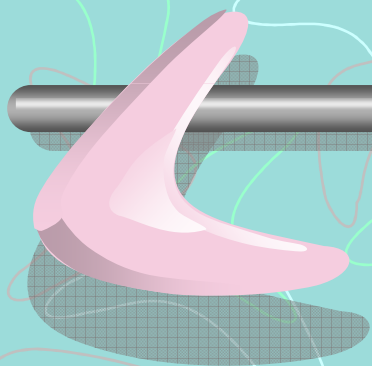


# 1 Day orientation to SMC chairpersons and head Teachers

Feb 3, 2008, Salleri, Solukhumbu



## Some Visuals of earthquake

**Dawang Sherpa**

Engineer

RRN

Feb 3, 2008













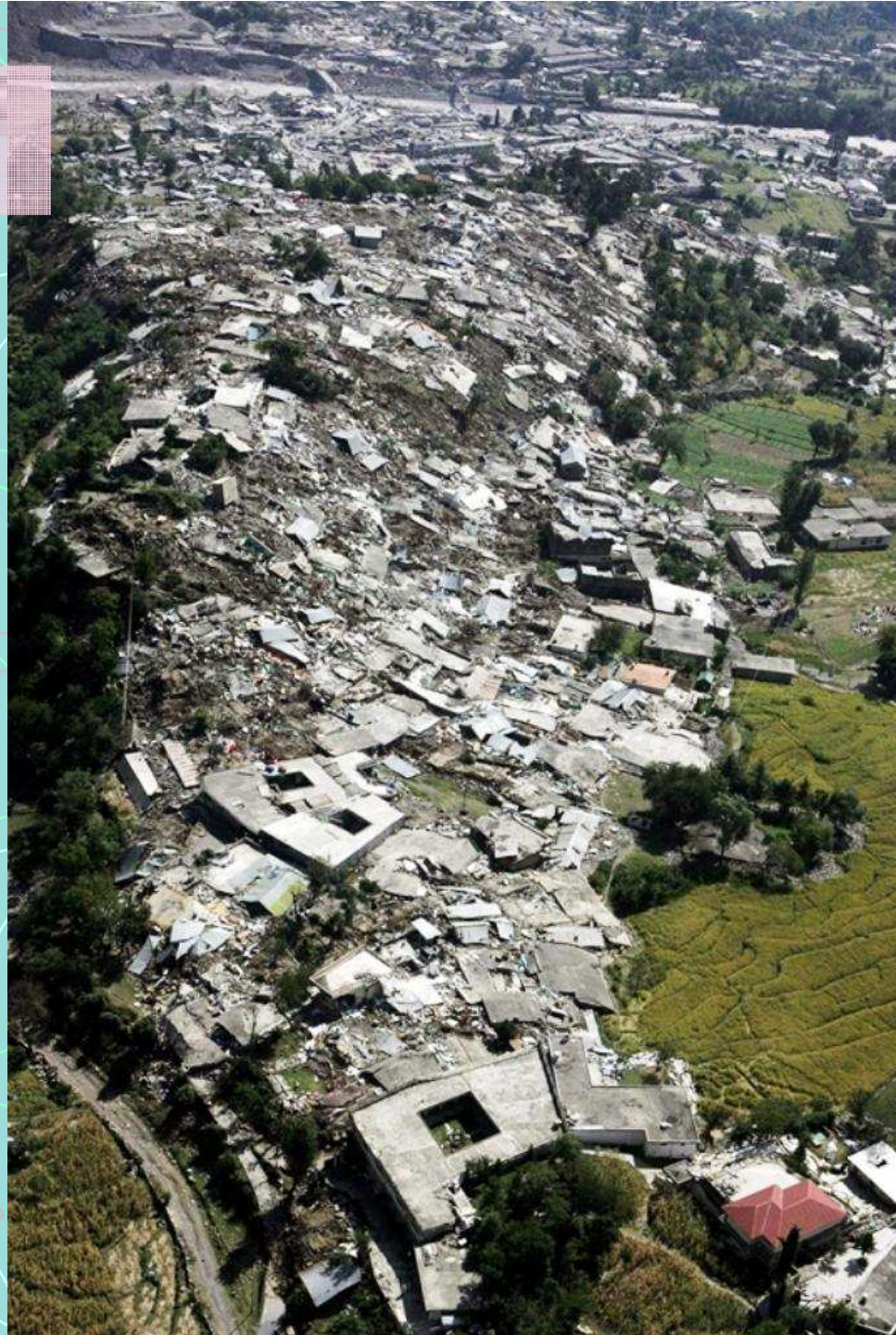


# 1995 KOBE EARTHQUAKE





# Balakot





