ACE AGE Awards Submission 2020 Entry Form

Category: Category 11: Best Building Project - General Contractor ($10-$40 Million)

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Project Name: University of Denver, Burwell Center for Career Achievement

Overview Statement

In July 2020, PCL completed the construction of the Burwell Center for Career Achievement, a new 3-story, 23,000 SF building on the University of Denver (DU) campus. The building was designed with the mission of facilitating community and campus connections while supporting student career development, employer engagement, and alumni activities. The building now prominently serves as a beacon on campus highlighting DU's commitment to environmental stewardship.

The Burwell Center is the first higher education project in Colorado to be constructed entirely of mass timber, boasts the tallest use of Cross Laminated Panel (CLT) shear walls in Colorado, and is targeted to be one of the first LEED V4 Platinum buildings certified in Colorado.

Solutions of Special Projects:

Building with mass timber presents unique challenges, especially since the structural material is exposed to view as the final product. The team's vision was to maximize the amount of exposed wood CLT ceilings, but minimize the clutter associated with exposed MEP systems. Early during preconstruction, PCL advocated for a team goal of "No Exposed Conduit." This ambitious goal required extensive 3D modeling and coordination of all conduit to confidently pre-determine their routing. Final sign-off of the clash-free BIM model took place months before construction started to allow for all MEP penetrations and J-box floor cutouts to be factory-cut by a CNC machine during CLT fabrication. All conduit was concealed within the topping slabs above the CLT panels, and the team goal of not having any exposed conduit was achieved.

Concealing all conduit within the slab, instead of installed exposed under the CLT panels, did pose another challenge. The original design required a #3 rebar mat for reinforcement within the 3" topping slab, resulting in areas of the slab only having an inch of cover when both conduit and rebar crossed paths. CLT floor decks can have a fair amount of deflection and PCL recognized this as an area of concern for cracking as there are exposed concrete topping slabs in open

spaces. To mitigate this risk, the team presented an alternate solution to use Forta Ferro Macro fiber mesh in lieu of rebar reinforcement. PCL built full-size mock-ups of both floor assemblies to illustrate cracking patterns and finish quality that could be expected in the final product of each. PCL's alternate solution was accepted and offered a better-quality product with higher crack resistance, additional ¾" of concrete coverage, and cost savings given back to DU.

Excellence in Project Execution and Management/Team Approach:
The Burwell Center is the third building PCL has built on the DU campus, making the team intimately familiar with the University's processes and campus vision. In collaboration with Lake Flato Architects, Shears Adkins Rockmore and Didier Design Studio, the team designed and built a campus heartbeat for DU students to call home.

PCL's heavy front-end preconstruction efforts started at the conceptual design stage and included extensive constructability reviews and value engineering, early selection of major subcontractors, analysis of multiple building systems, and the use of alternate manufacturers to ensure we met DU's fixed budget. Prior to the start of construction, PCL held a Quality Expectations meeting with DU to proactively manage their quality hot buttons and communicate a unified vision across the team. This partnership resulted in an absence of quality issues, which allowed PCL to minimize the use of contingency and give un-used contingency back to DU so they could be spent on owner-driven scope enhancements. PCL ultimately delivered the project under budget.

Architect, Ryan Yaden with Lake Flato Architects said, "PCL has been amazing to work with and supportive of sustainability and mass timber, acting as a great partner in advancing to full timber and LEED Platinum when we started with concrete and LEED Silver. I'm not exaggerating to say working with PCL has been one of the highlights of my career. We are continuing to look for work with them nationally and will certainly work with them again in Denver."

Construction Innovations/State-of-the-Art Advancement:
The Burwell Center is constructed entirely with mass timber, consisting of CLT floor and roof panels, CLT shear walls at the stair and elevator cores, and glulam beams and columns. PCL self-performed the erection of the entire 3-story mass timber structure over the course of 6 weeks

with only a seven man crew. This is a testament to the speed of mass timber construction when the team is committed to pre-planning, constructability reviews, and takes pride in their work. Utilizing mass timber reduces the overall carbon footprint of the building by using a rapidly renewable resource that has a low impact on the environment and the inherent ability to sequester massive amounts of carbon stored within the material. The energy consumed to produce CLT in factories is significantly less than concrete or steel and offers tremendous biophilic benefits to the occupants of the building. The wood volume used in the project takes 2.8 days to regrow in the leased Black Pine forest in Canada.

The Burwell Center will be one of the first LEED V4 Platinum buildings in Colorado and seeks energy performance 60% below the baseline for similar buildings by integrating a large photovoltaic panel array on the sloped roof structure, reduced water-usage, and daylighting models to maximize views, thermal comfort, and payback from reduced mechanical usage.

Environmental/Safety:

Safety was PCL's top priority over the course of the 13-month project, proven true by the zero recordable injuries and zero hours lost over the 39,000 manhours worked. This includes PCL's hourly craft labor who self-performed the surveying, selective demolition, concrete foundations, and erection of the mass timber structure. During erection of the building, PCL dealt with elevated work hazards by working closely with the onsite safety professionals to research the proper leading-edge personal fall arrest systems. PCL implemented rated tie-off anchors that were easily relocated in the CLT deck, providing flexibility in tying off. Once the CLT deck was complete, the team quickly eliminated any fall hazards with guard rails, toe kicks and netting.

When working on the exterior wall, a controlled access zone was set up to keep workers from walking in the work zone and PCL utilized an elevated pre-work checklist for all elevated and lift work. This checklist reinforced and reminded workers of the changing hazards when working in an elevated situation and the importance of planning work to avoid potential hazards.

A safe jobsite requires a steady stream of communication. PCL held weekly all-hands meetings with everyone on site and daily meetings with the foreman. These meetings were used to discuss the safety plan for all upcoming work. On multiple occasions, Architect, Dan Craig said, "This is the cleanest, most organized job I've been on."

Excellence in Client Service and/or Contribution to Community:
University campuses can be daunting, which is why the Burwell Center was designed to facilitate connections across campus, serving as a gathering hub for DU students, alumni, and faculty. PCL is honored to have played a role in bringing DU's mission to become the "Union Station of engagement, service, opportunity and transformation," to life. Below is a testimonial from, University Architect, Mark Rodgers.

Testimonial
While serving the University of Denver across three decades, I have had the opportunity to work with many construction companies. PCL has built for our University two iconic structures – the Newman Center for the Performing Arts and the newly opened Burwell Center for Career Achievement.

The Burwell Center project proved the value of extensive and intensive pre-construction services to create a building that is an exemplar for both pre-construction coordination by reducing the construction schedule by almost 20% through their willingness to embrace a CLT structural system that included the shear walls and their enthusiastic team commitment to demonstrate sustainability enabling us to go from "possibly gold" to LEED platinum.

PCL worked diligently with our Architect of Record team alongside a host of University staff to craft a building that draws our students from across our 125-acre campus in exactly the manner that is so important to our students graduating and finding careers of meaningful success. So, while not physically large, the building is immense given the institutional goals, the range of featured spaces, the variety of architectural elements, innovative mechanical systems, etc. all enhanced with PCL exceeding by more than 50% the University's goal to have at least 15% Disadvantage Business participation. Add the complexities of ensuring a healthy work site in the midst of Covid-19 with no positive tests and opening before the beginning of the academic year as planned – it is no wonder that it is heard throughout the halls of the University how impressed the institution is with PCL's work on the Burwell Center.

Finally, and most importantly, PCL fulfilled the requirement to safely manage a very tight site at a core student crossing point on our campus with courtesy and clarity.

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