FEBRUARY 2022 EQUILIBRIUM

Newsletter of the
Structural Engineers Association of Washington

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February Meeting Preview: West Seattle High-rise Bridge Emergency Closure Causes, Assessments, and Response

Please join us for a dinner presentation on one of the most impactful emergency bridge closures, the West Seattle High-rise Bridge. Jointly led presentation by the Consultant teams (WSP and BDI) and the Seattle Department of Transportation.

Date: Wednesday, February 16th, 2022
Time: Reception Begins at 5:45 PM
Location:
Glendale Country Club
13440 Main Street, Bellevue, WA 98005
Parking:
Plenty of free parking with easy access to the venue
Cost:
$45 per person

Register to Attend:
Click here.

After registering, you will receive a confirmation email containing information about joining the webinar.

The emergency closure of the cast-in-place post-tensioned segmental West Seattle High-rise Bridge has had a profound impact on local communities and the citywide transportation network. This presentation focuses on topics

related to the issue causing the closure of the corridor, including a look into the bridge condition and structural assessments conducted, the emergency stabilization and rehabilitation designs, bridge structural health monitoring systems installed on the bridge, and then associated actions taken including the development of an emergency response plan, community engagement, and traffic mitigation.

Presenters:
Kit Loo: PE, Seattle Department of Transportation.
Mr. Loo is the Manager of Bridge Operations and Bridge Engineering in the Roadway Structures Division of SDOT, with more than 25 years of experience in capital delivery, bridge design, bridge inspection, and construction experience working in both the private and public sector.



Greg Banks; PE, SE (WSP USA)
Greg is the managing director of the structures group within the Northwest Pacific District of WSP and also serves as a voting member of PCI's National Bridge Committee. Having been involved in the design of over 75-bridge projects, Greg is well versed in nearly all aspects of bridge and transportation projects but specializes in cast-in-place post-tensioned segmental design and construction, accelerated bridge design, and construction methods, and the seismic assessment and design of bridge structures. He focuses on practical solutions that are buildable, biddable, and maintainable



Brett Commander; PE (BPI)
Mr. Commander is a co-founder of BDI and has led the company's research and application of structural testing, monitoring, and non-destructive evaluation for over 30 years. He serves as the Vice President of Engineering and as a principal engineer he holds professional engineering licenses in 22 states. While much of his work has been considered innovative research, his goal has always been to produce practical results for structural evaluation. The scientific aspect of his work has been the utilization of the latest measurement and analytical tools. The art of his engineering has been in integrating those results with corresponding design codes and communicating useful information to infrastructure owners.

Click Here to Register!

Message from the President

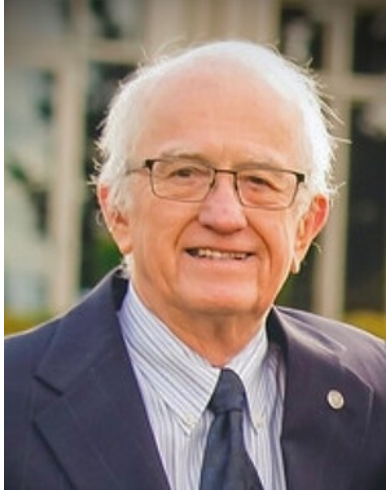
By Mike Visser, SEAW State Board of Trustees President

Fred Pneuman died Dec. 12, 2021.

Mr. Pneuman was president of SEAW in 1966 and was awarded Life Membership status in 1997. He had an illustrious career and advanced structural

engineering through his practice, lectures, and memberships in numerous technical committees. He was active in his community, served on his local planning commission and on city council.

While I did not know Mr. Pneuman, I can honestly say that in my time in SEAW, I have met and come to know many Fred Pneumans, each participating in SEAW in their own way: from those who serve in the various committees to those who serve on chapter and state boards. These committees are all run by active, caring engineers striving to make SEAW and their communities a better place.



Fred Pneuman (1931-2021)

SEAW is like any volunteer organization – it is effective only to the extent that its members make it so. Committees exist only because members are actively interested in them; committees that do not inspire wither away. SEAW is a source of professional growth for those who invest themselves.
But while SEAW's committees can always use more membership engagement, there are other areas that can benefit from involvement by SEAW members.

