# Damage Assessment and Disaster Recovery

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# Disaster phases

- Planning
- Response
  - Life-sustaining activities
  - ***Damage assessments conducted***
- **Recovery**
  - ***Transition to “community-sustaining” phase***
- Mitigation

# Response-Recovery Transition

- Based on damage assessments during response, recovery activities may vary
  - Simple restoration of previous infrastructure?
    - Temporary infrastructure needed?
  - Different kind of recovery indicated?
    - Infeasible/inadvisable to repair/replace damaged infrastructure?
    - Too costly? Lack of capacity?
    - Geographic or other permanent community changes?

# Organization: Response

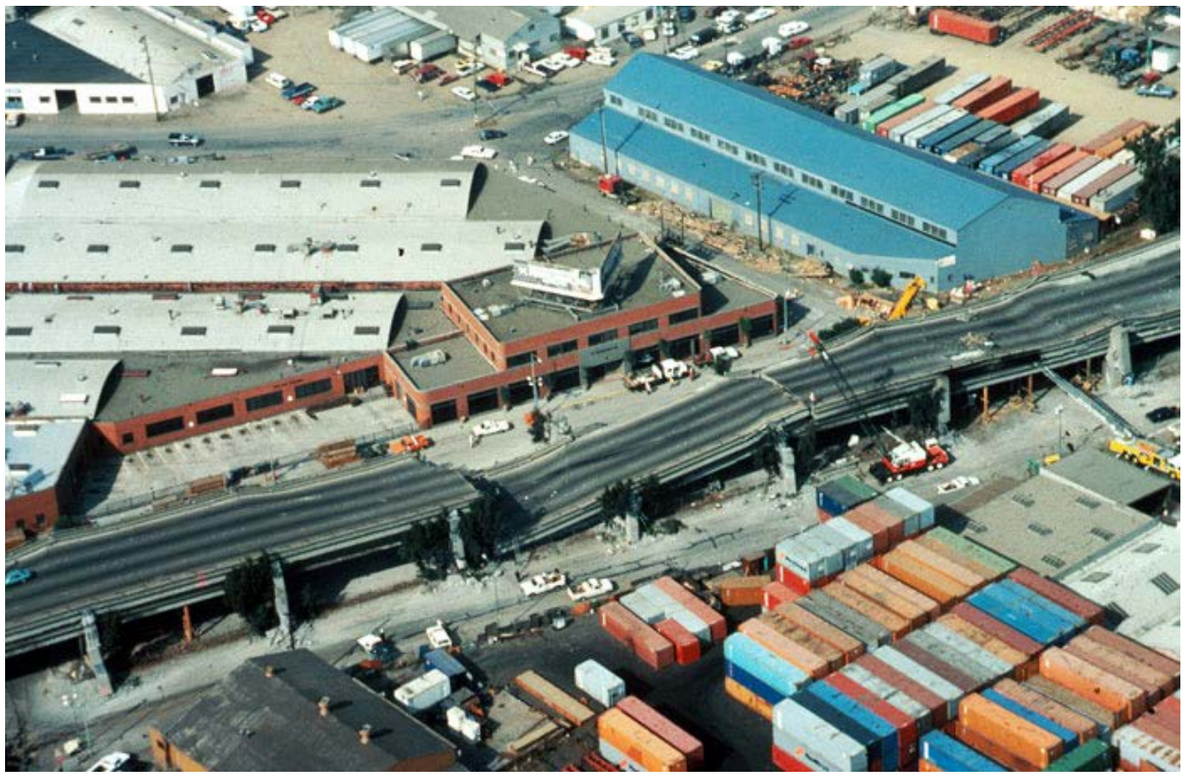
- Response: Incident Command System (ICS) - *hierarchical*
  - Federal assistance at request of state
  - Damage assessments produced
    - Results must be coordinated
  - Short-term restoration decisions focus on life-sustaining activities
    - Decisions must be coordinated: public/private priorities, funding available, eligibility for funding

# Organization: Recovery

- Long-Term Community Recovery - *coordinating*
  - Federal assistance at request of state
  - Identification of longer-term, “community sustaining” needs
    - There may not be such needs --> simple restoration indicated
    - Needs identified --> simple restoration, or do things differently?
    - Results must be coordinated: level of government, private sector, public involvement/expectations
- New federal recovery framework document being developed

# Example: Loma Prieta earthquake, 1989

- Major earthquake in San Francisco Bay Area, California — 17 October 1989
- Many roads and bridges destroyed or out of service
- Focus: restoration and improvement
- Overall: permanent changes to Bay Area transportation system and behavior



# Examples: I-880 interchange collapse; I-35W bridge collapse (2007)

- I-880: major highway link in State of Minnesota was destroyed - 29 April 2007
  - Focus on restoration - maximizing speed - expedited building
  - Repairs completed 24 May 2007
  - Disruption less than anticipated
- I-35W: bridge collapse - 1 August 2007
  - Focus on restoration - as well as potential for future transit
  - Replacement bridge - embedded sensing

*Figure 6 Aerial Photo of Bridge Area*


*Aerial Photo Courtesy of MnDOT, August 14, 2007*

# Example: Red River flooding (1997)

- Extreme flooding in several states including North Dakota: $3.5 billion in damage
  - Focus was on recovering *differently:* increasing resilience
  - Flood buffer zone created

# Example: Greensburg tornado (2007)

- Tornado (Fujita EF5, 205 mph-330 km/h winds) 4 May 2007 virtually destroyed Greensburg, Kansas (population ~1,500)
  - Focus: ensuring community survival
  - Comprehensive interagency recovery plan
  - “Green” rebuilding
  - Sister-city EcoPartnership with Mianzhu City, Sichuan Province

# Challenges

- Better/faster damage assessments: technology (embedded sensing)
- Methodology for prioritizing and sequencing infrastructure recovery: balancing data inputs and human inputs
- Coordination between levels of government, private sector, and community
- Successful implementation of national disaster recovery framework
- Definition of “successful recovery”