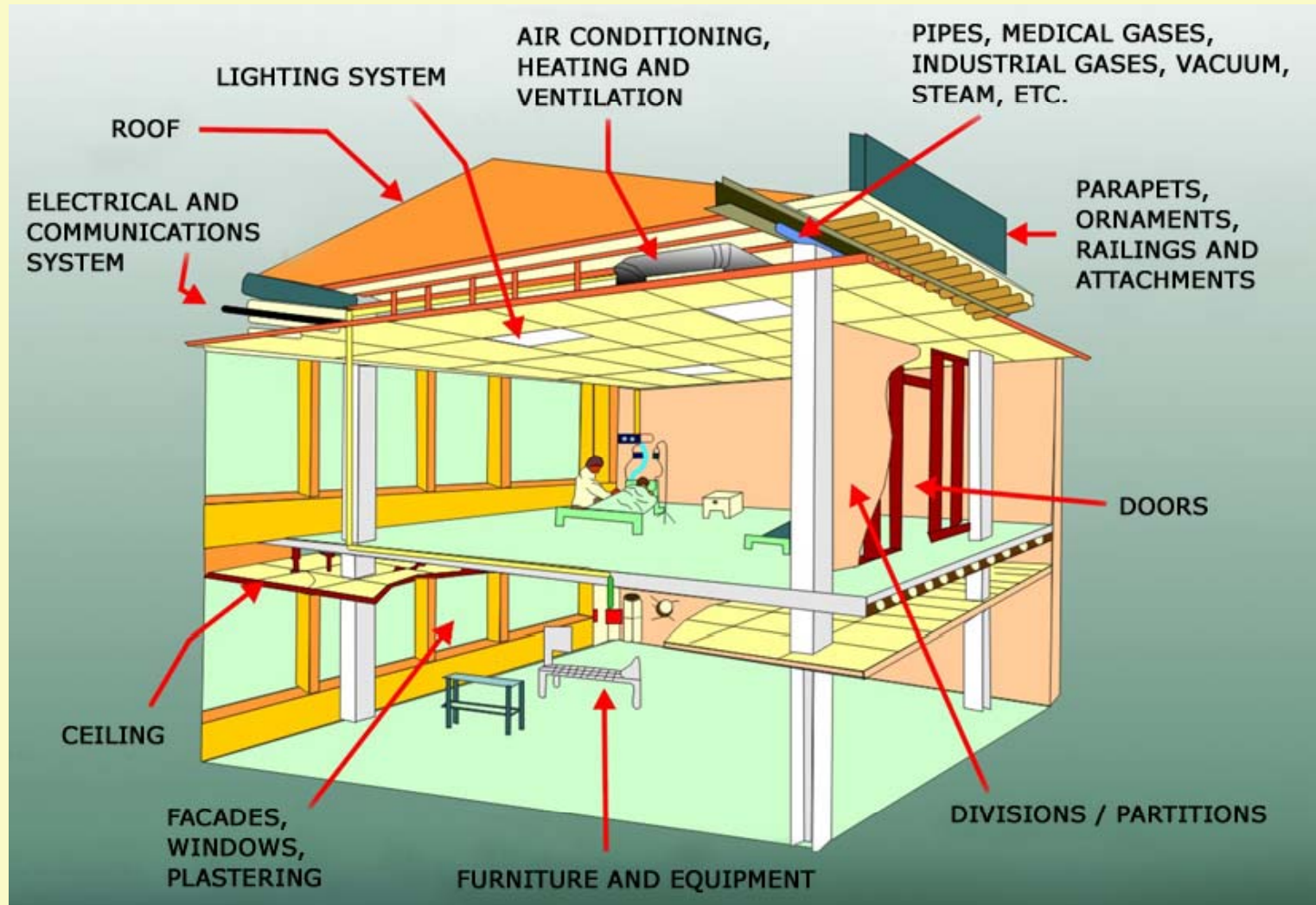


# Non-structural Components



# Non Structural Damages



# Izmit Earthquake 1999

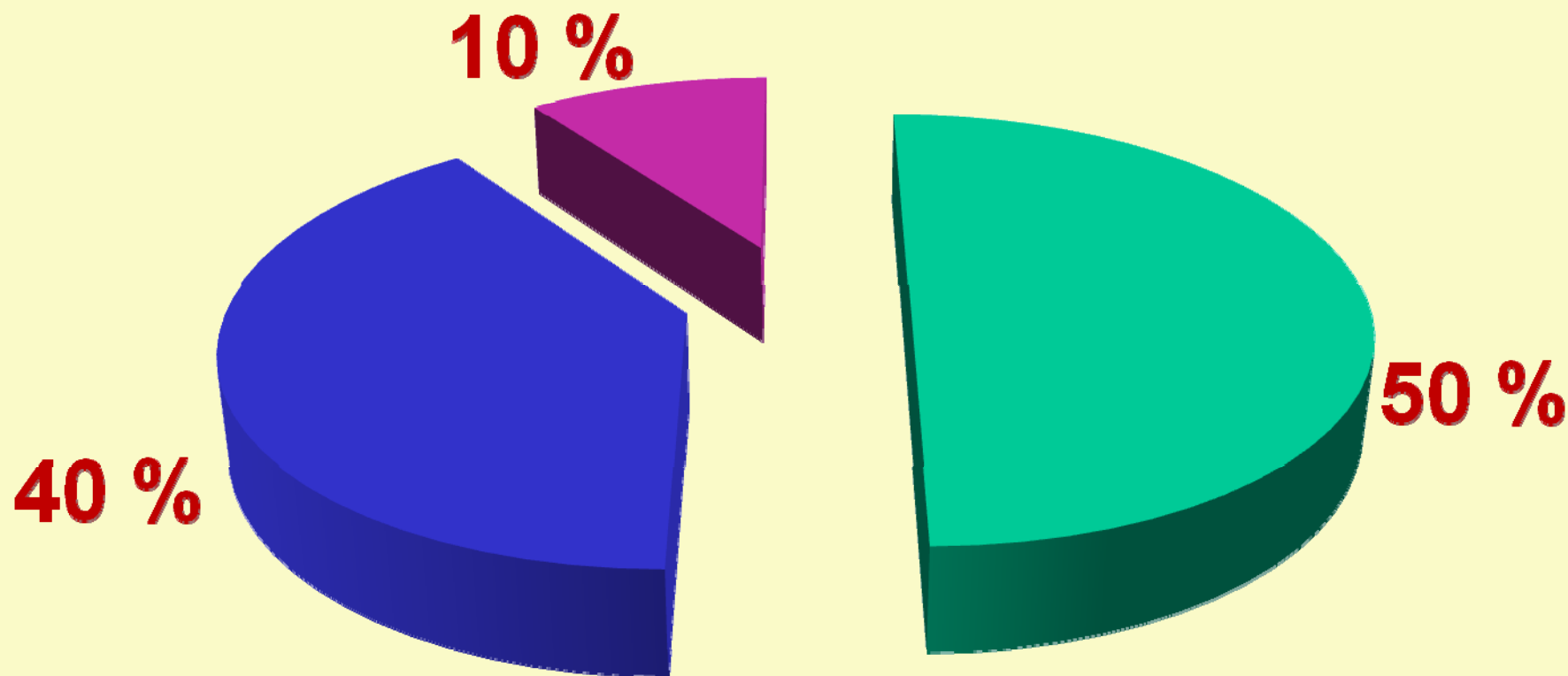


**50% of the injuries and 3% of the deaths were caused solely by non-structural hazards.