



CONNECTIONS

In Brief

March 2015 Volume 15 Issue 6

Newsletter of the
Structural Engineers
Association of Oregon

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SEAO has a twitter account
and can be
followed at
[@SEAOregon](https://twitter.com/SEAOregon).



Upcoming SEAO Meetings and Events:

Wednesday, March 18, 2015: YMF Happy Hour

Location: Ex Novo Brewing Co., 2326 N Flint Avenue, Portland, OR
Time: 5:30 pm to 7:30 pm
See Page 4 for more YMF information.

Monday, March 23, 2015: Last Call for Papers for Interested Presenters at SEAOC's 2015 Seattle Convention

Visit <http://seacrocks.com> to submit papers for interested presenters.
See Page 10 for information.

Thursday, April 23—Saturday, April 25, 2015: Structures Congress

Location: Oregon Convention Center, 777 NE MLK Jr. Blvd., Portland, OR
See Page 3 for more information.

Wednesday, April 29, 2015: SEAO Lunch Meeting

Topic: The New Tsunami Chapter 6 Development for ASCE 7-16
Speaker: Seth Thomas, KPFF Consulting Engineers
Location: Portland City Grill, 30th Floor, 111 SW Fifth Avenue, Portland, OR
Time: 11:30 am check-in and lunch buffet, noon program
PDH Credit: 1 hour
Meeting Sponsor: Open for Sponsorship.
Additional information will be provided in April's newsletter.

Thursday, May 14, 2015: SEAO Wood Design Seminar

Topics Covered: Cross-Laminated Timber, Diaphragm Design, 2015 SDPWS Revisions, & Timber Connections
Speakers: Ethan Martin & Terry Malone (Woodworks), Michelle Kam-Biron (American Wood Council), & Ben Brungraber (Fire Tower Engineered Timber)
Location: Sheraton Portland Airport Hotel, 8235 NE Airport Way, Portland, OR
Time: Registration Opens at 7:30 am, Seminar 8:30 am to 4:30 pm
Lunch will be included with your registration.
PDH Credits: 6 (4 for viewing video)
Additional information and registration forms will be included in April's newsletter.

Wednesday, May 27, 2015: SEAO Lunch Meeting

Topic: Oregon Zoo—New Elephant Lands Project
Speaker: Ed Quesenberry, Equilibrium Engineers LLC
Location: Portland City Grill, 30th Floor, 111 SW Fifth Avenue, Portland, OR
Time: 11:30 am check-in and lunch buffet, noon program
PDH Credit: 1 hour
Meeting Sponsor: Open for Sponsorship.
Additional information will be provided in April's newsletter.

Thursday, July 16 - Saturday, July 18, 2015: SEA Northwest Conference

Location: Boise, Idaho
See Pages 6 and 9 for more information. We will be updating the information in future newsletters.

CONNECTIONS is a monthly publication of the Structural Engineers Association of Oregon, published to disseminate current news to our membership and others involved in the profession of structural engineering. The opinions expressed reflect those of the author and, except where noted, do not represent a position of SEAO.

Send membership inquiries to:
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ENGINEERS WEEK SUMMARY

By: Michelle Chavez, Miller Consulting Engineers, Inc. &
Dave Beh, Nishkian Dean Engineering

On February 25, 2015, hundreds of high school students participated in Engineers Week, an event designed to encourage students to pursue careers in engineering. Thanks to the generous silver sponsorship and enthusiastic volunteers of SEAO, students were able to get a taste of the glamorous lifestyle that is structural engineering.

Students and their teachers had the opportunity to tour different facilities such as Boeing, PSU research lab, Port of Portland, Oregon Iron Works, and other locations. After their chosen field trips, students headed to DoubleTree Hotel Lloyd Center for exhibits and a banquet. Volunteer college educators and volunteer practicing engineers from the local engineering community directly interacted with the students and their teachers on the various field trips, the various exhibits, and at the banquet. Thank you to SEAO members CJ Marquardt and Lisa Buellesbach for dedicating their afternoon to represent our organization at

At the banquet, students were seated with members of the engineering community and encouraged to ask questions. There were approximately 630 participants at the banquet, a big success for this local event. The dinner was followed by excellent and inspiring talks by Dr. Cristina Crespo of Oregon Institute of Technology and Steven Miles of the Army Corps of Engineers. Thank you to our past SEAO president Amit Kumar, Dave Beh, Michelle Chavez, and Kyle Conner for representing SEAO as hosts at the banquet as well as the sponsorship of our members for sponsoring the event and making this event possible to five local high school students.



