

Newsletter of the Structural Engineers Association of Oregon

SEAO

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ONNECTIONS

February 2017 Volume 17 Issue 4

Upcoming SEAO Meetings and Events:

Wednesday, February 22, 2017: Annual SEAO SF Tradeshow

Location: Monarch Hotel & Conference Center, 12566 SE 93rd Avenue, Clackamas, OR Mini-Seminar Times: 12:30 pm to 5:15 pm Trade Show Hours: 5:00 pm to 8:00 pm PDH Credits Available: 5 See Pages 3 and 4 for additional information.

Thursday, February 23, 2017: 53rd Annual Engineers Week Banquet - Host a High School Student

Topic: Engineering Global Health Speaker: Evan A. Thomas, P.E., Associate Professor and Director of Sweet Lab at PSU Time: 6:30 pm to 8:30 pm Location: Lloyd Center DoubleTree by Hilton Hotel, 1000 NE Multnomah Street, Portland OR Visit website to become a sponsor <u>http://www.oregonengineersweek.org/sponsorship/</u> <u>sponsor</u>, or see flyer on Page 11.

Friday, February 24, 2017: Friedman Family Visiting Professional Lecture

Topic: Predicting Earthquake Hazards and Developing Seismic Design Ground Motions in the Cascadia Subduction Zone: What We Know, Don't Know, and the Challenges Ahead Speaker: Ivan G. Wong, Principal Seismologist, Lettis Consultants International Time: 3:00 pm Location: OSU Campus

See page 15 for additional information.

Thursday, March 2, 2017: YMF Site Visit

Location: OHSU South Campus Expansion Time: 4:00pm See page 5 for additional YMF information.

Friday, March 3, 2017: YMF Lunch Meeting

Location: Mackenzie Time: 12:00pm See page 5 for additional YMF information.

Thursday, March 16, 2017: YMF Happy Hour

Location: TBD Time: 5:30pm See page 5 for additional YMF information.

Tuesday, May 2, 2017: Oregon ACI Seminar

Topic: Troubleshooting Concrete Construction Speaker: Kim Basham, PhD, PE, FACI Time: 7:00 am to 4:00 pm Location: Crowne Plaza Hotel, Lake Oswego, OR See page 13 for additional information. 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: 9220 SW Barbur Blvd. No. 119 PMB #336 Portland, OR 97219

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PRESIDENT'S MESSAGE: AVOIDING MISTAKES BY: KEVIN MCCORMICK, S.E.



I was reading an article in the Engineering News Record December 2016 edition and came across a story about the failure of a wood

beam connection of a long span pedestrian bridge. The engineering firm was fined by the state board and there are currently lawsuits pending due to the death of a worker. This is a sobering reminder to us all, that when structural engineers make mistakes, people can die. My mentor and the founder of Miller Consulting Engineers, Ray Miller, always had a saying, "what happens when the nun and her three children were walking by?" (What makes this fictitious and a little humorous is the fact that Catholic nuns do not have children of their own.) This made us all smile, but my point is; it made us re-focus on the design and the connections. It does not matter if you are designing a sign that is hanging off a building, a steel frame that will support piping overhead in a processing plant, or even the post-tensioned slab of an office building. If you make a mistake, people will be at risk. We have all heard the saying, "you learn more from your mistakes than by doing it right". Why is that? Do we become complacent with the fact that it has worked so many other times before? Do not be "that engineer" who lets something slide. If it does not look right, it probably isn't. Getting another set of eyes to look at something is always a good idea.

Now, something on the lighter side. The Rolling Bridge is just 39 feet long and, when laid flat, spans across the Grand Union Canal in London. When a boat is set to pass, this unique engineered bridge rolls up into an interesting looking art sculpture on the river bank until the boat passes. Then it unrolls back across the canal for pedestrian traffic. It is constructed of timber and steel. The bridge rolls and unrolls via hydraulic pistons. It is not a massive structure, but it sure is innovative.

A reminder, the SEAOSF Trade Show is coming up on February 22nd at the Monarch Hotel. This is a great place to talk with suppliers, manufacturers, and engineers. Even if you are an "old" engineer, you might be surprised at what you can learn. It is a must attend for all of you "new" engineers. There are a lot of new and interesting items for you to learn about.

- Kevin McCormick

SEAO COMMITTEES

CODE ADVISORY COMMITTEE Seismic Reid Zimmerma

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SEAO SCHOLARSHIP FOUNDATION ANNUAL TRADE SHOW AND MINI-SEMINARS WEDNESDAY, FEBRUARY 22, 2017

This event provides a good deal of income to the scholarship fund in large part due to the continued support and participation of the vendors. Our past shows have been a great benefit to both the vendors and the foundation. To continue this success, we need our members to support the show and its participants with their attendance. You will have the opportunity to view a variety of products and discuss problems and ideas. It is an excellent chance for new SEAO members to see what materials and products are available and currently in use in the field.