**

**survivors estimated that 30% of their economic losses were due to loss of non-structural objects.**

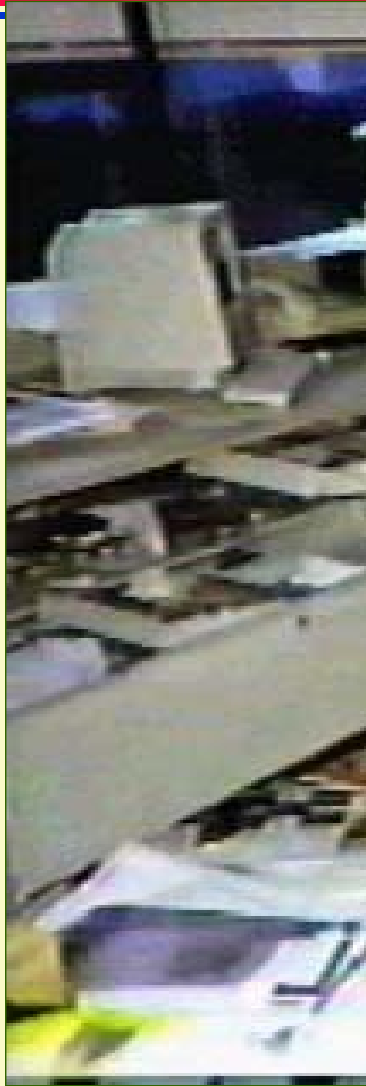
Petal, Marla. Causes of Deaths and Injuries in the August 17th, 1999 3:02 a.m. M=7.4 Kocaeli Earthquake, Research Report, Boğaziçi Üniversitesi, CENDIM, Istanbul, 2003.

