



CONNECTIONS

August 2015 Volume 15 Issue 9

Newsletter of the
Structural Engineers
Association of Oregon

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Upcoming SEAO Meetings and Events:

Friday, September 11, 2015: YMF Lunch Meeting

Location: KPFF Consulting Engineers, 111 SW Fifth Avenue, 26th Floor Conf. Room, Portland, OR

Time: Noon to 1:00 pm

Join us for our bi-monthly lunch meeting to discuss future events and activities. This is a great way to get involved. See Page 4 for additional YMF information.

Friday, September 11, 2015: OSBEELS Symposium: Transportation and Infrastructure

Location: Salem Convention Center, 200 Commercial Street SE, Salem, OR

Time: 7:30 am Check-in; 8:30 am to 11:20 am Morning Program; 11:30 am to 1 pm Lunch and Keynote Speaker; 1:10 pm to 4 pm Afternoon Program

See Pages 9 and 10 for additional information.

Thursday, September 17, 2015: YMF Happy Hour

Location: To Be Determined

Time: 5:30 pm to 7:30 pm

See Page 4 for additional YMF information.

Wednesday, September 23, 2015: SEAO 1st Annual Excellence in Structural Engineering Award Dinner

Topic: Urban Cities and How They Have Developed, With a Spotlight on Portland

Speaker: Paddy Tillett, ZGF Architects LLP

Location: Portland City Grill, 30th Floor, 111 SW Fifth Avenue, Portland, OR

Time: 5:30 pm Check-In & Social; 6:15 pm Dinner and Program

In addition to the Awards and Speaker, we will be Installing the new SEAO Board, announcing the SEAOSF Scholarship Winners, and presenting the Life Member Award.

PDH Credit: 1 Hour

More Information to follow in September's Newsletter.

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



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.

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PRESIDENT'S MESSAGE: SAVE THE DATE—SEPTEMBER 23, 2015

BY: JENNIFER EGGERS, P.E., S.E.



Save the date for **SEAO's 1st Annual Excellence in Structural Engineering Awards Dinner** featuring a very special **Keynote Speaker, Paddy Tillett**, on **September 23rd** at **Portland City Grill**! A few of SEAO's board members and both delegates attended this year's SEA NW Conference in Boise, Idaho. They invited Paddy Tillett of ZGF Portland to speak at their welcome dinner as their keynote speaker.

Paddy is a Principal at ZGF and focuses on planning and urban design. With over 41 years of experience, degrees from Oxford and Liverpool and planning projects across the United States, he is able to draw from a large array of experience.

I have to say, we were all so impressed with his lecture that as soon as we got back to Portland, I was calling him up in hopes that he could be our keynote speaker for our special night. He graciously agreed!! His topic at the NW Conference was on urban cities and how they have developed. It was fascinating and included a number of examples of cities across the US and highlighted Portland. His topic for our night will be along the same lines but will focus more on Portland. I can't wait and you DON'T want to miss it!

We all play a large role in our built environment around us, and Portland is changing so fast. Just look around! Come hear about the bigger picture, and see how what we do changes the way cities move, grow, and are used.

In addition to this great Keynote Speaker, we have four amazing awards to present, a new board to announce, scholarship award winners to honor and a life member award to present. Thank you all so much for the wonderful award entries that we received.

Please note the event will be held at the Portland City Grill. Parking is not a problem in the evenings and will be validated.

Come enjoy the amazing sunset views!! Please bring a guest if you like!

Looking forward to seeing you on **September 23rd**! If you have any questions about this event, please don't hesitate to contact me, another board member, or Lauren DiPalma (Chair of Awards Committee).

Jennifer

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Shawn Stevenson—
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Golf Tournament

Jane Ellsworth—jane@seao.org

Conferences

Kevin McCormick—kevin@miller-se.com

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Seth Thomas—seth.thomas@kpff.com
Phillip Davis—phillip.davis@kpff.com

CONTINUING EDUCATION COMMITTEE

Seminars

Andy Stember—andy@jasenginc.com

Professional Development

Open

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Jane Ellsworth—jane@seao.org

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NCSEA & WCSEA/NWC

Ed Quesenberry—
edq@equilibriumllc.com

Seth Thomas (Alternate)—
seth.thomas@kpff.com

MAY LUNCH MEETING RECAP

BY: DEANNA AMNEUS

Topic: A Structural Safari

Speaker: Ed Quesenberry, Equilibrium Engineers, LLC

Ed is the founding Principal of Equilibrium Engineers. He received his BS in Architectural Engineering from California Polytechnic State University. He is a registered Civil and Structural Engineer in Oregon, Washington, California, Idaho, Montana, and Minnesota. Ed has been a part of the AIA Portland Board of Directors, has served as an adjunct Faculty member at PSU, and is a past President of SEAO.



