Codes and Standards Update
InterSolar

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Chair, SEIA Codes & Standards Working Group

July 11, 2013

Codes & Standards

- While federal, state, and local policies strive to drive down cost, overly restrictive future regulation can drive it right back up.
- Future cost avoidance.
- “If you are not at the table, you are on the menu.” – Lorraine Ross, consultant for Dow Solar

SEIA Codes & Standards Working Group Major Accomplishments – 2014 NEC

- SEIA Codes & Standards Working Group engaged in development of 2014 National Electrical Code
- Working Group established Top 5 priorities.
- NEC 690.12, Rapid Shut-down of PV Systems
- SEIA members and member consultants drafted public comments to provide improved safety and reliability
- Building consensus with other stakeholder groups

Effective Dates of 2012 IFC and 2012 IBC

- Some states have a statewide adoption process; others have “home rule.”
- Effective date in California is January 1, 2014.
- We are already seeing early adopters, including State of Maryland, some cities and counties.
- Educate, and be prepared.
- Identify your local code effective dates.
- Avoid pain by training your staff, beginning with sales staff.

2012 International Fire Code (IFC)

605.11 Solar photovoltaic power systems. Solar photovoltaic power systems shall be installed in accordance with Sections 605.11.1 through 605.11.4, the *International Building Code* and NFPA 70.

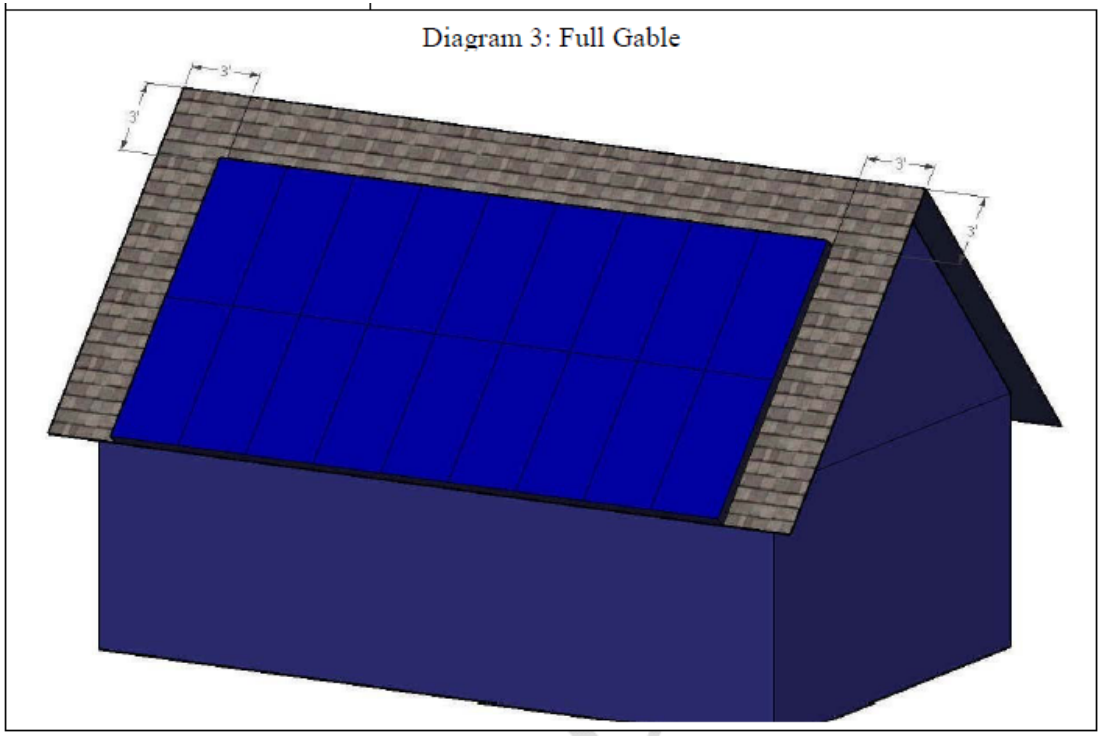
- Marking
- Location of DC Conductors
- Access and Pathways
- Smoke Ventilation
- Ground Mounts

