

NEHRP ACEHR: FEMA Briefing

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FEMA, Risk Management Directorate**



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FEMA's Priorities Under NEHRP

- Support Building Codes and Standards for New and Existing Structures;
- Develop Guidance and Tools (books, software, training);
 - A listing of ~100 FEMA Earthquake Program publications is at:
<http://www.fema.gov/plan/prevent/earthquake/pubindex.shtm>
- Program Implementation and Outreach (awareness campaigns, media, articles, initiatives);
- Support multi-state Consortia and Partnerships;
- Support for State EQ Programs (direct and indirect);
- Disaster Support (SME, MAT post-event studies);
- Support Standards for Critical Lifelines Infrastructure
 - (discontinued in 2005 due to resource reductions, recently identified as a need by the FEMA Administrator)



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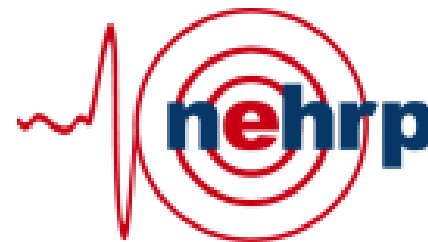




FEMA NEHRP HQ Staff

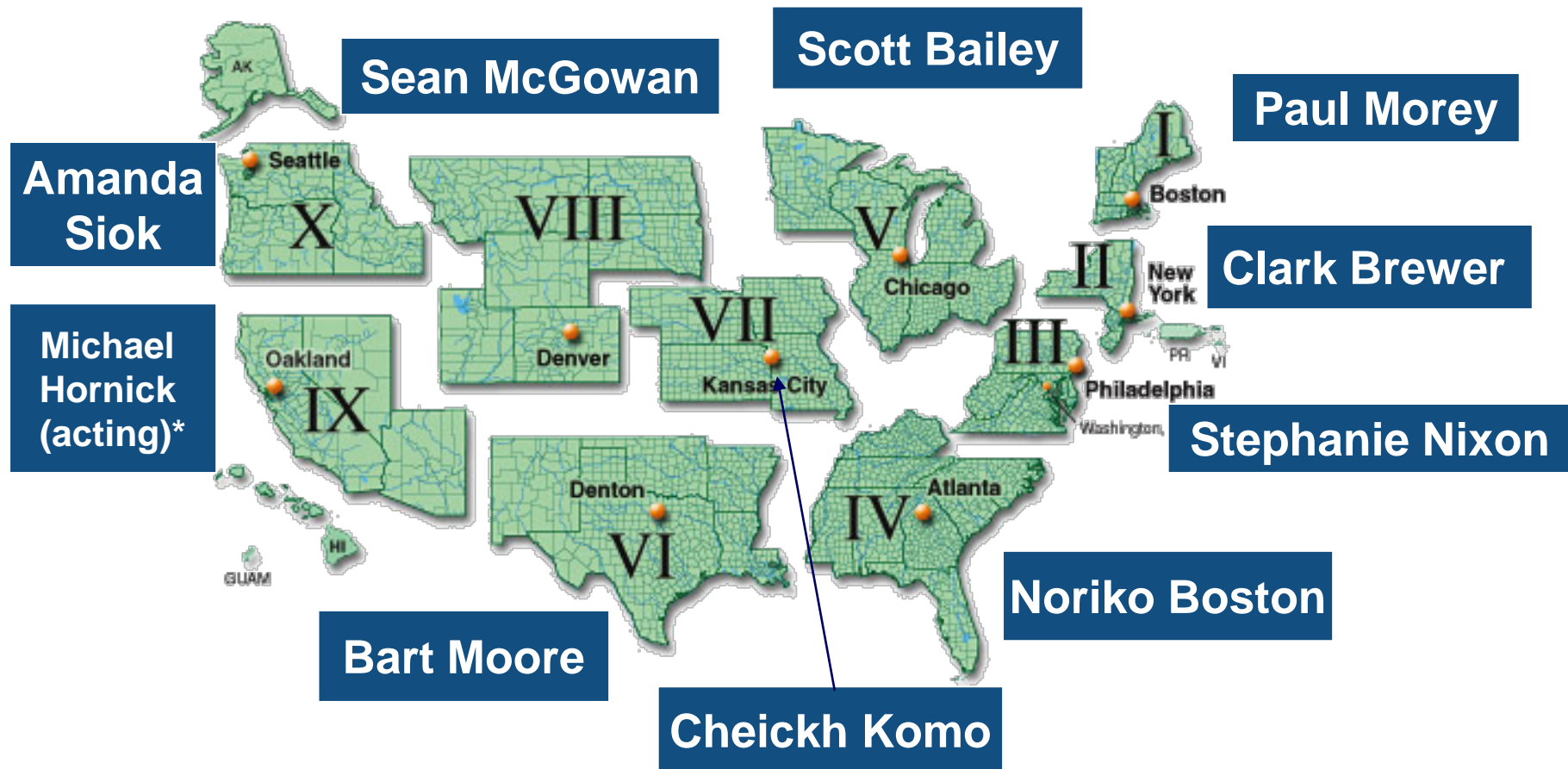
- **Edward Laatsch** – Division Director
- **Bill Blanton** – Building Science Branch Chief
- **Mike Mahoney** – Senior Staff Member/EQ Codes/Special Projects (PBSD)
- **Andrew Herseth** - EQ Existing Buildings Guidance
- **Mai ‘Mike’ Tong** – EQ New Buildings Guidance
- **Gabrielle ‘David’ Javier** – Program Implementation, State Assistance
- **Jonathan Foster** – Outreach, Multi-State Consortia
- **Tammy Roy** – Management Analyst