The mini-seminars will run from 12:30 pm until 5:15 pm, allowing vendors to go more in depth and offer more information to the members than might be available at the Trade Show alone. See page 4 for the list of mini-seminars available.

As always, donations — no matter how big or small — are very much appreciated. Remember that all proceeds will help the organization reach our scholarship goal. The Trade Show is free to all SEAO members and includes a meal and two beverages. We look forward to seeing you at this year's Trade Show!

Date: Wednesday, February 22, 2017

Location: Monarch Hotel 12566 S.E. 93rd Avenue Clackamas, OR

Schedule:

Mini-Seminars:12:30 pm to 5:15 pm (See schedule on page 4)Trade Show:5:00 pm to 8:00 pmDinner:Served at 6:00 pm

Cost: Complimentary dinner and two beverages for SEAO members \$25 per person for non-members

Reservations:

Please call or email Jane Ellsworth before noon on Monday, February 22, 2016. You only need to RSVP for the Trade Show. It is not necessary for mini-seminars. Phone: (503) 753-3075 Email to: Jane@seao.org

PDH Credit:

SEAO recommends a maximum of 5 total hours of PDHs for the event. This includes a maximum of one hour for each seminar attended and one hour to those who register their attendance for documentation at the Trade Show. See Jane Ellsworth to sign-up specifically for that documentation.

SEAO SCHOLARSHIP FOUNDATION TRADE SHOW **MINI-SEMINAR SCHEDULE** WEDNESDAY, FEBRUARY 22, 2017

SANDY WILLAMETTE ROOM

12:30 - 1:30 PM: International Masonry Institute

Tips to Optimize Structural Masonry By Bob Campbell

The focus of the seminar is to give participants a clearer understanding of the interrelationship in masonry buildings between materials, architecture, engineering and construction. Taught using a "Tips" format, the seminar will highlight areas where proper understanding of masonry - from architectural and engineering design to materials to construction methods - can result in better engineered and completed buildings. Ways to use existing materials more effectively, explanations of the effect of one selection on another, discussions of new materials and current code and specification provisions will be included.

1:45 - 2:45 PM: STRUCTURLAM

Prefabricated Mass Timber is the Future By Erica Spiritos

Cross-Laminated Timber paves the way for a new paradigm of construction centered on renewable building materials, 3D modeling and coordination, cutting-edge prefabrication technology, and quick, clean, guiet assembly with minimal on-site waste. CLT is a multilayer wood panel, with adjacent layers oriented crosswise for rigidity and stability. Used for floors, roofs, and walls, it enables design and construction of tall timber buildings that are safe, reliable, natural, and beautiful. In this talk, we will discuss the current state of CLT fabrication, the design possibilities for a material that is both structural and architectural, and the how the CLT industry is raising the bar for quality, bridging the gap between the rural and urban environments, and inspiring collaboration in the construction industry.

3:00-4:00 PM: Simpson Strong Tie

Strong Frame Special Moment Frames By Shalini Prochazka

The Strong Frame special moment frames by Simpson Strong-Tie are cost-effective alternatives to traditional, site-built moment frames. The special moment frames feature Yield-Link® Structural Fuses that enable frames to be repaired after a seismic event by removing the yielded fuses and bolting on new ones. The Strong Frame® Yield- length effects in the design parameters. Link[™] structural fuse connection is listed in ANSI/AISC 358-16, Chapter 12. The presentation will discuss features, benefits and applications of the Strong Frame® Ordinary and Special Moment Frame and discussing the options available for the designers.

4:15 - 5:15 PM: KNIFE RIVER

ARCIS Thin Prestressed/Precast Concrete Technology

By Zak Perkerewicz and Dusty Andrews

This seminar will explain the benefits and applications of ARCIS Precast Concrete Panels. ARCIS Panels can range from 3/4" to 2" thick and can be used in numerous applications. Attendees will learn how this product is designed, manufactured, and installed. Also, the presentation will showcase multiple local projects that have utilized this technology.

CLACKAMAS ROOM

12:30 – 1:30 PM: Cascade Design Group

Structural Software By Peter Bambe

See the latest developments in the most intuitive structural software in the design industry which allows you to design, beams, joists, rafters, columns and footings, often in less than a minute. You will see how you can design a 25 member project in less than 30 minutes using our new and revolutionary StruCalc tool called Load Tracker which allows you to quickly and easily transfer member reactions through an entire project.

1:45 - 2:45 PM: SCAFCO

Cold-Formed Steel Product Innovations and New Solutions. By Jason Warren.

The presentation will include information and an overview of the PLC4 Bypass Slab Slide Clip, Seismic Drift/Deflection Track, The I-Stud Shaftwall System with 43mil Thickness, and lastly Back-to-Back Bolted Member capabilities. We will discuss the new testing which has been completed on these products as well as their third party certification, and how they can be used to solve problems which commonly occur in the steel framing industry.

