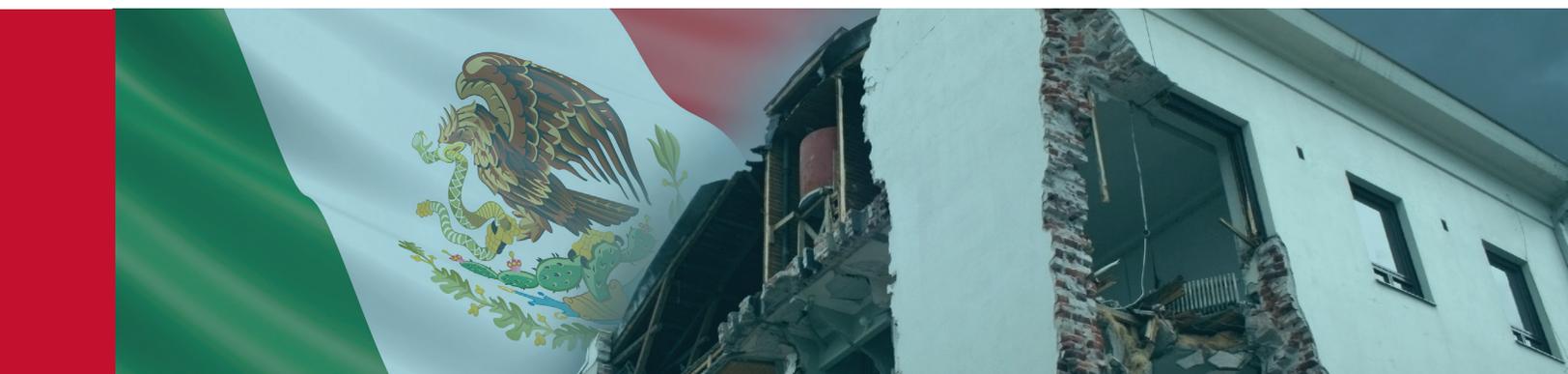


# RMS® Mexico Earthquake Model

Advanced earthquake modeling for Mexico



## KEY BENEFITS

- RMS-developed historical earthquake catalog with events spanning nearly 450 years
- New innovations included within Mexico subduction zone modeling
- Ten vulnerability regions reflect regional differences in design and construction practices
- “Micro-zones” allow granular analysis of risk hot-spots in Mexico City
- Advanced high-resolution soil amplification modeling
- Updated basin amplification model for Mexico City
- Improved differentiation of insured building inventory
- New industry exposure and loss curves

## Benefit from the Latest Scientific View of Seismic Hazard across Mexico

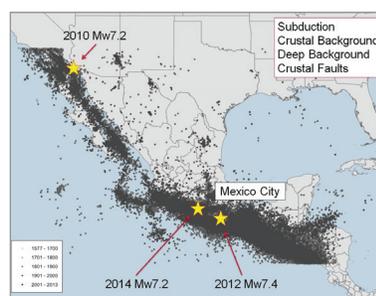
The RMS Mexico Earthquake Model incorporates the latest scientific view of the Mexico subduction zone and other seismic sources in the country. Combining published instrumental and historical data, the model uses a catalog especially developed by RMS that covers seismic events spanning from 1577 to 2013.

The updated model incorporates an improved understanding of the subduction zone geometry and recurrence rates. The model includes updated time-dependent recurrence, which takes into consideration recent earthquakes along the Mexico subduction zone and allows for early repeats as observed in the historical catalog.

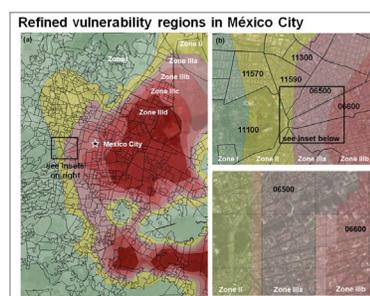
The model adds new multi-segment ruptures, including magnitude 9+ events.

## Increased Definition of Regional Variations Provides Greater Clarity

Featuring ten vulnerability regions across Mexico, the vulnerability module captures regional differences in design and construction practices and reflects the seismic zones defined in Mexico’s building code.



The internally developed RMS catalog combines published instrumental and historical catalogs



Building code defines six micro-zones in México City – Zone I (Firm), Zone II (Transition), Zone III (Soft Soil)

Included in these ten vulnerability regions are six “micro-zones” located in Mexico City. These were first identified in the aftermath of the 1985 earthquake, where researchers discovered that the seismic performance of similar buildings varied significantly within Mexico City and appeared to be correlated with the soil properties of the building sites. With some micro-zones smaller than postal codes, the RMS Mexico Earthquake Model assigns vulnerability regions in Mexico City at 100 meter resolution.

## REGIONS COVERED IN RMS MEXICO EARTHQUAKE MODEL:

### Shake

All of Mexico

### Liquefaction and Landslide

All of Mexico

With recent changes to the seismic design provisions in Mexico's National Seismic Code set to make a significant impact on the performance of new buildings, the model now includes a "post-2015" band to reflect the beneficial impact of this change. Professor Hugón Juárez García from the Universidad Autónoma Metropolitana (UAM)-Azcapotzalco in Mexico City reviewed the updated vulnerability module.

## High-Resolution Amplification Models Enable Next-Generation Hazard Modeling

The Mexico Earthquake Model includes an upgraded soil amplification methodology that empowers (re)insurers to enter a new era of high-resolution geotechnical hazard modeling. The new soil amplification model reflects the latest science and explicitly uses Vs30 (average shear wave velocity in the top 30 meters at a site). To enable the new methodology, RMS developed a high-resolution Vs30 data layer covering all of Mexico, derived from direct Vs30 measurements and surficial geology.

RMS also updated the Mexico City basin model, to better capture the complex shaking amplification that occurs because of the deep soft soil layers found there. The basin model is primarily based on recorded ground motions from the 1985 Michoacán earthquake.

## Refine Your View of Risk for Business and Commercial Areas

(Re)insurers working in Mexico cannot always collect all primary characteristics that define a location. In these instances, the RMS Mexico Earthquake Model fills in the gaps by assigning the fraction of the insured building stock associated with each missing characteristic, such as building height, year of construction or construction class. The model uses an RMS-developed building inventory database to assign the missing values. The database is specific to Mexico and reflects regional differences in inventory, such as between commercial districts, historical centers and coastal hotel zones.

## Analysis of Liquefaction Risk: Lessons from New Zealand

RMS invested significant resources to understand the effects of liquefaction from the 2010-11 Canterbury Earthquake Sequence in New Zealand. Leveraging billions of dollars of claims data, RMS developed a new probabilistic liquefaction model that covers all of Mexico and uses a series of RMS-developed data layers, including ground water depth. The new model is able to predict the location and severity of liquefaction at high resolution and allows (re)insurers to price differentially and select risk more effectively.

## Market Insight Provides More Accurate Estimates of Industry Exposure and Loss

RMS has also developed a Mexico Industry Exposure Database (IED) and Industry Loss Curves (ILCs). The IED was built using high-resolution building stock, building size and replacement cost data from a variety of sources. Within Mexico City, building level data was also incorporated. RMS surveyed public and private sources to determine coverage relativities, limits, deductibles, and take-up/penetration rates by line of business and region to provide the best estimate of insured exposure in Mexico. The ILCs present industry loss by line of business by region and are derived from the IED in combination with the RMS Mexico Earthquake Model.

## Find out more

Ask your RMS sales or customer services representative for more information about the RMS Mexico Earthquake Model, or email [sales@rms.com](mailto:sales@rms.com).

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