



CONNECTIONS

October 2010 Volume 11 Issue 2

Newsletter of the
Structural Engineers
Association of Oregon

SEAO

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Wednesday, October 27, 2010

SEAO Committee's will be meeting prior to the social hour.

We will be selling raffle tickets for \$2.00 each. Proceeds will go to the Young Member Fourm.

Portland

Governor Hotel, Ballroom
614 SW 11th Avenue
Library Room 2nd floor

\$32.00 Pre-paid Member
\$40.00 Pre-paid Non Member
\$18.00 Students

Corvallis (Program webcast)

CH2M Hill
1000 NE Circle Blvd, Bldg 10, STE 10350
Corvallis, OR

Corvallis Social Hour Begins at 6:00pm
\$20.00 Prepaid Member
\$33.00 Prepaid Non Member
\$13.00 Students

TIMES: Committee Meetings: 4:30pm (Portland location only. See p. 3)
Check-in and Social Hour: 5:30pm
Dinner: 6:15 pm
Program: 6:45 pm

PDH CREDIT:

1PDH has been recommended for this program

RESERVATIONS:

Call or email Jane Ellsworth before 5:00 PM, Friday, October 22, Ph (503) 753-3075,
Email: jane@seao.org.

You can now register and pay online at www.seao.org

About the Program:

Drew will talk about the following projects:

Astoria Column: Removal and replacement of the existing spiral stair within the column. We used the existing design and replicated it using both early 20th century techniques combined with 21st century technology.

Panama Museum of Biodiversity: CWI assisted in fabrication locally in Panama, provided fabrication services in Portland and shipped steel via container and provide supervision and leadership erecting the structure.

MIC, transit station and Miami International Airport: CWI modeled and fabricated a very complicated oval structure.

Evergreen Waterpark: CWI was in on the project early in the design phase and provided modeling services as well as the fabrication of the structural and miscellaneous steel component.

(continued on page 3)

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: A NEW YEAR

By: *Trent Nagele*



As we move into fall and resume monthly meetings and activities, it marks the beginning of SEAO's new calendar year. We have a new board, though I believe many are familiar friends and colleagues to many of you. We also have a renewed energy and excitement about the year ahead and the opportunities that SEAO provides for all of us to make a difference in our profession and our communities.

Last month as Jenny handed over the traditional gavel at our dinner meeting, I reflected on my years in SEAO and those first meetings I attended not knowing anyone in the room except for a few coworkers. I was a new engineer just learning the trade and craft of my chosen profession. But what impressed me with SEAO was the opportunity it presented to be in the company of so many experienced engineers—Real Engineers! Little by little I began to get acquainted with some of them, and opportunities came to participate on a committee or help with a special project, and I not only met new people, but I learned new things as well.

This year, the board has set several goals for the organization. At the front of this list is the goal of increasing the value that SEAO represents to each one of our members. We want SEAO to be meaningful and relevant. We want it to be accessible and a place to share information, to learn and meet fellow professionals, and make a difference. But we can't do this alone, and we can't do it without your participation.

There are three ways I'd like to suggest you consider participating. The first is pretty simple: read the newsletter. I know there are lots of other publications clamoring for your attention, but if you want to know what's happening in your state, with your profession and colleagues, this is our way of sharing this information. I realize we haven't always struck the chord perfectly with the newsletter, but it is our primary way of communicating with you, so take a minute to look through it. And, if

you have a comment or topic you'd like to see addressed, or maybe you have an article you want to share, drop us a line. We'd love to consider it for publication. But at a minimum, spend a few minutes to see what's happening with SEAO.

The second is to attend a lunch or dinner meeting. If you haven't been to a meeting recently, come check it out. Catch up with colleagues you haven't seen in a while. Earn a PDH for listening to the presentation—who knows, you might even learn something! Of course, if you're not in the Portland area and it's hard to make the meeting in person, consider hosting a webcast for your area. Our webcast in Corvallis had over a dozen people from seven different companies attending last month.