3:00 - 4:00 PM: CoreBrace

Effects of Increasing Length on Buckling-Restrained Braces Design

Values

By Maria Chumbita

A comparison of test results from long (40') and short (20') Buckling-Restrained Braces (BRBs) with the same core area and casing size will be presented, together with a proposed approach to account for

MASS TIMBER/CLT COMMITTEE NEWS

The SEAO Mass Timber/CLT Committee was formed due to a general increase in the interest of mass timber design and in response to the *Oregon Statewide Alternate Method No. 15-O1- Cross Laminated Timber Provisions*, which amends ASCE 7-10 Table 12.2-1 to include cross-laminated timber shear walls. While the Statewide Alternate Method provides global seismic design coefficients and factors, it is silent on the design of individual lateral load resistant elements. The purpose of the Committee is to serve as an SEAO member resource for the design of mass timber and CLT elements and buildings in general.

The Committee is pleased to announce a new resource document for information on mass timber design and construction. This resource document may be accessed by SEAO members from the Mass Timber/CLT page on the SEAO website. It is in spreadsheet format and includes folders for:

- Website Links to Code Councils
- Lists of Building Codes and Design Guides
- Titles, Publications and Authors of Published Research
- Titles, Publications and Authors of Research in Progress
- Titles and Authors of Non-Technical Publications
- Cross-Laminated Timber Suppliers in North America
- Cross-Laminated Timber Suppliers (Outside of North America)
- Cross-Laminated Timber Connector
- Product Data Reports

Links have only been supplied for websites that are professional websites. If you wish to locate information on an item that does not have a link, a "Google Search" can be performed based upon the title and author's name. Please read the disclaimer on our web page. It is the document resource user's responsibility to conform to all copyright laws for any information they access.

The resource document is intended to be a living database of technical and non-technical resources known to the Committee. The Committee's mission is not to provide direct design recommendations. Rather, our intent is to provide information to help facilitate design by the Engineer of Record, who must make their own judgments about the design of mass timber and CLT elements. The document will be updated periodically based upon SEAO and Mass Timber Committee member input.

Please visit the Mass Timber/CLT Committee web page at <u>https://www.seao.org/committees/technical/clt/</u> to access the resource document.

ASCE Webinars

Tuesday, February 28, 2017, 8:30 AM – 10:00 AM PST. Design of Lateral Load Resisting Systems in Masonry Buildings.

Tuesday, March 7, 2017, 8:30 AM – 10:00 AM PST. 2015 IBC, ASCE 7 and 2015 SDPWS Seismic Provisions for Wood Construction.

Friday, March 31, 2017, 8:30 AM – 10:00 AM PST. Practical Nonlinear Modeling and Analysis of Buildings including a Case Study.

YOUNG MEMBER FORUM ACTIVITIES

BY: KATE PFRETZSCHNER AND DEANNA KUHLMAN

Upcoming YMF Events:

Thursday March 3^{td} – Site Visit

Location: OHSU South Campus Expansion Time: 4:00pm Space is very limited! Please contact <u>dkuhlman@mcknze.com</u> or <u>seth.thomas@kpff.com</u> for information and to reserve your spot

Friday March 3^{td} – Lunch Meeting

Location: Mackenzie Time: 12:00pm to 1:00pm Additional site visits and volunteer opportunities will be planned! Lunch will be provided.

Thursday March 16th – Happy Hour Location: TBD Time: 5:30pm to 7:30pm

March — Winterhawks Game

YMF Website:

Please visit our website for more information on YMF events:

http://www.seao.org/committees/advocacy/ymf/ .

JANUARY MEETING RECAP BY: DEANNA KUHLMAN

Topic: Structural Repairs on the Marion County Courthouse Square

Speaker: Mike Ahern, Pivot Engineers & Dave Clark, Structural Group

The Marion County Courthouse Square building was opened in September 2000. It consisted of a three-story PT transit mall and a five story PT office building. Prior to July 2010, several issues became apparent to the tenants of the building. Large diagonal cracks were visible in the basement, in columns, and in architectural finishes. The office building's envelope was also having issues with operability and

water intrusion. Once evaluated by an engineer, the building was completely evacuated in September and requests for proposals for repair were sent out. The design build contract was signed in 2012 and the building reopened 18 months later in April of 2014.



On top of any typical repair issues, this project was especially challenging due to bad press (the newspaper was across the street), having to displace a full office building, coordinating the transit hub, and finally the fact that a prominent government building was declared unsafe a mere 10 years after it was built. They estimated that it would cost \$50-\$60 million to build a new square, whereas the actual repairs came in around \$25 million.

This project required several months of investigation in addition to design. Several outside engineers were pulled in to aid the litigation process. Analysis and investigation continued through design to coordinate accurate conditions, and engineers designed repairs using a performance based design. A peer review was also required for the retrofit design. In addition to the rigorous review, the design team had to produce 4 sets of drawing packages to the contractor to accommodate the demanding CA schedule.