# Balakot





































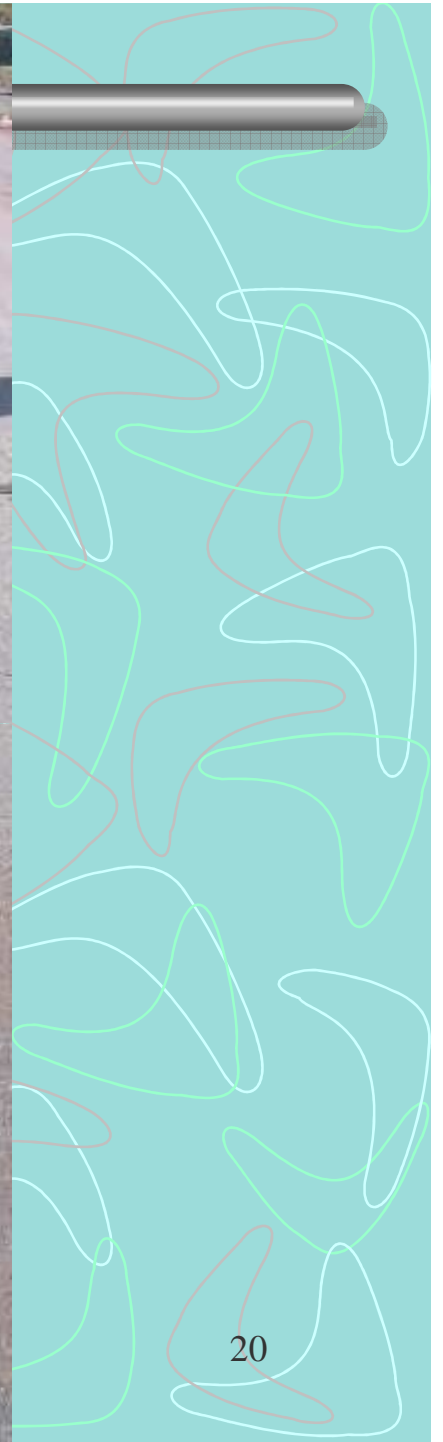




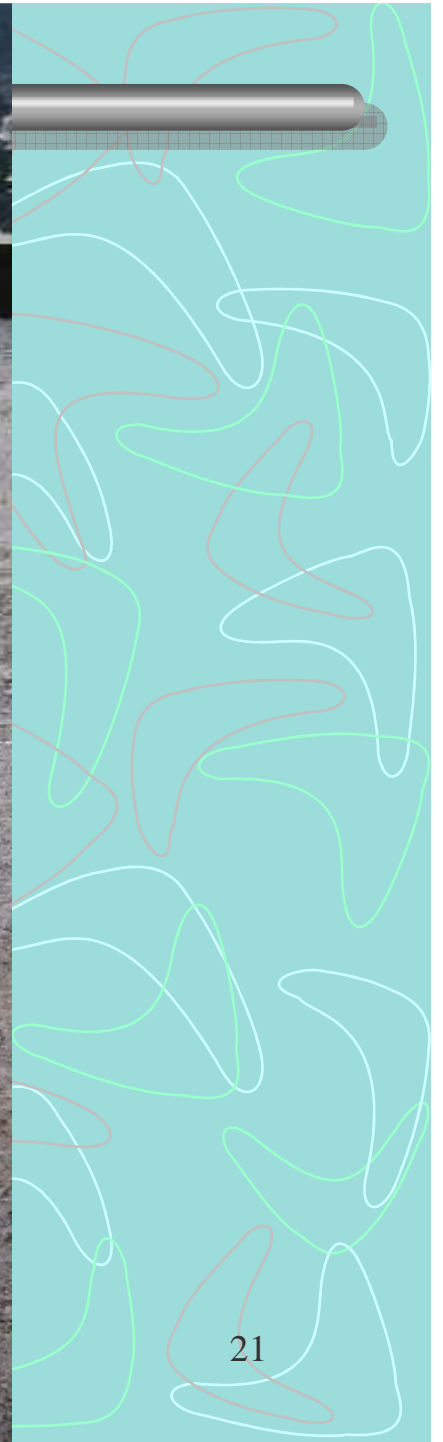
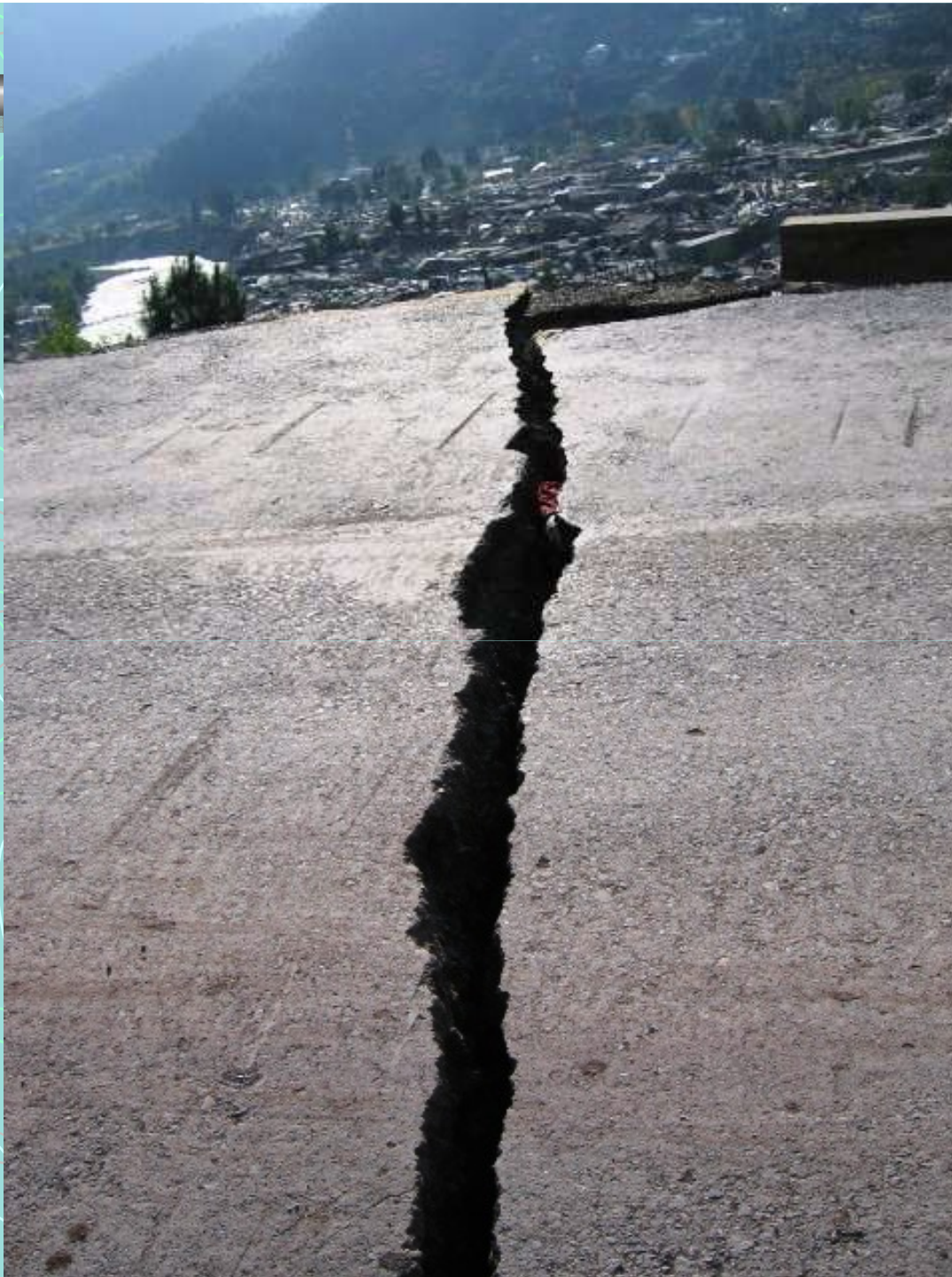










