Frequently Asked Questions

Question 01:

Elaborate the following terms:

a. Quality Assurance

b. Quality control

Answer:

Quality Assurance:

- Rigorous, independent monitoring and correction need to be undertaken by competent third party professionals or professional agencies (other than those involved in the Quality Control effort) to ensure that the design intent is actually realized in buildings.
- This is referred to as Quality Assurance, and is required in each of the activities mentioned above.
- Quality must be ensured by all stakeholders involved in the building delivery process.
- Each activity needs to adhere to a pre-specified procedure laid down in design codes and standards.
- There is no single activity that is more important than the others, which alone determines the quality of the building being built.
- Building owners need to seek professional services that comply with:
- Proper understanding and estimation of earthquake hazard at the site,
- Rigorous design, compliance with prevalent standards, specifications and bye-laws
- Independent design review (peer review)
- Procurement of intended quality materials
- Careful construction of the building
- Independent construction audit
- Approved occupancy and use of buildings

Quality Control:

- Quality control means adopting and ensuring formal procedures and processes that are based on scientific principles and professionally agreed norms.
- The need to ensure quality arises at every step of the building development process.
- These steps include:

- Conceptualizing structural configuration – Architects and Structural Engineers need to work together to adopt a good configuration.
- Designing the structure – Structural Engineers need to take utmost care while performing required calculations as per sound structural safety concepts and relevant design standards
- Preparing structural drawings – Structural Engineers and Draughtsmen need to comprehensively and accurately present structural design intent in well detailed drawings
- Selecting construction materials - Contractors need to take utmost care in selecting the intended construction materials, and adopting construction procedures as per standard specifications
- Converting structural drawings at site – Competent Site Engineers need to faithfully follow structural drawings to ensure that the design intent is actually realized in the building working with Certified Artisans, as per good construction practices laid down in standards and specifications
- Undertaking post-construction activities – Maintenance Engineers need to embed long-term maintenance steps (like preventing leaks), thereby avoiding structural damage) in post-construction handling of structures, and preventing damage to buildings (especially to critical structural members).

Question 02:

Elaborate the impacts of the fire after earthquakes.

Answer:

- Damage to infrastructure after an earthquake is a major loss trigger. One of the consequences of such damage is fire following a seismic event.
- This can be caused not only by damage to piping and tanks but also impairment of fire fighting system, eg. damage to water supply system (piping, tanks) and/or pumps as well as fire walls.
- In other words, an earthquake can not only trigger a fire by releasing combustible material but also impair passive or active fire fighting systems.

Hazards:

- Insufficient or missing gaps between the piping and wall at penetrations. This can cause shearing of the pipe and release of contents during an earthquake.
- Improper bracing of piping. Critical piping must be braced against swaying to prevent impact against each other pipes, structural elements, etc. Bracing should be done with tensioned wired or rigid elements.
- Inadequate design of fire fighting pump room. Unanchored pumps, suspended ceilings, inadequate gaps at pipe wall penetrations, lack of anchorage of day tank are some of the common issues identified in fire fighting pump houses, which are susceptible to damage during seismic shaking.
- Poor anchorage of tanks and equipment piping. Tall equipment or liquid containers are especially susceptible to damage if not properly

anchored. Piping connected to such equipment, if not provided with flexible joints and suitable bracing, are also susceptible to damage.

Controls:

- Critical piping to be braced from swaying by means of supporting frames, tensioned wires, etc. Attention is to be given to the connection of the bracing to the pipes.
- Provide an adequate gap around critical piping at penetrations of walls. Gaps are to be filled with suitable non-combustible fire stopping material that can deform under seismic loading, eg. acrylic sealants.
- All production critical equipment, including fire-fighting pumps, to be properly anchored to the foundations. Anchor bolt configuration and foundation design are to be checked by qualified structural engineer.
- Avoid connection of critical piping, including fire fighting water, valves and equipment to unreinforced masonry or concrete block walls.
- Such components are to be supported by engineered frames anchored to the concrete floor slab and load-bearing elements (columns, beams, etc.).
- Since these components may alter the seismic performance of the load-bearing elements a qualified structural engineer should control the adequacy of the elements.
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- One does not have to go far back in time to be reminded of the great force of Mother Nature and the havoc an earthquake can cause in terms of direct damage to the natural and built environment.
- Over the past decade, earthquakes have become costlier, both in terms of social and economic costs.

Question 03:

Elaborate the socio-economic impact of earthquake.

Answer:

- Macroeconomic impact

- GDP falls drastically after an earthquake.
- Likewise, Multidimensional poverty is likely to receive grave impact owing to hurdles in drinking water and sanitation services, schools and health facilities, and increased food insecurity.
- Balance of Payment is estimated to receive negative effect because of increased imports against low export volume thus making the domestic production failing to meet higher demand of construction.

- Impact on Agriculture
- Impact on Commerce and Industries.
- Impact on tourism.