FEMA's National Earthquake Hazards Reduction Program



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Regional EQ Program Managers



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***Region 9: Forest Lanning reassigned to Response but Is still a Program asset. Selection for new EQ position has been made.**

Program Budget

- The FY 2018 Earthquake Program budget stayed at \$8.5M, the same level as FY 16 and 17.
- This figure includes:
 - All program-related projects.
 - All earthquake state assistance and consortia partner funding.
 - Program Salaries and Expenses.
- While our FY 2019 budget has not yet been confirmed, we do not anticipate significant changes to our current spending plan or list of ongoing projects or activities.



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Possible Future Changes

- FEMA Earthquake Program management and senior staff met with FEMA Administrator Brock Long on August 1.
- The Administrator highlighted several areas where he wanted to see additional activities:
 - Lifelines Infrastructure: coordinate with Response and resurrect ALA;
 - Building Codes: greater efforts to improve State and local adoption;
 - Expand Earthquake Insurance Coverage: insurance coverage is a critical part of mitigation, work with industry to increase the base;
 - Disaster Relief Appropriations Act (DRAA): identify new opportunities from DRAA that could be used to expand earthquake mitigation;
 - Support of FEMA Response: better coordination and support;
 - Grow Earthquake Program Outreach: take advantage of opportunities like ShakeOut to better advance our earthquake resilience message.



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Possible Future Changes

- In order to undertake these additional activities, we are identifying new funding opportunities and changes.
 - The Planning, Safety and Building Science Division (where we are housed) recently developed a Business Case Analysis for expanding our resources.
 - We are also currently developing individual requests for additional resources for specific earthquake issues.
 - If approved, these initiatives would impact the FY 2021 budget.
- There has been a recognition that the Building Science Branch has too large a span of control.
 - A Division realignment plan that would split the Building Science Branch and form a new Earthquake and Wind Science Branch is currently under consideration.



