

# National Earthquake Hazards Reduction Program

*... a research and implementation partnership*

## NIST BFRL Program Update

Presentation to Advisory Committee on Earthquake Hazard Reduction  
23 November 2009

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FEMA

NIST

National Institute of  
Standards and Technology



USGS  
science for a changing world

national **earthquake** hazards reduction program

# Presentation Outline

- Budget, General Issues
- ATC “Roadmap” Philosophy
- Recent Publications
- In-house developments
- 2007 - 2008 Extramural Accomplishments
- 2009 Extramural Startups



# Budget, General Issues

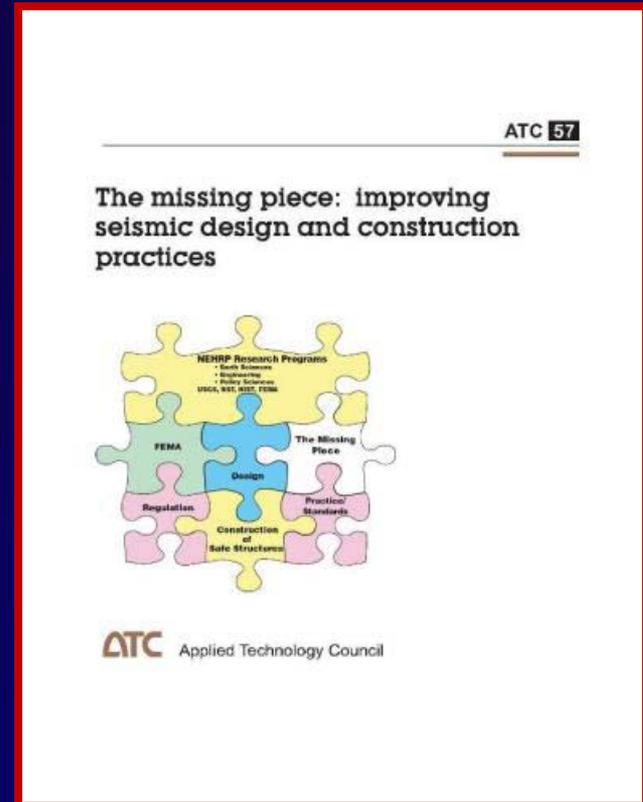
- Program managed as part of BFRL Disaster-Resilient Structures and Communities Strategic Goal area
- Currently operating under Continuing Resolution through 12/18/09 – spending set at prorated monthly amounts from FY 2009 Scientific and Technical Research and Services (STRS) appropriation (\$4.1M)
- Requested FY 2010 STRS appropriation: \$4.1M
  - Includes \$3.35M for research
  - Includes \$750K for NEHRP Secretariat
- FEMA, NSF, & USGS provide \$85K each, cash or in-kind, for NEHRP Secretariat
- Allocated ARRA funding amounts will be determined at time of grant awards



# ATC “Roadmap” Philosophy

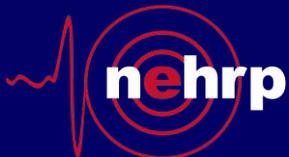
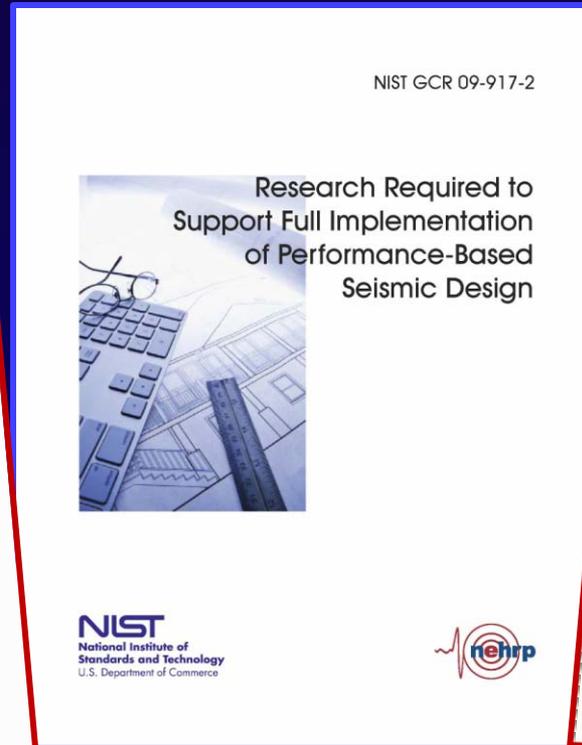
Combined in-house and extramural program has six primary focus areas, consistent with “Roadmap:”