After a full investigation, it appeared the as built drawings were consistent with construction. The team used nondestructive testing techniques that include: radar, impact echo (good for flat plate slabs), pull bond testing, and petrography.

In a nutshell, the original building was under designed and suffered from a lack of oversight through design and CA. The following are the three main structural concerns of the original building.

Punching Shear at Columns

Almost a quarter of the office building columns had punching shear issues. Several punching shear issues were reported in the transit mall as well. The punching shear reinforcement was under designed,

and exceeded the maximum shear capacity. To retrofit the columns, a shear cap was added. Dowels ran vertically into the face of the slab and horizontally through the flexural reinforcing in the column. It was especially challenging to coordinate drilling to miss the existing stirrups, PT, and



flexural reinforcement. It was also key to not demo any of the existing column, because they were being utilized. The new column cap relied entirely on shear friction to transfer shear into the existing column.

Flexural Failures at Columns

After analysis, it was found that several columns were under designed flexurally. The unbalanced moments from uneven bay spacing drove up the moments on the columns that ranged from 12"x12" to 12"x26". To repair the columns, they increased the effective depth of the column. Vertical rebar was added with some shear reinforcement doweled into the column to confine it. FRP was used to create additional confinement and strength for the column. To fully develop the vertical bars, they had to be passed through the slab for additional anchorage.

Flexural Failures at Slabs

Any repairs to the transit mall had additional challenges because everything was visible to the public. There were minimal architectural finishes to cover the structure. The original wearing surface on the transit mall was concrete pavers over the PT deck. They used this to their advantage and utilized the paver height for a structural bonded overlay. The overlay was composite and increased the effective depth of the slab. Epoxy dowels were used at 2ft oc over the entire slab. That resulted in over 3,000 holes drilled in the PT deck, and only 6 strands were hit. They used a low shrinkage mix to transfer shear into the slab.



Handling the press was key on this project. They gave regular progress updates, provided training sessions (CFRP training), gave tours to public officials, and provided training opportunities for firefighters. All of these slowly helped repair the reputation of the courthouse

square, so that the question from the public changed from "is it going to fall down?" to "when will it be done?"

IBC INFO

1603.1.8

Special Loads

CHANGE TYPE: Addition

CHANGE SUMMARY: The dead load of any rooftop-mounted photovoltaic (PV) solar panels must now be identified on the construction documents.

2015 CODE:

1603.1.8 Special Loads. Special loads that are applicable to the design of the building, structure or portions thereof shall be indicated along with the specified section of this code that addresses the special loading condition.

1603.1.8.1 Photovoltaic Panel

Systems. The dead load of rooftop- mounted photovoltaic panel systems, including rack support systems, shall be indicated on the construction documents.

Photo Courtesy of Peter Kulczyk

CHANGE SIGNIFICANCE: With the increasing use of photovoltaic (solar) panels on rooftops, it has become clear that there is a need for specific code requirements related to these panels. Such panels are considered fixed equipment and as such would fall under the definition of dead load. Rooftop PV panels are considered special loads and their dead load should be indicated on the construction documents. The code language was revised to clarify that the provisions apply to roof loads for the design of the roof structure, not to the design of the photovoltaic panels or modules themselves. A new definition of "photovoltaic panel system" has been added to Section 202, and new Section 1607.12.5 provides loading requirements for roof structures supporting PV panel systems.

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



SUPPORT THE ASCE/AISC NATIONAL STUDENT STEEL BRIDGE COMPETITION AT OSU

Oregon State University has the honor of hosting the 2017 National Student Steel Bridge Competition (NSSBC) on May 26-27. Help us to make the 2017 NSSBC a resounding success and to keep student registration fees low by becoming a sponsor!

• Platinum Sponsorship Level

- Contribution: \$5000 +
- Benefits: Booth at the display event; Ad space (3.5"x3") in the competition guide; 2 tickets to the awards banquet; Logo on the competition shirts and website
- Gold Sponsorship Level
 - o Contribution: \$2500
 - Benefits: Ad space (3.5"x3") in the competition guide; 2 tickets to the awards banquet; Logo on the competition shirts and website
- Silver Sponsorship Level
 - o Contribution: \$1000
 - Benefits: 2 tickets to the awards banquet; Logo on the competition shirts and website
- Black Sponsorship Level
 - o Contribution: \$500
 - Benefits: Logo on the competition shirts and website
- Orange Sponsorship Level
 - o Contribution: \$100
 - Benefits: Name on the competition shirts and website

Other opportunities for company and NSSBC branded merchandise are also available. If you are interested in sponsoring the 2017 NSSBC event, please contact Chelsea Farnsworth at <u>farnswoc@oregonstate.edu</u>.

ASK A QUESTION, GET AN ANSWER

Do you have a code question you would like to ask the Wind Committee or Snow Committee? SEAO is pleased to announce a simple way for Q&A's with technical committees. Email questions to jane@seao.org, and SEAO will direct your question to the appropriate committee chair for a response. Questions and their answers will be made anonymous and available to the membership on the website <u>www.seao.org</u>.