The third—and realize I'm probably pushing it here—is to consider joining a committee. If you want to see real change and be part of the action, this is where you want to be. Through the years, SEAO's committees have influenced the practice of structural engineering in this state (and beyond) in tremendous ways, for which we all have benefitted. You may not realize it, but there are currently about 70 people participating with SEAO's various committees to make a difference for their profession. Consider joining them. Or if you think there's a need for a new committee to address a topic not currently represented, give us a proposal for what you'd like to see. Our committees aren't set in stone.

Remember, this is your organization. I know it's easy to look at SEAO as just another newsletter, or meeting, or seminar that you can take or leave. However, from my experience, it's much more than that. The friendships and contacts you'll make here, and particularly if you're willing to get involved, will not only benefit your profession and those who will follow you, but will make you a better engineer for the time you've spent as well.

I am grateful for the opportunity to serve as your President this year and for the privilege to work with the tremendous group of dedicated professionals in this organization who put in countless hours to fulfill SEAO's mission. We're looking forward to a great year—I hope you'll join us in being a part of it.

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COMMITTEE UPDATES

Young Member Forum:

This month's YMF happy hour is Thursday, October 21st. We're meeting on the other side of the Willamette this time! Come to the Green Dragon Pub (at the intersection of SE 9th and SE Belmont) around 5:30 to socialize with the young professionals of SEAO and AIA. We look forward to seeing you there! If you're not on our emailing list and would like to be, contact Ciera Speer at Ciera@JGPierson.com.

Open Committee Meetings:

In addition to our regular dinner meeting, many of our SEAO committees will be meeting before dinner. This open format will be an opportunity to join in the committee discussion, meet other committee members, and bring ideas.

If you've considered joining a committee, or just wondered what they do, this is your chance to see them in action!

Even if you don't reside in the Portland area and thought maybe committees were just for those folks in the metro area, I'd encourage you to reconsider. Make the trip to Portland. With committee meetings, social time, dinner and program, the trip should be worthwhile. In the future, there should be opportunities to participate with the committees via conference call.

Currently, we're anticipating that the following committees will be meeting on October 27th, 4:30pm at the Governor Hotel in downtown Portland:

- Seismic
- Wind
- Snow
- Vintage Building
- Emergency Response
- Legislative
- Website
- Newsletter
- Young Member Forum

SEPTEMBER MEETING RECAP

Following Dr. Chia-Ming Uang's presentation for the September dinner meeting on Underlying Concepts in Seismic Design Codes: Application to Steel Building Structures, several asked about getting a copy of his presentation. Dr. Uang has graciously made a copy of his presentation available. If you would like a copy, please email Jane at Jane@seao.org

OCTOBER DINNER MEETING

(continued from page 1.)

About the Speaker:

President and CEO of Columbia Wire and Iron Works, Inc. CWI is a 108 year old steel fabrication and erection company. CWI is known for working on fast track projects, iconic structures and high end architectural projects. I spent my first summer working in the shop at the age of 12 and have spent my entire career working at CWI. In addition to my day job I spend a substantial amount of time promoting career options to high school students and working with them to promote the trades, architecture and engineering. The following are associations I am involved with: Past President of the Pacific Northwest Steel Fabricators Association, Board member of the Portland Workforce Alliance, Board member of the Manufacturing 21, Board member of the Oregon Workforce Investment Board.



DID YOU KNOW?

Did you Know????

In the October issue of STRUCTURE magazine, the cover story is a feature on the Lower Burnett Road/South Prairie Creek bridge in Buckley, WA. The piece was written by SEAO Member Paul Gilham, P.E., chief engineer at Western Wood Structures, Inc. and the contributor of our technical article this month on glulam specifications. The bridge, a part of the Rails-to-Trails project, provides a significant link in the Foothills Trail, a trail system in Washington which will be more than 28 miles long when completed.