It is a sad fact that Washington State's public schools are failing many students, particularly those of color. According to the Office of Superintendent of Public Instruction, less than 30% of Washington's Black, indigenous and Hispanic students met standards for science or math in the 2018-2019 school year, a number that matches the SAT's "meets standards" results for Washington's students in math. This failure affects the current and future state of structural engineering in Washington state and beyond.

While I do not know how to fix what appears to be a systemic failing, organizations do exist that are attempting to help at a more individual level. The Boys and Girls Clubs of America have STEM programs and can use volunteers and mentors. The ACE Mentor Program is geared to students interested in careers in architecture, construction and engineering. And the schools themselves have a desperate need for volunteers. These are good programs, and I'm sure there are others. And while these organizations always require funds, your donations cannot match the value of your time.

The needs are real, and volunteers benefit as much as the beneficiaries.

Fred Pnueman and his wife traveled extensively and volunteered their services in support of Palestinians living in the Episcopal Diocese of Jerusalem. Memorials in his name may be made to Habitat for Humanity, Congregations for the Homeless, or the American Friends of the Episcopal Diocese of Jerusalem. Mr. Pnueman helped build SEAW, and he also positively impacted the lives of many people.

Be like Fred.

February Technical Seminar Preview: Using Composite Beams for Mass Timber, Hollowcore Concrete, and Wide-Span Steel in Hybrid Structures

The SEAW Seattle Chapter YMG invites all members to a virtual technical seminar on February 23 at 5 PM. Peikko will present "Using Composite Beams for Mass Timber, Hollowcore Concrete, and Wide Span Steel in Hybrid Structures," an AIA-Accredited Course. Peikko is a global operating specialist of fastening technology for concrete constructions and composite beams for slim floor structures. Peikko supplies a large selection of concrete connections and composite beams for both precast and cast-in-place solutions in a wide variety of applications. The presentation is AIA accredited and will include an overview of what a composite structure is as well as the benefits and advantages of using these types of systems. The program will examine industry standards and performance attributes for composite structures, enabling the design professional to select the appropriate system for a specific site.

If you are interested in attending the presentation, please fill out the form at the link below:
https://forms.gle/K7T8BRGAjsZti4jm8
Thank you and we hope to see you at the seminar!

Seattle Chapter Virtual Meetings Experience Considerable Attendance

Increase

By Shalini Prochazka, SEAW Seattle Chapter President

The pandemic is exceptionally challenging for all of us. In light of the current increase in COVID cases, the SEAW Seattle Chapter has paused in-person monthly dinner meetings. The Seattle Chapter holds eight dinner meetings each fiscal year, typically on the fourth Tuesday of the month starting in September and ending in May, excluding December. In addition, in June, SEAW organizes a June Social, which is a popular event with a lot happening, including awards, presentations, scholarships, and even a raffle with door prizes. These events offer engaging presentations, opportunities for continuing education, an avenue for networking, and an opportunity for the structural engineering community to come together and meet like-minded folks.



The monthly virtual Seattle Chapter meetings have been able to reach a wide audience during the pandemic.

The pandemic has impacted the in-person event, however, there is a silver lining. Recently there had been a sharp decline in in-person attendance, attributed to several factors like traffic and the time commitment required to attend these events. An event with 30 or more registered attendees would be considered well attended. Now that meetings are all virtual, the attendance to these monthly meetings has increased by over 400% with the average attendance going up to 150 attendees. We call this a silver lining, as we have been able to not only engage just a large number of Seattle Chapter SEAW members, but also provide presentation and continuing education hours to SEAW members in all other chapters. During the virtual June social, the Zoom platform enabled breakout sessions and provided networking opportunities to engage and reconnect with fellow structural engineers.

As soon as the pandemic numbers have declined to a safe level, we hope to resume in-person meetings. However, with the success of attendance realized through the virtual discussions, the SEAW Seattle Chapter programs will continue the virtual segment to engage as many members as we can.

If you have attended a recent virtual monthly dinner meeting, we would love to hear your feedback and suggestions for future meetings. Please consider dropping us a note at info@seaw.org or attend the SEAW Seattle Chapter board meetings, being held virtually on the fourth Monday of each month.