Engineers Week Banquet Hall

The volunteers from SEAO all had positive experiences and interactions with several students and hopefully inspired the next generation of engineers!



SEAO Table in Exhibit Hall

the exhibit hall that was visited by 330 students and teachers. Flyers were shared with educators informing them of SEAO YMF presentations that can be provided in their classrooms.

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STRUCTURES CONGRESS 2015



Structures Congress 2015 - Oregon Convention Center
April 23- 25, 2015 - Premier Event for Structural Engineers

[Register Early and Save Money](#)

Join us to:

- Learn from dynamic technical sessions - choose from more than 120
- Take part in the Council of American Structural Engineers (CASE) Spring Risk Management Convocation
- Connect with colleagues - more than 1,200 attendees expected
- Be inspired by two renowned keynote speakers in Plenary Session: Tad McGeer, Ph.D., Founder and President of Aerovel Corporation and Avery Louise Bang, CEO of Bridges to Prosperity
- Earn Professional Development Hours (PHDs).
- Interface with students and young professional.
- Visit Portland for roses, parks, museums, outdoor adventures, great food, microbreweries, and so much more.

View all registration options and choose the one that works best for you. Flex Registration might interest you - learn more about this at [registration option](#).

We expect the hotels to sell out in advance of the official cutoff date. Make your [hotel reservation](#) today.

Quick Links

View [Technical Program](#) 120 technical Sessions.

Instructions [For International Travel](#)

Materials to help [convince your boss](#)

TRADE SHOW VENDORS: THANK YOU!!

SEAO would like to thank the following vendors for their participation at this year's Trade Show in February:

ASC Steel Deck	RISA Technologies
Boise Cascade	Simpson Strong Tie
Contech Services	SR Contractors
CoreBrace	Star Seismic
Galvanizers Company	Trex Company
Knife River	USP
LP Corp	Verco
Mason Supply Company	Web Joist
Powers Fasteners	Weyerhaeuser Trus Joist
Ram Jack	Woodworks
RedBuilt	

YOUNG MEMBER FORUM ACTIVITIES

By: Phil Davis & Seth Thomas

Upcoming YMF Events:

Wednesday, March 18th – YMF Happy Hour —

Location: Ex Novo Brewing Company
2326 N Flint Avenue, Portland

Time: 5:30 pm to 7:30 pm

Bring a friend, coworker, or both and enjoy a beer and some food while getting to know some other young professionals in our area.

YMF Website Info:

<http://www.seao.org/committees/advocacy/ymf/>. Please visit our website for more information on YMF events and information.

SEISMIC EVENTS

[ASCE Webinars \(www.asce.org\)](http://www.asce.org)

Tuesday, April 7, 2015, 9:00 AM – 10:00 AM PT.

[Introduction to the Seismic Design of Nonbuilding Structures to ASCE 7-10.](#)

Friday, April 17, 2015, 8:30 AM – 10:00 AM PT.

[Seismic Evaluation and Retrofit of Existing Buildings: An Overview of Changes to the new ASCE 41-13.](#)

SEAO AWARDS

SEAO is pleased to announce the first annual Structural Engineer Awards Presentation taking place at the September dinner meeting. Projects will be judged on innovative design, engineering achievement and creativity. Awards will be presented in the following categories: New Buildings Under \$10M, New Buildings Over \$10M, Renovation/Retrofit, and Special Use Structures. The submission form will be available in the May newsletter. Start thinking about projects you've completed within the last two years that you might like to submit.

CITY OF PORTLAND CITY OF PORTLAND'S TITLE 24.85 SEISMIC DESIGN REQUIREMENTS FOR EXISTING BUILDINGS

The City of Portland is proposing to revise Title 24.85 **"Seismic Design Requirements for Existing Buildings"**. In December 2014, Bureau of Development Services, City of Portland, requested comments and feedback on the proposed changes from interested parties. The comments submitted in response to this request were considered by the City's Structural Advisory Board in February 2015. The recommendations of the Structural Advisory Board to the proposed changes and the comments along with the revised proposal are posted on the Bureau of Development Service's website at <http://www.portlandoregon.gov/bds/>.

The Bureau of Development Services is interested in getting your feedback on the revised proposed changes. Since comments to the original proposal were due and submitted by December 31, 2014, we request that new comments be limited to recommendations of the Structural Advisory Board and resolution of previous comments submitted. Please email your comments to amit.kumar@portlandoregon.gov by **March 27th, 2015**.