Equilibrium Engineers is the consulting structural engineer for the Oregon Zoo's New Elephant Habitat. Ed Quesenberry has deemed this project a "structural safari" due to the unique structures, number of building materials, and design constraints from the Zoo. One of which is that the Zoo must remain operational throughout the construction process, which means working around elephants, visitors, and trains. Equilibrium Engineers had the advantage of participating in the master planning of the project for the Zoo and was able to make a smooth transition into the conceptual design for the new exhibit.

The project had many challenges, including geotechnical concerns, lack of building codes pertaining to animal loads, and designing a train trestle with a radius. The site had unconsolidated soils, settlement issues, and was susceptible to landslides. Furthermore, elephants present design challenges not typically encountered in structural engineering. Equilibrium needed to balance observed behavior with past experience. To successfully accomplish this project, the team worked with the Zoo's User Group and groundskeeper.

The project expanded the elephant enclosure from two to six acres and was meant to enrich the experience for the elephants and visitors alike. The bond for the expansion was approximately \$42 million and included 60,000 square feet of new buildings. The project includes a pedestrian bridge and a glass-clad Forest Hall for viewing elephants indoors.

Since there were no formal guidelines for elephant loads, anecdotal data from other zoos was used and the engineers at Equilibrium had to rely on engineering judgment. Damage tolerance was critical to communicate to the owners. Displacement sensitivity could determine the amount of attention the elephants would pay to an object—if it moves, they consider it a toy. Zoo management had to decide the level of acceptable damage to bollards and other equipment; as designing for no damage was not a cost option that was available to the Zoo.

Each elephant has its own personality and design loads. To simplify analysis the largest elephant, Packy, was used as the design elephant. At 14,000 lbs, the 53-year-old bull is one of the largest elephants in captivity and has a shoulder height around 11 feet. Equilibrium determined three load types: leaning, body impact, and trunk impact. The heights at which these loads are applied



were iterative. The height that was assumed was superseded by observed behavior and rub marks seen in the existing enclosure.

- Leaning loads were 50 to 100% of the design elephant's weight. To verify these loads, Tusko, the younger more aggressive elephant, pushed on a load cell. After just a few moments, the load cell more than confirmed the design loads being used. Leaning loads were considered to have an elastic response—the object should not be damaged and should bounce back.

(Continued on Page 4)

MAY LUNCH MEETING RECAP (CONT.)

- Body Impact loads were typically point loads found using kinetic energy. For this model, a 14,000 lb elephant would run 5 mph into an object. This is the worst case load and more damage is expected.
- Trunk loads occur when an elephant slaps its trunk against the structure. The load is applied at 20 feet high and is a 1,500 lb point load. It was assumed that the elephant does not grab on to the object, due to the presence of protective mesh or other protective means around structure and equipment. Trunk loads should also have an elastic response.

Once all parties were aware of the loads and level of acceptable damage, significant cost savings were realized.

Other unique aspects of the project include insulated cast-in-place concrete walls and the Zoo train. For the tall concrete walls, Equilibrium and the Contractor had to coordinate concrete pumping techniques to balance the wall pressures. For the train, Equilibrium had to become familiar with American Railway Engineering and Maintenance-of-Way Association (AREMA) requirements, which are not typical for structural engineers.

One of the first completed structures was a tall sunshade canopy in the elephant habitat. After a short time in service, the structure had to be field-modified after an elephant noticed the movement and rattling sound that would occur after being nudged. After the elephant noticed the rattling, it kept nudging and pushing on the structure until the structure was moving in a cyclic motion and experiencing a code level earthquake. To mitigate the problem, the rattling noise was silenced and the tall columns were stiffened to deflect at their top a maximum of 1.75 inches versus the original 3 inch allowable design deflection. In general, elephant loads governed the individual component lateral load strengths, while seismic controlled the overall lateral building loads.

