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An Innovative Approach to Seismic Risk Assessment and Management
Your company has earthquake prone locations and you want to:
- identify the risk priorities in your portfolio
- optimize your resources for assessing seismic risks
- assess the vulnerability of your facilities and probability of physical damage, BI, and other financial losses
- determine the most cost-effective strategy for mitigating the risks

Seismic Risk is a combination of three main components:

- Hazard (H): Frequency and intensity of earthquakes
- Vulnerability (V): Fragility of the structures
- Exposure (E): Values (goods and activities) at risk

Risk = H x V x E

How can AXA Matrix Risk Consultants provide support to mitigate earthquake impacts?

By helping clients to develop risk mitigation strategies through better quantification and understanding of risk associated with seismic events.

Why is it an innovation?

While traditional approaches to seismic risk assessment rely on qualitative indicators of the average damage observed in past events (macroseismic intensity) or on the sole hazard of the site, AXA MATRIX Risk Consultants’ approach is fully quantitative and probabilistic.

This innovative approach encompasses individual quantification of the seismic input, the structural response of each building, and the related economic losses.

Because no two clients are alike, AXA Matrix Risk Consultants tailors its approach to individual needs, within a multi-level framework, which can flexibly adapt to differences in portfolio size, available resources, and time constraints.

The AXA Matrix Risk Consultants Integrated Approach

**CLIENT’S NEEDS**

**SOLUTIONS**

**SIZE OF THE PORTFOLIO**

**LEVEL 1 Assessment:** Seismic Risk Gap Analysis, a quantitative approach for seismic risk prioritization analysis

- You need to address risk priorities among your portfolio
- You don’t have sufficient resources for a visual inspection of all the plants of your portfolio

**LEVEL 2 Assessment:** Rapid visual screening and loss assessment through FRAME@Risk

- You need to perform seismic loss assessment of your facilities
- You need to understand the vulnerability of your structures and the potential economic impact of earthquakes
- You need a quantitative loss assessment for managing different mitigation strategies

**LEVEL 3 Assessment:** Site Specific Risk Analysis

- You want your structures to be surveyed by a structural engineer
- Your portfolio is composed of peculiar or critical structures
- You need engineering solutions for structural retrofitting and loss prevention

**What are the deliverables obtained?**

Level 1 provides a global quantitative picture of the risk over a building portfolio. It is ideal for addressing the major risks and optimizing resources for further analyses.

Level 2 provides a building-by-building damage and loss assessment, essential for rational and informed decision making.

Level 3 provides a full loss prevention report and recommendations for the mitigation of the impacts of future earthquakes on individual building and relevant non-structural components.

**What actions could be taken afterwards?**

Multiple risk mitigation options are contemplated including:
- increasing risk communication, promoting risk awareness, implementing emergency management planning, retrofitting existing structures, developing early warning systems and/or transferring risk to the insurance market.
- AXA MATRIX Risk Consultants can help clients choose the best tradeoff among the wide range of available risk mitigation strategies.

**The FRAME®Risk software tool**

FRAME®Risk is the innovative AXA MATRIX proprietary tool operated by the Center of Expertise for Earthquakes and Tsunamis. It represents the core of AXA MATRIX’s quantitative approach to seismic risk, performing probabilistic loss assessment, structural and non-structural fragility assessment, and damage-to-loss functions, i.e., studies dedicated to linking the structural damage to the loss of content and/or downtime.

**What are the advantages of such an approach?**

- An efficient allocation of available resources.
- Rational and transparent support to risk management decisions.