- Technical support for building code development
- Performance-based seismic design development
- National design guidelines development
- Evaluated technology dissemination
- Enhanced design productivity and interoperability development (future focus)
- Development of improved evaluation and strengthening for existing buildings (increased future focus)



*Program goal: ~ 50/50 in-house/extramural split*

# Recent Publications



# In-House Developments

- Recently added new staff members



Jay Harris - 2008



Kevin Wong - 2009



Jeff Dragovich - 2009



Michelle Harman - 2009

- Actively seeking new staff members



# In-House Developments

## New projects begun in 2009:

- Assessment of ASCE 41 First Generation Performance-Based Seismic Design Methods for New Buildings in High Seismic Regions
- Nonlinear Seismic Analysis Based on Modal Superposition



# 2007 - 2008 Extramural Accomplishments

- Building Seismic Safety Council: NIST GCR 09-917-2, Research Required to Support Full Implementation of Performance-Based Seismic Design
- NEHRP Consultants Joint Venture (NCJV)\*
  - Task Orders 1 & 4: Quantification of Building System Performance and Response Parameters (\$608K)
  - Task Order 2: Development of Seismic Design Guidelines for Port and Harbor Facilities, Phase 1 (\$140K)
  - Task Order 3: Development of Techbriefs on Special Concrete and Special Steel Moment Frames (\$155K)
  - Task Order 6: Improved Nonlinear Multi-Degree of Freedom Modeling (\$509K)

*\* NCJV is a partnership of the Applied Technology Council and the Consortium of Universities for Research in Earthquake Engineering, also supported by the three earthquake engineering research centers*



# 2009 Extramural Startups

- NEHRP Consultants Joint Venture (NCJV):
  - Task Order 2: Development of Seismic Design Guidelines for Port and Harbor Facilities, Phase 2 (\$180K)
  - Task Order 5: Integration of Collapse Risk Mitigation Standards and Guidelines for Older Reinforced Concrete Buildings into National Standards, Phase 1 (\$200K)
  - Task Order 7: Development of Techbrief on Reinforced Concrete Diaphragm Systems (\$125K)
  - Task Order 8: Development of Techbrief on Guidelines for Performing Nonlinear Structural Analysis (\$125K)
  - Task Order 9: Improved Procedures for Selecting and Scaling Earthquake Ground Motions for Performing Time-History Analyses (\$500K)



# 2009 Extramural Startups

- NEHRP Consultants Joint Venture (NCJV):
  - Task Order 10: Improved Procedures for Characterizing and Modeling Soil-Structure Interaction for Performance-Based Seismic Engineering (\$500K)
  - Task Order 11: Improved Structural Response Modification Factors for Seismic Design of New Buildings, Phase 1 (\$650K)
  - Task Order 12: Assessment of ASCE First Generation Performance-Based Seismic Design Methods for New Buildings in High Seismic Regions (\$140K)



# Concluding Remarks

- Combination of late 2009 arrival of funding and evolving in-house work force resulted in greater reliance on extramural work than will be true in the future.
- 2007 – 2009 projects have largely arisen from specific needs found in FEMA projects.
- As in-house work force grows and stabilizes and results of National Research Council study become available, more long-range planning will be accomplished, giving clearer future focus.
- Efforts have been initiated to foster close, synergistic working relationship between FEMA and NIST, so that both agencies' projects mesh well.
- Several ARRA proposals offer good opportunities for unique advances, if they are funded.

