









WASHINGTON





CREWMMan



Earthquake Engineering Research Institute







# **Business Impacts**

Jack Meszaros, PhD University of Washington, Bothell and the National Science Foundation









## Contributors

- Dr. Jacqueline Meszaros, Ph.D.\*\*
  - U.W., Bothell and National Science Foundation
- Dr. Stephanie Chang, Ph.D.
  - University of British Columbia
- Bob Freitag
  - Cascadia Region Earthquake Workgroup
- Mark Pierepiekarz, P.E., S.E.
  - MRP Engineering and Structural Engineers Association of Washington
- Mark Stewart
  - Washington State Emergency Management Division

\*\* - Team Leader

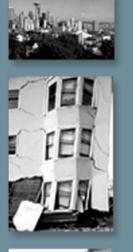






# **Intent of Chapter**

- Overall business/economy effects: Lessons from other quakes
- Preparing: Vivid scenarios for some highly vulnerable spots
- Preparing: Business' priority concerns



### **Lessons from Past EQs: Nisqually**

1949 Olympia M 6.8, 33 mi deep

\$0.2 billion

2001 Nisqually M 6.8, 36 mi deep

\$2-4 billion

??? Seattle Fault M 6.7, Shallow

\$33 billion



Nisqually most damaged businesses:

- Poor soil
- Older, unretrofit buildings

Nisqually's most vulnerable businesses:

- Marginal or leveraged
- Long traffic disruptions

Seattle Fault Earthquake Scenario



### Lessons from Past EQs: Northridge

2001 Nisqually M 6.8, 36 mi deep \$2-4 billion

1994 Northridge M 6.7, 10 mi deep \$40 billion

??? Seattle Fault M 6.7, Shallow

\$33 billion



Insured losses \$12.5 b = \$1300/person in LA County

seattle Fault Earthquake Scenario Northridge's most vulnerable businesses: small businesses in areas with lots of damage, particularly lifeline damage



### Lessons from Past Disasters: Kobe

1994 Northridge M 6.7, 10 mi deep

\$ 40 billion

1995 Kobe M 6.9, 8.7 mi deep

\$100 billion

??? Seattle FaultM 6.7, Shallow

\$ 33 billion

Seattle Fault Earthquake Scenario

Business disruption widespread due to lifeline failure and overall destruction/debris Business disruption losses \$100 billion Port of Kobe never recovered competitiveness







## **3 Specimen Neighborhoods Issaquah, Renton, Pioneer Sq.**

- Ist-order challenges
  - People
  - Building
  - Contents
  - Lifelines
- 2nd-order challenges
  - Employee disruption
  - Downstream disruption
  - Upstream disruption
  - Neighbors







# **3 Specimen Neighborhoods**

Issaquah, 1970s era shopping center

1st-order

- Buildings stand but damaged; roads OK
- Phones and traffic lights out
- Employees/customers want to leave
- Closed for days for inspection, lifelines

#### 2nd-order

- Slow repair, competitive disadvantage
- Small businesses most vulnerable







# **3 Specimen Neighborhoods**

### Old Downtown Renton

1st-order

- Collapse of old, unretrofit buildings
- Lives lost; many buildings seriously damaged

#### 2nd-order

- Debris and damage persist
- Few merchants have funds to recover/rebuild
- Historic downtown in danger







# **3 Specimen Neighborhoods**

### Seattle, Pioneer Square

1st-order

- Some collapse but most retrofit buildings will stand
- Terrifying shake and building noise
- Tons of contents damage
- Alaska Way viaduct partial collapses

2nd-order

- 2/3 buildings and roads closed for months for repair
- Far more expensive to restore than to rebuild
- Historic and cultural qualities will not be recovered







## **Priority Business Concerns**

- People.
- Loss of power.
- Surface transportation.
- Communication with customers.
- Physical loss.
- Just-in-time inventories.
- Permanent loss of business.







February 28, 2005



WASHINGTON





CREWMMan



Earthquake Engineering Research Institute