MARK YOUR CALENDARS

Nov 11 — Wind & Flood Design Using 2009 IBC & ASCE 7-05
Embassy Suites, Washington Square

Nov/Dec—No Meeting. Happy Holidays!

Jan 26 — Lunch Meeting

Feb 24 —SEAO Tradeshow (Thursday)

SCHOLARSHIP WINNERS

By: Tonya Halog, Scholarship Committee Chair

The SEAOSF has awarded three \$2,000.00 scholarships to Adrienne C. Busch, Joseph A. Jenkins, and Peter Kahn, and one \$2500 Don Kramer Memorial Scholarship to Marty J. Flansburg for the upcoming academic year. Once again, the generosity of our membership, combined with the success of the annual Trade Show continue to keep our scholarship program strong.

Adrienne C. Busch is now a senior at the Oregon Institute of Technology, where she has an overall GPA of 3.9 and engineering GPA of 3.9. She is also a recipient of the Oregon Institute of Technology Engineering Honors Scholarship and the Presidential Silver Level Scholarship from OIT. After earning her engineering degree, she plans to attend graduate school for a Master's degree in Structural Engineering. As student member of Engineers Without Borders, Adrienne traveled to Tanzania this summer to repair wells and pumps in a poor region of the country. She has been a member and officer in the ASCE student chapter at OIT.

Joseph A. Jenkins is in his second year of graduate studies at Portland State University. He earned his undergraduate degree in civil engineering from the University of Washington. Joseph has been involved with the UW Chapter of Engineers Without Borders. After many weeks of research and design he traveled to Yanayo, Bolivia last September to implement a roadway reconstruction project. Joseph is serving his second term on the board of directors for Washington State YMCA Youth and Government which hosts both the mock youth legislature and mock trial events.

Peter Kahn is in his senior year at Portland State University, where he has an overall GPA of 3.21 and engineering GPA of 3.67. He works as an undergraduate teaching assistant. Peter attended school this summer as he is aggressively pursuing his Bachelor's degree as well as his Master's degree in Civil Engineering with an emphasis in Structural Engineering.

Marty J. Flansburg graduated from the University of Portland in May with an overall GPA of 3.49 and engineering GPA of 3.5. While attending college full-time, Marty worked 25 to 30 hours a week for his brother's engineering firm in Camas. Prior to pursuing his engineering degree, he worked as a carpenter for a construction company for five years. Dr. Kuhn, Civil Engineering Department at University of Portland, describes Marty as a hard working and dedicated individual who has become a quiet mentor and role model and leader of his younger classmates. Marty is now enrolled this fall at Portland State University for graduate studies in structural engineering.

SEAO will invite the scholarship recipients to the October Dinner Meeting – please attend so you can meet them. In addition to the scholarship, they will each receive a one-year student membership to SEAO.

Thanks again to all of the donors to the Scholarship Foundation. Also, I would like to thank the Scholarship Committee for their help in reviewing and scoring the applications: Chad Kilian (Black & Veatch), Brad Larsen (OBEC Consulting Engineers), and Dominic Webber (Kramer Gehlen & Associates).

Understanding Specifications for Glued-Laminated Timber - Part II

By Paul Gilham, PE, SE, Western Wood Structures

The following is a continuation of the Part I article which appeared in the September 2010 edition of the SEAO Newsletter.

11. Appearance Grade: The standard appearance grades for glulam members are Framing, Industrial, Architectural and Premium. Framing grades are members that have not been surfaced to the standard net size but are left the same width as the dimensional lumber sizes they are made from. For example, a 4 in. nominal member will be 3 ½", the same width as the 2x4 laminations used to build the members. This grade is intended for members that are installed within the framing of the building walls, such as door and window headers, where a finished appearance is not warranted. The use of the full width member eases the construction of the framing since spacers are not required to flush out the member. These members have not been surfaced by a planer so a considerable amount of glue will be on the surface.