Committees include: Seismic, Wind, Snow, Code, Vintage Building, and Special Inspections.

NEW MEMBERS

The newest members to join SEAO are:

Michael Clark – Catena Engineers Angeline Stimpson – Mackenzie Eric Heidebrecht – Catena Engineers Brian Klump – Contech Services Serge Alexandre – SIKA

Welcome New Members!!

EMPLOYMENT OPPORTUNITIES

MILLER CONSULTING ENGINEERS, INC. Structural Engineer Portland, OR

Miller Consulting Engineers, Inc. is a well-established structural engineering firm located in Portland, Oregon, is looking for an experienced engineer with four or more years of experience. We provide diversified structural engineering services to a wide variety of clients and design with timber, concrete, masonry, steel and composites. Our consulting firm is a fastpaced business and last year we completed over a 1,000 projects. We offer competitive salaries based on experience, are a family oriented firm, maintain reasonable work hours, and have a great work environment.

A bachelor's degree in civil/structural engineering and a professional engineering license are required (or the ability to take the exam). Our engineers have the opportunity to work on a wide variety of projects including commercial, industrial, residential, towers, retaining walls, specialty structures, seismic analysis/retrofit, and historical restoration of structures. If you are looking for this kind of work environment with diversified structural engineering, please contact us.

MORRISON-MAIERLE, INC. Structural Engineer Missoula, MT

Morrison-Maierle, Inc. has exciting opportunities in our Missoula, Montana office for entry to mid-level Structural Engineers. Morrison-Maierle is anchored in the western United States, and has approximately 300 employees and is currently ranked within the *Engineering News Record's* "Top 500 Design Firms."

Opportunity: Morrison-Maierle is recruiting to fill entry to mid -level structural engineering positions. Duties will include working under the direction of the Project Manager and Task Managers in the execution of project related duties. Qualifications: Master's degree in Civil-Structural Engineering; 0 to 6 years' experience. Engineer Intern certification. If years of experience have been fulfilled, Professional Engineering (PE) license is preferred.

For more details and to apply, please visit our website at <u>www.m-m.net</u>. An Equal Opportunity Employer – Minorities / Females / Disabled / Veterans.

Contact information: email hr@miller-se.com.

VENDOR ADVERTISING

SEAO is now accepting vendor advertising!

Cost of a full page ad running for one month: \$250 - Members \$350 - Non Members

For more information, contact Jane Ellsworth at jane@seao.org.

ERICKSON STRUCTURAL CONSULTING ENGINEERS

Structural Engineer Vancouver, WA

Erickson Structural Consulting Engineers, located in Vancouver, WA, is seeking a motivated and detail-oriented, full-time structural engineer to immediately join our growing and busy office. Candidates must have a BS in civil/structural engineering from an ABET-accredited program and a minimum of 1 year of postgraduation work experience in a consulting structural engineering office environment. We are a small, vibrant company that focuses upon working with existing building structures, including forensic investigations of building structures and failures, remedial design for distressed building structures, structural analyses of existing buildings, design of structural renovations and modifications to existing buildings, evaluation of insurance claims involving structural loss and seismic evaluation and rehabilitation of existing buildings.

The successful candidate must be comfortable with direct client interaction, possess excellent English verbal and written communication skills, and demonstrate familiarity with a wide range of building structural systems. Candidates must also be proficient in, and experienced with, the use of AutoCAD to produce structural construction documents, such as foundation plans, framing plans, elevations, sections and details. This position requires attention to all phases of a project, from initial client meetings and structural design to construction phase jobsite visits. Preference will be given to candidates with experience in the evaluation and remediation of existing building structures.

This position offers a very competitive compensation package, a flexible and family-friendly work schedule and an opportunity to play a significant role in the firm's success. To apply, please send your resume and cover letter to info@ericksonstructual.com.

WISEMAN + ROHY STRUCTURAL ENGINEERS Structural Engineer San Diego, CA

Wiseman + Rohy Structural Engineers is a full service Structural Engineering company with four decades of quality projects constructed around the United States. Most of these projects are in Southern California and western states. We have an opening for an engineer with over 5 years of experience in structural engineering. This position offers the opportunity to participate in challenging and unique projects in all types of commercial structures. We are looking for a highly motivated engineer to become a long-term part of this established company.

Immediate position available. Please Send Resumes To: <u>HR@wrengineers.com</u>.

<u>ROWELL ENGINEERING</u> Structural Engineer Portland, OR

Rowell Engineering, a small and unique engineering firm in Portland, is looking for a full time engineer with structural experience to join their team; preferably a licensed engineer with experience in residential and small commercial structural engineering, but will consider a resourceful entry-level engineer eager to learn. This engineer will have solid communication skills and enjoy working with customers and peers in creating solutions. We offer a competitive salary and benefits package commensurate with the experience of candidate.