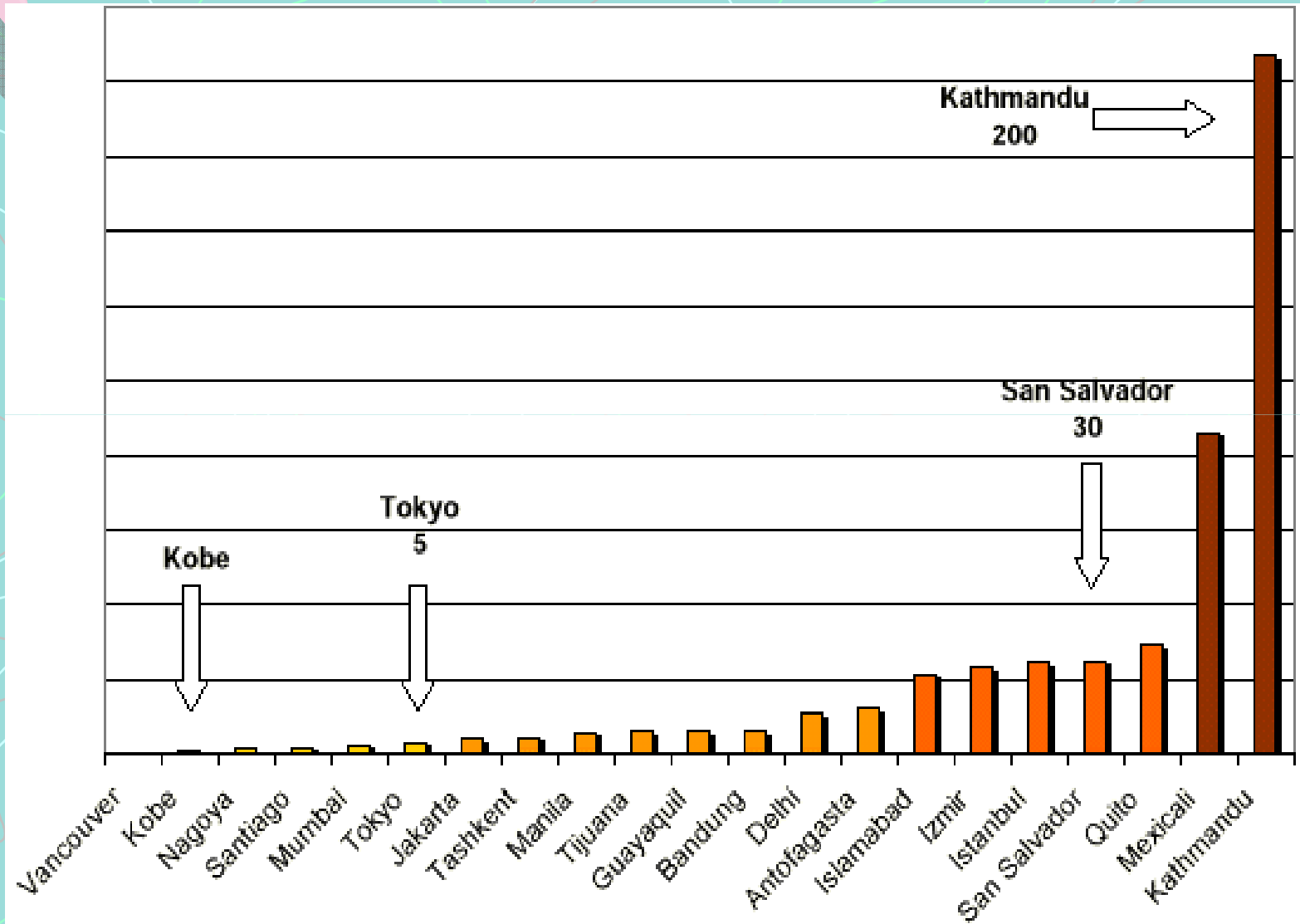




# **Destruction by Bam Earthquake**



# Per Capita Risk of Casualties





# Earthquake Safety Day



**Shake Table Demonstration and Earthquake Safety Exhibition**



# Elements of Retrofitting



Bracing to increase lateral strength of wall



Jacketing of a column



# Involvement of all



# Bitter Facts

- **Researches in Geology, seismology and Engineering being carried out since past hundred years!**
- **Thousands of Specialists trained in many countries but people continue to die from earthquakes in unacceptable numbers!**
- **Knowledge exists, but Risk not Reduced!**



Pawel Kopczynski / Reuters



# Preparedness for External Disasters



Singapore 006, 2000



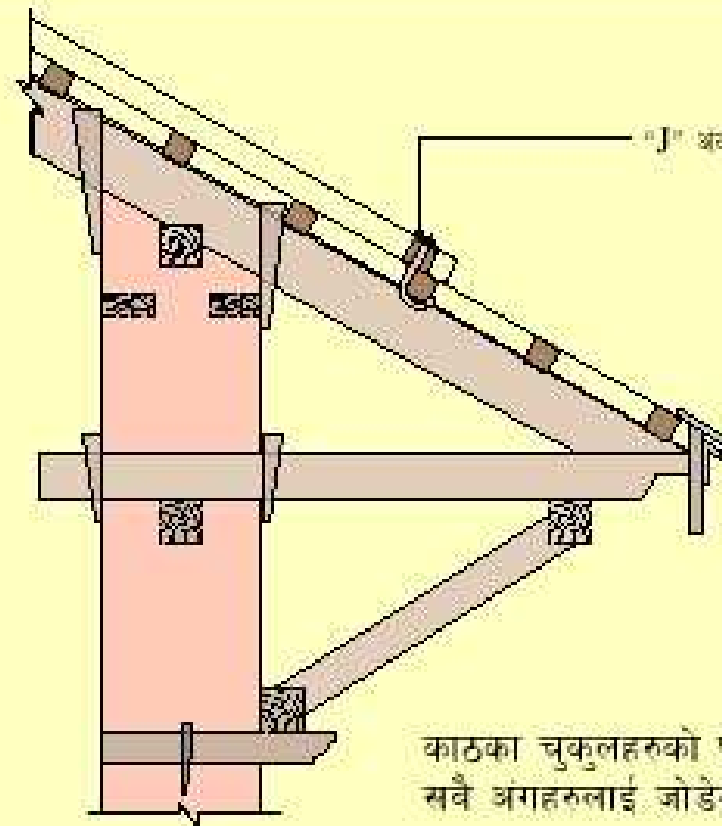
Ukraine air show crash, 2002<sub>28</sub>



