Seattle Fault Earthquake Scenario

Conference

February 28, 2005

Earthquake Engineering Research Institute




Seattle Fault Earthquake Scenario

Introductions

Don Ballantyne, P.E.
ABS Consulting, Inc.

Earthquake Engineering Research Institute




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Project Oversight Committee

- Donald Ballantyne, PE – ABS Consulting
- Stacy Bartoletti, PE, SE – Degenkolb Engineers
- Susan Chang, PhD, PE – Shannon & Wilson
- Barb Graff – City of Bellevue
- Greg MacRae, PhD, PE – University of Washington
- Jacqueline Meszaros, PhD – University of Washington/ NSF
- Ines Pearce – City of Seattle
- Mark Pierepiekarz, PE, SE – MRP Associates
- Jane Preuss, AICP – Planwest Partners
- Mark Stewart – Washington State Emergency Management Division
- David Swanson, PE, SE – Reid Middleton, Inc.

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Acknowledge the 100 volunteers that contributed over 4000 hours to this project.




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Scenario

- Magnitude 6.7 earthquake
- Seattle Fault
- Epicenter at Harbor Island, moving easterly 14 miles
- 6.5-foot offset




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Scenario Results

- Dead – 1600
- Destruction - $33 Billion
- Downtime – months to years




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Study Area

- King County focusing on Seattle and Bellevue
- Pierce and Snohomish Counties
- Study area includes over half the state's population, and 6 of the 10 largest cities.
- King County has 44 % of the jobs state wide




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Earthquake Risk

- Washington has the 2nd highest risk in the US
- Deep Earthquakes – 1949, 1965, 2001 – Nisqually
- Cascadia Subduction – 7 over 3500 years, the last one in January, 1700
- Crustal – M7.3 on the Seattle Fault 1100 years ago, 7 meter offset




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Scenario Earthquake

- Seattle Fault presents the highest risk to the region
- M6.7 likely event on that fault, as demonstrated by trenching in Bellevue
- Many of the vulnerabilities in this scenario are also manifested in other earthquakes: other crustal, the subduction, and large deep events.




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Scenario Objective

- Establish a baseline.
- Bring stakeholders to the table to ask:
- Are the risks acceptable?
- And if not, what action shall we take?




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Introducing the Seattle Fault Earthquake Scenario

Craig Comartin, S.E.

Earthquake Engineering Research Institute

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Tool and Resources

- Draw on existing information
- Use HAZUS to provide an overview
- Seismology from the USGS
- Geology from the WSDNR and USGS
- Use GIS to relate hazards to the infrastructure
- Multidisciplinary team – scientists, geologists, engineers, emergency response professionals, economists, social scientists – most that have been involved in the regional earthquake community




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Limitations

- Scenario – not a detailed risk or vulnerability study
- Intent to provide a regional perspective of the risk, not to focus on any single system or owner
- Comprehensive, but not exhaustive; did not evaluate:
  - Aftershocks
  - Tsunamis
  - Fire following




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Integrated – People, Facilities, and Systems

- Regional transportation system –
  - Bridges are just a component of the highway segments that are designed to get us from Point A to B
  - Highways are only one component of the overall regional transportation system that includes ports, ferries, and airports.
- Emergency response and recovery is dependent on integrated systems
  - Transportation, electrical power, hospitals
- Study participants “worked across traditional boundaries”




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Document Availability and Follow-up

- Hardcopy by end of March
- Available at the EERI web site by mid-March
  - http://seattlescenario.eeri.org/
- Interest in future participation
  - EERI web site questionnaire




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Call to Action

1. Establish an independent state seismic safety board or commission.
2. Implement risk reduction plans for critical public facilities.
3. Retrofit high risk buildings.
4. Protect the transportation infrastructure.

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