Scope of work: The engineering position involves structural analysis and design of residences, apartments, and small commercial buildings. It requires a working understanding in all aspects of residential construction including a solid grasp of the structural aspects of Residential and International Building Codes. Engineering with materials such as wood, concrete, and steel are primary to the structural experience required.

Please submit your resume to toddr@rowelleng.com.

NISHKIAN DEAN Senior Engineer Portland, OR

Nishkian Dean is seeking a Senior Engineer, the candidate should have 5 to 10 years of progressive experience with structural design. The role of this position will be to serve as a Project Engineer / Manager. In this capacity you would be responsible for the structural design of complex structures, coordinating with supporting staff and client interaction. It is critically important that the candidate be comfortable in serving in a leadership role in this position and can demonstrate their experience doing so. The future expectation is that the successful candidate will take a management and ownership position with the firm.

We are seeking individuals that are creative, motivated with a keen interest in structural engineering. If you are looking for a progressive environment with long-term growth potential contact us!

Visit: https://www.linkedin.com/jobs/view/267560085.

Contact: ed.dean@nishkian.com.

LUND OPSAHL Structural Engineer Seattle, WA

Lund Opsahl is a growing structural engineering firm located in the SODO neighborhood of Seattle and we are looking to expand our team of exceptional individuals. Lund Opsahl is known for its technical leadership and creative environment. We are a woman owned business and work on a wide range of project types.

We value the professional relationships within our firm and we believe those values are fundamental to the development of professional relationships outside of our firm. Collaboration within our office as well as with our clients requires commitment and responsibility. Currently we are looking for people in the following positions: Structural Engineer and Design Engineer.

Please visit our website, <u>www.lundopsahl.com</u> for additional information and job descriptions for each of these positions. You can also send inquires and/or resumes to <u>ca-</u> <u>reers@lundopsahl.com</u>.

CATENA CONSULTING ENGINEERS Structural Engineer

Portland, OR

catena consulting engineers provides the personal environment of a small firm while providing the opportunity to work on a variety of projects. Our projects vary in size from a single day's effort to large projects with construction values in excess of \$300 million. You will gain design experience in concrete, steel, timber, and masonry buildings and will work on a wide variety of project types including buildings created for healing, learning, living, and interacting. Due to the technical complexity and challenge of many of our projects, we seek engineers that hold a Master's degree, and that have a desire to learn, grow, and be challenged. U.S. citizenship is preferred. We are currently seeking engineers with 0-6 years of experience in structural engineering for buildings. For a detailed advertisement and to our website http:// submit your resume, visit www.catenaengineers.com/opportunities.php.

KPFF PORTLAND Structural Engineer Portland, OR

KPFF Portland is looking for Experienced Structural Engineers who are motivated and interested in an opportunity for growth. KPFF is about freedom. Freedom to work on what inspires you. Our engineers work on a vast spectrum of projects that are located around the globe: from anchorage of mechanical systems to complex, non-linear analysis of highrise structures. We have the benefits of a large, stable firm but none of the red tape that comes with it. Providing first-class service to our clients is what we're about. We are a group of dedicated, friendly, collaborative, hard-working professionals. Please use the appropriate link below for full details. KPFF is an equal opportunity employer.

Experienced Structural Engineer:

Apply Here:

http://chc.tbe.taleo.net/chc05/ats/careers/requisition.jsp? org=KPFF_2&cws=63&rid=73

WRK ENGINEERS Multiple Engineering Positions Vancouver, WA

WRK Engineers is looking for positive, team oriented engineers to join our firm. We offer a creative, challenging, and energetic environment, and work on a wide variety of structural projects. Our projects include design of commercial, infrastructure, and industrial facilities as well as seismic evaluation, resiliency, and strengthening of existing facilities locally and internationally. Ideal team members will have zero to ten years of experience and be competent designing with all major construction materials. Suitable designers will have an undergraduate in Civil or Structural engineering with a preference for a Structural graduate degree and licensed PE.

We offer competitive salaries, benefits, and flexible work hours.

Visit <u>http://www.wrkengrs.com/careers/</u> to view position descriptions and submit your resume.



Celebrating over 50 years of growing new engineers in Oregon & Washington

53nd Annual E-Week High School Program

You are an essential part of the 53rd Annual Engineers Week High School Program.

Date: Thursday, February 23, 2017

Location: Lloyd Center DoubleTree by Hilton Hotel - 1000 NE Multnomah St.

To participate at E-week, do one of the following:

- 1) Go to <u>http://www.oregonengineersweek.org/sponsorship/</u> for online registration.
- 2) Send in the following form and a sponsor check (see details on next page).

We will contact you with additional day of the event information.