2015 International Fire Code (IFC)
ICC Group B Development Process in 2013

- Proposal F64-13 (Thomas) Approved as Submitted at ICC Committee Hearings.
- For Marking requirements and Location of DC Conductor requirements, simply reference NFPA 70 (National Electrical Code).
- Complete strike-out of Marking requirements and Locations of DC conductors in the 2015 IFC.
- Eliminates conflicts and correlation issues.

2012 IFC Residential Fire Setback Requirements

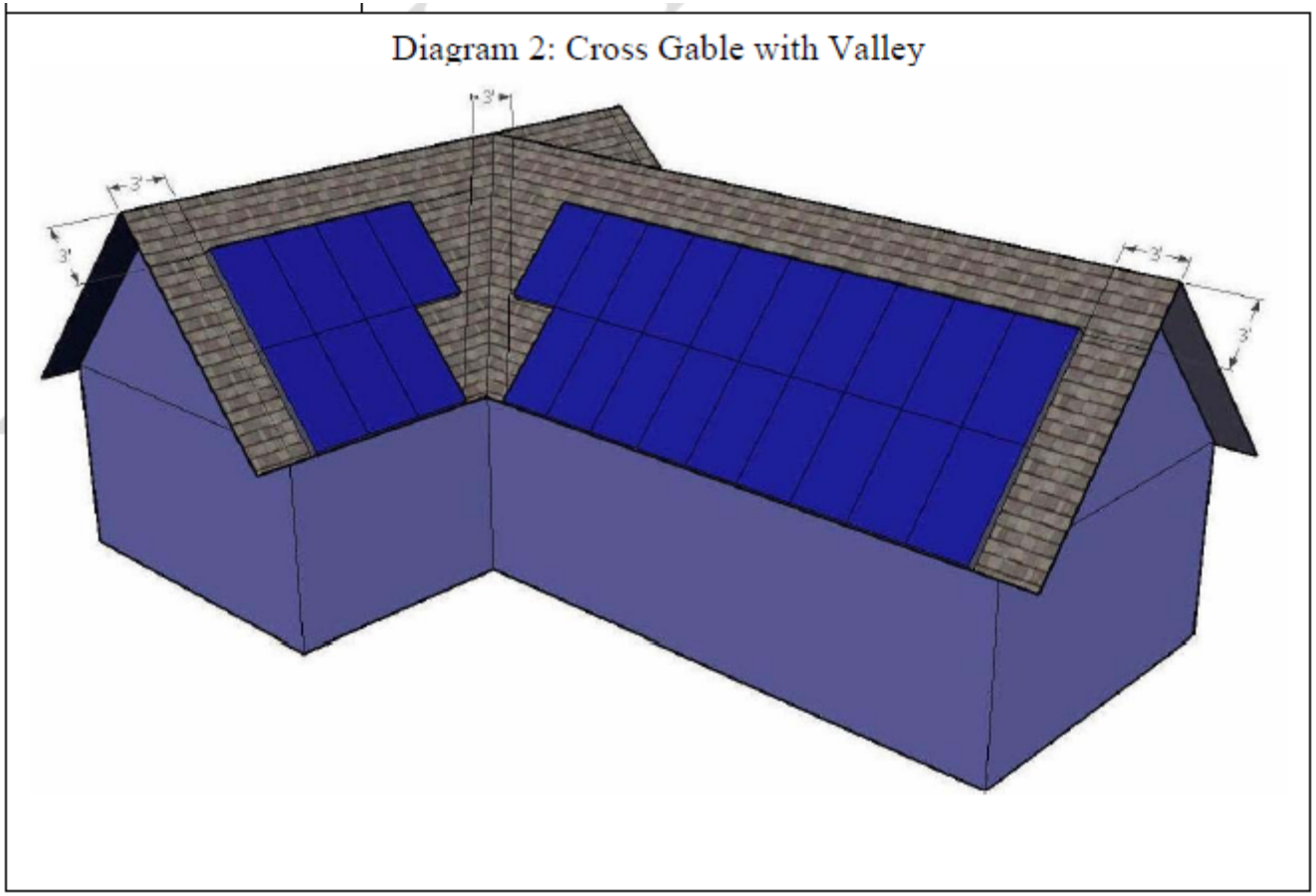
605.11.3 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 605.11.3.1 through 605.11.3.3.3.



