MMI Engineering recently performed a study to evaluate the seismic risk for a portfolio of buildings owned by a San Francisco Bay Area client. The study calculated risk metrics, such as loss estimates and building square footage closures for specific earthquake scenarios on the San Andreas Fault, which helped the client in developing their disaster response strategy and in defining financial capacities needed to withstand the estimated losses.

The world we live in is highly uncertain, where almost every process has some randomness attached to it. Seismic loss estimation of large, spatially distributed portfolios is one such process, which contains numerous sources of uncertainty and variability. In such a scenario, estimates of seismic losses also tend to have variability attached with them, which makes disaster planning quite challenging. Thus, a methodology is required which can help decision makers understand their seismic risk exposure.

MMI Engineering's seismic loss estimation software incorporates current industry standard methodology to formulate estimates of the highest standards. It provides detailed estimates of several parameters of interest which give valuable insight into the performance of individual buildings, and the portfolio at large. For example, the software identifies which buildings attract the highest dollar loss in a particular seismic event, helping decision makers decide if a building is worth retrofitting for a certain monetary investment. It calculates the expected dollar losses, and helps in putting the earthquake insurance premiums in perspective. It also identifies which buildings would attract the most structural damage, which helps in expediting recovery and inspection efforts after an earthquake.

Based on clients' needs, the type of metrics generated from the software can vary from cost-benefit studies for seismic retrofit to evaluation of insurance needs based on risk tolerance of the lenders.

Risk metrics generated:
- Dollar loss by building and categorization by building types (e.g. Concrete shear wall or wood frame)
- Building Square footage closures, and categorization by room type (e.g. Classrooms and labs)
- Identification of vulnerable and damage-prone buildings
- Equipment, books, art, and content value lost.

Portfolio Specific Data
We visited key buildings and generated customized structural analysis data
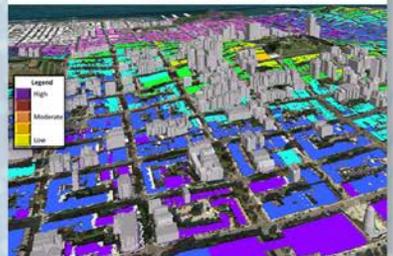

Individual structural properties of every building are modeled

Data that connects
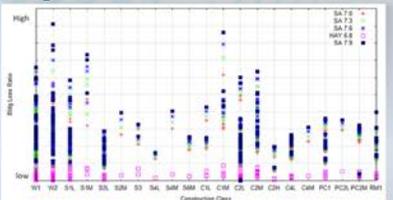We bound together the data with a relevant narrative and informative visual aids.

Loss data represented spatially and color coded for easy visualization

Robust functional Software
We ensured rigorous and reliable methodologies were implemented in the software.

Thousands of probabilistic analyses were conducted for each building