Air Garuda, 1996

# Observed Earthquake Resistant Elements

- Wooden Corner stitch
- Wooden Pegs





# Observed Earthquake Resistant Elements



- Thick walls
- Vertical Post at Corners
- Use of Wooden wedges, Carpentry Joints (Dovetailing)

- Summary: Many earthquake-resistant elements present
  - sometimes many in one building
  - Sometimes some in another

# Olive View Hospital, California, USA

(San Fernando Earthquake, 1971)

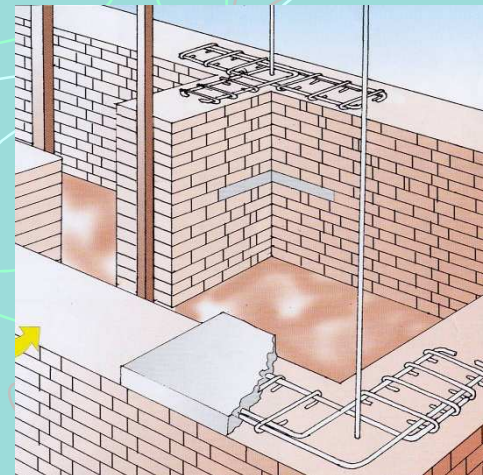




# Reduce Vulnerabilities to Earthquakes

**New Buildings** : Construct strong, earthquake-resistant buildings according to the Building Code

- **Additional Cost** for typical buildings up to 3 stories
  - **4-6% in Masonry (Cement mortar)**

