

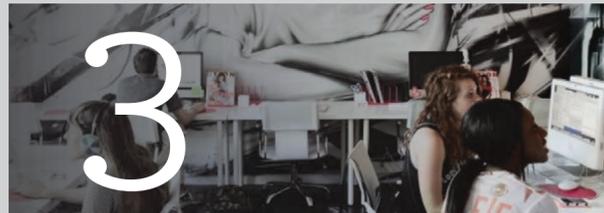
THE REDLINE

A BIENNIAL PUBLICATION FROM COUGHLIN PORTER LUNDEEN
REVIEWING ALL THINGS A/E/C AND PACIFIC NORTHWEST



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FEATURED



FEATURED ARTICLE

CROSS-LAMINATED TIMBER

How CLT, the most innovative wood material on the market, is gaining momentum in the Pacific Northwest.

Each edition, we dive into some of A/E/C's most compelling topics, featuring content that reveals what's inspiring us, exciting us, and keeping us on our toes.



MEET INTERNATIONAL DO-GOODERS, CONSTRUCTION FOR CHANGE

Seattle-based Construction for Change is making a difference worldwide, creating safe, sustainable infrastructure for nonprofits to carry out their missions.



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SUPPORTING STEM & THE NEXT GENERATION OF GREAT ENGINEERS

Celebrating the evolution of STEM.



RAINDROPS KEEP FALLING ON MY HEAD

Finally, there's sun in the forecast! Our team has some great, "get outside" recommendations to help you seize the spring in the beautiful PNW.

COUGHLINPORTERLUNDEEN
STRUCTURAL CIVIL SEISMIC ENGINEERING



A NOTE FROM THE EDITORS

Welcome to the first edition of The Red Line! Why The Red Line? The name is a nod to the many red lines that appear on drawings, drafts, and designs; markups that are essential to the work we do each day and reflect continued improvement and evolution.

Part of our mission is to “redefine the role of a traditional engineer.” Achieving this requires not only following, but investing in the latest trends and technologies. Not only talking internally, but sharing our thinking and encouraging conversation. Not only understanding the nuances of our industry, but widening our lens to incorporate the region and our world.

In this inaugural edition, we’re especially excited to release the featured article, “Cross-Laminated Timber,” in which our team explores what makes the material so special, what’s happening internationally, and how it’s gaining momentum in the Pacific Northwest.

The Editorial Team
Coughlin Porter Lundeen

1. CROSS-LAMINATED TIMBER

By now you've heard of Cross-Laminated Timber (CLT), the panelized wood product that's providing the backbone for mid-rise towers in Europe and Canada, and getting those of us in the Pacific Northwest anxious for timber creations of our own.

HOW IT'S MADE (CLT 101)

Before we get ahead of ourselves, a quick recap: CLT is a prefabricated series of layered orthogonal planks, each glued to the one below. The result is a product that can compete with traditionalists like concrete and steel. As it becomes increasingly clear that building with CLT is a "when," not an "if," manufacturers are popping up in the Northwest and British Columbia, eager to become a part of what analysts project to become a \$4 billion industry.

BENEFITS, WHY IT'S WOWING US

CLT is undisputedly the most innovative structural product happening with wood right now. As engineers, we're excited by the prospect of a new building product, especially one with the qualities of CLT. Here's how we see CLT changing the game:

- CLT panels are five times lighter than concrete, and 14 times lighter than steel. This means less weight on the foundation and ground underneath (which is especially advantageous on sites with poor soil).
- Designed and detailed properly, the product saves time in construction via prefabrication, allowing it to compete cost-wise with steel and concrete.
- CLT is carbon-consuming and renewable. Instead of increasing the carbon footprint, building with wood creates a positive impact instead of emitting carbon with steel or concrete.
- It has significant architectural advantages. CLT can be left exposed, and allows for tall ceilings, open spaces and hidden connections.
- It's beautiful and sustainable! And with the adoption of a new building material, we'll see a new generation of creativity and design.

CLT BEYOND BORDERS

In terms of mid- to high-rise wood construction utilizing CLT, Europe and Canada are far ahead of the U.S. That said, we're making progress on many fronts. Oregon is leading the nation with a twelve-story, CLT, mixed-use development (the performance-based design is awaiting a building permit in Portland) and Southern Oregon is home to the nation's first supplier of

structural-certified CLT. The International Code Council has a Tall Wood Building ad hoc committee developing code updates for future mass timber high rises; a consortium of academics representing various U.S. universities, including UW and WSU, are completing a FEMA analysis to codify seismic coefficients for CLT shear walls; and CLT shear walls and connectors under seismic loading are experiencing significant testing in the Northwest.