# Cause of Injury and Death



■ Non Structural Elements ■ Structural Elements ■ Both

# North Ridge Earthquake 1994



# Non Structural Damage

North Ridge 1994



- **Life Safety**
- **Loss of Property**
- **Loss of Functionality**



# Non Structural Mitigation



- 1. Removal**                      **Flammable gas, acid etc.**
- 2. Relocation**                      **Heavy items on lower Shelves**
- 3. Restricted Movement**                      **Elastic straps in cupboards**
- 4. Anchorage**                      **Fasten with bolts, cables**
- 5. Supports**                      **Provide extra cable to the fan**

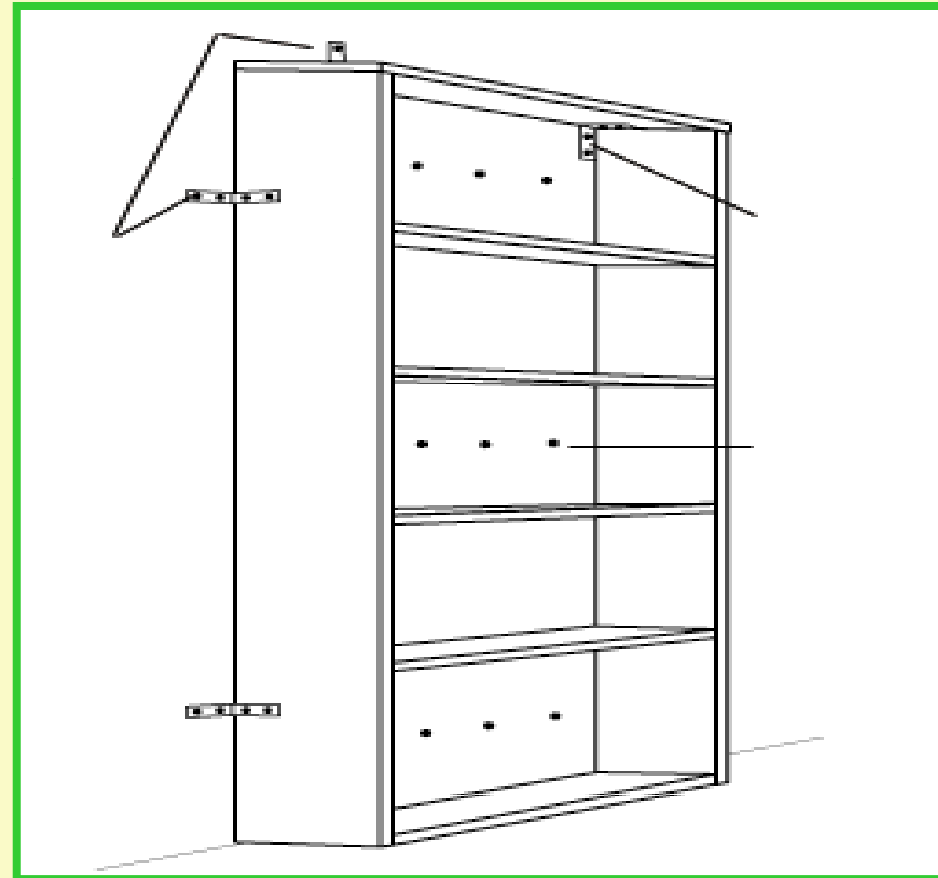
# Non Structural Mitigation



- 6. Substitution**                      **Heavier roof replaced by lighter**
- 7. Modification**                      **Plastic lamination on glass panel**
- 8. Reinforcement**                      **Tie non-structural wall**
- 9. Redundancy**                      **Alternate / stand by generator**
- 10. Rapid Repair**                      **Spare parts, tools & Equipment**