More Details:

- The steel in the caging systems was double the amount of structural steel.
- The Zoo Lights event determined some of the dates of completion.
- Elephant staging was integral in the project.
- Four feet of sand is provided as a base in the enclosure for better elephant foot health.
- CLT was used on the visitor service center roof and was the first permitted use of CLT in the State of Oregon.

In summary, this project presented many unpredictable elements and required a critical, mindful design and construction. Equilibrium Engineers and everyone involved in the project learned much about designing for animal and visitor behavior. To date, it has been one of their most challenging and rewarding projects.

YOUNG MEMBER FORUM ACTIVITIES

By: Phil Davis & Seth Thomas

Upcoming YMF Events:

Friday, September 11th — YMF Lunch Meeting

Location: KPFF Consulting Engineers, 26th Floor Conference Room, 111 SW Fifth Avenue, Portland, OR

Time: Noon to 1:00 pm

Join us for our bi-monthly lunch meeting to discuss future events and activities. This is a great way to get involved in SEAO.

Thursday, June 18th — YMF Happy Hour –

Location: To Be Determined

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.

AWARDS COMMITTEE NEWS

By: Lauren DiPalma

SEAO is pleased to announce the first annual Structural Engineer Awards Presentation Dinner at the September meeting, to acknowledge outstanding projects and structural engineering advancement. Projects have been judged by a panel of invited judges from multiple fields related to design and construction and have been based on innovative design, engineering achievement, and creativity.

Submission Categories:

- New Buildings Under \$10M
- New Buildings Over \$10M
- Renovation/Retrofit
- Special Use Structures

Please mark your calendars to attend the Awards Dinner on September 23, 2015 in Portland, Oregon. More information will follow in September's newsletter.

SEAO/OACI ANNUAL GOLF TOURNAMENT NEWS

The annual golf tournament has come and gone and was a great success. It was fully sold-out and all had a hot and wonderful time on the greens.

The SEAO Trophy was awarded to a foursome from VLMK (see below left). The Overall winners of the tournament were the Ash Grove team: James Wells, Doug Gilmer, Dave Denham, and Alan Plusquellec.

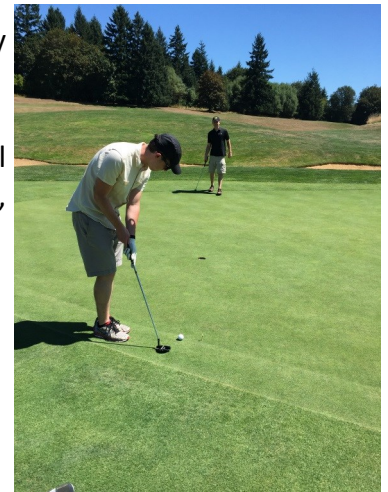
Kevin McCormick was the raffle winner for the grand prize—an Apple watch.



SEAO Trophy Winners: (Team VLMK):
Tony Jenkins, Colby Anderson, Ken Rust,
Stephen Stenberg

SEAO would like to acknowledge our sponsors, who through their generosity make this tournament a success:

Simpson Strong-Tie, Lafarge North America, Whitaker Ellis, Knife River, Raeco, CalPortland Cement, Masons Supply Company, Grace, SR Contractors, Carlson Testing, Dayton Superior, Cemex, Lehigh Cement, LaRusso Concrete, Euclid, W.G. Wright & Associates, Pioneer Waterproofing, Weyerhaeuser, Brundage Bone, Peterson Structural Engineers, Five Star, Ash Grove Cement Company, Contech Services, Kraft Tool Company, TerraFirma, RedBuilt, Ram Jack, Butterfield Color, Pacific Paper Tube, Mayes Testing Engineers, ABC Polymers Industries, Zurn, Quikrete, Powers Fasteners, KPFF Consulting Engineers, W.R. Meadows, Lyons Manufacturing (Patchcrete), WJE, SpecChem, Miller Consulting Engineers, Rust-Oleum



Colby Anderson of VLMK
On the Green



Tony Jenkins of VLMK
Tees Off

CROSS-LAMINATED TIMBER COMMITTEE NEWS

The Cross-Laminated Timber committee is currently gathering information to create a resource document that will eventually be posted to the SEAO website. If you have information that you feel might be useful or wish to contribute any pertinent information on this innovative material, please contact Scott Nyseth via email at scott.nyseth@stonewoodstructural.com.