Updates to SDCI's Tip 314: Seattle Building Code Requirements for Existing Buildings that Undergo Substantial Alterations



By Nathalie Boeholt, Seattle Department of Construction and Inspections

In December 2021, the Seattle Department of Construction and Inspections (SDCI) published an updated and improved version of Tip 314 concerning the Seattle building code requirements for existing buildings that undergo substantial alterations. This Tip was developed for construction projects that are designed with the Seattle Building Code (SBC) and does not apply to substantial alterations on projects designed with the Seattle Residential Code (SRC).

Tip 314 was updated to the 2018 Seattle Existing Building Code (SEBC). The Tip now includes examples for each definition of a substantial alteration (also called triggers) and provides more clarity on the associated code requirements.

Substantial alteration is a concept only found in the SEBC in section 307 and can be confusing to applicants. SDCI wants to make buildings safer and conserve energy. The intent of the substantial alteration concept is to bring an existing building into compliance with the current code for energy, fire (such as sprinklers), and certain life safety requirements (such as means of egress or seismic resistance) depending on the trigger. SDCI's goal with this update is to help owners, developers, architects, and engineers better understand the:

- Triggers (there are a total of 5 triggers per SEBC 307.1.1)
- Corresponding code requirements per SEBC 307.1
- Seismic regulation requirements (SEBC 307.1.2)
- Seismic report requirements (SEBC 307.1.3)
- Energy use regulations (SEBC 307.1.4)

You will find additional information on the seismic report requirements in SDCI's Director's Rule, DR 15-2021, at this link.
SDCI recommends scheduling construction pre-submittal conferences for projects that may constitute a substantial alteration. more information on how to schedule a conference can be found in the Tip and at this link. The updated Tip 314 is available at this link.
Anyone is welcome to contact Natalie Boeholt at nathalie.boeholt@seattle.gov about the update.

Recap of the SEAW Student Showcase

By Juzer Millwala, YMG Chair

The SEAW YMG showcase on Jan 25, 2022, was held virtually online. It featured two case studies by Seattle University students and two graduate research presentations by University of Washington students.

The first case study, "Seismic Evaluation of Lucky Peak Powerhouse for Seattle City Light," was by Mauricio Ayala, Mia Pizzuto, Meng Juan Timm, Roberto Cordero Aguilar, and Eugenio Sánchez. Students had looked into the existing drawings and geotechnical conditions to create a SAP model of the current structure. The aim was to understand behavior of the structure under seismic loads for operation, immediate occupancy, life safety, and collapse prevention.



The Larned Apartments in Seattle was the subject of a case study by a group of university students, shared at the Seattle Chapter Student Showcase in January.

The second case study was on "Larned Apartments Seismic Retrofit" by Lawrence Takemoto, Rilen Loo, Jarred Mahon, Quinn Nakasato, and Lan Nguyen. This building was initially a hotel and underwent renovation in 1991 to switch to apartments. The students had to look at multiple drawings to understand the existing structure, which consisted of an unreinforced masonry (URM) veneer and internal moment frames. URM main failure mechanisms are out of plane bending and in-plane rocking or sliding. The team was looking into a bolt plus solution retrofit for the URM and analyzing the existing moment frame to understand retrofits required.

These studies are a great way for students to be mentored by professional engineers while solving practical design challenges. It allows them to not only understand the materials they are designing but also the code references which will better prepare them for when they start their professional career in structural engineering.

The first graduate research was on "New Slab-Column Connections for RC Gravity Systems; We Have Done Cyclic Tests and are Currently Conducting Punching Tests" by Austin Anderson. The research looked into incorporating Concrete Filled Steel Tube (CFST) with flat plate slab along with a ring system connection utilizing post-tension bolts that resulted in larger drift capacity and reduced damage to the slab where drift is reduced under 5%.

The second graduate research was on "ASTM A1085 HSS braces for SCBFs and the Reconsideration of B/T Limits" by Joe Kaldestad. The aim was to understand the cyclic response of ASTM A1085 braces as these are the fuses that undergo local buckling in a seismic event. With b/t limits revised, larger braces could be utilized. Revised b/t limits would also result in better performance and ductility. The presentation also touched on A1085 HSS braces vs A500, as A1085 would result in a lower Ry to be used in design.

New research on connections or design revisions allows us to optimize the behavior of our structure and make our designs more efficient. While both researchers mentioned they have additional work to be done, these are continuous advances in our profession that are being made. These presentations create awareness about what is to come as we move forward.