Here in Washington, our timber legacy began more than a century ago with pioneers like Frederick Weyerhaeuser. Even so, we have yet to experience the timber revolution our neighbors in Oregon and British Columbia are promoting. It's not only seismic considerations that complicate CLT's progress in the Pacific Northwest. In general, politicians have been slower to lead, but encouragingly, we're starting to see that change. Last month, the state senate reintroduced Senate Bill 5450 which instructs the Building Code Council to adopt new rules for CLT use in buildings. While a small step toward comprehensive codification, it's most definitely a start.

WHAT'S NEXT FOR CLT?

CLT is undeniably attractive - from sustainability and economics, to aesthetics and design possibilities. It's an elegant solution, but it's not all-encompassing or right for every program. It must be chosen with intention, and with the right team to back it up.

As we continue to study and execute CLT projects, we've identified key commonalities of successful projects. Each starts with a highly motivated owner who is brave enough to break barriers. Then, the team commits to CLT early in design, ensuring there's time to confront and surpass obstacles along the way. That team must be multidisciplinary, including contractors, building officials and fire marshals. The construction team is particularly important, given the industry's common resistance to change.

Where do we see CLT best fitting into the Seattle-scape? Put simply, in structures between 85 and 160 feet tall. Seems specific? It is. Seattle urban planning has an inherent gap here, and it seems CLT is the perfect, economically-responsible solution for this zone.

COUGHLIN PORTER LUNDEEN AT THE FOREFRONT

Coughlin Porter Lundeen is an active proponent of CLT's development, both locally and nationally. In addition to using CLT and other mass timber products on several projects, our team regularly participates in mass timber workshops, contributes to studies and research projects, and supports an internal task team. We've presented at several national seminars and have

successfully proposed alternative building materials to local jurisdictions, including Seattle, for structural systems not currently pre-approved by the building code. We're excited for CLT's continued development, and are committed to contributing to the conversation in the Pacific Northwest and beyond.

RESOURCES

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- Stroo, Hans D. "CLT: Washington State's Mass Timber Opportunity." Plan Washington. 26 May, 2016. Web.
- "A National First: Cross-Laminated Timber." Oregon Best. 10 Sept., 2015. International Mass Timber Conference
- Evans, Layne. "Cross Laminated Timber: Taking Wood Building to the Next Level. reThink Wood, American Wood Council, FPInnovations. 14 Oct. 2013.



Chris Duvall, P.E., S.E., has contributed to various studies concerning the use of CLT in the Pacific Northwest. He recently completed an evaluation of structural elements on the University of Washington's West Campus, addressing the hurdles of using CLT as an alternative to concrete and steel. Chris has presented nationally and continues to push CLT research and applications forward.
chrisd@cplinc.com

CLT WORLD MAP



Cross-Laminated Timber around the world.



PULLMAN, WASHINGTON
 WSU PACCAR ENVIRONMENTAL TECHNOLOGY BUILDING
 In addition to using CLT in its construction, the WSU PACCAR Building is equipped to test timber/wood products and conduct structural experiments in the impressive "showcase bar" and high-bay area. The space features a reaction floor and wall as well as a bridge crane.
 LMN Architects, Coughlin Porter Lundeen (Image courtesy of Coughlin Porter Lundeen & Ed LaCasse Photography)



PORTLAND, OREGON
 FRAMEWORK
 Likely to be the tallest mass timber building in the U.S., Framework is a 12-story mixed use building featuring ground-level retail, five levels of office, five levels of housing, and rooftop amenity space. It is one of two projects that received funding as part of the 2015 U.S. Tall Wood Building Prize Competition.
 LEVER Architecture (Image courtesy of Next Portland)



VANCOUVER, BRITISH COLUMBIA
 BROCK COMMONS
 Construction is almost complete at the University of British Columbia for an 18-story Brock Commons Student Residence (previously called Tall Wood Building). At 173 feet (53 m) tall, with housing for 404 students, it will be the tallest mass wood hybrid building in the world.
 Acton Ostry Architects (Image courtesy of Acton Ostry Architects Inc. & University of British Columbia)