Industrial Appearance Grade members are used primarily for roof construction in industrial buildings or in unexposed applications such as above a ceiling area. These members are surfaced on two sides and the bottom edge. The voids resulting from knotholes are left unfilled. Voids as deep as one quarter the beam width and as long as half the beam width are permitted.

In Architectural Appearance Grade, all voids larger than ¾" in length are filled with a "wood toned" colored filler or with clear wood inserts. It is important to note that the choice is left to the laminator unless clear wood inserts are specified. Clear wood inserts are chosen to reasonably match the color and grain of the surrounding wood. Clear wood inserts are significantly more expensive than the wood toned colored filler. In architectural grade members the corners of the member exposed to view are eased, the exposed faces are surfaced smooth and the wide face of the lamination exposed to view must be free of all loose knots.

Premium Appearance Grade is the highest standard appearance grade. This grade requires all voids to be filled with filler or clear wood inserts. Additionally, the wide faces of the lamination exposed to view are selected for appearance and shall be free of loose knots. The knot size on this face is limited to 20% of the net face width. Again the corners of the exposed edges are eased. Current industry practice for easing the edges is to use a radius between 1/8" to ½".

Appearance grades are defined in AITC 110, "Standard Appearance Grades for Structural Glued Laminated Timber." Most project specifications reference this document.

It is possible to specify higher appearance requirements than those found in AITC 110. In this case the appearance requirements are agreed to between the buyer and seller. The buyer can specify hand selected, tight knot laminations with no voids in the exposed face or can specify clear grain, containing no exposed knots. The Beaverton Library is an example of the latter.

Example:

"Member not exposed to view in the completed work shall be Industrial Appearance Grade. Members exposed to view in the completed work shall be Architectural Appearance Grade. Truss members shall be Premium Re-sawn appearance."

12. Timber Connections: When the scope of the glulam portion of the project includes the supply of the connecting steel and hardware, it is helpful to include the specifications for the steel plates, welding, hardware, timber connectors in the glulam specification. Often the steel specifications on a project refer to steel framing and are not appropriate for the incidental steel and hardware used to manufacture heavy timber components such as trusses.

Example:

"Steel assemblies used to connect glulam to glulam shall be manufactured from ASTM A36 steel plate. All welding shall be performed by AWS certified welders to AWS specifications. Shop prime steel assemblies black. All connecting hardware shall be ASTM A307 shop prime painted black. 4" Malleable Iron Shear plates shall conform to Grade 32510 of ASTM Standard A47."

13. Fire Resistive Construction: When the glulam members on a project are required to provide a fire resistance rating of one or more hours, the supplier must inform the manufacturer of this requirement. There are two code accepted methods calculating a fire resistance rating for a glulam member. The original method calculates the number of minutes a member is rated for based on member size and the percentage of the allowable load carried by the member. This method is included in IBC section 721.6.3. A more recent method uses the desired fire rating to determine the reduced section size of a member exposed to fire and the average ultimate strength of the wood to check the adequacy of a member. This method is shown in NDS chapter 16.

In each of these methods the manufacturer must be instructed to add an additional tension lamination to the exposed face(s) of the member and remove a core lamination. These members are then marked, "Fire Resistive – One Hour." The shop drawings must indicate this requirement. Since an additional tension lamination is substituted for a core lamination at the time of manufacturing, it is not possible to upgrade a member once it leaves the plant.

Example:

"Glulam members marked FR on the plans shall be constructed to meet One hour fire resistive requirements. One core lamination shall be replaced with a tension lamination added to the outer tension zone. Mark each FR glulam "Fire Resistive-One Hour"."