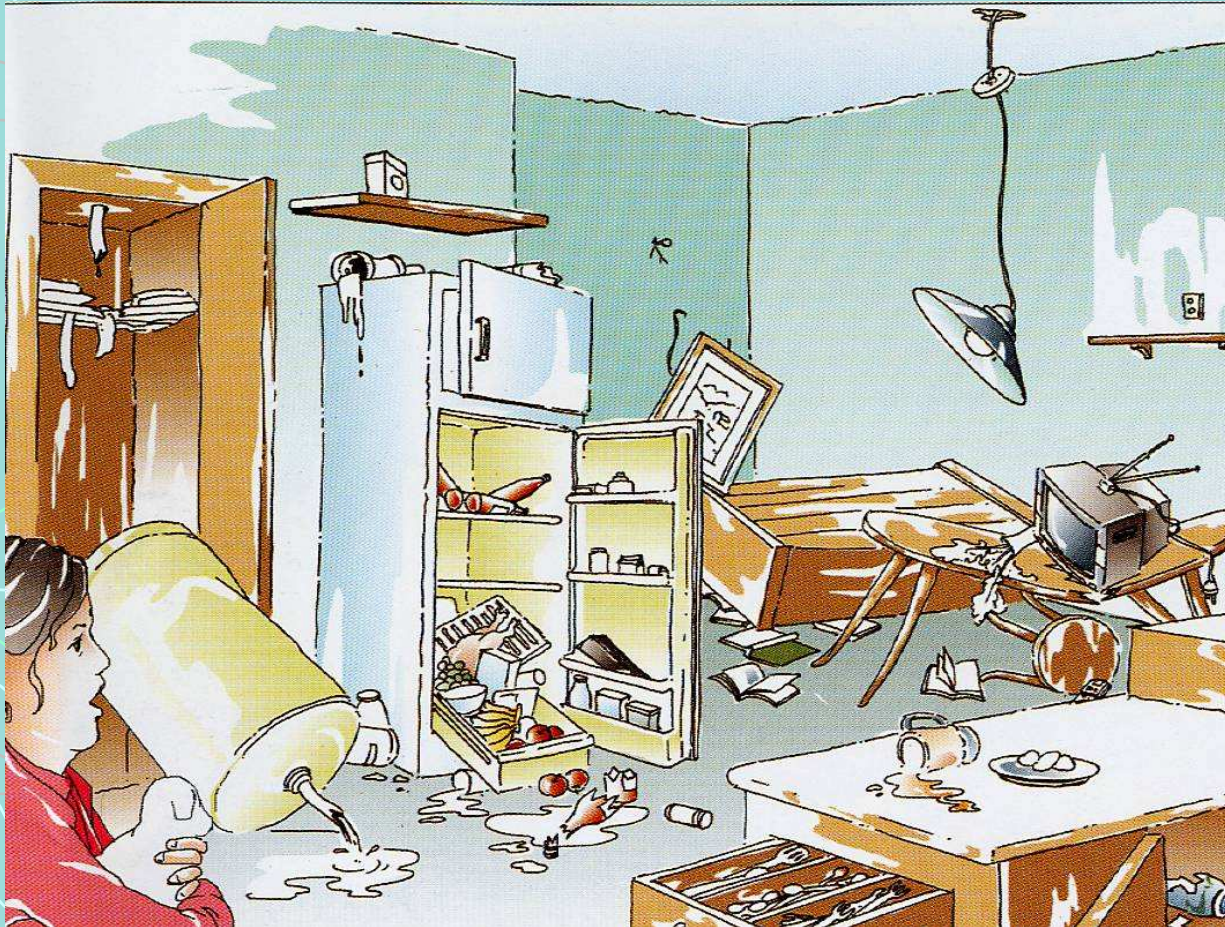


# Structural Damage





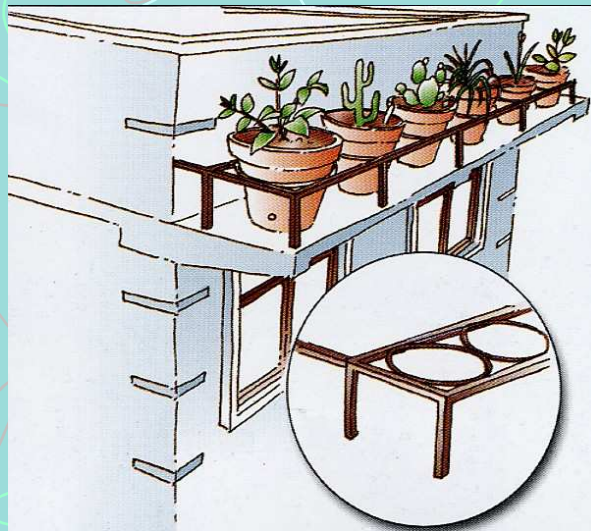
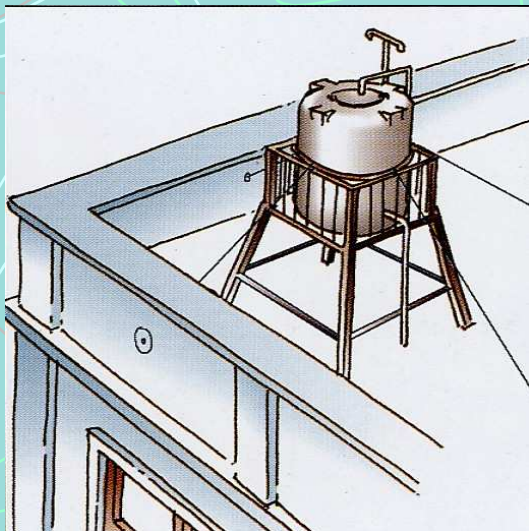
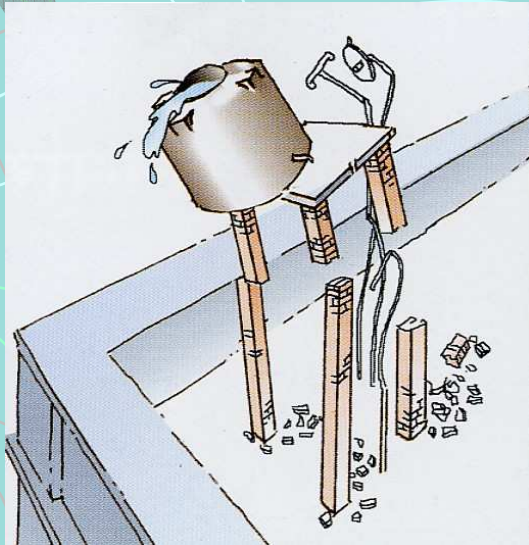
# Non-structural Damage



If you do not do anything now, this will happen to your house!



