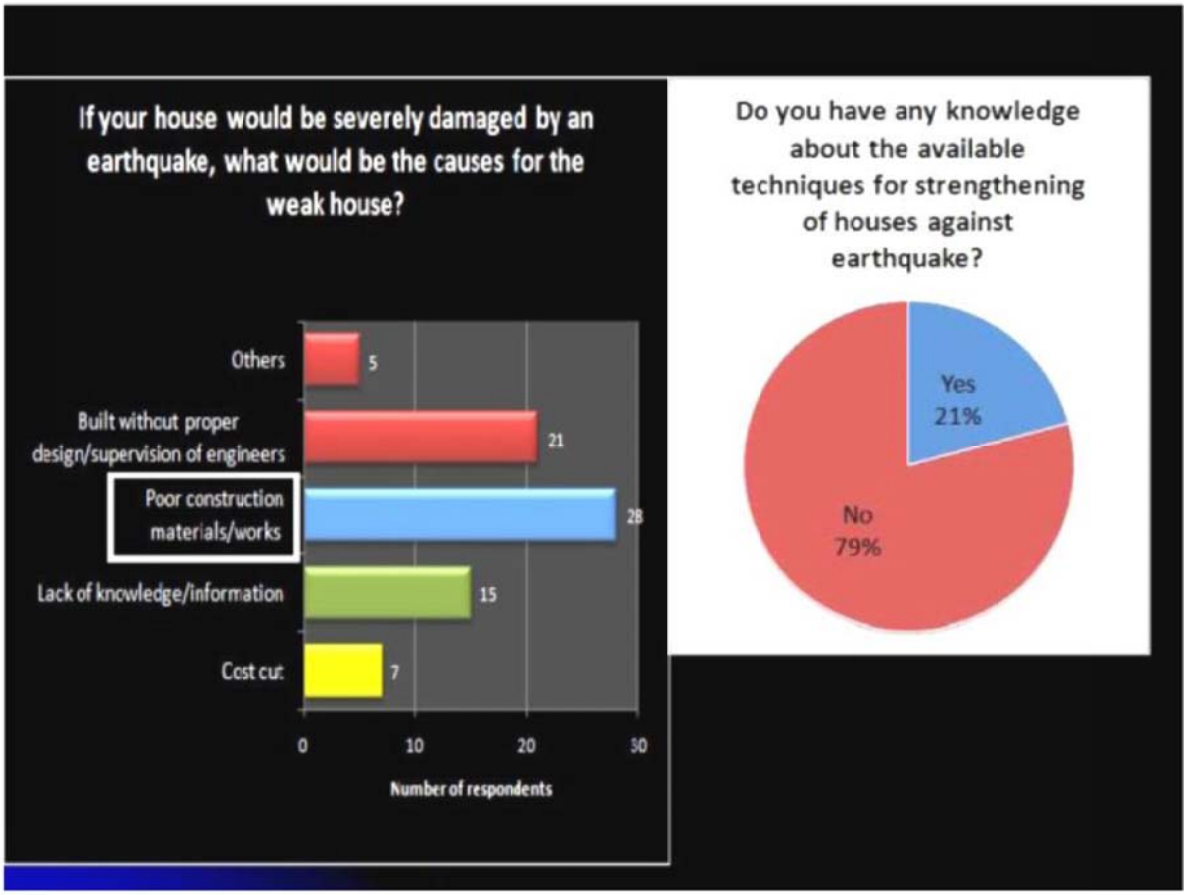


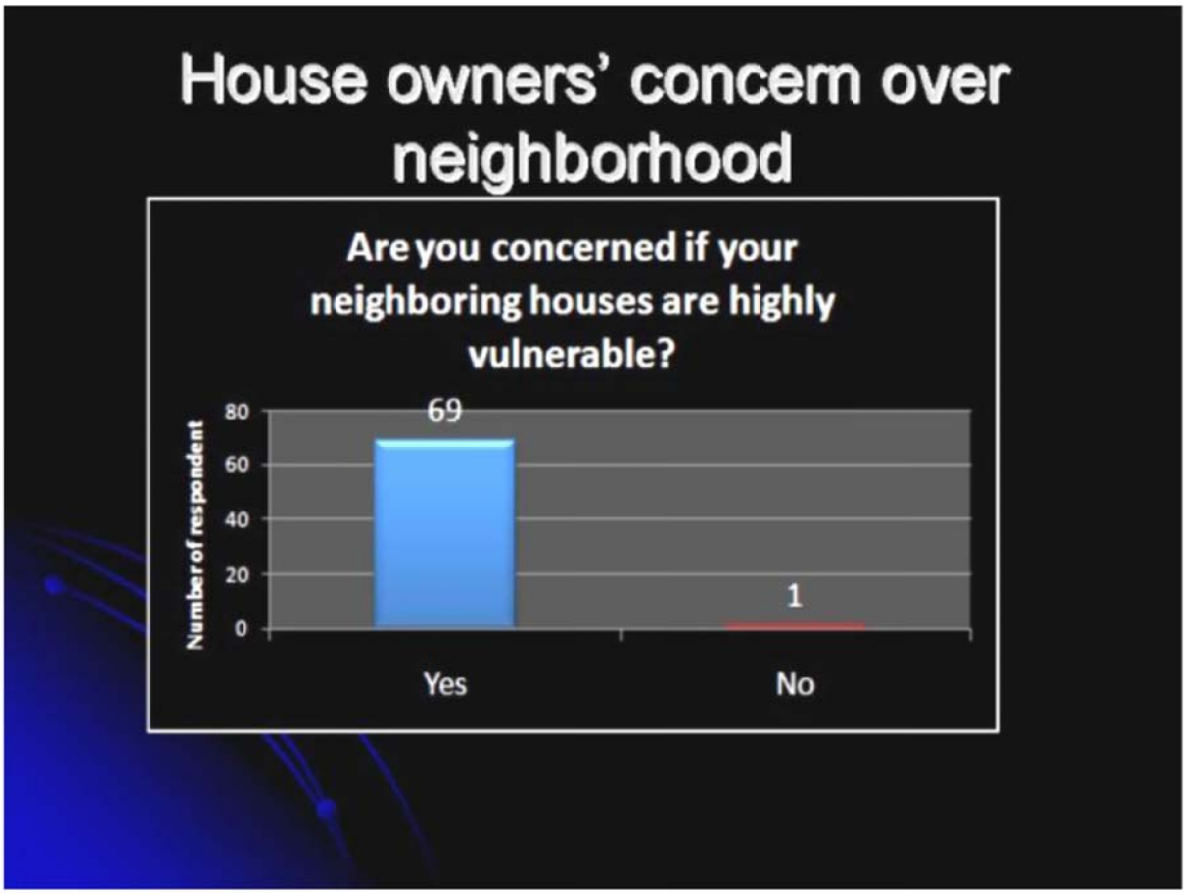

**If your house would collapse and kill some of your family due to a big earthquake, whom would you blame?**




Mostly rely on to masons/ carpenter to build their house

Mostly think if their house collapse and kill member of the family, it is God's will and nothing can be done about it


If your house would be severely damaged by an earthquake, what would be the causes for the weak house?
Others
5
Built without proper design/supervision of engineers
21
Poor construction materials/works
28
Lack of knowledge/information
15
Cost cut
7
0
10
20
30
Number of respondents
Do you have any knowledge about the available techniques for strengthening of houses against earthquake?
Yes 21%
No 79%


House owners' concern over neighborhood
Are you concerned if your neighboring houses are highly vulnerable?
Number of respondent
80
60
40
20
0
69
1
Yes
No

# Concluding Remarks

- Government officers, house owners and builders consider earthquake in West Sumatra to be a priority compared to other disasters such as flood, landslide and volcanoes.
- Most house owners rely on the masons/carpenters to retrofit or reconstruct their houses in Padang City, but unfortunately, most of the masons are untrained and work only based on their limited experience.
- Earthquake safer housing is still considered as expensive and complicated technology.

# Concluding Remarks

- Builders have motivation to become skilled crafts in building earthquake safer housing. They expect government to conduct training programs on earthquake resistant construction more often.
- Several initiatives had been implemented by the local government in order to support the earthquake safer housing in Padang City, such as disseminating information through guidelines, poster, mass media, television and trainings.
- Consultation mechanism for earthquake safer housing such as the one implemented by *Klinik Konstruksi – UNAND* is an effective way to dissemine the knowledge. More outreach program is needed for the wider community .


Thank you....