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Earthquake State Assistance Programs

- Original NEHRP Earthquake State Assistance Grants:
 - Combined into EMPG in 1990's and still exists for States that recognize their earthquake hazard under EMPG.
- Earthquake Mitigation Grant Program – two types:
 - Direct State Assistance (direct funding with 50% cash match)
 - Consortia and Partner Support (support work done by partners)
- National Earthquake Technical Assistance Program (NETAP)
 - FEMA's program for delivering earthquake education and awareness training, at request of State and Region.
 - Meets NEHRP Statutory responsibility
 - Cooperative agreement with Applied Technology Council (ATC).



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Earthquake Mitigation Grant Program

■ **Direct State Assistance**

- Reintroduced in 2017 after a four year hiatus.
- Of 37 eligible, 12 States participated in 2017 and 2018.
- 1/3 of grant funding to the 12 participating States.
- Under 44CFR, Part 361, requires a 50% Cash Match.
- Funding by Regional Cooperative Agreements.
- Managed by Regional EQ Program Managers.

■ **Consortia and Partner Support**

- States submit Support Requests, reviewed/approved by FEMA.
- Consortia submit “Base Work Plans” that are approved by FEMA.
- State Requests and Consortia Plans are then aligned and added.
- Cooperative Agreements funded by Headquarters.
- Managed by Headquarters EQ Staff.



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Status of Earthquake State Assistance Program

- Total available EQ funding remains \$3,330,900 but we will have \$90,700 less overall this year due to loss of NESEC multi-hazard funding that we have received in the past.
- We have 5 additional States participating in the program in 2019 due to revised USGS hazard maps. Four of the five are taking Direct State Support (no first year match requirement) (becomes 25% next year).
- We will need to spend \$12,000 more for NEPM travel in 2019 (4 more states in the State Support component).
- We have requested consortia and partners submit a work plan, which we are now using to reallocate funding.



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EQ Cooperative Agreement

- Earthquake Regional Consortia
 - Northeast States Emergency Consortium (NESEC)
 - Central U.S. Earthquake Consortium (CUSEC)
 - Cascadia Regional Earthquake Workgroup (CREW)
 - Western Seismic States Policy Consortium (WSSPC)
- Other partners supported under the agreement:
 - Earthquake Engineering Research Institute (EERI)
 - Federal Alliance for Safe Homes (FLASH): Outreach
 - Southern California Earthquake Consortia: ShakeOut
 - Applied Technology Council: NETAP



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FEMA PROJECT UPDATES

Recent changes provided in **RED**



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Model Building Codes

- State/local building codes are one of the most effective mitigation strategies to reduce earthquake losses.
- FEMA's design guidance products are inputs into the seismic provisions of the International Codes.
- I Codes are adopted in some form by all 50 states or local government; enforcement is at the local level.
- FEMA has long history of working with model codes:
 - Dating back to 1985 for flood and 1990 for earthquake.
- OMB Circular A-119 and the Technology Transfer Act
 - Requires federal agencies to use available codes where possible.
 - Encourages federal agencies to participate in the code process.



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Update on Building Codes

- 2018 edition of the I Codes are available.
- 2021 update cycle of the I Codes has begun with Group A code change proposals.
 - Group A codes are fire, plumbing, mechanical, means of egress.
 - Deadline for proposals was January 2018, CAH was held in April, and the PCH was just held last week. Online Voting will be later this month.
- Group B codes begin with code change proposal deadline in January 2019.
 - Group B is IBC Structural, IEBC, IRC Building, and other codes.
 - Deadline is January 2019. CAH and PCH will be held later in 2019. This will be the bulk of our activities.



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Update on Building Codes

- FEMA monitors the model building code process to ensure that codes provide adequate seismic protection through our Seismic Code Support Committee (SCSC).
 - Task order managed by ATC; SCSC chaired by Kelly Cobeen.
 - SCSC submitted 3 Group A code change proposals; one each to the IPC, IMC and the IFGC to improve anchorage language and the reference language to seismic requirements of IBC Chpt 16.
 - IPC passed CAH, IMC disapproved at CAH but passed PCH, and IFGC disapproved at CAH and failed PCH. Still have the Online Voting to do and we plan to do an eGov delivery blast.
 - SCSC also worked with the ICC BCAC on a new IBC section on shipping containers used as structures. This passed CAH and PCH with our support.
 - SCSC is already working on Group B code change proposals.
 - Currently working on ~10 proposals, most for IRC.