# Mitigation of Nonstructural Hazard



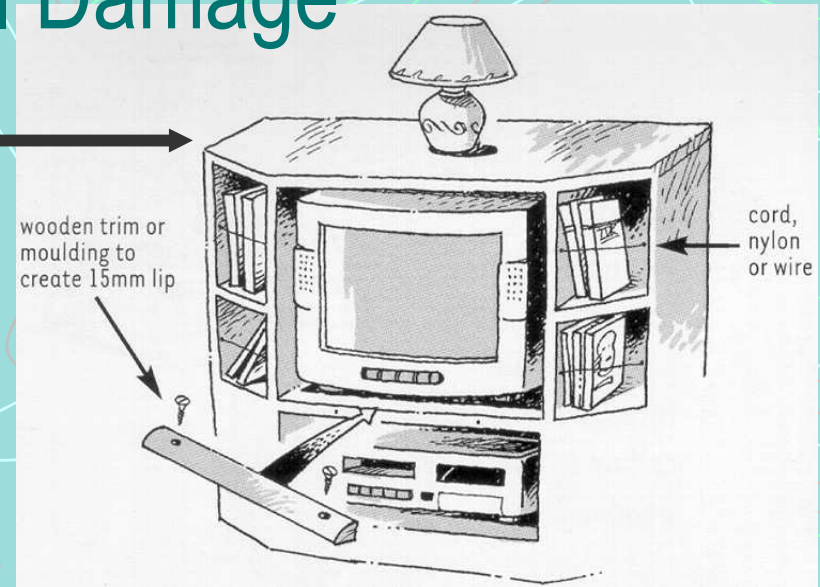
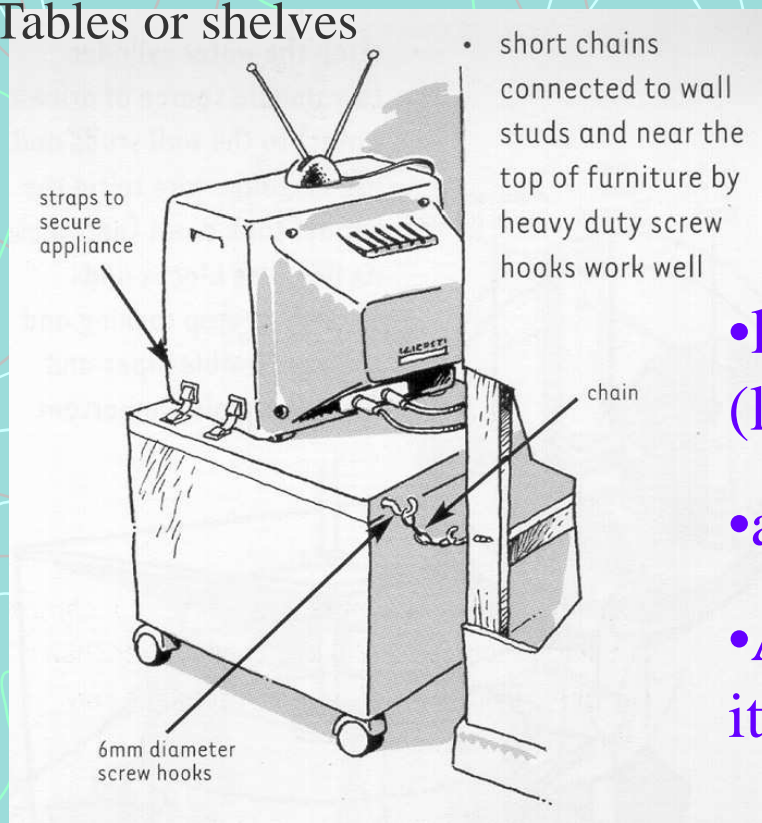
Do you have the  
case?