- Full Gable Roof
- Greater than 2:12 pitch
- 3-foot setback at each gable end.
- 3-foot setback from ridge.

http://osfm.fire.ca.gov/pdf/reports/solarphotovoltaicguideline.pdf

2012 IFC Residential Fire Setback Requirements



- Hips and Valleys
- Greater than 2:12 pitch.
- 3-foot clear at gable ends.
- 3-foot clear at ridge.
- 3-foot clear at hips and valleys.

http://osfm.fire.ca.gov/pdf/reports/solarphotovoltaicguideline.pdf

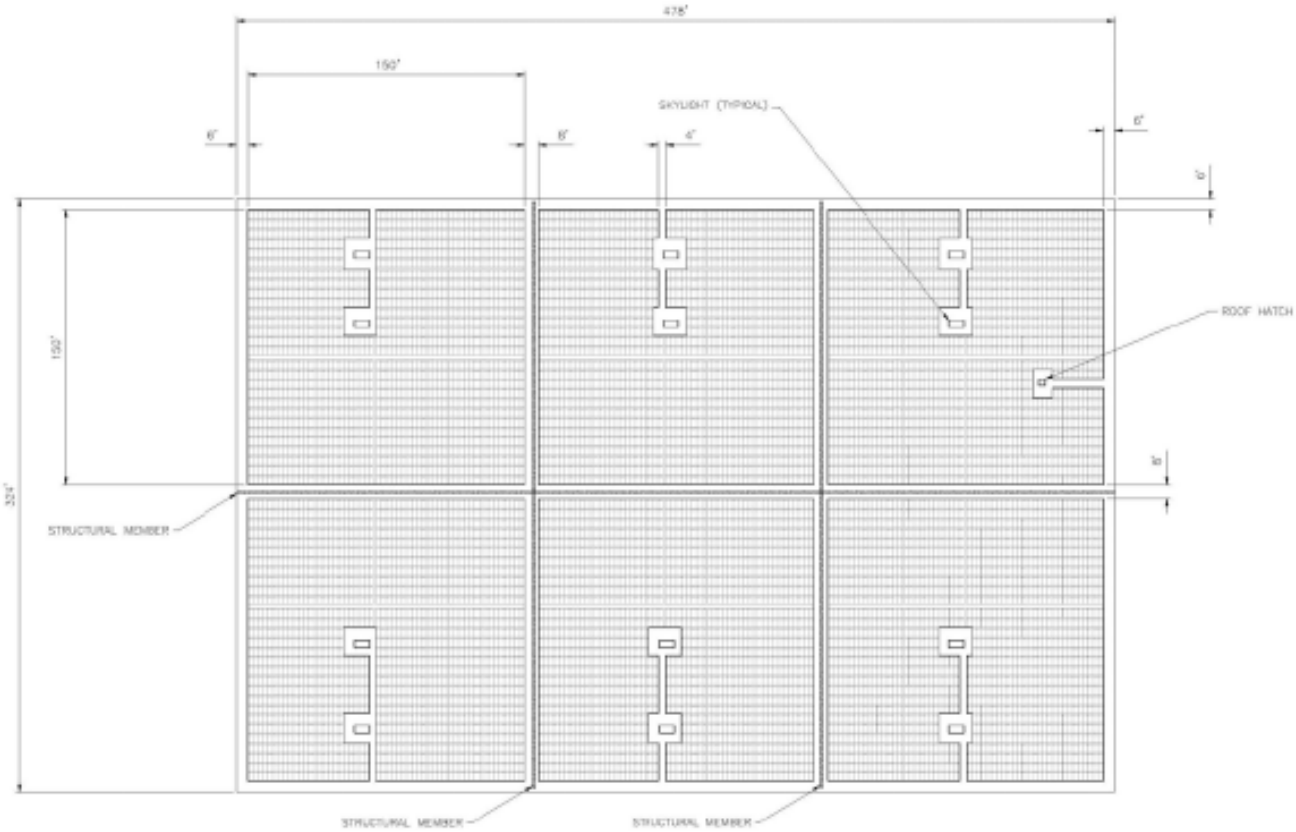
2015 IFC Residential Fire Setback Requirements ICC Group B Development Process in 2013

