EARTHQUAKE RESISTANCE TECHNIQUES

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EARTHQUAKE

Terms:

1) Fault Plane
2) Hypocenter
3) Epicenter

- They are natural disaster of a generally unpredictable in nature.
- It is the shaking of the earth due to movement of earth's crust.

INTERESTING FACT:

When such quakes happen, enormous amount of energy is released, which is far greater than big nuclear bomb

Some of the general design concepts:

- Follow current earthquake standards and codes.
- Provide strong foundation.
- Use best quality materials.
- Avoid irregular shaped structures and framing system.
- Introduce shear walls to transfer seismic loads down to the bottom of foundation.
- Maintain integrity by providing seismic bands:

  1) At the plinth level of the building.

  2) At the level of lintels of doors and windows.

  3) Vertical Reinforcing bars at all wall junction.

How earthquakes impact buildings

1. Create a flexible foundation

- Strong foundation for an earthquake resistant home.
- Designing from the ground down
- Designing foundation to suit the risk.
- Large steel reinforced floating slabs, etc.

2. Counter forces with damping.

- Pendulum power
- Damping effect on structural response

- Earthquake create horizontal pressure on buildings, causing them to collapse.
- Collapsing building cause $2.1 billion in damage and 10,000 deaths a year an average

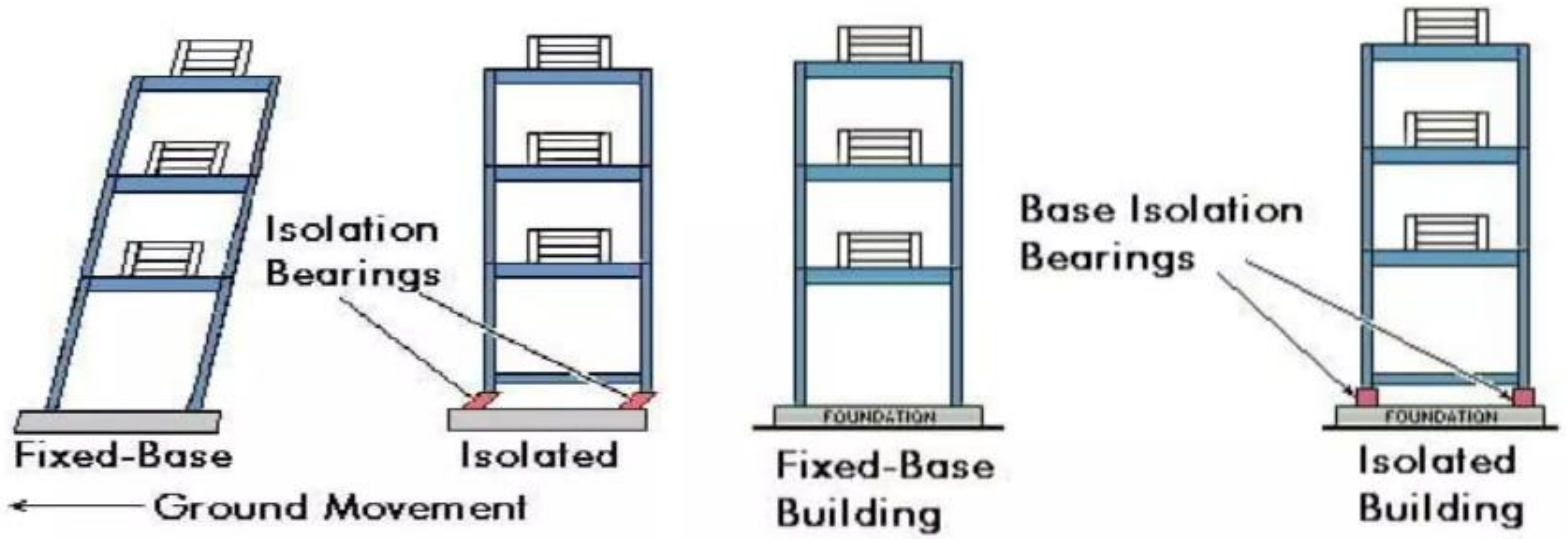
Before we look the features, it's important to understand how earthquakes impact man-made structures. When an earthquake occurs, it sends shockwaves throughout the ground in short rapid intervals in all different directions. While buildings are generally equipped to handle vertical forces from their weight and gravity, they cannot handle side-to-side forces emitted by quakes.

This horizontal load vibrates walls, floors, columns, beams and the connectors that hold them together. The difference in movement between the bottom and top of buildings exerts extreme stress, causing the supporting frame to rupture and the entire structure to collapse.

How to make building earthquake proof

- One way to resist ground is to “lift” the building’s foundation above the earth. Base isolation involves constructing a building on top of flexible pads made of steel, rubber and lead. When the base move during the earthquakes, the isolators vibrators while the structure itself remains steady.