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 www.seao.org.

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

NEW MEMBERS

The newest members to join SEAO are:

April New Members:

Scott Kent—Residential Engineering LLC
Lucian Gilloan—Livermore Architecture & Engineering, Inc.
Paige Cameron—CH2M Hill
Victor Millan-Simpkins
Eric Anderson—WJE, Inc.
David Guisande—David Guisande Consulting
Mark Voss

May New Members:

Jonathan LaLonde—Student
Cecelia Guess—BergerABAM
Scott Nyseth—Stonewood Structural Engineers
Matt Hoffman—KPFF Consulting Engineers
Landon Harman—Mackenzie

Welcome New Members!!

SEAOC CONVENTION SEPT. 9–12, 2015

The official website has been opened for the 2015 Structural Engineers Association of California (SEAOC) Convention.

The convention will be held at the Hyatt Regency in Bellevue on Seattle's Eastside.

Please visit the website for additional information on programs, social events, and exhibitors. Registration should be formally opened on the website soon.

<http://convention.seaoc.org/>

MEMBER OF THE MONTH: JASON THOMPSON

*BY: MIKE BAIR, TRUS JOIST, AFFILIATE BOARD
DIRECTOR & AUDIT COMMITTEE CHAIRMAN*



The Board of Directors of the Structural Engineers Association of Oregon takes great pleasure in honoring and recognizing Jason Thompson of Catena Consulting Engineers for all of his work in service on the Audit Committee.

Jason is a long-time SEAO member who has served SEAO as a past Board Director, past-Seismic Committee Chair, and member of the Audit Committee for the last two years.

As the Chairman for the 2015 Audit Committee this year, reviewing the 2014 books, the Committee and I found Jason's participation extremely helpful in completing our tasks. Jason volunteered two years in a row in this role, for consecutive years 2014 and 2015, and provided much needed continuity and insight in this process.

Jason was born and raised in California. He received a BSCE degree in 1993 from the University of California, San Diego and a Master's degree in Structural Engineering in 1994 from the University of California, Berkeley. Jason joined Catena Consulting Engineers in 2013 and was elevated to Principal in 2014. He is a licensed Engineer in Oregon, California, Iowa, and Montana.

He is married to wife Carrie and has 10-year-old twins, Ethan and Sadie. He enjoys time with his family, completing projects at his house, and exploring the Pacific Northwest.

The SEAO Board would like to thank Jason for his dedicated service to our organization and the engineering community at large.

CONGRATULATIONS, Jason, for a well-deserved honor!

EMPLOYMENT OPPORTUNITIES

FROELICH ENGINEERS

Structural Engineers Portland, OR

Established structural engineering firm has multiple positions available for structural engineers with two to ten years in structural design of commercial and residential construction. Candidate must exhibit a working knowledge in a variety of materials.

Personal qualifications required:

- Excellent verbal & written communication skills.
- Positive and professional attitude.
- Self-motivated problem solver who can work alone and as part of a team.

Froelich Engineers offers excellent employee benefits including company paid medical, dental, and vision insurance and a company matched 401k plan.

Send us a resume today at
pdx@froelich-engineers.com.

Visit our website at www.froelich-engineers.com.

STONEWOOD ENGINEERS

Senior Project Manager Camas, WA

Stonewood Structural Engineers is looking to hire a Senior Project Manager. This position requires the ability to manage large and complex projects. Excellent communication and organizational skills and the ability to develop a rapport with our clients and support staff is imperative. Must be proficient with the IBC and ASCE 7-10. We are looking for a minimum of 10 years of experience, but will consider less for qualified individuals. Experience in seismic retrofits and concrete and steel design is preferred.

Stonewood Structural Engineers offers a competitive compensation package. Benefits include medical, dental and vision insurance, a 401(k) investment plan, and performance bonuses.