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State Building Codes Update

- SCSC has an increased focus on education and outreach to work with state and local adoptions and enforcement.
- There have been several recent actions by different states to weaken their building codes that are of concern.
- Arkansas state legislature weakened their seismic code provisions at the request of a steel producer firm.
- Florida past a new law that mandates that all future editions of the Florida Building Code will NOT be based on future editions of the International Codes. All future changes will need to be submitted directly to the state.
 - While not seismic, this is a serious concern, esp. if other states follow.

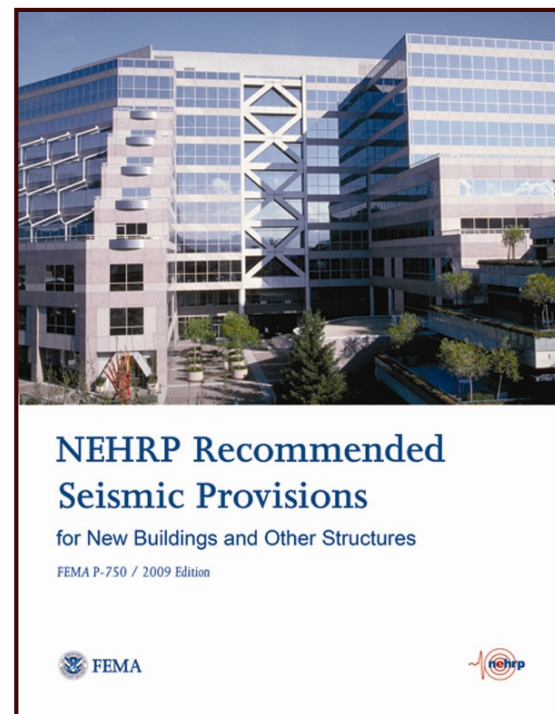


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NEHRP Recommended Seismic Provisions

- *2015 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-1050)*
 - Part 1: Major Changes (to ASCE 7);
 - Part 2: Commentary (explanation of changes);
 - Part 3: Resource Papers (new material/issues)
- Primary resource for ASCE/SEI 7-16 and the 2018 IBC and IRC.
- Update for 2020 edition underway.
 - Provisions Update Committee (PUC); consists of 21 subject matter experts.
 - 9 Issue Teams, 114 volunteer experts.
 - Two ballots have taken place on changes.

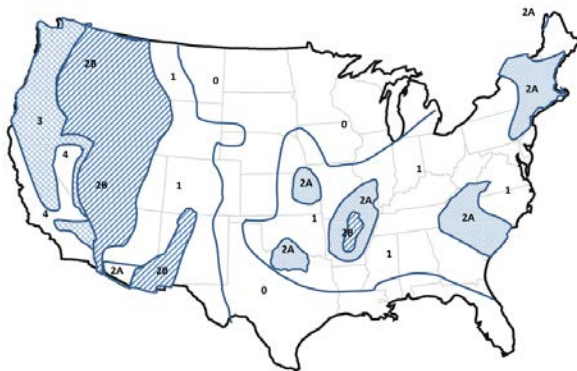


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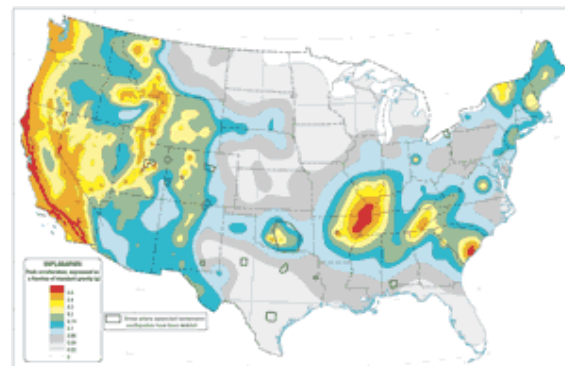