Strong Foundations For an Earthquake Resistant Home



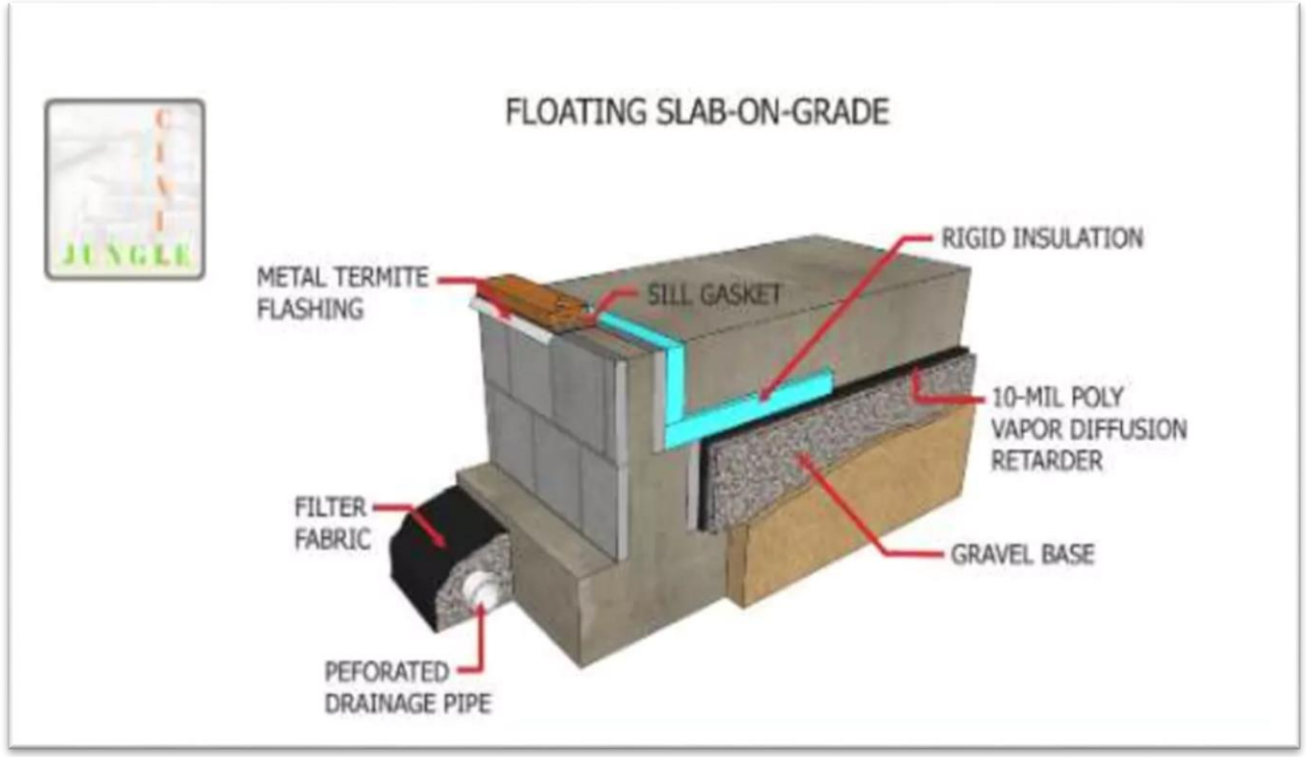
DESIGNING FROM THE GROUND DOWN

- As most building sit on foundation which contact the earth, the design, preparation and construction of a building's foundation is of prime importance within a seismic region. Experience has shown that the ground works for a building, can contribute to a building surviving a quake. If a building constructed on loose or filled-in soil, there is more likelihood of it sliding off its foundations. When it constructed on solid firm ground or even better bedrock, a structure is more likely to remain intact through an earthquake.

DESIGNING FOUNDATIONS TO SUIT THE RISK

- Depending on the level of seismic activity, within a region there are a number of foundation styles which may be used. There are four basic types of foundation used in earthquake prone areas, Ranging from basic floating slab, through to deep piled structures. The decision of which one to use, should be made in conjunction with an architect after studying the regional building code.

Large steel reinforced floating slabs

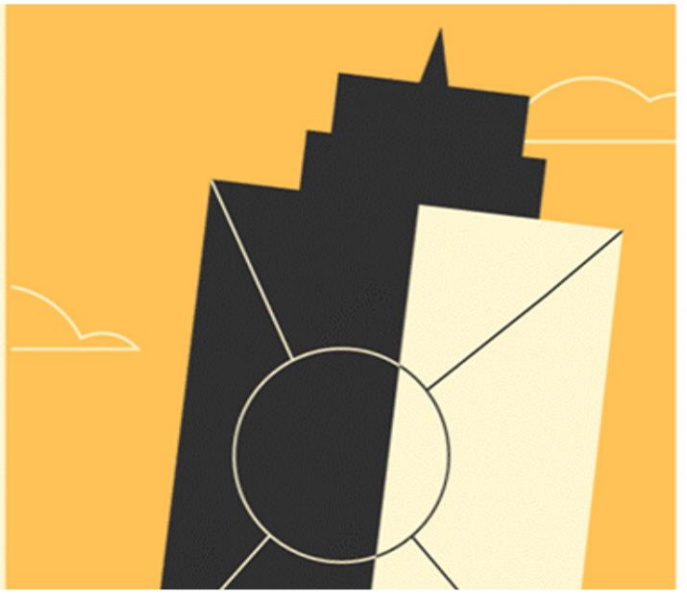


Deep anchored pedestal structures

COUNTER FORCES WITH DAMPING

A large weight and hydraulics move opposite the earthquake's movements to "dampen" or dissipate the energy.

BIG RENTZ



THANK YOU