LONDON, ENGLAND
 OAKWOOD TOWER
 England's PLP Architecture and University of Cambridge researchers have proposed the Oakland Tower, which at 984 feet (300 m), would dwarf Amsterdam's HAUT. "We've put our proposals as a way to imagine what the future of construction could look like in the 21st century," said Michael Ramage, who heads up the Cambridge University team. At 80-stories, the structure would form part of the Barbican estate and would create more 1,000 new residential units.
 PLP Architecture, Smith and Wallwork Engineers (Image courtesy of PLP Architecture)



PARIS, FRANCE
 BAOBAB
 Michael Green Architecture (MGA) and DVVD have teamed up with REI France developments to propose the tallest wood building in Paris. The carbon-neutral proposal, developed as part of the city's innovative Réinventer Paris competition, aims to alleviate the city's urban housing challenges.
 Michael Green Architecture (MGA) and DVVD (Image courtesy of Michael Green Architecture (MGA))



AMSTERDAM
 HAUT
 Expected to make its debut on the Amsterdam skyline in late 2017, Haut should become the world's tallest wooden-framed building. It will stand at 21 stories and 239.5 feet (73 m).
 Team V Architectuur (Image courtesy of Team V Architectuur)



STOCKHOLM
 TRÄTOPPEN
 Anders Berensson Architects has unveiled conceptual plans for Stockholm's tallest building: a 436-foot (133 m) wooden skyscraper covered in numbers, which would be erected on top of a 1960s car park in the city center.
 Anders Berensson Architects (Image courtesy of Anders Berensson Architects)



FINLAND
 PUUKUOKKA
 Winner of the prestigious Finlandia Prize for Architecture, Puukuokka was designed by Finnish studio OOEAAA for housing developer Lakea Oy. According to architect and studio founder Anssi Lassila, it is the tallest wooden apartment block in the country and one of the first high-rise examples of prefabricated CLT construction in the world.
 OOEAAA (Image courtesy of Mikko Auerniitti and dezeen magazine)



C

The Construction for Change (CfC) mission is to create safe, sustainable infrastructure for nonprofits across the world. From schools and refugee centers, to community buildings and health clinics, the CfC network is dedicated to alleviating poverty in the world's most under-resourced areas.

The organization's impact is widespread, with projects in Solomon Islands, India,

Cambodia, Kenya, Zambia, and more. When one of our engineers spent six months in Malawi with CfC, he brought passion for the mission home to the States, and to Coughlin Porter Lundeen.

Selected as a CfC Change Fellow, structural engineer Tyler spent six months serving as a project manager in Malawi, overseeing the construction of a health clinic. He returned from Africa to begin his role at Coughlin Porter Lundeen, but was unsure of how to advocate for CfC now that he wasn't onsite. "I believed wholeheartedly in what Construction for Change was doing, but I was new, entry-level, and didn't feel like I was in a position to suggest pro-bono work."

CONSTRUCTION FOR CHANGE

discover our partnership with Seattle-based nonprofit

But his manager was, and he was curious. Associate Principal Cory Hitzemann encouraged Tyler to share his experience at an all-company lunch session. From there, Coughlin Porter Lundeen's involvement snowballed. Firm leadership ran with the idea and created ways for the firm to support CfC and its mission.

Today, we're honored to have a small role in Construction for Change's global impact. We regularly donate design talent and consultative hours to CfC's projects, and members of our structural team serve on CfC's Pre-Planning Committee, a group of internal staff, architects, contractors, and estimators who collaborate to evaluate potential projects and address a program's needs, details, and challenges. *Continued ->*



ALL CFC PHOTOS BY JKOE PHOTOGRAPHY



Recently, we've worked on Construction for Change teams to support:

**PROJECT 1:
WOMEN'S PROTECTION
CENTER (WPC)
HETAUDA HOUSE -
HETAUDA, NEPAL**

The WPC offers refuge to victims of human trafficking, abusive or abandoned homes. It's a secure home for women and their children, offering case management, advocacy-based counseling, tutoring and educational development, and vocational skills training programs. The five-story concrete structure broke ground on September 26, 2016, as soon as the rainy season allowed.