Understanding Specifications for Glued-Laminated Timber - Part II

(continued from page 5)

14. Fabrication: The specifier should determine if the fabrication of the glulam members warrants shop fabrication. For warehouse construction and headers for wall framing, for example, the tools available in the field to fabricate the members will be adequate to cut the ends and bore the holes, etc. It will be desirable to specify shop fabrication for more architecturally important members such as trusses or arches or for connections such as kerfs, or top shapes, where the field conditions and tools are not suited to make acceptable cuts, holes, etc. Large members are difficult to maneuver and fabricate with the typical tools found at the jobsite.

Example:

“To the extent possible, shop-fabricate all glulam for connections and top shapes including cutting to length and drilling bolt holes. Provide uniform gaps no greater than 1/8 at the time of fabrication for all truss web to truss chord connections. End gaps between members shall be uniform and not exceed 1/8”. Holes shall be drilled perpendicular to the face of the member. Drill wide members from both sides as required to prevent mis-alignment of holes.”

15. Finish: There are three types of finish that are typically specified for glulam members. End Seal refers to applying a penetrating sealer to the ends of the members after end cuts are made. Moisture readily moves in and out of the member ends and can cause checking and/or splitting of the members. The sealers retard the rate of moisture movement which minimizes these effects.

One coat of the manufacturer’s standard clear penetrating sealer can also be specified. Like the end sealers, these retard the rate of moisture movement in the members. A coat of penetrating sealer also provides some resistance to road grime and dirt that is picked up on the jobsite. These sealers are not intended to be finish coatings but offer protection during transit and erection.

Glulams can be ordered with a factory stain or a finish sealer applied at the manufacturer’s facility. These are intended to be a finish coating. Refer to AITC 111, “Recommended Practice for Protection of Structural Glued Laminated Timber during Transit, Storage and Erection” for further discussion.

Example:

“Apply one coat of manufacturer’s penetrating sealer to each member after fabrication. End seal each end of each member immediately after cutting.”

16. Protection During Transit and Storage: There are several levels of protection that can be used for glulam members during transit and storage. The most basic level is a load wrap where the truckload of members are enclosed on the top sides and ends with water resistant paper of opaque polyethylene or equivalent. This wrapping extends to the bottom of the load and is secured with staples, tape or other suitable fastenings that do not damage the exposed surfaces. Once the members are delivered, the wrappings are removed and the members are exposed. This level of protection is commonly used in warehouse or framing members.

Often members are bundled together and then wrapped. This wrapping provides protection both during transit and at the jobsite. When the members are removed from the bundle and placed in the structure, they are no longer protected.

Finally, members can be individually wrapped. By doing so, the wrapper can remain on the member during erection of the building and only those areas near connections are unwrapped. It is important to re-cover the exposed portions of the beam once the connections are made to prevent bleaching due to sun exposure.

In the case of bundle wrapped or individually wrapped members, it is important to slit the bottom of the wrapper while the members are stored. This allows trapped moisture to escape and minimizes the amount of checking, splitting or staining experienced by the members.

Refer to AITC 111, “Recommended Practice for Protection of Structural Glued Laminated Timber during Transit, Storage and Erection” for further discussion.

Example:

“Load wrap or bundle wrap industrial appearance grade members. Individually wrap Architectural and Premium Grade members. Individual wrappers shall remain on the members until they no longer serve a useful purpose including protection from weather, sunlight, soiling and damage from other trades. Slit the underside of wrappings to prevent the accumulation of moisture inside the wrapping.”

17. Preservative Treatments: When glulam members are directly exposed to the weather and not protected by a roof overhang or eave, it is important to apply a preservative treatment to prevent degradation due to fungus and/or insect attack. Preservative treating is done by placing the glulam members into a pressure cylinder, filling the cylinder with preservative mixed with a liquid carrier and then pressurizing the cylinder to force the preservative into the members. The preservatives are designed to be toxic to decay fungus and insects and to chemically bond to the wood cells. There are several preservative treatments available on the market. However, not all preservatives are appropriate or available for glulams. AITC 109, “Standard for Preservative Treatment of Structural Glued Laminated Timber” offers a description of the types of treatments and limitations associated with each. Finishes such as latex paint may not be appropriate to use with preservative treated members. It is advisable to contact glulam suppliers to determine the best treating options for a particular use.