- When voluntary, only about 50 percent of California AHJs require/ enforce rooftop fire setbacks
- SEIA proposal F69-13 for broadened exception unanimously "approved as modified" at ICC Committee hearings in Dallas.
- If successful, this proposal is expected to eliminate fire setbacks on approximately 50 percent of residential projects nationwide.
- Similar language added to 2015 International Residential Code.

605.11.3, Exception 2

Roof access, pathways, and spacing requirements need not be provided where the fire chief has determined rooftop operations will not be employed.

2012 IFC Commercial Flat Roof Access Pathways



SOLAR ARRAY EXAMPLE – LARGE COMMERCIAL

8' WALKWAYS

- Centerline Access Pathways.
- 150-foot maximum array dimension.
- 6-foot or 4-foot clear perimeter at parapets.
- 8-foot pathways.
- 4-foot clear pathway to sky lights and roof access hatch.

http://osfm.fire.ca.gov/pdf/reports/solarphotovoltaicguideline.pdf

2015 IFC Residential Fire Setback Requirements ICC Group B Development Process in 2013

- Consensus agreement that not every skylight needs access for smoke ventilation.
- Preliminary approval of SEIA proposal F74-13 at ICC Committee Hearings.
- IFC Section 605.11.3.3 is revised.
- Clarify that access is needed at roof standpipes, ventilation hatches, access hatches, and smoke & heat vents.
- Access is required at skylights at 150-foot intervals.
- Access is not required at every skylight.

2012 International Building Code (IBC)

1509.7.1 Wind resistance. Rooftop mounted photovoltaic systems shall be designed for wind loads for component and cladding in accordance with Chapter 16 using an effective wind area based on the dimensions of a single unit frame.

- Effective Wind Area (EWA) is used in structural calculations to determine wind pressure.
- EWA is defined in ASCE 7.
- Artificially small EWA increases wind pressure, which increases cost.
- Overly restrictive in most cases.

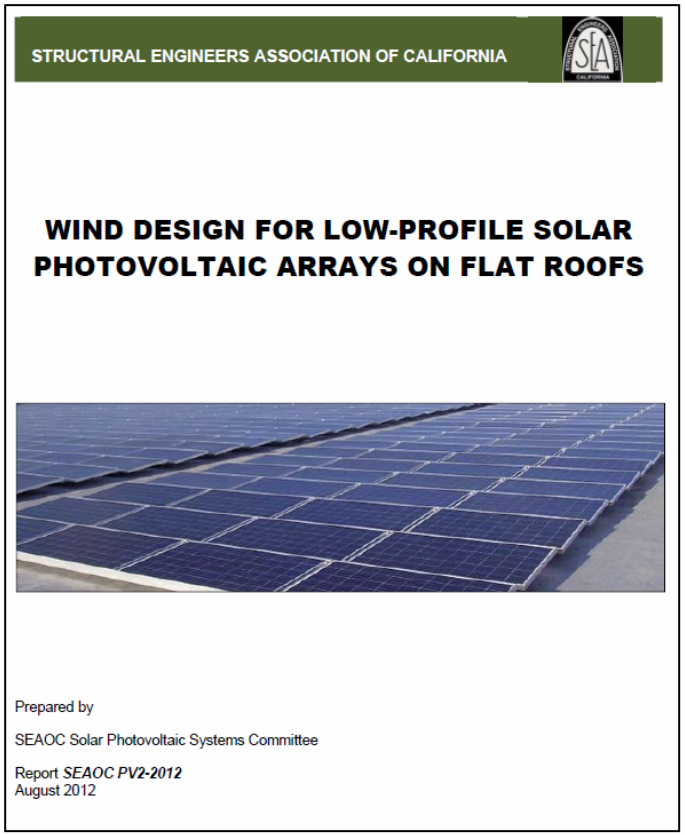
2015 International Building Code (IBC)
ICC Group A Code Development Process

