

# Building Categorization

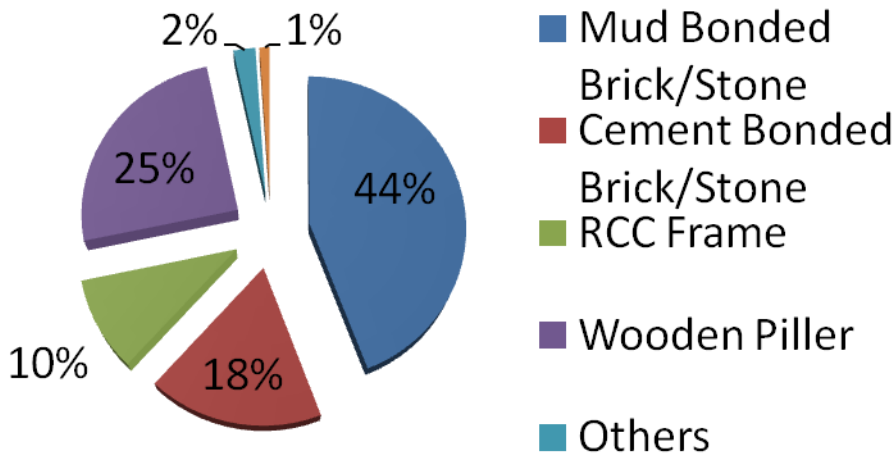
## *Common Type of Buildings in Nepal*



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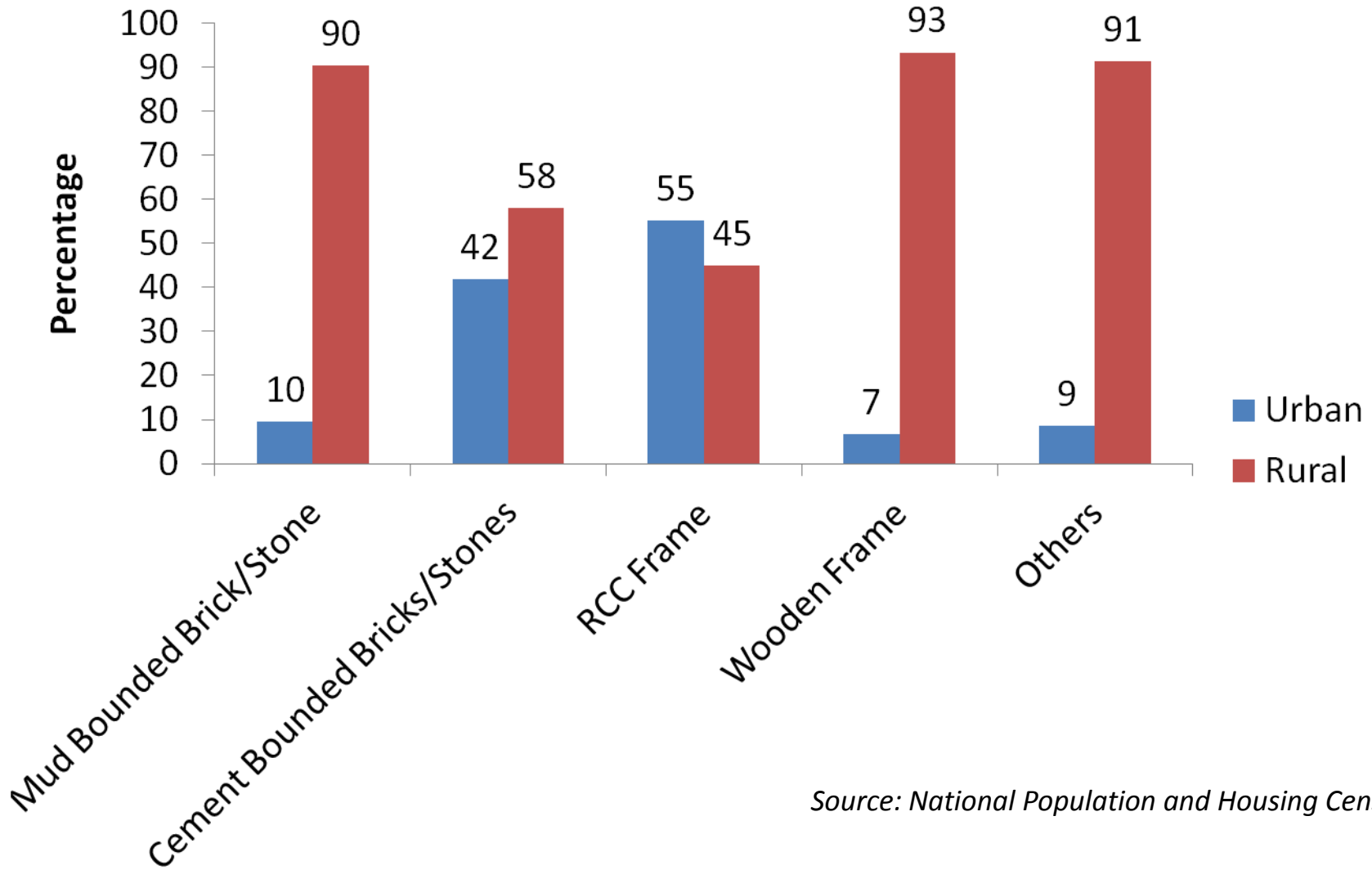
# Total Building Stock in Nepal