IBC CODE INFORMATION

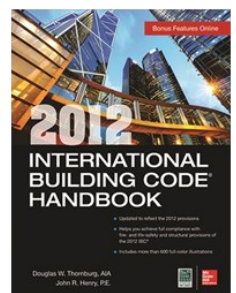
EXCERPT FROM 2012 IBC HANDBOOK

1704.2 Special Inspections.

The owner is responsible for the employment of special inspectors meeting the approval of the building official and all costs associated with the employment of special inspectors. Note that the special inspectors must be employed by the owner, or the responsible registered design professional acting as the owner's agent, not by the contractor or builder. This ensures independence of the special inspector and avoids any potential conflict of interest that could occur if the special inspector were employed by the contractor or builder. Note that the special inspections required by Chapter 17 are in addition to, not in lieu of, the jurisdiction inspections required by Section 110.

There are exceptions to the requirement for special inspections for minor work or work not required to be designed or sealed by a registered design professional, Group U occupancies accessory to a residence, and prescriptive cold-formed steel or wood light frame construction. The exemption from special inspection of R-3 occupancies was deleted in the 2009 IBC because the structural systems in modern single-family residential buildings can be as complex and challenging as commercial structures, especially large custom homes. Engineered seismic-force-resisting systems are very common in residential structures in Seismic Design Categories D, E, and F. Group R-3 occupancies often have components that require special inspection such as high-load diaphragms, high-strength concrete, structural steel frames, high-strength bolting, complete penetration groove welds, engineered masonry, and deep (pile) foundation systems. The exemption for Group U occupancies accessory to a residential occupancy is for those structures that are typically not required to be designed by a registered design professional or those designed and constructed in accordance with the *International Residential Code*® (IRC)®. Exception 1 does not necessarily mean that inspections are not required, only that they are not required to be made by a special inspector. However, the above comments regarding structural systems used in the R-3 occupancies could also apply to U occupancies. It is not inconceivable that a large private garage could have structural components that would require special inspection. Exception 1 refers to "conditions in the jurisdiction" as a possible exception. The primary conditions envisioned by the code in this case refer either to the jurisdiction having the resources and skill level necessary to perform the requisite special inspection tasks, thus obviating the need for a special inspector hired by the owner, or the work is of a minor nature in the opinion of the building official. Note that this exception for special inspection cannot be invoked by the owner. One purpose of the exception is to allow jurisdictions to perform special inspections if the jurisdiction so desires. Exception 3 waives special inspection for prescriptive light-frame construction of cold-formed steel or conventional wood structures. Section 2211.7 applies to prescriptively framed detached one- and two- family dwellings and townhouses less than or equal to three stories constructed in accordance with AISI S230.

This excerpt is from the 2012 International Building Code Handbook, authored by John Henry, PE and Doug Thornburg, AIA. The book is available at shop.iccsafe.org. Use ID # 4000S12.



SEA NW CONFERENCE JULY 16-18, 2015

Structural Engineers of the Northwest!

On Page 9 is the **BRING A GUEST Invitation** for the 2015 SEA Northwest Conference!

- This is **NOT your typical conference** where you travel to a beautiful city and then stay inside a bland, windowless conference room!
- We have you **JUMPing** to multiple venues to fully experience and enjoy Boise!
- Special social events have been planned to be **FUN** for you and **FUN** for your guest!
 1. Dinner on the top floor of the tallest building in Idaho.
 2. Dinner at the Boise Art Museum with special local entertainment.
 3. Happy Hour* on the rooftop of The Owyhee.
 4. Boise River group float.
 5. BBQ and games in the park.
- **BRING A GUEST**- Spouse, Significant Other, Friend, Kids, or your next door neighbor!
- While you are learning they can be playing:
 1. Shopping Boise's boutique stores.
 2. Hiking the foothills or strolling along the river greenbelt.
 3. Wine tasting.
 4. And so much more!
- When: July 16-18, 2015
- Where: Downtown Boise, Idaho
- **P.S. You also get 12 PDH's!** (Bonus PDH's if you are a **Delegate, Young Member Leader, SEA Board Member/Officer, or SEA Committee Chair.** More on this later.)

*Happy Hour is a 21 and over event

For more information on the 2015 SEA Northwest Conference go to: www.SEAIdaho.org.