- Collaborative work:
- National Council of Structural Engineers Associations (NCSEA).
- Structural Engineers Association of California (SEAOC).
- Formalized and preserved commonly accepted engineering practice.
- Allows complete displacement of Live Load in structural calculations in most cases.

2015 International Residential Code (IRC) ICC Group B Code Development Process

- SEIA Proposal RM97-13 focused on Live Load for IRC.
- Preliminary approval by unanimous vote of ICC Building Committee at first hearing.
- Formalized and preserved commonly accepted engineering practice.
- Allows complete displacement of Live Load in structural calculations in most cases.

Structural Engineers Association of California, Solar Photovoltaic Systems Committee, Wind White Paper Published August 2012.



- Structural Engineers, Code Enforcement Agencies, Solar Industry.
- Wind Tunnel Researchers: David Banks, Gregory Kopp, Timothy Reinhold.
- Developed calculation method based on combined solar-specific wind tunnel data points.
- Includes commentary on Effective Wind Area.

Structural Engineers Association of California
Solar Photovoltaic Systems Committee

- Boundary Layer Wind Tunnel.
- Scale model of building rotates to simulate varying wind direction.
- Results are *not* the same if not a *boundary layer* test.

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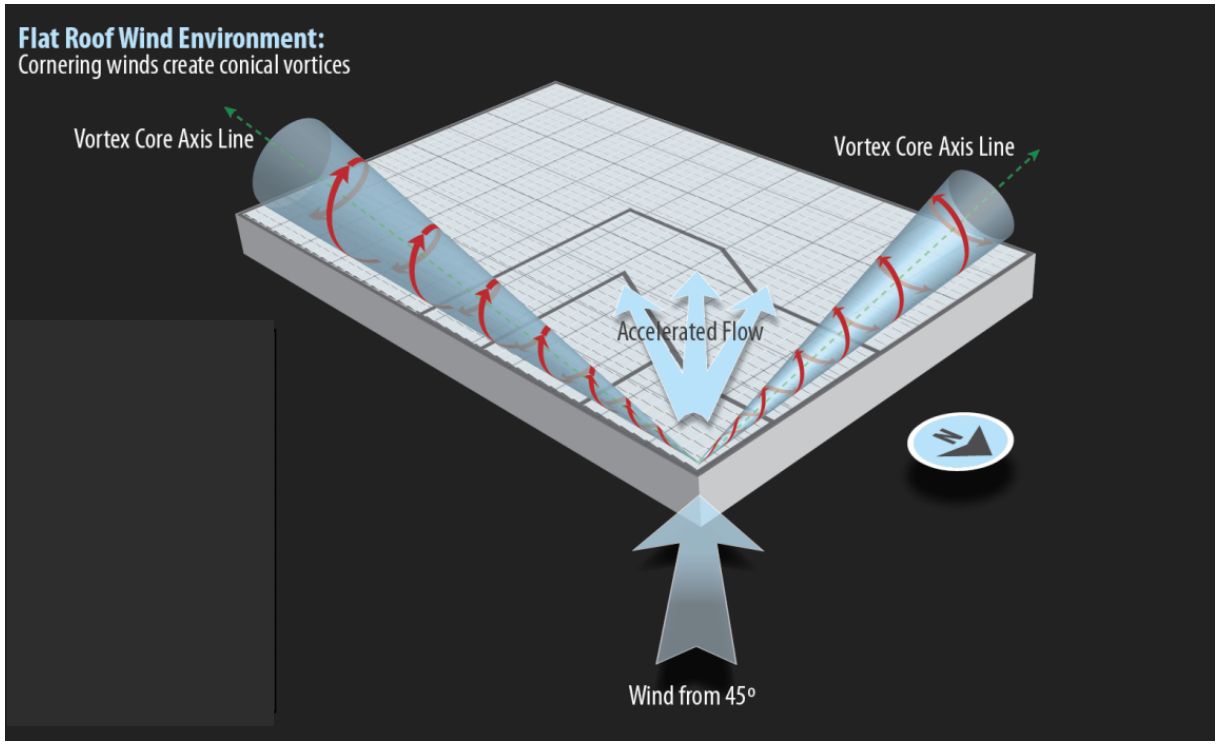