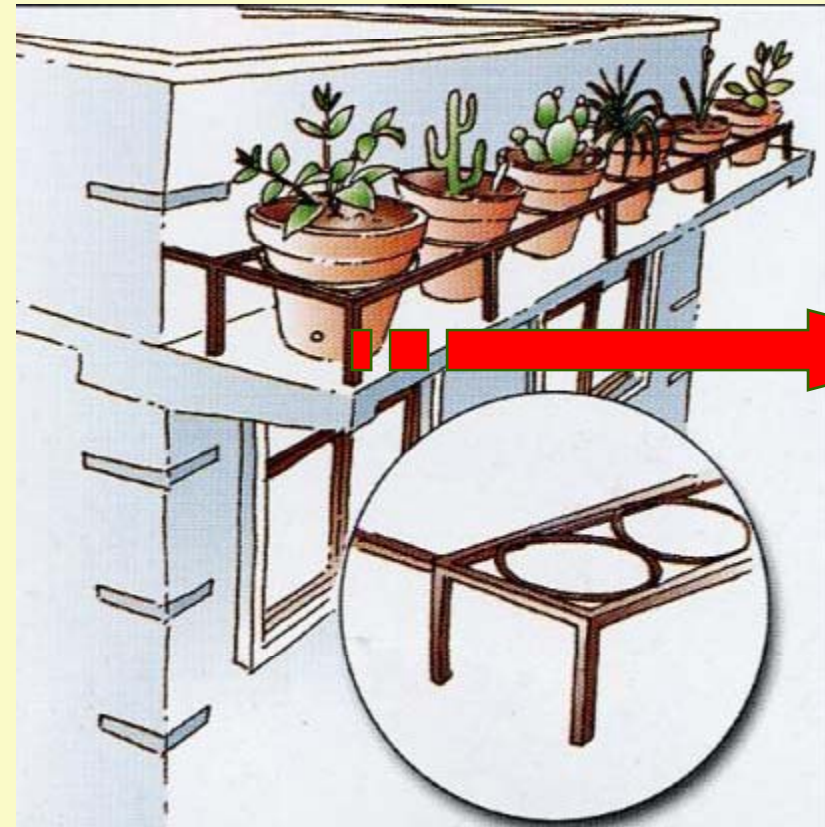
# Non Structural Mitigation



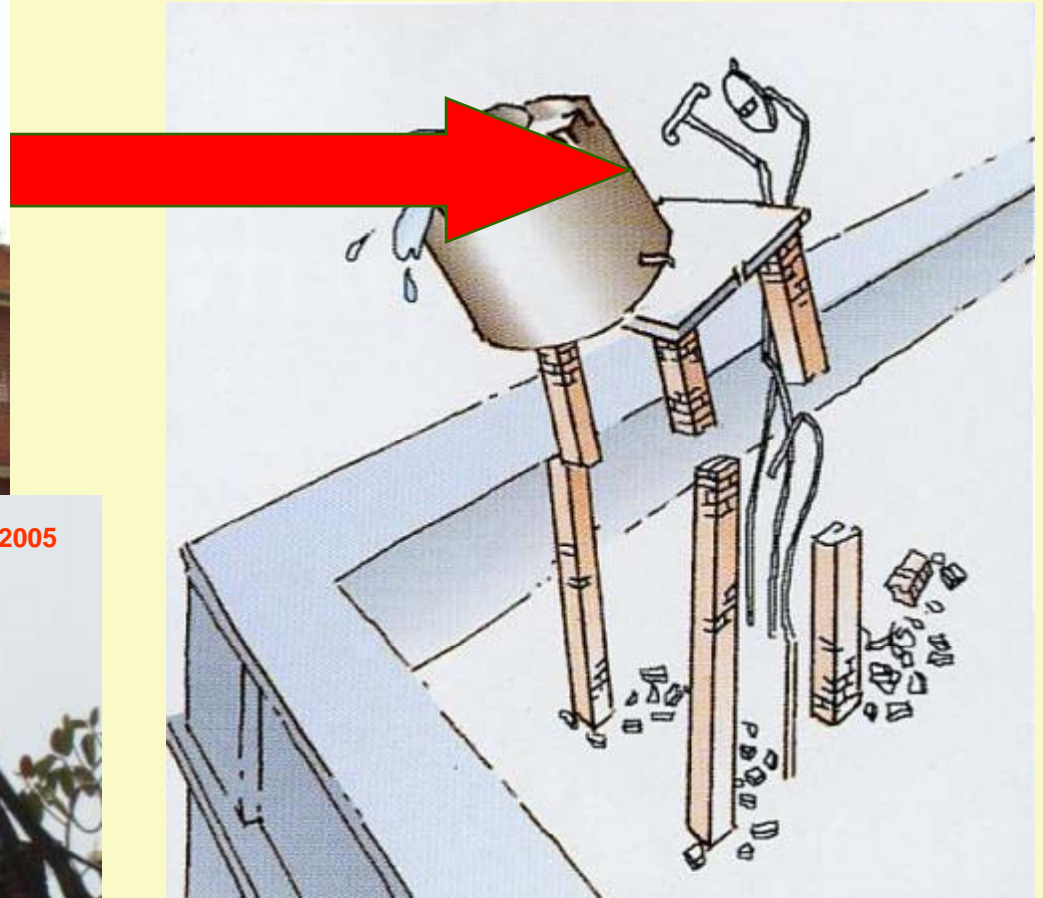
# One Flower pot is Enough to Kill



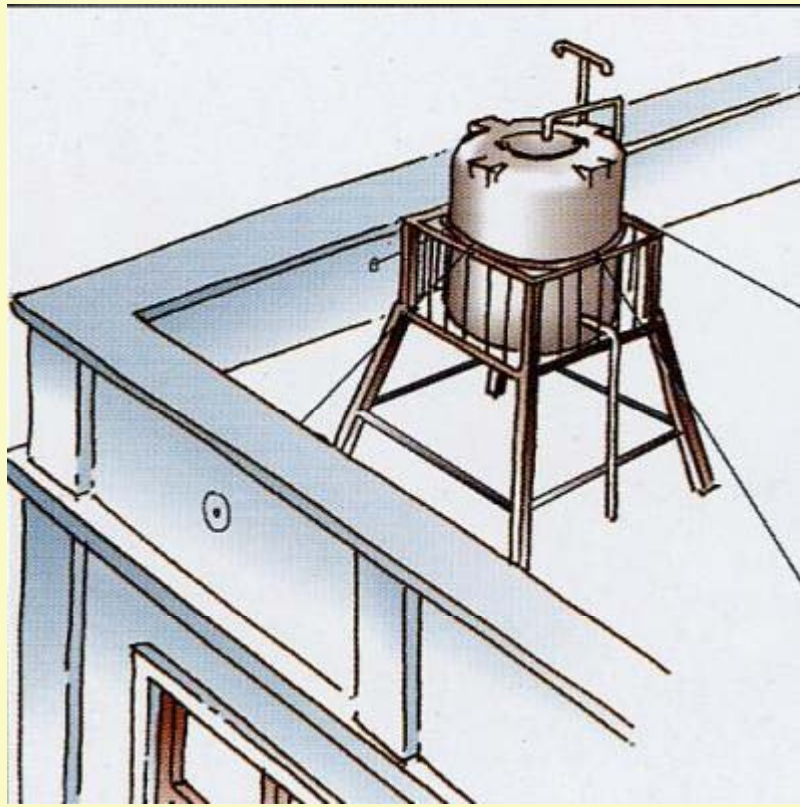