Area	Total	Type of foundation of house					Not stated
		Mud bonded bricks/ stone	Cement bonded bricks/ stone	RCC with pillar	Wooden pillar	Others	
<b>Nepal</b>	<b>5,423,297</b>	<b>2,397,441</b>	<b>952,702</b>	<b>539,004</b>	<b>1,350,151</b>	<b>126,281</b>	<b>57,718</b>
<b>Urban/Rural</b>							
Urban	1,045,575	229,733	399,479	297,117	89,343	10,852	19,051
Rural	4,377,722	2,167,708	553,223	241,887	1,260,808	115,429	38,667
<b>Ecological Belt</b>							
Mountain	363,698	337,421	7,893	2,954	11,562	1,206	2,662
Hill	2,532,041	1,641,237	343,461	324,881	187,836	7,493	27,133
Terai	2,527,558	418,783	601,348	211,169	1,150,753	117,582	27,923



Source: National Population and Housing Census 2011

## Household Types in Urban vs. Rural Areas



Source: National Population and Housing Census 2011

# Basis of Categorization

- Material type
- Load resisting system
- Configuration
- Height of Building
- Quality of Construction
- Ground Slope

# Category as per National Building Code

## Four levels of design and construction

- International state-of-art (Part I)
  - Sophisticated design philosophies and analytical techniques in the world
- Professionally engineered structures (Part II)
  - Designed by professional engineers following code requirements
  - Hospitals, meeting halls, factories, warehouses, multi-storied buildings, residential buildings . Masonry: unreinforced; RCC frames: with and without masonry infills
- Buildings of restricted size designed using mandatory rules-of-thumb (Part III)
  - Small buildings with limitation of height, number of stories and floor area can be designed by professional advisor reinf., eq. resisting elements etc.
  - Limits on span and height, member sizes, min.
  - RCC buildings with and without masonry infill; Load bearing masonry
- Remote rural buildings where control is impractical (Part IV)
  - Guidelines: Rural buildings- low strength masonry and earthen buildings

# Building Categorization

- Non-engineered (non- strengthened)
  - Low strength
    - Adobe building (up to 2-3 storeys incl. buingal)
    - Stone in mud, timber floor (up to 3 storeys incl. buingal)
    - Stone in mud, RC floor slab (up to 2-3 storeys)
    - Brick in mud, timber floor (up to 2-3 storeys incl. buingal)
    - Brick in mud, RC floor slab (up to 2-3 storeys)



# Building Categorization

- Non-engineered (non- strengthened)
  - Stone in cement mortar (up to 3 storeys, <1000sft. plinth area )
  - Brick in cement mortar (up to 3 storeys, <1000sft. plinth area )
  - RCC frame with masonry infill (up to 3 storeys, <1000sft. plinth area)
  - RCC frame with masonry infill (> 3 storeys, <1000sft. plinth area)
  - Mixed



- 80% of building : up to 3 storey and <1000 sft. in plinth area
- Target of this training : share the strengthening techniques of these buildings