- Researchers observed higher wind pressures at paths of corner vortices.
- Lower wind pressures at interior zones and shielded rows of modules.

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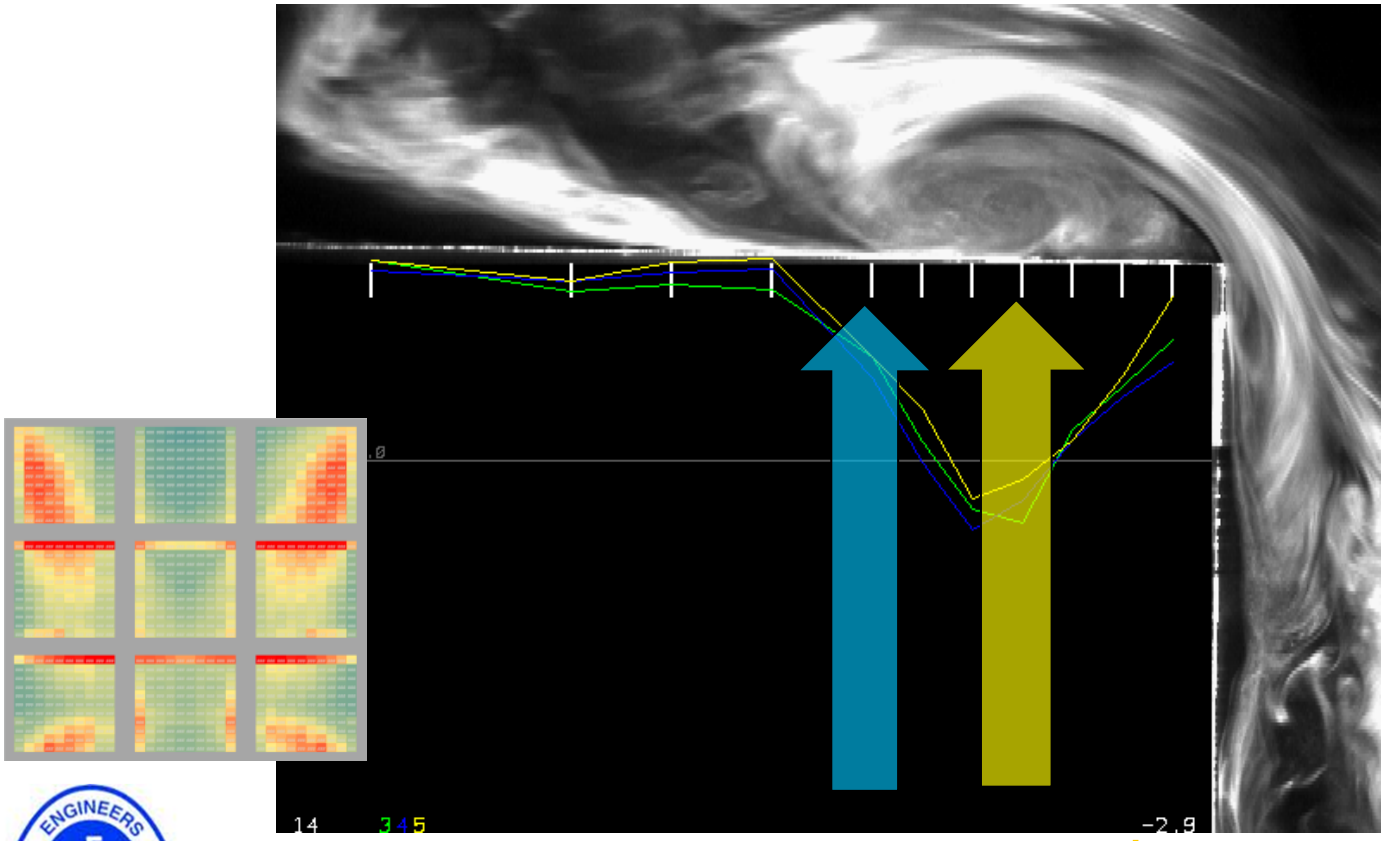