Engineers Week Sponsorship Levels

| | | Sponsor Included on E-week Web and Facebook Pages | Title Sponsor on all Event Publications* | Official Sponsor of College Seminars | Number of Sponsored Students | # Banquet Dinner Tickets for Your Organization |
|------------|---------|--|--|---|------------------------------------|--|
| Platinum | \$2,000 | ~ | 1 | √ | 20 | 15 |
| Gold | \$1,000 | ~ | ~ | | 10 | 10 |
| Silver | \$500 | ~ | | | 5 | 5 |
| Individual | \$75 | | | | 1 | 1 |

*Title sponsors will be included on all event publications if program support is committed by December 31, 2016.

| E-week Sponsor Registration |
|--|
| Organization Name: |
| Is this a public agency or non-profit? If so, do you want to participate in the Exhibit Hall? Yes please – contact me with more information |
| Contact Name: |
| Email Address: |
| Phone Number: |
| Sponsor level - check one: |
| Platinum \$2.000 |
| \Box Gold \$1.000 |
| Silver \$500 |
| Individual \$75 x # of attendees |
| I cannot attend, but I would like to sponsor a student - \$40 |
| Send this form and a sponsor check payable to " <u>ASCE Oregon Engineers Week</u> " to: |
| Tova Peltz c/o Oregon Department of Transportation 123 NW Flanders Street Portland OR 97209. |
| We will confirm receipt of your registration and send more day of event details. Please email <u>tova.r.peltz@odot.state.or.us</u> with any questions. |
| The Engineers Week High School Program is a tax-deductible program affiliated with the American Society of Civil Engineers, a 501c3 non-profit organization. |

| | REGON ACI SEMINAR MAY 2 nd , 2017 | | | | | |
|---|--|--|--|--|--|--|
| OREGON CHAPTER | TROUBLESHOOTING CONCRETE CONSTRUCTION With: Kim Basham, PhD, PE, FACI | | | | | |
| TUESDAY MAY 2 ND 7:00 ^{AM} – 4:00 ^{PM} | CROWNE PLAZA HOTEL 14811 KRUSE OAKS DR LAKE OSWEGO, OR 97035 Bengineers receive 6 PDH's for Attending Seminar Contractors receive 6 CEU's for Attending Seminar | | | | | |
| CDACE IS LIMITED | TO 100 SEATS, SO BE SURE TO REGISTER EARLY!! | | | | | |
| 7:00 ^{AM} -7:30 ^{AM} | REGISTRATION | | | | | |
| AM SESSION | | | | | | |
| 7:30 ^{AM} -8:00 ^{AM} | Continental Breakfast will be provided | | | | | |
| 8:00 ^{AM} -9:15 ^{AM} | Evaluating Low Concrete Strength (75 min) Field vs. Lab Cured, Evaluating Strengths, Non-destructive Testing (NDT) for Strength | | | | | |
| 9:15 ^{^M} -9:30 ^{^M} | BREAK | | | | | |
| 9:30 ^{4M} -10:30 ^{4M} | Troubleshooting Concrete Cracks (60 min) Why Concrete Cracks, Intrinsic vs. Structural Cracks, Restrained-shrinkage Cracks | | | | | |
| 10:30 ^{AM} -10:45 ^{AM} | BREAK | | | | | |
| 10:45 ^{^M} -11:30 ^{^M} | Troubleshooting Concrete Cracks, continued (45 min) Controlling Cracks: Concrete Shrinkage, Jointing & Reinforcement | | | | | |
| 11:30 ^{AM} -12:30 ^{PM} | LUNCH A Full Lunch will be provided | | | | | |
| PM SESSION | | | | | | |
| 12:30 ^{PM} -1:30 ^{PM} | Troubleshooting Formwork and Surface Finishes (60 min) Formwork Pressures, As-cast Finishes - Smooth Form vs. SF-1.0, SF-2.0 & SF-3.0, Imperfections vs. Defects | | | | | |
| 1:30 ^{PM} -1:45 ^{PM} | BREAK | | | | | |
| 1:45 ^{PM} -2:45 ^{PM} | Troubleshooting Steel-troweled Floors (60 min) Aggregate Shadowing, Window of Finishability, Premature Finishing, Air-Entrainment, Surface Delaminations, Crusting | | | | | |
| 2:45 ^{PM} -3:00 ^{PM} | BREAK | | | | | |
| 3:00 ^{PM} -3:55 ^{PM} | Troubleshooting Scaling of Exterior Slabs (55 min) Durable Concrete, Air Entrainment, Premature Finishing, Steel-troweling vs. Floating & Brooming, Overworking the Surface | | | | | |
| 3:55 ^{PM} -4:00 ^{PM} | Closing Remarks | | | | | |

ABOUT THE SPEAKER:



Kim Basham, PhD, PE, FACI KB Engineering, LLC Senior Structural Engineer

EDUCATION

B.S. and M.S. in Structural Engineering from Virginia Polytechnic Institute & State University and a Ph.D. in Civil Engineering from the University of Wyoming.