You can now LIKE us on **FaceBook**, FOLLOW us on **Twitter**, and CONNECT with us on **LinkedIn**

I hope to see you all this summer!

Sarah McClendon
2015 SEA Northwest Conference Host

MEETING NOTICE



PROFESSIONAL ENGINEERS OF OREGON
A chapter of the National Society of Professional Engineers



MEETING NOTICE Columbia Chapter

Date: April 7, 2015
Time: 6:00 PM
Where: Hayden's Grill
8187 SW Tualatin Sherwood Rd
Tualatin, OR 97062
Fee: \$30.00; \$35 for non-members
RSVP Required

Panel Discussion on Engineering Education in Oregon

The Professional Engineers of Oregon, Columbia Chapter will host a panel discussion on Engineering Education in Oregon. The panel will consist of key representatives from Oregon Engineering Schools including Dr. Renjeng Su of Portland State University, Dr. Sharon Jones of the University of Portland, Dr. Devlin Montfort of Oregon State University, Dr. Dietrich Steinmetz of Portland Community College and Dr. Mateo Aboy of the Oregon Institute of Technology. It will take place on April 7, 2015, at Hayden's Grill, 8187 SW Tualatin Sherwood Rd, Tualatin, OR 97062. We will have an opportunity to hear from some of these key players on how they see Engineering Education and give attendees an opportunity to respond.

Registration is from 6 to 6:30 pm, social hour and dinner from 6:30 pm to 7:30 pm with the panel discussion to follow.

For more information contact Christian Steinbrecher, P.E., PEO Columbia Chapter Program Chair, cfs@CaRPEngrs.com or 503-297-4827. Register on line at <http://www.oregonengineers.org>. PDH hours available to attendees.

TECHNICAL ARTICLE by JOSEPH WALTON SE, and PETER HATTON GM, STEEL ENCOUNTERS

Steel Deck Basics

I have recently had the opportunity to become acquainted with the many diverse aspects of steel deck, including product options, alternates, and installation issues. Just as the codes evolve, so do the steel deck product offerings. Some products fade from the market as more economical alternatives replace them. Keeping current with the manufacturer's product evaluation reports and literature is important to ensure specifications are consistent with products currently being produced.

I would like to discuss the basic aspects of steel decking in an effort to insure all of the stakeholders are on the same page in the hopes of utilizing the benefits of steel decking for maximum benefit..

Deck Material

Structural steel decking is produced from cold rolled galvanized or painted, non-galvanized sheet steel. The minimum yield strength which is permitted by code for light gage steel structural elements such as deck is 33 ksi (Grade 33) however 50 ksi (Grade 50) material is now becoming common for west coast manufacturers. Adjusting the gage can impact the strength, flexibility and serviceability. A typical starting point for deck design is 20 gage with adjustments made to fit the needs of the structure.

Be aware that 22ga and 20 ga are prone to dunnage denting. If an area on your project is public space, (eg the Commons or Gym in a school) caution your client of that likelihood. While those projects would be shipped with double dunnage, that only reduces the potential for damage but does not eliminate.

Deck Profiles

Common deck profiles are B (1-1/2"), N (3"), and W (2" or 3"), and Form deck (9/16" or 1-3/8"). Each profile designation is associated with a profile depth, panel width and flute spacing.

Diaphragm Shear and Flexibility

Using steel deck as a diaphragm is a common way to distribute lateral loads to the vertical lateral force resisting elements. Adjusting the deck thickness, support spacing, and connections of the deck to itself and supports can create a suitable and economical diaphragm. Shear values for deck systems from west coast manufacturers have increased significantly over time with the development of 'punchlok' pneumatic sidelap attachments. When diaphragm performance is a design consideration, consider specifying the minimum design shear and maximum flexibility required on the drawings. This enables the bidders to develop the most economical solution.

If diaphragm flexibility is critical, be sure to state that maximum value.

A great tool for determining lowest installed cost of a steel roof deck diaphragm can be found here....a very slick calculator for working all this out.

http://www.vercodeck.com/verco_calc/

Start by selecting your criteria and then 'Design', Filter for attachments (Hilti pins) , gauges (20), deck types (PLB) and it will provide results sorted in order of lowest to highest installed cost. (The Index 1.0 being lowest installed cost) Field labor in the NW is generally costed at \$75/hr.