Example:

“Members directly exposed to the weather shall be preservatively treated with type C pentachlorophenol to a minimum net retention of 0.6 pcf. per AWWA specification C28.”

Understanding Specifications for Glued-Laminated Timber - Part II (continued from page 6)

Execution

18. Jobsite Storage: The minimum requirements to protect the members during jobsite storage are specified in this section. Typically glulam members should be stacked on flat surface a minimum of 6" off the ground with supports spaced evenly and close enough together to prevent bending of the members. Members allowed to bend during storage may exhibit permanent deformations. Refer to APA Builder Tips R540, "Proper Storage and Handling of Glulam Beams" for more information.

Example:

"Store glulam material on a flat surface at least 6" above the ground. Place supports close enough together to prevent noticeable deflections."

19. Installation: This section specifies the level of care the contractor must use when installing the glulam members.

Example:

"Install glulam member true, plumb and with uniform close fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place. Use non-marring nylon slings to lift members and using corner protectors as required to prevent damage to member edges."

20. Field Cutting, Notching and Drilling: The EOR may wish to limit the amount of field fabrication allowed. Include in this section are limitation on other trades such as plumbing and electrical contractors with respect to notching and drilling of glulam members. See AITC Technical Note 19, "Guidelines for Drilling or Notching of Structural Glued Laminated Timber Beams."

Example:

"Avoid cutting glulam members after fabrication. Where field fitting is unavoidable, comply with the requirements for shop fabrication. Field notching of glulam members is not allowed without approval from the engineer of record. Holes not shown on the Structural drawings or approved shop drawings shall not be drilled without approval from the engineer of record."

Finally, all of the documents listed in this article are available to download from AITC at www.aitc-glulam.org and form APA-EWS at www.apawood.org.

PRESTRESSED CONCRETE DESIGN CLASS

PRESTRESSED CONCRETE DESIGN CLASS

SPONSORED BY KNIFERIVER AND OREGON PRECAST CONCRETE INSTITUTE

CE 408/508 or CE 808 - Prestressed Concrete (3 credits)

Prerequisite: course in reinforced concrete design

Instructor: Dr. Keith Kaufman of Kniferiver Winter Term: 6-9 PM on Mondays starting January 3rd in Kearney Hall 312 at OSU.

Course is also available as a regular university course (CE 486/586) if you are pursuing a degree.

MASONRY DESIGN CLASS

SPONSORED BY MASONRY INSTITUTE OF OREGON

CE 408/508 or CE 808 - Masonry Design (3 credits)

Prerequisite: course in reinforced concrete design

Instructor: Sue Frey of CH2M-Hill

Winter Term: 6-9 PM on Thursdays in Kearney Hall 205 at OSU starting January 6th. Course is also available as a regular university course (CE 482/582) if you are pursuing a degree. Also, note that the masonry design course is available on-line in the e-campus version (CE 408/508 or CE 808) including videos, and does not need to be an on-site attendance class.

NOTE: CE 408/508 are undergraduate and graduate workshops. CE 808 is the least expensive option and is a professional workshop, not applicable to a degree. Cost for CE 808 is \$175 for each 10 week course for continuing education students. PDH credits earned.

Admission information: <http://ecampus.oregonstate.edu/services/admissions/>

Registration information:

<http://ecampus.oregonstate.edu/services/registration/register.htm>

Students need to apply for admission and register before the start of the term to avoid late fees.

CRN for CE 808 (Masonry) = 37741

CRN for CE 808 (Pres. Conc.) = 37877

Questions? Please contact Prof. Tom Miller at OSU at (541) 737-3322 or thomas.miller@oregonstate.edu.