To learn more about Construction for Change and the projects they're building around the world, visit: www.constructionforchange.org

**PROJECT 2:
MEDICAL CLINIC -
RAGHOGARH, INDIA**

Raghogarh's Medical Clinic is one of five proposed clinics which will serve the 235,000 people in the Raghogarh region of Madhya Pradesh, India. CfC will use this clinic to pilot and refine their model, then further expand in India, where one in four children suffer death, many due to malnourishment and lack of effective medical treatment.

Construction recently completed, the Optimize Health clinic will open this June, providing care for more 5,000 people. Utilizing a combination of dedicated Community Health Workers, innovative technology (mobile apps, interactive cloud-based medical records, and more portable diagnostics), and streamlined protocols, this clinic will provide high-quality care in one of the most impoverished states in India.



ON THE CALENDAR

upcoming industry events, conferences and Seattle favorites.

WSU IMAGINE TOMORROW

May 20, 8 a.m.-3 p.m., Beasley Coliseum.
imagine.wsu.edu

ACE MENTOR PROGRAM OF WASHINGTON - STUDENT PRESENTATION NIGHT

May 24
acementor.org/affiliates/washington

ANGELHACK GLOBAL HACKATHON SERIES: SEATTLE

May 27-28
[Eventbrite Info](#)

MADE IN SEATTLE WEEK

June 5-9
madeinseattle.splashthat.com

2017 DBIA NW GOLF TOURNAMENT

June 8, 10 a.m., Willows Run Golf Complex.
dbianwr.org/dbianw-golf-tournament

GLOBAL AI HACKATHON

June 23-25
[Eventbrite Info](#)

A4LE SCHOOL TOUR & DINNER

June 28
[Washington Chapter](#)

SEAFAIR AIR SHOW & HYDROPLANE RACES

August 4-6
seafair.com

NATIONAL PARK SERVICE 101ST BIRTHDAY / FREE ENTRY DAY

August 25
[NPS Free Day Info](#)

GEEKGIRLCON

September 30, October 1
geekgirlcon.com

FROM THE FIELD: PROJECT UPDATES



FOSTER LIBRARY

Perkins+Will / King County Library System / Tukwila, WA

The new Foster Library opened its doors on April 29. In the heart of the new Tukwila Village, our civil and structural teams collaborated with master developers, city engineers, and the Perkins+Will team to bring it to life. According to Tukwila Reporter, the library and the entire master village has been eagerly awaited by the community and is expected to redefine the area, "For 20 years, residents and business owners along the Boulevard pushed city officials to breathe new life into the neighborhood, including a new neighborhood center such as Tukwila Village."

Municipal and community buildings are some of the most rewarding projects for our team, and the Foster Library is no exception as it's allowed us to expand our expertise in cross-laminated timber (CLT) and complement a modern architectural vision. Additionally, sustainability was emphasized throughout with the implementation of green roofs, high-grade lamination, and a hydronic heated floor system. The team has consistently emphasized community education, regularly sharing details of the project's sustainability efforts.

LEARN MORE

[More about the vision for Tukwila Village City of Tukwila project website](#)

SOUTHPORT ON LAKE WASHINGTON

MG2, ZGF, Mithun / SECO Development / Renton, WA

Southport on Lake Washington is the culmination of SECO Development's vision that began in 1999. Situated on the shore of Lake Washington, this mixed-use development is an important project for the community, attracting new businesses, residents, and tourists to the area.

This summer, the opening of the luxurious Hyatt Regency signals an important milestone in completion of this waterfront destination. As construction of the technology-rich, 730,000-square-foot office campus wraps up in 2019, it joins the hotel and upscale living complex of Bristol Residences in transforming this former industrial site. As the live webcam proves, the project's marketing mantra rings true: "Southport is rising!"

LEARN MORE

[Project Progress via the Live Webcam www.southport.life](#)



SUPPORTING STEM AND THE NEXT GENERATION OF GREAT ENGINEERS

ACE MENTORSHIP

As ACE mentors, we introduce students to the professional world, to what we do as engineers, and to the interdisciplinary collaboration that's required of every A/E/C project. Nine Coughlin Porter Lundeen employees support the program by leading high-level planning, designing hands-on challenges and activities for students, and serving as approachable, professional mentors.

This session has been a banner one for ACE. Students have been encouraged to envision their future in the field as they toured industry offices, the Starbucks Reserve and Roastery, and Seattle Academy's Makers Spaces. At a workshop hosted here at Coughlin Porter Lundeen, they were invited to try their hands at civil and structural engineering challenges. In addition to filling them with tacos, we tasked them with designing water filtration systems and building straw towers to be tested against loads and earthquake simulation.