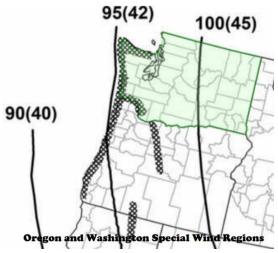
The SEAW YMG would like to thank all the presenters along with their faculty advisors (Dawn Lehman with UW and Paul Jhon Smith with Seattle U) for making the showcase a success, and we look forward to what new information will be shared next year.

WEC Reports on SWR Study, WDM Design Example 3A

By Scott Douglas, WEC Chair

The Wind Engineering Committee (WEC) presents the following report for February:

- **Washington/Oregon Special Wind Regions (SWR) Study** – CPP is well under way with the SWR Study that will quantify specific wind speeds and boundaries in Washington State. They are currently working on the Columbia River Basin SWR, the initial summary report for that SWR should be ready by the end of January. The Washington Pacific Coast SWR will follow, followed by the North Olympic Peninsula SWR, with completion of these SWR's in the next couple of months.



ASCE 7-16 Figure 26.5-1B, Oregon and Washington Special Wind Regions

The results of CPP's study will be reviewed first by the SEAW WEC, then approved by the SEAW State Board. SEAW's final recommendations will then be submitted for adoption by the Washington State Building Code Council, and eventually for inclusion in ASCE 7 and the UBC.
The SEAW Wind Engineering Committee would like to extend their deep gratitude to the Structural Engineers Foundation of Washington (SEFW) and those that have donated to the Foundation at SEFW.org. The Structural Engineers Association of Oregon (SEAO) was only able to raise SWR study funds for Oregon's portion of the Columbia River. Therefore, SEAW was required to raise an additional $7,500 to fund the Washington Pacific Coast SWR. Per a request from the SEAW State Board, SEFW approved funding the additional $7,500.

- **WDM Design Example 3A** – A final draft of a revision to Design Example 3A of the SEAOC Wind Design Manual has been completed. Figures are being finalized, and the revised problem will be forwarded to the SEAOC for review and subsequent inclusion in the next revision of the SEAOC Wind Design Manual.

- **Participation** - All SEAW members, whatever their experience, are encouraged to participate at in WEC meetings. Please contact the WEC chair, Scott Douglas sdouglasscott@gmail.com, to join the SEAW WEC and receive additional information and announcements on Committee activities and actions.

- **Next Meeting** - Thursday February 24 from 12:00 noon to 1:00 pm. Meeting will be virtual via the following Zoom link: https://us02web.zoom.us/j/87401839422?pwd=QnNodnFQTUxqQmo5UzRQNHJKLytYQT09

Meeting ID: 874 0183 9422#
Passcode: 912750

SEFW Updates in 2022

By Angela Gottula Twining, SEFW Executive Director


Craig Roberts


Cale Ash


Melissa Verwest


Ted Smith

It seems 2022 is off to a great start. The Structural Engineers Foundation of Washington held its Annual Meeting in January and renewed Board terms and elected officers for 2022.

Some highlights:

- Craig Roberts of CT Engineering will continue as SEFW Chair. Cale Ash of Degenkolb will continue as Vice Chair, while Melissa Verwest of Knife River will also serve as Vice Chair. Joining them for another year is Ted Smith as Secretary/Treasurer.
- Joining the Board are Herb Ahten of Verco Decking and Trevor Lunde of GLY Construction. Both Verco and GLY have been strong supporters of SEFW for years and we welcome their input to the Board.

- Transitioning off the Board are Craig Stauffer of PCS Structural Solutions, Connie Holloway of ZGF Architects, and Tom Corcoran, recently retired. We are grateful for their many years of service and wish them the best in their next endeavors.

Many of you likely just renewed your SEAW membership. At this time of making your annual dues payment, we hope you will consider a donation to SEFW to help fund efforts related to the mission of promoting the profession of structural engineering through scholarships, education, research, and outreach. You can donate by check sent to the SEFW PO Box or by PayPal.

If you attended the Fall Forum, you may remember our tribute to Richal Smith, SEAW member and former SEFW Board Member, recognizing his service to SEAW and SEFW. Richal passed away in June 2021, and we recently learned he left a sizable gift from his estate to the SEAW scholarship fund. We are touched by the generosity of Richal and the Smith family! SEFW is hoping to use this gift to originate a "legacy fund" for others to determine bequests or donate funds in memoriam.