Deck Finishes

Steel deck is made from galvanized or non galvanized sheet steel. (ASTM A653 or A651). The latter is always supplied primed but should never be used in a humid environment like the Pacific North West or Hawaii. It may demonstrate surface rust upon delivery and at any time afterwards leading to costly field repairs and finger pointing between all parties. A number of NW TI projects have revealed old non-galvanized roof decks with significant rust damage due to condensation and leaks.

Galvanized deck is most commonly specified as G60 (0.6 oz of zinc/sq ft or, 0.3 oz/sq ft per side). A G90 zinc coating provides greater protection and is an inexpensive add-on for exterior exposure, or humid environments. Galvanized deck can also be provided with either a 0.3 mil (0.003") grey or 0.6 mil (0.006") white underside primer. Remember, it is a primer and may not serve well as a finish paint, although for an informed Architect and Owner, it might. The double white primer has been used successfully in warehouses to enhance the interior lighting and reduce lighting costs – it does look good.

Did you know prime painted steel deck is coil-coated first and then roll-formed? The paint has to be tough and flexible to undergo the severe stresses of roll-forming without cracking or peeling.

There are specialty deck manufacturers who fabricate the dove-tail decks and deep decks, acoustic or non acoustic. Those have their place and, while dove-tail in particular appears more expensive in initial cost, it can serve as an architectural ceiling as well as structural deck and thereby save the cost of that architectural product and/or acoustic treatment, and be less expensive overall.

Manufacturers of dove-tail decks offer high performance paints for special applications like natatoriums. Coil coated high performance paints may have a higher initial cost, but eliminate field painting and are less expensive overall.

Did you know that galvanized steel sheet is passivated? What is that? It's a coating applied to minimize white rusting of the steel deck prior to installation. It may linger and have a greasy feel to it. If the bare galv deck is to be field painted, most Painters are aware of this and how to deal with it.

Do you still specify 'phosphatizing' ? That is an archaic term and a toxic process that is, for west coast manufacturers at least, no longer used. State of the art, non-toxic cleaning solutions are now used but the term lingers in old specs.

Acoustic Deck:

There are many decisions to be made when specifying and designing with acoustic deck. An acoustic consultant is almost essential. But know that the NRC values vary for each frequency in the audible spectrum and are 'averaged' for most purposes. NRC values are dependent upon the roof assembly and in particular, the board and thermal insulation above the perforated acoustic deck.

So an acoustic specialist must be involved to determine what is important for your project. Then you can think about structural requirements.

Economics

There are a few rules of thumb to follow in order to keep steel decking practical and economical.

- Zoned diaphragms – With larger buildings, it is typically cost effective to zone the diagram, varying deck gage and / or deck attachment patterns. Typically the use of 3 or 4 zones strikes a reasonable balance between economy and constructability. Show the diaphragm values you need, not a manufacturer's catalogue values, and provide a tolerance. (eg 900 plf +/- 5%) so bidders can offer cost-effective solutions and not have to increase from 20ga to 18ga for 60,000 sq ft of roof because they are off by 30 plf.
- Deck span – Maximize the deck spans or minimize the deck gage. Installers' pricing is based on 'pieces handled'. Larger deck spans means fewer joists (or supports) and fewer days on site & lower installed cost. Typically specifications require a 3-span minimum which is consistent with most manufacturer's published diaphragm data.

TECHNICAL ARTICLE by JOSEPH WALTON SE, and PETER HATTON GM, STEEL ENCOUNTERS

- Minimize / eliminate one and two-span situations. Those are above all dangerous and add to installers' risk, time & costs for safety measures.
- Pin fasteners at supports – Consider the use of pins such as Hilti for deck attachment and at the very least, add a note “pin attachment systems may be used with the prior approval of the EOR” so they can be proposed by the installer when it makes sense. . They are the standard for large roof diaphragms. Shear capacities of deck systems using pins and pneumatic sidelap connections often match those previously attainable only with welding.
- Furthermore, unlike welding, pins & Punchlok attachments do not damage the paint systems on the deck or the support steel. The absence of field touch-up after installation is a huge savings in time & money alone, especially important when high performance coatings are used.
- Pneumatic sidelap connections - The mechanically clinched sidelap connections created with pneumatic tools (eg PunchLok® system.) have almost eliminated the use of sidelap screws and the always un-popular, difficult and expensive top or side seam welds. PunchLok is strong, fast, reliable, not weather-dependent, and clean, requiring no touch-up. It is also easily inspected.