peak pressure on solar panels in NE corner

peak pressure on roof

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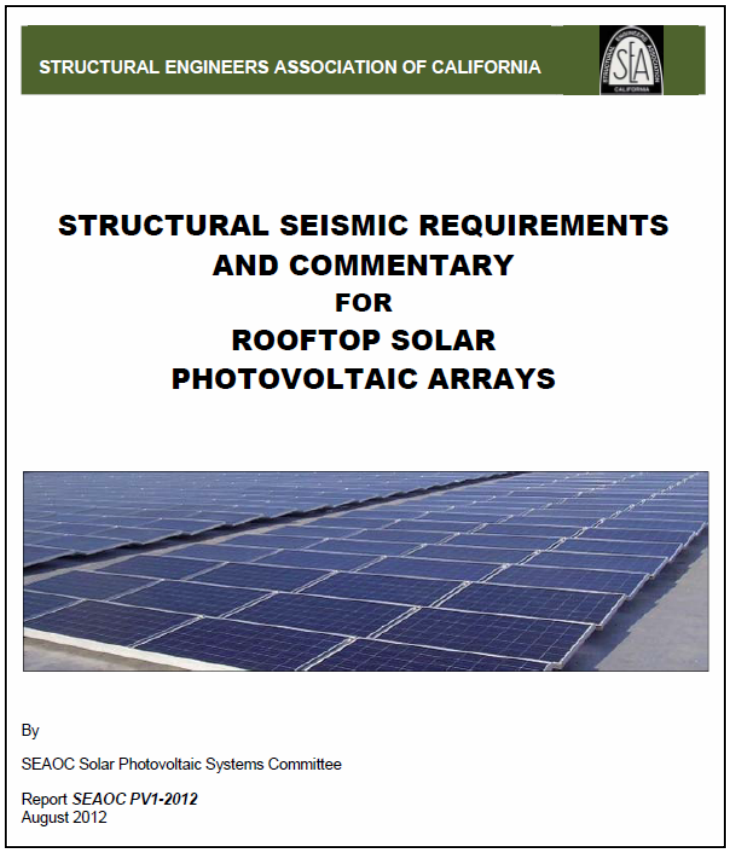
Structural Engineers Association of California, Solar Photovoltaic Systems Committee, Seismic White Paper Published August 2012.



- Research conducted by Joe Maffei, PhD, S.E.
- Shake table testing at Pacific Earthquake Engineering Research Center (PEER).
- Justifies use of ballasted, non-penetrating PV mounting systems.
- Based on displacement method of analysis.

Structural Engineers Association of California
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- Friction testing to determine Coefficient of Friction.

- Shake table testing to determine patterns of displacement during simulations of historic seismic events.

THANK YOU!

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