We welcome your feedback and ideas as we embark on a new year of fulfilling our mission. Please contact us at admin@sefw.org to get involved.



Richal Smith (1932-2021)

Engineer's Notes from Afield

By Darrell Staaleson, P.E., S.E.

Tiger Tiger.

On the last day of steelheading my friend and I were out in the Gorge. It's a two-mile hike down steep terrain into the canyon. The day was glorious – warm, bright sunshine, an autumn breeze, and not a single steelhead. In the gorge, the sun drops behind the mountains early and summer turns to late Autumn fast. There were ferocious brookies and few trout, so not really just a day of scouting, reading water, and casting practice. And there was something else.

Remember when Luke Skywalker lands in the swamp and says to himself, "Hum, I feel like…" And Yoda speaks up and says, "Feel like what?" Luke is surprised and turns with his blaster and says, "…Like I'm being watched!"



Danger Close!

My friend and I have been in the wild enough to know what that feeling is.

Suddenly, it's dark in the gorge. We break down our fly rods (my friend carries three because he broke his favorite rod once while we were out and was morose and sullen all day), pack our gear, and start the hike out. It is a steep climb and the air in the forest is close. I was freezing ten minutes ago on the river. Now I'm down to no shirt and cutoffs. After a day of hiking in water and clambering over slippery rocks and bushwhacking through blackberry and tall grass, that hike back out of the gorge seemed noticeably steeper. When I was younger, I could run up a hill like this with ankle weights.

I look back and say to my friend, "We're being followed."

He says, "I know. Is he the same one who's watched us all day? "

I reply, "Yup."

Finally, up to the top of Mt. Everest, we are on the flat section of the trail with dense forest on both sides. I can just see the road a few hundred yards ahead. And I'm thinking, "this would be a great place for an ambush!" My friend stops in his tracks.

Just a whisper, "Look!"

"Tiger, Tiger burning bright in the forest of the Night. Oh, what mortal hand can frame the glory of the tiger's mane." That (or something like that) is the famous poem. Well, there he is not 30 feet off the trail regarding us – a cougar. That's a big kitty!

Years ago I was hiking in the Pecos Mountains with my friend who had been a commando in WWII fighting the Nazi in France.

"You need to sharpen your sense of the Now and discern between Fear and Panic. Fear isn't some kind of unmanly weakness. That is a lowbrow misconception – the kind of misconception that will get you killed. Fear is in fact a survival instinct from our reptile brain. Do not ignore it! You need to train that thinking part of your brain so that it doesn't dismiss the warning signals, without spending your life a high alert. The Now – what the ancients call, 'The non-abiding mind.' Panic is another misconception. That is a hesitation between the fight or flight. That will also get you killed."

"Your field is engineering and construction - not exactly a low-risk environment."

"What do you mean?" I asked.

"This isn't just about mortal combat. This is life. Be present in your work! When you get that feeling of fear, don't dismiss it. Whether you're looking at plans of your design or you are out on a job site, keep your awareness. You'll be able to see when something isn't right in your plans. And it isn't an uncommon occurrence for people to get run over by a tractor, you know."

Calendar of Events

- February 1 (through March 31) – SEAW Refresher course
- February 16 - WA ACI Chapter and SEAW Joint Meeting: “West Seattle High-rise Bridge Emergency Closure Causes, Assessments, and Response”
- February 23 – February Technical Seminar: Using Composite Beams for Mass Timber, Hollowcore Concrete, and Wide-Span Steel in Hybrid Structures
- February 24 – Wind Engineering Committee meeting

For more details and registration on events visit the website.

Membership Postings

In accordance with SEAW bylaws, membership applications are vetted by the executive director, granted probationary status by the chapter board, and posted for membership comment. Membership is considered accepted 30 days after posting if current year dues are paid and no member objections have been received. **Read More**

New Members:

- Lawrence Takemoto, Seattle University, College of Science and Engineering
- Dawn Lehman, University of Washington
- Ken Savage, Sacre-Davey Engineering
- Amelia Kabor, Fast + Epp
- Gabriel Caceres, Seattle University
- Bethany Brown, Swenson Say Faget
- Uzo Uwaoma, University of Washington

Employment Opportunities

Are you currently seeking employment as a structural engineer, senior manager, or a senior engineer technician? Check out our job board for current employment opportunities. **Learn More**

MC Squared Inc.

