Outline presentation Tuesday December 4th at 1PM Hawaii time (?)
14th US-Japan Workshop on the improvement of structural design & construction practices
Session 3: Risk Management and Loss Estimation

Message: **Will this help the engineering community**

Kit: GEM can be bases for new tools

Outline:
Risk Portrait under single scenario event for large portfolio, that includes spatial correlation

Use cases:
• Uniform Hazard Spectra to a common standard
• retrofit-cost-benefit-calculator
• Exposure DB (interface)
• Damage assessment (vulnerability, replacement cost)

What can you do: be involved....

** GOOGLE BUSINESS FOR GEM

working together to assess risk
Transparent Global Earthquake Risk and Loss Estimation

Nicole Keller | GEM Foundation
Why GEM?

‣ ‘advanced’ tools and resources for quantifying seismic hazard and risk as critical input to risk management are inaccessible to many

‣ there is a wide body of knowledge and science but it is not connected nor leveraged to the max

‣ worldwide we face similar issues, but use different approaches, tools and platforms to deal with it, and therefore cannot really share data and improve risk assessment together
A global collaborative effort driven by public-private partnership

(1) global data, methods, guidelines and tools

(2) linking up with and facilitating regional Initiatives

(3) open-source platform and (software) tools

(4) knowledge sharing and technology transfer

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10+ private organisations

15+ public agencies

8+ international bodies
How is GEM different?

**Scientific**
Quantitative measures and outputs based on (the latest) science

**Humanitarian**
Empowering organisations and individuals at various levels to manage risk; risk transfer, building codes, planning

**Global**
A framework and platform for collaboration, sharing data and knowledge and hereby joint learning – worldwide

**Credible**
Make information clear and accessible; be transparent in what we know and don’t

**Independent**
open-source (software) tools, transparency in methods and process, leading to independent outcomes
Working together to assess risk

Organisations and individuals (data, results)

Local - national, regional - programmes & collaborations (data, methods)

Global Framework (tools, data, methods)

OpenQuake
Calculate, Share, Explore
One network, two interfaces

Data ⇔ Tools

Methods

v1 in 2014

OpenQuake Expert
- Calculate
- Model
- View
- Explore
- Capture

OpenQuake Essential
- View
- Explore
- Capture
A holistic approach: ‘total risk’

Integrated Seismic Risk

Physical Seismic Risk
Probability of damage and loss to people and structures due to earthquakes

Socio-Economic Vulnerability and Resilience
Vulnerability of society and economy and their capacity to cope with earthquake events

Seismic Hazard
Probability of ground shaking due to earthquakes

Exposure
Elements at risk

Physical Vulnerability
Vulnerability of structures and their occupants to seismic hazard
### Models
- Seismic source models
- Ground motion models
- Physical exposure models
- Physical vulnerability models
- Composite index models (social vulnerability, resilience, indirect loss)

### Products (pre-computed results)
- Hazard maps
- Hazard curves
- Stochastic event sets
- Risk maps (physical and total)
- Average annual losses (total and insured)
- Event loss tables

### Datasets
- Earthquake history
- Instrumental catalogue
- Geodetic strain rate
- Active faults
- Tectonic regionalisation
- Buildings and population
- Earthquake consequences
- Physical Vulnerability
- Vulnerability and resilience indicators

Global by default; upload, share, use more local products
Facilitate decision-making: retrofit cost-benefit map
Use, share, collaborate on data
Capturing NEW data: continuous updating
Handheld and crowdsourcing devices for inventory of buildings – for risk assessment or to process damage data after an earthquake