Project 17

- The 2020 update of the *NEHRP Recommended Seismic Provisions* includes Project 17, to develop the next generation seismic design value maps.
 - Sponsored by FEMA through our ongoing NIBS/BSSC task order.
 - 29 national subject matter experts and USGS, NIST and FEMA scientists are involved as volunteers.
 - Currently working to balance new knowledge of earthquake science and uncertainty in design ground motions, reform of SDC's, and improve deterministic ground motion definition.
 - New approach to multi-period spectra has been approved to PUC.
 - **Project extended one more year to resolve issues.**



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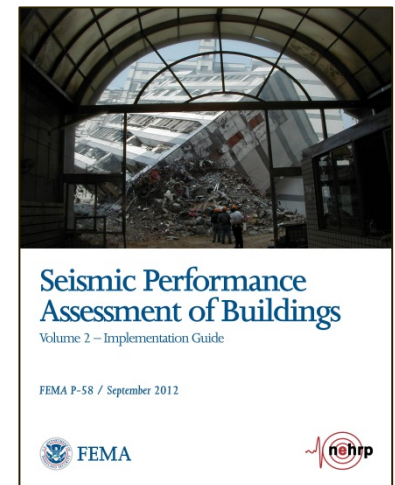
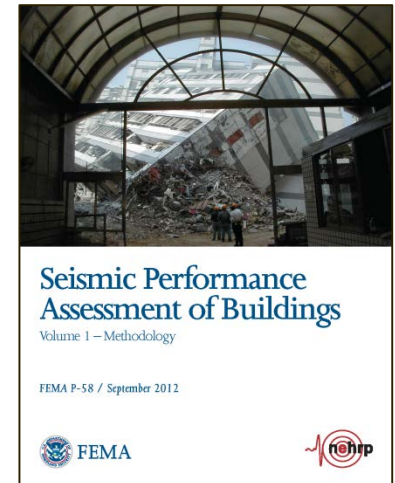


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Performance Based Seismic Design

- PBSD is a process for an owner to assess performance in way they can understand:
 - Dollars - Casualties - Downtime
- Phase 1 was to develop a Seismic Performance Assessment Methodology.
 - 10 year effort based on the FEMA 445 Action Plan.
- FEMA P-58 was published in 2012.
 - Volume 1: Methodology
 - Volume 2: Implementation Guide
 - Volume 3: Supporting Data CD
 - Performance Assessment Calculation Tool (PACT) for the large amounts of data involved.



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Performance Based Seismic Design Project

- PACT 3.0 update released last year (FEMA P-58 CD).
- The goal of Phase 2 was to use FEMA P-58 Phase 1 Assessment Methodology to develop Design Guidelines to assist design professionals to:
 - Develop efficient performance-based designs.
 - Quantify performance of typical code-conforming buildings.
 - Guidance on simplified design to achieve performance objectives.
- A second but equal goal of Phase 2 is to develop User Guides to assist building owners and decision makers in selecting appropriate performance objectives.
- Phase 2 of the PBSO Project is now done and the contract expired.