SPACE IS LIMITED TO 100 SEATS, SO BE SURE TO REGISTER EARLY!!

ACTIVITIES AND EXPERIENCE

Dr. Basham is a member of the ACI 306 – Cold Weather Concrete Committee, ACI 302 – Concrete Floor and Slab Construction, and ACI 347 – Formwork Construction of the American Concrete Institute; American Society of Civil Engineers; The Concrete Society, American Society of Concrete Contractors; and International Concrete Repair Institute. He is a certified Trainer and Examiner for the Concrete Field Testing Technician, Concrete Flatwork Technician & Flatwork Finisher, and Concrete Lab I programs sponsored by ACI. Dr. Basham has taught structural analysis, concrete and masonry design, and concrete material courses at Virginia Military Institute, the University of Wyoming, and the University of Colorado at Denver. He has been an instructor in many concrete seminars and short courses directed towards architects, engineers, and contractors across the United States and abroad. He has published over 150 articles, coauthored *Excavation Safety* published by the Aberdeen Group, and been a contributing writer for *Concrete Contractor* magazine. Dr. Basham has also served as an expert witness in numerous litigation and arbitration cases concerning concrete construction, materials, and engineering.

Prior to KB Engineering, Dr. Basham worked as a structural engineer with Concrete Engineering Specialists LLC, Structural Services Inc. and a concrete/construction engineer with Baker Concrete Construction Inc. Prior to joining Baker, Basham was the Engineering Director for World of Concrete and Contributing Editor for *Concrete Construction* magazine. He was also the Director of Engineering for CTC-Geotek, Inc. and an Assistant Professor of Civil Engineering at the University of Wyoming and the Virginia Military Institute. Dr. Basham specializes in structural analysis, concrete design, mix designs, concrete specifications and preconstruction, formwork, shoring and reshoring, temporary structures, mass concrete placements, concrete forensic investigations, structural evaluations, condition surveys, destructive and nondestructive testing, concrete repair, concrete construction techniques, and concrete technology and research.

Please complete the registration form below (can be filled out in Adobe Acrobat or printed and completed).

| Registrant Name: | | | | | | |
|--|--|--|--|--|--|--|
| Company/Organization: | | | | | | |
| Phone Number: | | Email Address: | | | | |
| Choose Amount of Payment: | \$295 Non-Member | \$265. ⁵⁰ (\$295 Less 10%) OACI Corporate M membership: \$500 yearly fee*, use for all members of your organizatio | ember \$265.50 (\$295 Less 10%) OACI Individual Members for personal use only. | | | |
| Add-On Option: \$200 Vendor Tabletops Available (Space is limited) *To Register for an OACI Membership Please Visit: www.OregonACI.org! | | | | | | |
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Predicting Earthquake Hazards and Developing Seismic Design Ground Motions in the Cascadia Subduction Zone: What We Know, Don't Know, and the Challenges Ahead

Friedman Family Visiting Professional Lecture

Ivan G. Wong

Principal Seismologist Lettis Consultants International Walnut Creek, CA

In only the past two to three decades has it become accepted that the Cascadia subduction zone is capable of generating giant earthquakes (moment magnitude [Mw] 8.5 and larger). Hence in this relatively short timeframe, the earthquake scientific and engineering communities have been playing catchup in terms of characterizing the hazards from such megaquakes and developing adequate seismic design criteria for ground shaking and tsunamis. The next Cascadia subduction zone megaquake will be the most severe natural hazard threat that the Pacific Northwest has ever seen. The Pacific Coast will be subjected to a devastating tsunami with wave heights in excess of 30 m in



some locales and the areas from the coast inland up to 200 km will be hit by strong and sustained ground shaking. Two to three decades is a very short period of time to prepare the region for such formidable hazards and although significant progress has been made, there are significant holes in our knowledge and challenges in filling those holes. In this presentation, I will describe what we know and don't know in terms of the earthquake potential of the CSZ megathrust and its impacts, and how the available information is being used by the engineering community to not only develop seismic design criteria for new buildings, facilities, and structures but probably most challenging, assessing the seismic stability of our existing inventory.

FRIDAY FEB. 24 3 P.M.

Kearney 312 FREE

Food and drinks will be provided.

Ivan G. Wong is the principal seismologist with Lettis Consultants International in Walnut Creek, California. Ivan has more than 40 years of experience in the fields of engineering seismology and seismic geology. Ivan is a past member of the EERI Board of Directors, past President of the EERI Northern California Chapter, past member of the Editorial Board for EERI's Earthquake Spectra, and currently serves as an Associate Editor for the Bulletin of the Seismological Society of America. He is a member of numerous scientific and engineering committees, panels, and working groups including Chair of the Working Group on Utah Earthquake Probabilities and a member of the CISN Advisory Panel, ANSS National Steering Committee, and the American Nuclear Society Working Groups on Probabilistic Seismic Hazard Analysis and Surface Fault Rupture and Deformation.

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