

Designing an earthquake proof building

Year 5/6

Ways of strengthening buildings

To withstand earthquakes and high winds

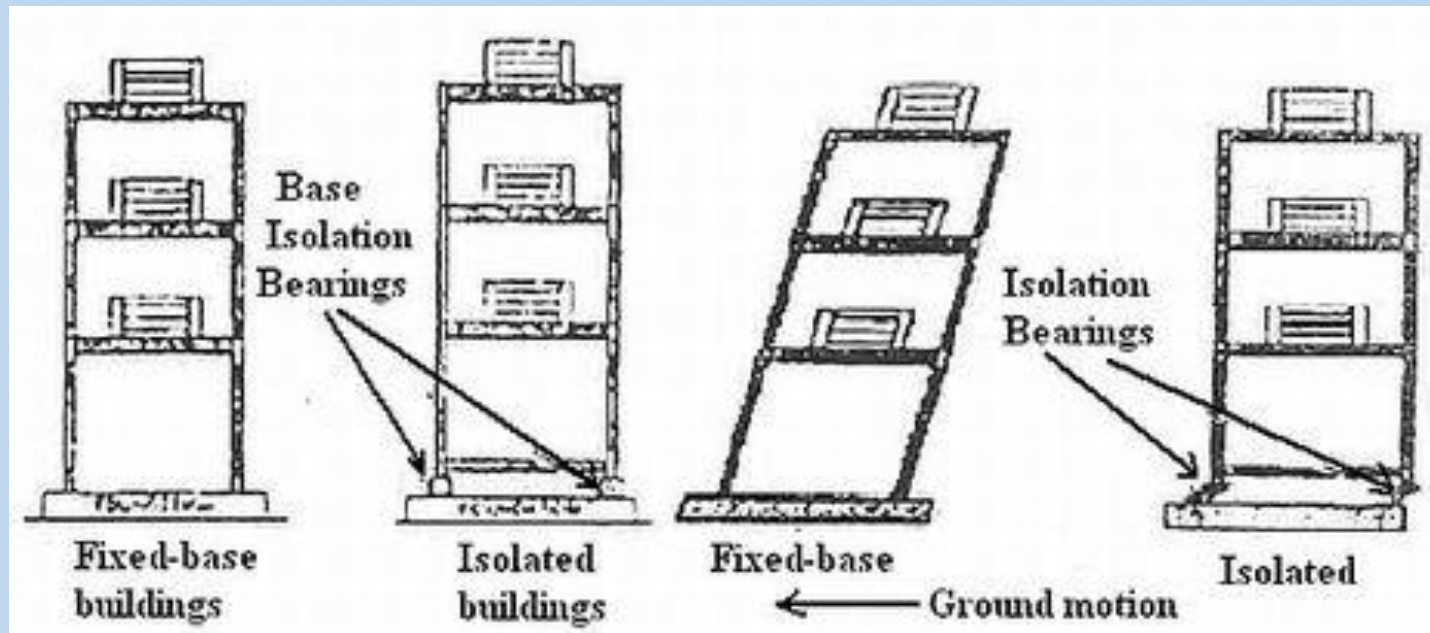
Cross- bracing

- Two diagonal supports in a X shape.
- This helps to provide strength and support preventing the building from twisting.