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FEMA P-58 Phase 2 PBSD Products

- FEMA P-58-1, *Seismic Performance Assessment of Buildings, Volume 1: Methodology*
- FEMA P-58-2, *Seismic Performance Assessment of Buildings, Volume 2: Implementation Guide*
- FEMA P-58-3, *Seismic Performance Assessment of Buildings, Volume 3: Supporting Electronic Materials and Background Documentation*
- FEMA P-58-4, *Seismic Performance Assessment of Buildings, Volume 4: Methodology for Assessing Environmental Impacts*
- FEMA P-58-5, *Expected Seismic Performance of Code-Conforming Buildings*
- FEMA P-58-6, *Guidelines for Performance Based Design of Buildings*
- FEMA P-58-7, *Building the Performance You Need*



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Performance Based Seismic Design Project

- The ATC-58 PBSD Development project has been superseded by the ATC-138 PBSD Support project.
- FEMA P-58-5 and -6 did not pass review and are currently being revised and updated under ATC-138.
 - Both under review and will be completed by the end of CY 2018.
- We are conducting training courses using the updated material as digital handouts.
 - The first course was held in conjunction with the 11NCEE in Los Angeles, CA on June 25.
 - The second course was held in San Francisco on September 25.
 - The third course will be held in Seattle on November 29.



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Existing Buildings Guidance

- ASCE/SEI Standard for Seismic Retrofitting (ASCE/SEI 41-17) is basis for 2018 IEBC.
- FEMA project (ATC-124) to develop a series of design examples for use with ASCE/SEI 41-13 (with commentary for -17).
- This project has been completed and will be available as FEMA P-2006. It is currently available online and in printing.
- Co-sponsored by SEAOC, who performed reviews. SEAOC will conduct in person CA training, using our course material. FEMA will do all other training, including webinars.



**Example Application Guide
for ASCE/SEI 41-13 Seismic
Evaluation and Retrofit of
Existing Buildings**

with Additional Commentary for ASCE/SEI 41-17

FEMA P-2006 / June 2018



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Existing Buildings Guidance

- Identification and Mitigation of Non-Ductile Concrete Buildings (ATC-78).
 - Development of an assessment guideline document for non-ductile, concrete buildings to identify buildings that present an earthquake collapse hazard.
 - Project includes development of a simplified analysis procedure, by completing the frame analysis procedure and continuing development of a wall analysis procedure.
 - The task order includes validation testing of the frame analysis procedure on an inventory of actual buildings.
 - Building data from Mexico City was used to validate the methodology. Currently under review,
 - To be published as FEMA P-2018 by the end of CY 2018.



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Existing Buildings Guidance

- California Earthquake Authority approached us with a proposal to develop code provisions for addressing residential seismic vulnerabilities. CEA would fund, both would co-manage, and FEMA would publish.
 - The project was contracted by CEA with ATC (ATC-110).
- Project has developed criteria for several vulnerabilities:
 - Cripple walls (to 7'), chimneys, living space over garage, and hillside.
- Pre-standard will be published as FEMA P-1100.
- Next step will be a standards development committee that will be managed by the International Code Council.
 - Finished standard would then be submitted as a code change submittal to the IEBC (possibly to replace Appendix A-3).



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Existing Buildings Guidance

- Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories.
 - Developed in response to request by San Francisco for guidance for a city weak story retrofit ordinance.
 - Targets “Marina District” and Northridge style weak story, multi-unit wood frame residential structures.
 - Retrofit limited to 1st weak story only.
 - New study to address SoCal issue of retrofit of open front garage opening only and resolution of any torsion issues that could result.



Seismic Evaluation and Retrofit
Of Multi-Unit Wood-Frame
Buildings With Weak First
Stories

FEMA P-807 / May 2012



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Existing Buildings Guidance

- A new FEMA project (ATC-140) was initiated last year to study existing buildings related issues that were too complex for the ASCE volunteer committee process and develop language to resolve the issue and submit it into the current ASCE/SEI 41 update process.
- Issues currently under investigation and development:
 - Issue 1, Linear/Nonlinear, Static/Dynamic Analysis (Terry Lundeen)
 - Issue 2, Foundations (Roy Lobo)
 - Issue 3, Concrete Shear Walls (Wassim Ghannoum)
 - Issue 4, Tier 1-2 (Peter Somers)
 - Issue 6, URM (Bret Lizundia)
 - Over the course of the six year ASCE process, we plan to address more issues as these are completed.