# Flower Pots can be Secured



# Where will we get Water from ?



# Water Tanks can be Secured



# Simple Improvement: Relocation

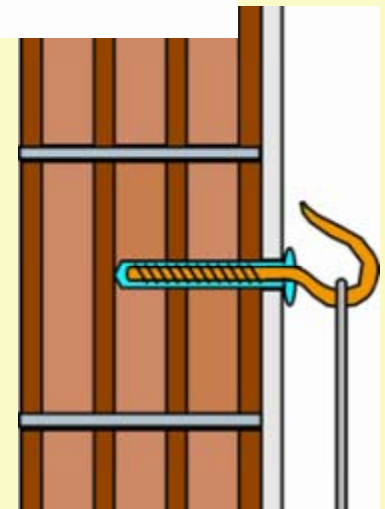
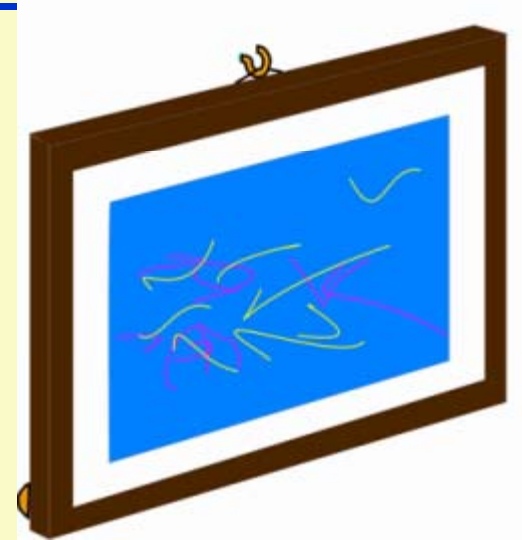