Submit resume and cover letter to
scott.nyseth@stonewoodstructural.com

MADDEN & BAUGHMAN ENGINEERING

Structural Engineer/Project Manager Portland, OR

Madden & Baughman is seeking an experienced structural engineer for a full-time project manager position with opportunities for advancement in the company.

Qualified applicants will have the following:

- A Professional Engineering license in Civil or Structural Engineering in at least one state.
- A minimum of five years of experience in structural design of buildings. Preferred candidates will have project management experience.
- A working knowledge of AutoCAD and/or Revit Structures.

We offer competitive salary and benefits. Compensation will depend on your experience and qualifications.

Please respond to this advertisement by emailing your resume to jobs@maddenbaughman.com. You can find more information about our firm by visiting our website at www.maddenbaughman.com.

Engineer In Training Portland, OR

Madden & Baughman Engineering is seeking an Engineer in Training for a full-time staff engineer position with the opportunity for advancement in the company.

Qualified applicants will have the following:

- A Bachelor's or Master's degree in Civil Engineering from an ABET accredited Civil or Architectural Engineering program. Preferred candidates will have an Engineer In Training certificate.
- Internship or work experience at an engineering firm or with a construction company.
- A working knowledge of AutoCAD and/or Revit Structures.

We offer a competitive salary and benefits. Compensation will depend on your experience and qualifications.

Please respond to this advertisement by emailing your resume to jobs@maddenbaughman.com. You can find more information about our firm by visiting our website at www.maddenbaughman.com.

EMPLOYMENT OPPORTUNITIES (CONT.)

KPFF CONSULTING ENGINEERS

Experienced and Entry Level BIM/CAD Modelers Portland, OR

KPFF Portland is looking for both Experienced and Entry-Level BIM/CAD Modelers who are motivated and interested in an opportunity for growth.

KPFF is about freedom. Freedom to work on what inspires you. Our modelers work on a vast spectrum of projects that are located around the globe: from anchorage of mechanical systems to complex, non-linear analysis of high-rise structures. We have all 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. We are looking for exceptional modelers to join us. Please use the appropriate link below for full details.

Experienced Modeler Apply Here: http://chc.tbe.taleo.net/chc05/ats/careers/requisition.jsp;jsessionid=C7E8EA90347EB424C07FBBB0763537A6?org=KPFF_2&cws=63&rid=96

Entry-Level Modeler Apply Here: http://chc.tbe.taleo.net/chc05/ats/careers/requisition.jsp?org=KPFF_2&cws=63&rid=255

KPFF is an equal opportunity employer.

POWER ENGINEERS

Project Engineer Portland, Oregon

Power Engineers is seeking a Sr. Project Engineer to work in the Substation Civil/Structural Group in our Portland, Oregon office. The successful candidate will have a BSCE from an accredited university, have at least seven to ten years of experience in electric substation civil/structural design and have an active P.E. license and/or the ability to obtain a local (OR, WA) P.E. license within 6 months. Consulting engineering experience and/or experience in the electric utility industry is a plus. In addition to leading and managing project work, the successful candidate will function as an area lead that directly supervises all group civil engineers and technical support personnel.

Please send resume and cover letter to jeff.johnson@powereng.com.

CATENA CONSULTING ENGINEERS

Structural Engineer Portland, OR

Catena 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 have earned 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 to 4 years of experience in structural engineering for buildings. For a detailed advertisement and to submit your resume, visit our website:

<http://www.catenaengineers.com/opportunities.php>.

DCI ENGINEERS

Structural Project Engineer Portland, OR

DCI Engineers is currently seeking a Structural Project Engineer with 0 to 5 years of experience for our Portland office. Working knowledge of steel, concrete, wood, and masonry design is desired.

Our focus on client service makes good communication and customer service skills a must.

The position will involve the design of all categories of seismic and gravity framing systems for every building and material type. License in the State of Oregon is preferred but not required. Please apply via email to: resumes@dc-engineers.com.