Simple  
improvement can  
save life and  
property



# Reduce Non-structural Damage

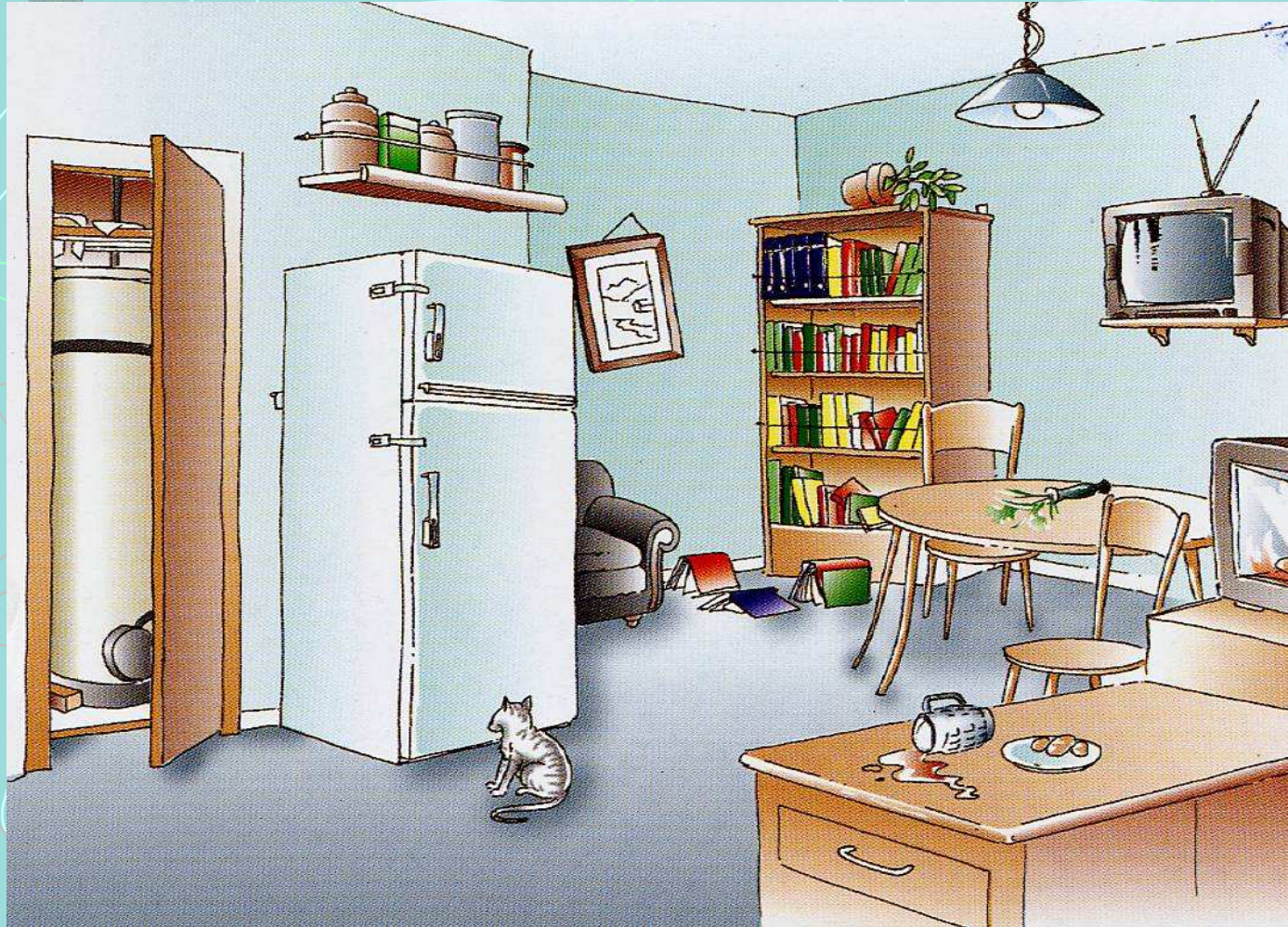
Secure television/computers etc with Velcro, non-slip mats, tight strap or chain, brackets, recesses, or “lips” on Tables or shelves



- limit sliding & rocking movements (lips, non-slip mats, straps, bracket)
- anchor against sudden jolts
- Adding weight to the bottom of tall items



This condition could be achieved!



**This condition can be achieved with little effort!**



# Emergency Plan Elements: Fix loose objects

- **Fix well** all unsafe situations which can hurt when fall over (inside : heavy furniture, statues, frames, mirrors... ; outside : water supply of the roofs, flowers pots...)



# IMMEDIATE ACTION: INDOORS

- **Do not run downstairs or rush outside** while the building is shaking or while there is danger of falling and hurting yourself or being hit by falling glass or debris
  - Staircases are usually unsafe!
  - **Do not jump out from windows, balconies!**





## IMMEDIATE ACTION: OUTDOORS

- Get into nearest **open space**, keeping clear of buildings, high walls or dangling electric wires.
- If you are in a city, seek shelter under archways or doorways but do not re-enter damaged buildings .
- Do not try to walk through narrow streets



# AS SOON AS YOU CAN

- **put out** all domestic fires and **turn off** heaters, electricity, gas and water at source





# AS SOON AS YOU CAN: CHECK FOR HAZARDS

- ◆ **Fire or fire hazards.** Put out fires in your home or neighborhood immediately. Call for help, but don't wait for the fire department.
- ◆ **Damaged electrical wiring.** Shut off power at the control box
- ◆ **Downed or damaged utility lines.** Do not touch downed power lines or any objects in contact with them.
- ◆ **Spills.** Clean up any spilled medicines, drugs, or other potentially harmful materials such as bleach, dye, and gasoline or other petroleum products.
- ◆ **Fallen/Toppling items.** Beware of items tumbling off shelves when you open the doors of closets and cupboards.









***Thank You***