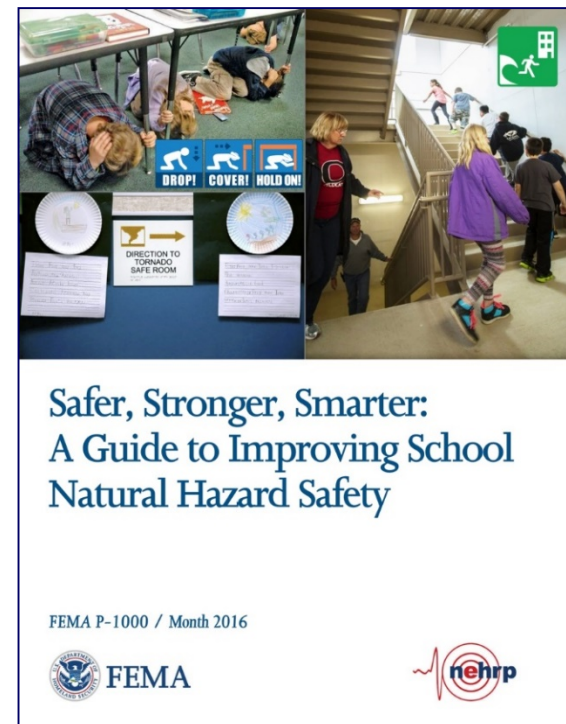


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FEMA School Safety Guide

- A new school safety guide to provide guidance on multiple natural hazards, as well as supplemental guidance specific to earthquakes & others.
- Guidance for administrators / staff on:
 - What to do operationally before, during and after a natural hazard event;
 - Physical protection of school facilities (i.e., retrofit and considerations for new school construction).
- Manual is complete and available. **Now using ATC training task order to conduct in-person and webinar courses.**
 - First in-person was the May NEPM. First webinar was last September. Developer and instructor was Lori Peek.

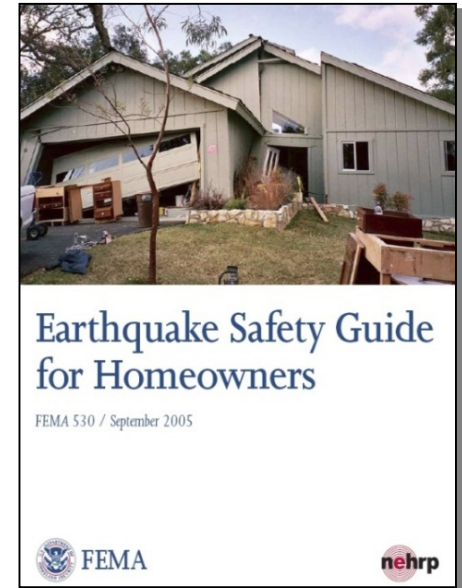


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Homeowner Outreach Guide

- *Earthquake Safety Guide for Homeowners* (FEMA P-530) is obsolete and has been removed from circulation. This was one of our most popular publications.
- The Guide is currently being updated under our ATC-137 training and products update task order as we do not have funds for a separate full-scale update task order.
- **New title: Earthquake Safety at Home: Prepare, Protect, Survive, Recover, Repair.**



New Projects

- With the completion of the Non-ductile Concrete Buildings Collapse Assessment and Building Irregularities projects, we now have funding to start two new projects:
- “Guide for Repair of Earthquake Damaged Buildings to Achieve Future Resilience.”
 - The repair of earthquake damage is a critical component to the recovery of a community after an earthquake disaster, and in turn the overall resiliency of a community. However, guidance on repair of earthquake damage is limited and such a guide is needed.
- “Soil Structure Interaction Design Guide.”
 - Soil-structure interaction (SSI) is not a simple relationship. This project is to develop design guidance for SSI implementation within the consensus design standards and model building codes.



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