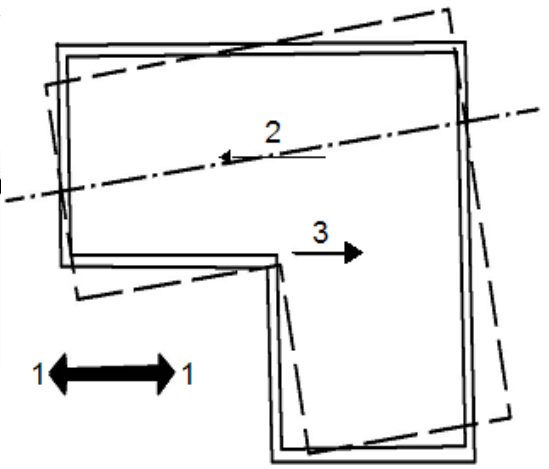
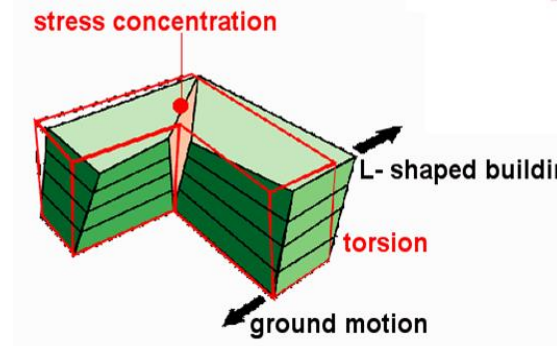
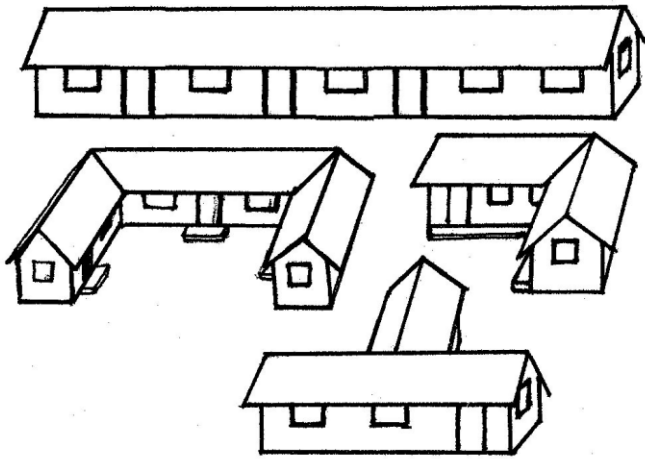
# Building Categorization