**Move heavy objects to the lower shelves**

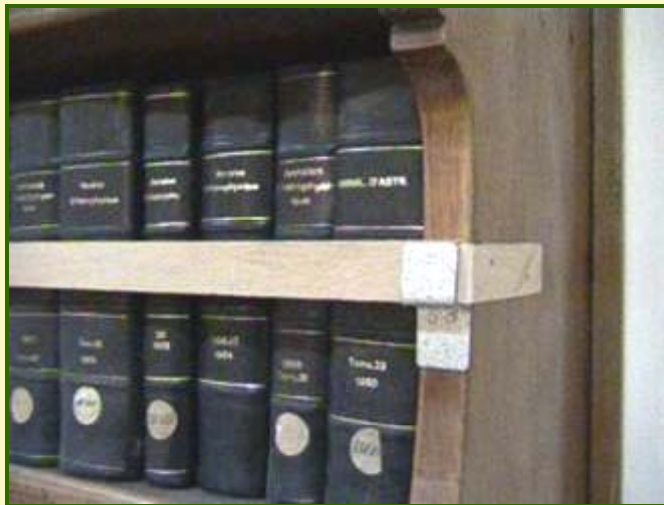
**Keep sitting furniture / beds away from windows.**

**Clear the exit ways**

# Simple Improvement: Ties & Hooks

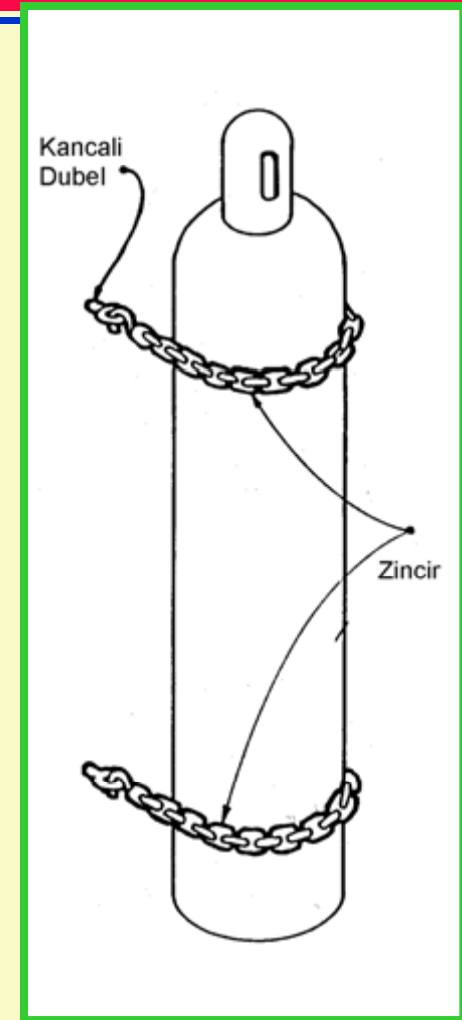


# Simple Improvement





# Simple Improvement: Restrict Movement



# Shattered Glass Panes



# Non Structural Mitigation

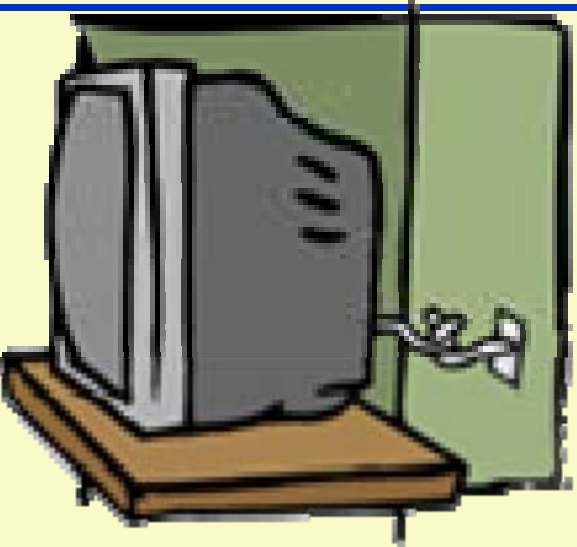
- 1. Make a list of Non structural Hazards and Mitigation Measures**




- 2. Secure life threatening items first**



# Non Structural Mitigation

- 
3. Secure those things that have significant economic value.

- 
4. Secure those items that will let you live more comfortably .