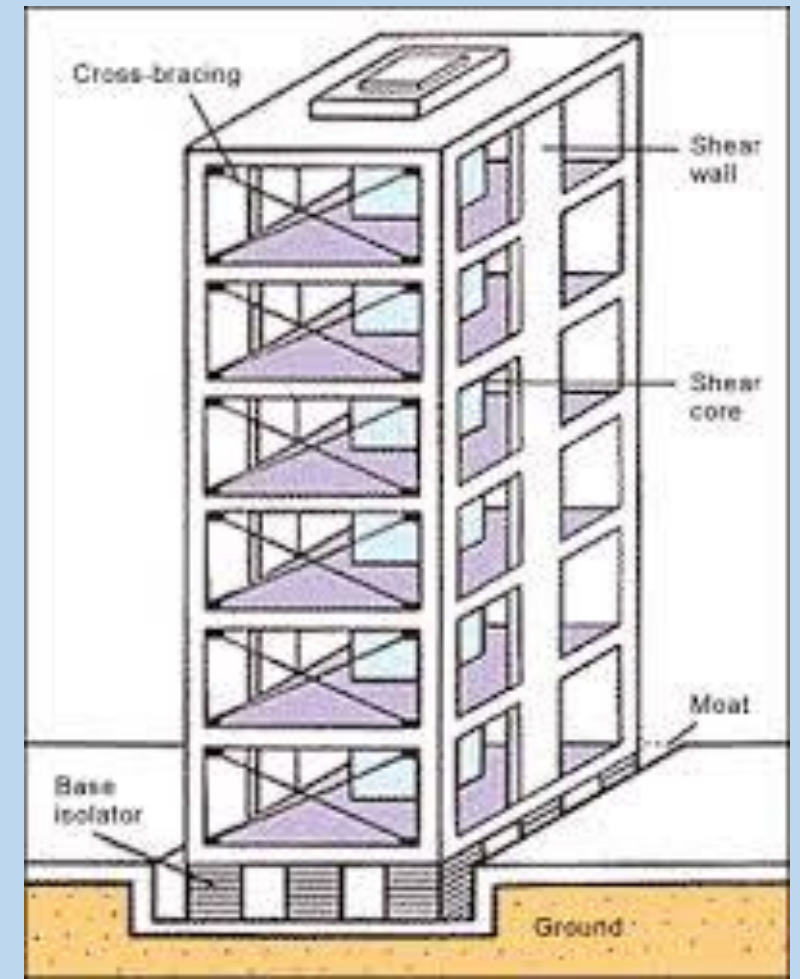
Base Isolation or shock absorbers

- This allows the building to move side to side as the earthquake happens and absorb the shock waves.



Shear Walls

- Thin walls made from concrete with steel bars in them.
- This helps to reduce rocking movements.
- This building also has cross bracing
- and base isolators



The shape of the building...

Some of the most earthquake-proof tall buildings in the world.