- Engineered Masonry Buildings (strengthened)
- Engineered RCC buildings

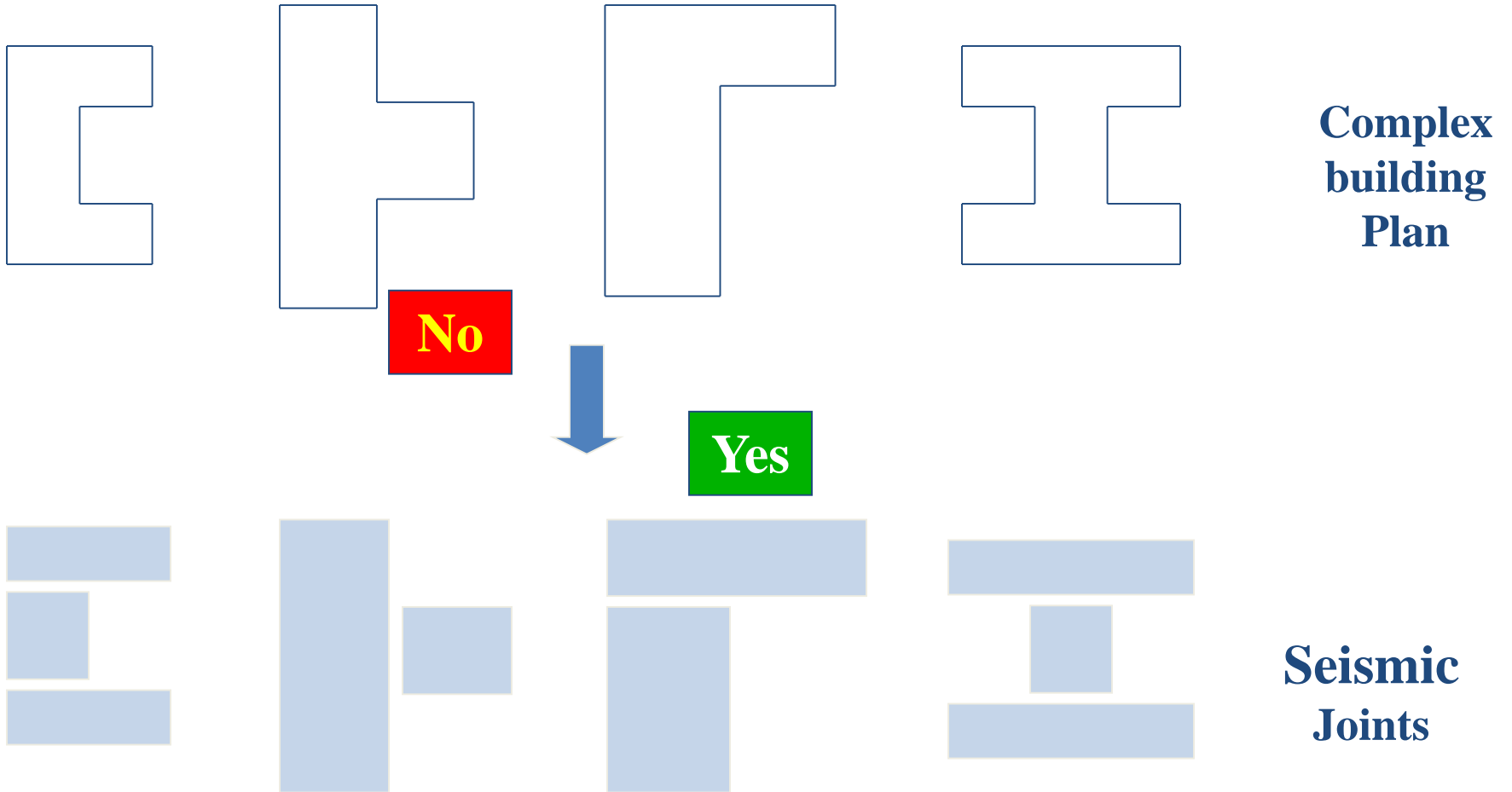




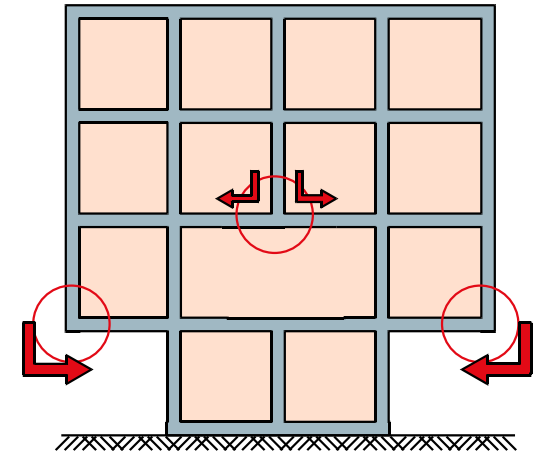
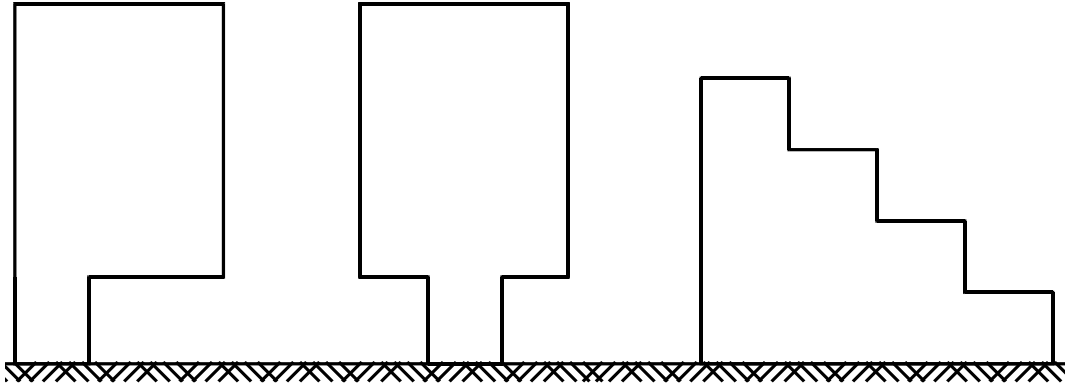
# Configuration: Irregular Shapes



# Plan Shapes



# Irregular Elevations



Load Path Disturbed