2015 OSBEELS SYMPOSIUM: TRANSPORTATION & INFRASTRUCTURE



Presentations Offered

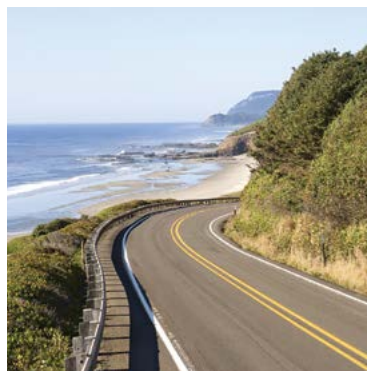
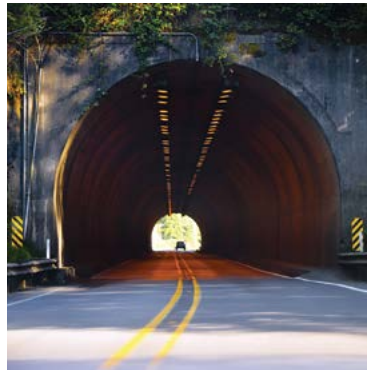
- ◆ Oregon Resilience Plan
- ◆ Mobile Mapping
- ◆ Tilikum Bridge
- ◆ 3D Roadway Design
- ◆ Connected/Autonomous Vehicles
- ◆ Active Transportation Management
- ◆ Digital Signatures

Lunch/Keynote address on the Historic Columbia River Highway.

\$80 Registration Fee

Registration includes lunch, materials, and refreshments during breaks.

Attendance for the full day will earn registrants 8 PDHs. Each hour of class time is worth 1 PDH.



Friday September 11, 2015

@The Salem Convention Center

200 Commercial Street SE, Salem OR 97301

7:30 a.m. Check-in begins | 11:30 a.m. Lunch and keynote presentation

Visit www.oregon.gov/OSBEELS for more information



Oregon State Board of Examiners
for Engineering & Land Surveying
670 Hawthorne Avenue, SE, Suite 220
Salem, Oregon 97301

SEPTEMBER 11, 2015 OSBEELS SYMPOSIUM: TRANSPORTATION & INFRASTRUCTURE

To Register...

Return completed forms to:

Fax: 503-362-5454 | Email: osbeels@osbeels.org

Standard Mail: OSBEELS

670 Hawthorne Ave. SE, Suite 220

Salem, OR 97301

Additional forms can also be found on the

OSBEELS Web site at www.oregon.gov/OSBEELS

For questions, call 503-362-2666

Registration Information

Name:	PE PLS RPP CWRE
Preferred Name on Badge:	Dietary Needs:

Contact Information

Mailing Address:		
City:	State:	Zip:
Phone:	Email:	

Emergency Contact Information

Name:	Phone:
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Presentation Selection (Please choose one presentation from each time slot.)

TIME	PRESENTATIONS	
8:30 am - 9:50 am	Oregon Resilience Plan	Mobile Mapping
10 am - 11:20 am	Tilikum Bridge	3D Roadway Design
1:10 pm - 2:40 pm	Connected/Autonomous Vehicles	Active Transportation Management
2:50 pm - 4 pm	Digital Signatures	

Select payment method (choose one)

Check or Money Order (payable to OSBEELS)	Cash	Amount enclosed:	
Debit or Credit Card (Visa, Mastercard, Discover, or AmEx)		Total charge to card:	
Card number	Exp. date	Security code*	Billing Zip/Postal code

Payment Signature (serves as payment authorization if paying by debit or credit card)

Signature	Date (Mo/Day/Yr)
-----------	------------------

* Debit or Credit Card Security Codes

Refunds and Cancellations - Only written refund requests will be considered. Requests must include name of attendee and method of payment. Requests may be submitted via standard mail, email, or fax to OSBEELS. Refund requests received less than 10 days prior to the symposium will not be granted. However, registration fees may be transferred to another attendee at no additional charge.

Hotel Information - The Grand Hotel, 201 Liberty Street SE, Salem, OR 97301 / Toll Free: 877-540-7800 / www.grandhotelsalem.com.

RESERVATIONS METHOD: Rooms are subject to availability of rooms at the time the reservation is made. Please contact the hotel for more information. Call the toll free number to get the group rate, 877-540-7800. Let them know you're a part of the OSBEELS Symposium in order to receive the special rate. Reservations are based upon availability at the time of the reservation.

ACCESSIBILITY: The facilities are accessible to person with disabilities. Please request ahead of time if auxiliary aids and/or services are needed.