We're looking forward to the final presentation night, where students will share their final designs and reflections on all they've learned in the past year.

Want to know more? Visit: www.acementor.org

INTERNSHIPS

We welcomed 11 interns into our ranks last year. We believe that internships should be about much more than coffee runs and "busy work." The Coughlin Porter Lundeen interns become an integrated part of our civil and structural teams, participating on live projects, joining mentor groups, and visiting sites. Their only coffee runs were self-motivated. And we can't blame them, because we are in Seattle after all...

Know someone who'd be a great fit as an intern? Send them our way!
cplinc.com/firm/careers/

REPICTURE STEM

RePicture STEM, a collaboration between Getty Images, Washington STEM, and Your Life, is challenging STEM stereotypes. Its goal is an important one: evolve the "stock" photography associated with STEM. Photos have power, and we agree that the next generation of STEM imagery should inspire youth and be inclusive.

The program's mission to reshape how STEM is perceived is one that we wholeheartedly believe in, and the initiative made us rethink our own internal library, reminding us that the photos we publish alongside our content contribute to perceptions. Science, technology, engineering, and math help shape our world, and we're excited by efforts that ensure STEM is encouraged and supported.

Read more about RePicture STEM [here](#).



After a long, rainy winter,

the Pacific Northwest is finally expecting some decent weather. As a Seattle-based firm, we know the importance of savoring the summer months and seizing any day when the sun decides to show itself. We plan to spend our upcoming, good-weather days outdoors at Coughlin Porter Lundeen soccer and softball league games, team golf outings, our annual company picnic, Mariner and Sounders games, and the like.

We also plan to take advantage of all the PNW has to offer, venturing beyond the city for some backpacking adventures and hikes. To help with your planning, we've rounded up a few of our team's favorite hikes. >>>

See you on the trails!

RATTLESNAKE LEDGE

Recommended By: Aaron Fjelstad, P.E., LEED AP, Civil Project Engineer
Distance: 4 miles roundtrip
Area: Snoqualmie, North Bend
Difficulty Level / Elevation Gain: Easy / 1,160 ft.

Why I Love It: Rattlesnake is a quick hike close to Seattle, perfect for an after work adventure. It's relatively easy, but the payout is big: great views of the lake and surrounding valley from the top. Plus, there's the added bonus of a post-hike swim!

WTA Write-up

CHAIN LAKES LOOP

Recommended By: Walt Busch, P.E., Structural Engineer
Distance: 8 miles roundtrip
Area: North Cascades, Mt Baker-Snoqualmie National Forest
Difficulty Level / Elevation Gain: Moderate / 1,700 ft.

Why I love it: This is a great intro hike to the Mt. Baker area boasting big views of Shuksan, Baker, and the North Cascades. The drive is a little further from the city center, but that distance eliminates many of the I-90 crowds. The alpine lakes are perfect for swimming and fly fishing.
Tip: Beginning at Bagley Lakes, hike the loop counter-clockwise to get the elevation gain out of the way while your legs are fresh. Take advantage of the many backcountry campsites, and use your sleeping pad to float and relax on the lakes!

WTA Write-up

BANDERA MOUNTAIN

Recommended By: Laura Grignon, P.E., Civil Senior Project Manager
Distance: 8 miles roundtrip
Area: North side of I-90
Difficulty Level / Elevation Gain: Moderate / 3,400 ft

Why I Love It: Located off of the Ira Spring Trail, this is a great day hike with easy access from the city. It's perfect for when you want a good workout and fabulous views without driving long distances from Seattle.
Tip: If you're feeling particularly energetic, continue on to the more remote Mount Defiance, which has even better views, more chances for flowers.

WTA Write-up

ABOUT THE RED LINE

Published by Coughlin Porter Lundeen, The Red Line is a biannual collection of the firm's news, perspective, and commentary on A/E/C industry topics. All content is curated and written in-house.

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ABOUT COUGHLIN PORTER LUNDEEN

Coughlin Porter Lundeen is a civil and structural engineering firm. Focused in the Pacific Northwest, we partner with clients across markets to bring unique project visions to life. We were founded with the goal of exceeding the standards and services provided by engineering firms, and today, more than twenty years later, that vision continues to guide all that we do.