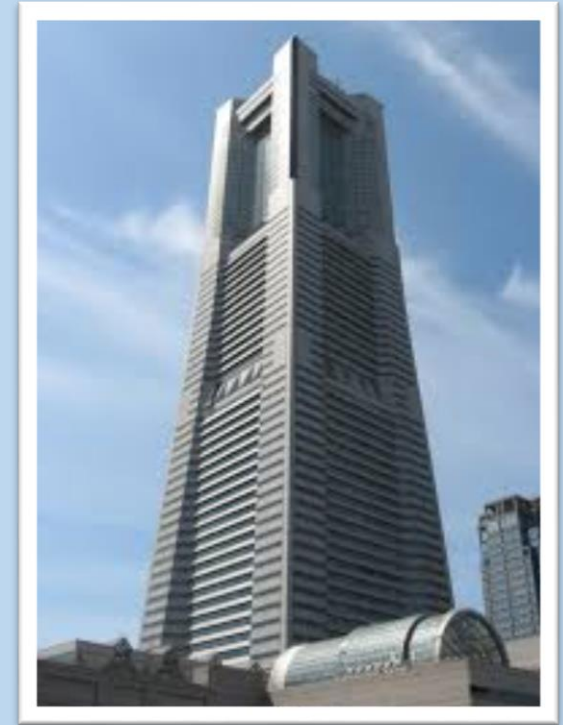
Transamerica
Pyramid
San Francisco



Taipei 101
Taiwan



Burj Khalifa
Dubai



The Yokohama
Landmark Tower
Japan

The Taipei 101 building

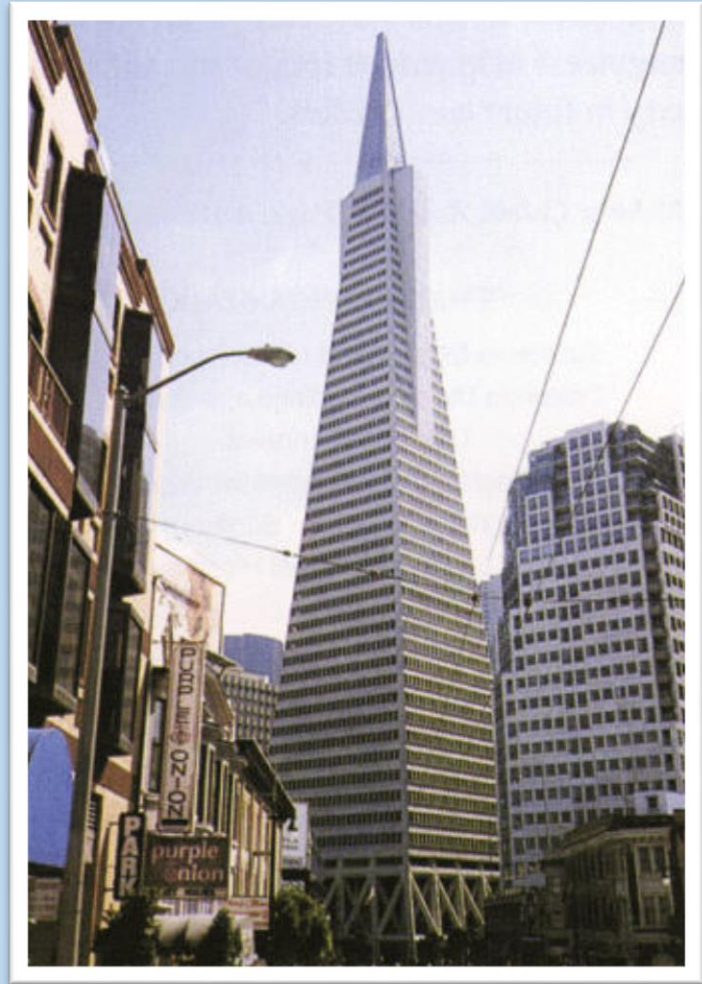


Uses a 730 ton 'tuned mass damper' (TMD) – a giant steel ball that acts like a pendulum to counteract sway in high winds or earthquakes

The Transamerica Pyramid- San Francisco



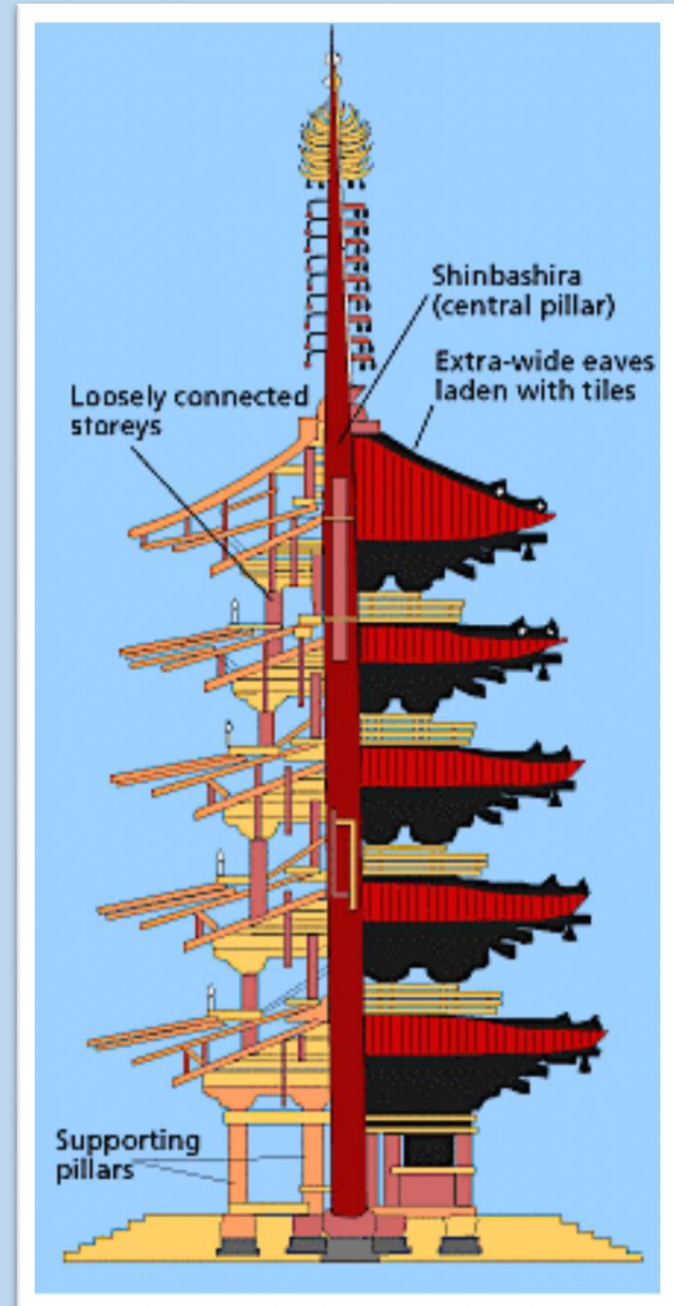
Example of cross - bracing



A Japanese Pagoda



Very flexible. Central core gives strength, storeys can move separately on flexible joints, supporting pillars act like shock absorbers.



Other things to consider:

- Gas and electricity lines are automatically turned off
- Shutters come down on the building over the windows
- Sprinkler system



Your Turn...

Design your earthquake – proof building

- Cross bracing – provides strength and stops the building twisting
- Base isolation/shock absorbers - allow sideways movement
- Shear walls – thin concrete walls with steel pillars for extra strength
- Shock absorption using ‘dampers’ e.g. tuned mass damper – like a pendulum
- Central core