MC Squared Inc. is a Structural Engineering design firm located in Olympia, Washington. We service the Pacific Northwest as well as 20 other US states. We provide structural engineering for projects ranging from small residential projects to the full structural design of multi-story buildings. Typical projects include structural design for additions and modifications to existing buildings, glass store fronts, seismic upgrades for existing buildings, retaining walls, soil retention systems, and marina/port facilities.

We are currently in search of candidates who have experience in structural engineering design. We do not require a PE or SE license, but we are interested in candidates who do. If you are licensed outside of Washington State, you should be able to become licensed in Washington State within 6 months.

MC Squared offers all employees paid vacation and sick leave, retirement plan with company matching,

and health and dental insurance for employees and immediate family.

Qualified candidates should have:

- Bachelor of Science in Civil/Structural Engineering
- A EIT or PE or SE license in Washington State
- Experience with Microsoft Office, Risa 3D, Adapt, Enercalc, RetainPro, Simpson CFS Designer, Forte, RedSpec, and Allpile

To apply, please send resume with cover letter to MC Squared Inc., Attn: Jim Farley, via email at office@mc2-inc.com .

Holmes

Holmes is a structural and fire engineering firm, with offices in San Francisco, Los Angeles, Portland and Seattle. We are part of the New Zealand based Holmes Group, with offices around the Pacific Rim. Compelled by the possibilities, we are relentlessly pursuing Why – to create what is Best.

We are seeking Engineers for our San Francisco, Los Angeles, Portland and Seattle offices. Candidates must be fast learners, ambitious, have the ability to handle increased responsibilities, have excellent verbal and written communication skills, and be able to interact effectively with clients, project teams, and colleagues. We are looking for all levels of Engineers.

Check us out at www.holmes.us.

INTERESTED IN JOINING US? PLEASE visit Holmes - Career Page TO SUBMIT AN APPLICATION.

GLR Engineers

GLR Engineers is seeking applicants for a structural engineer position in our Spokane, WA office. The applicant shall have a minimum of 4 years of relevant experience in the field of structural consulting design. Desired experience shall consist of working with multiple types of building materials, project types and the ability to contribute on multiple projects and deadlines. The selected applicant will be expected to produce structural calculations required for permit submittals, work with GLR's in-house drafting department to produce construction drawings, coordinate with architectural clients and other design team members, and succeed in operating in a team environment. Knowledge of Revit modeling is a plus. Applicant must be self-motivated with a strong drive to learn and expand their knowledge base.

GLR ENGINEERS | GOKEY LANE RASMUSSEN

GLR Engineers is a structural engineering firm with offices in downtown Boise, ID and Spokane, WA. We work on a variety of project types across the country and offer a diverse range of design experience on a week to week basis. Work will be shared between both office locations, web-based communication skills are a must. We offer a competitive salary, excellent benefits, and flexible work hours.

Please send your cover letter and resume for review and consideration tojacob@glrengineers.com.

Swenson Say Fagét

Structural Staff Engineer / Project Engineer
What's missing from Swenson Say Fagét? You! SSF has immediate openings in our Seattle and Tacoma offices for talented Structural Engineers. All experience levels are encouraged to apply. Responsibilities include being smart, having common sense, playing well with others, and tackling challenges like a dog with a bone.

We approach project design with open minds and technical chops to find solutions to some real head-scratchers. Our loyal clients provide staff at all levels opportunities to directly collaborate with architects, owners, contractors, developers, artists, and public and private entities on projects of all types and sizes. Our office culture is informal. Besides being flexible, hardworking, and technically savvy, did we mention we're also really nice people and like to have a ton of fun?

We've been in business for 27 years and remain committed to creating a place where people want to

spend their time and energy. Pay is dependent on experience and benefits are great. Check us out at www.ssfengineers.com. If you like what you see, we'd love to hear from you.
Submit your resume to info@ssfengineers.com.

Message from the Chair

By Darrell Staaleson, P.E., S.E.



Please consider joining the Public Information Committee in 2022 and volunteering for any of the associated efforts:

- Equilibrium
- Hall of Fame
- SEAW Brand Ambassador to NCSEA
- #SEEAboveAndBeyond social media campaign

We are accomplishing much good work! Contact: Darrell Staaleson at dstaal@staaleng.com or 253.520.0388.