

Risk Panel Discussion

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Discussion Topics

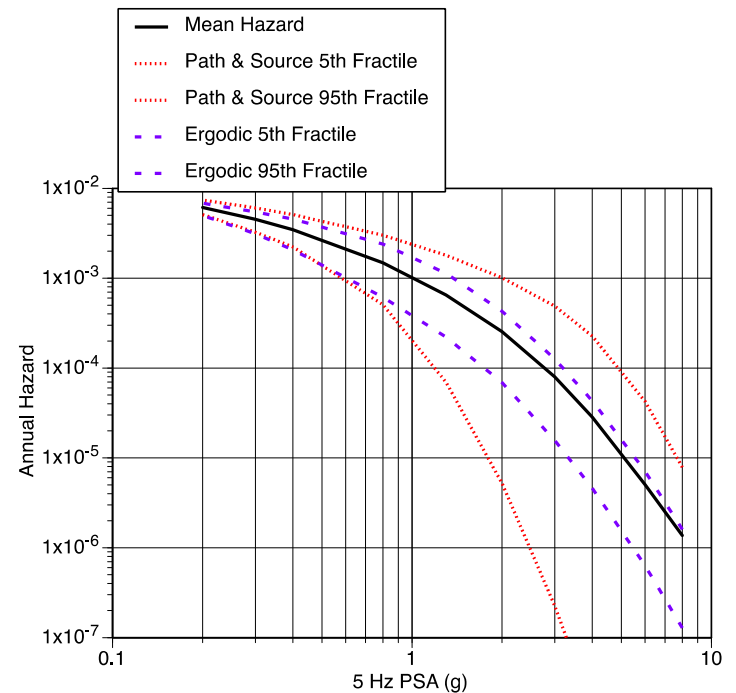
- What is acceptable risk?
- How do we use risk evaluations?
- How do we communicate risk?

Uses of Risk

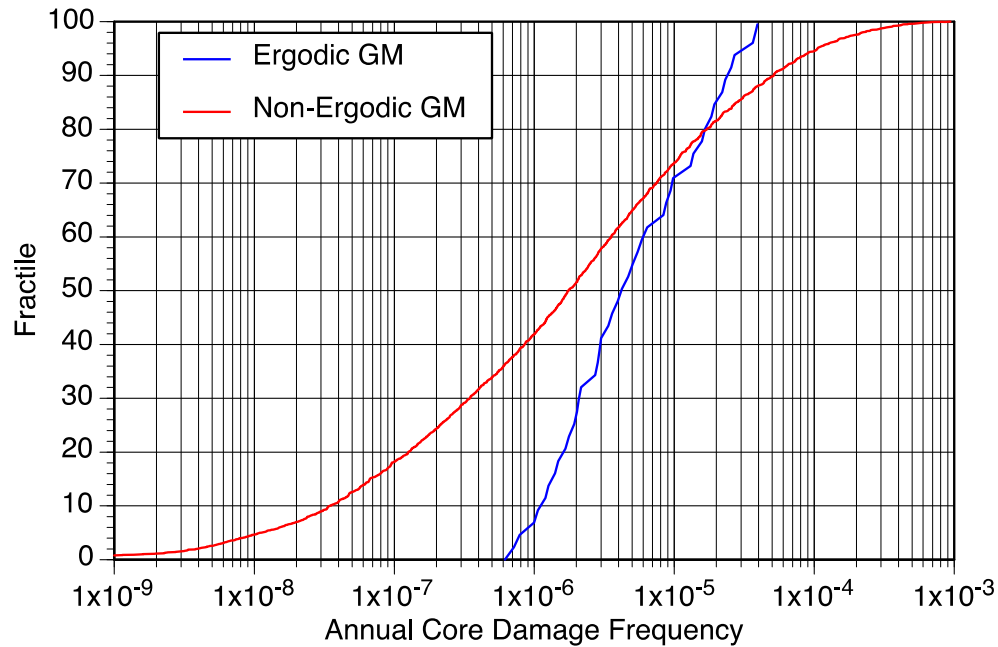
- Relative Risk for Risk Reduction
 - Use risk to identify sites that have significantly larger risk than other sites to set priority for risk mitigation
- Guide Judgments
 - Consider the limitations of the current earthquake science and earthquake engineering when making risk-informed engineering judgments
 - Communicate the uncertainty in the risk estimates

Is the Full Uncertainty Captured?

- Ground-Motion Hazard
 - Moving from global average models (ergodic) to site/source – specific ground motion models (non-ergodic) leads to much larger uncertainties in hazard
- Fragility
 - Should there a similar increase in uncertainty of fragility curves moving from generic fragility curves to plant-specific (equipment-specific) fragility curves?



Simplified Example of Uncertainty in Risk Due to Earthquake Ground Motion



Fractile	Ergodic	Non-Ergodic
5th	1E-6	1E-8
50th	4E-6	2E-6
95th	3E-5	1E-4
Mean	2E-5	2E-5

Tsunami Hazard and Risk

- Large changes in Japan
 - Estimate of tsunami hazard increased by about a factor of 1000
- Epistemic Uncertainty in Tsunami hazard?
 - What is the scientific uncertainty in the updated tsunami hazard model?

Use of Risk

- How should regulators make risk-informed decisions given the large uncertainties in the risk estimates?
 - Is the uncertainty in the risk estimate so large that the risk is not useful?

Communication of Risk

- Communication of Risk
 - Should provide the epistemic uncertainty in the risk and not just the mean risk
 - But showing huge uncertainties may limit credibility