More rules of thumb are presented by the Steel Deck Institute (SDI). www.sdi.org

Bring A Guest!

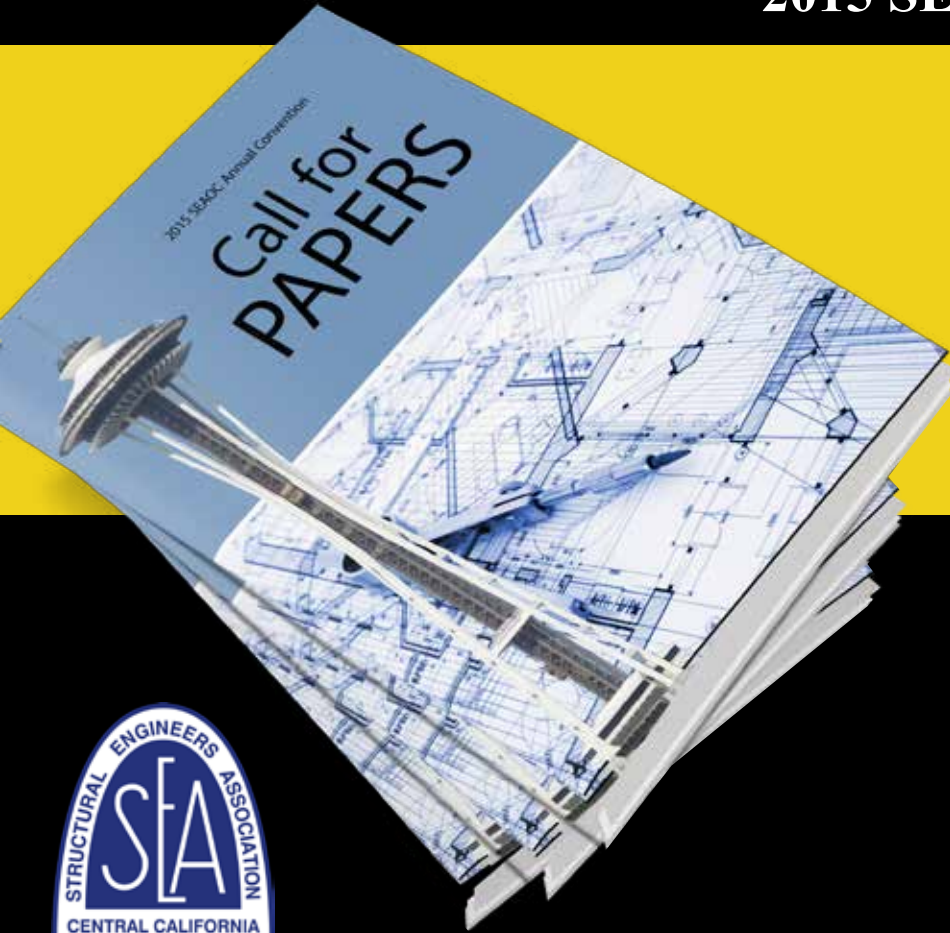
(Or the entire family!)



- ✓ **Explore Boise!**
- ✓ Shop, eat, relax and play
- ✓ Finally, someone will get your jokes! (Bring a witness for this!)
- ✓ **A much needed Vacation**
- ✓ Kids can splash and play in the pool
- ✓ **Float the Boise River**
- ✓ Enjoy the art museum!
- ✓ **Date night with a view!**
- ✓ Go on a wine tour- or brewery tour
- ✓ **Spoil yourself at a boutique hotel**
- ✓ A Staycation!
- ✓ **Touch the blue turf**
- ✓ Hike the foothills
- ✓ **All the cool Structural Engineers will be there!**
- ✓ **All this plus an Engineering Conference!!**

Now accepting Exhibitor applications and Sponsors!
For more information go to SEAIIdaho.org

2015 SEAOC Annual Convention



Have you submitted your abstract yet? Don't be left out. Visit seaocrocks.com and submit your abstract today!

LAST CALL!



Abstracts are requested for papers to be presented as part of the Technical, Business Practice, and Younger Member Programs of the 2015 SEAOC Convention, to be held September 9 through 12, 2015 at the Hyatt Regency, Bellevue (Seattle area), Washington. Interested presenters should upload an abstract of their paper (300 words or less), a brief bio (500 words or less).

The deadline for receipt of abstracts has been extended to Monday, March 23, 2015. Please visit <http://seaocrocks.com> and submit your papers now.