

Patrons Oxford Insurance Office Building

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Press Release

In need of a new office and a desire to be closer to the growing city of Portland, ME, Patron Oxford Insurance recently celebrated the grand opening of their 20,000 SF corporate headquarters in the Portland Technology Park. Becker Structural Engineers (BSE) served as the structural engineering consultant to Scott Simons Architects to complete the design, which started in 2015. Zachau Construction Company began construction in the summer of 2016 and the project was substantially completed in June 2017. Challenges were faced throughout the various phases of the project. Beginning with the initial review of the site location, the unique positioning of the building on the site, utilizing innovative and emerging products to address exposed architectural detailing and developing custom designs for the intricate structural connections. Starting from within the ground, R.W. Gillespie, Inc., performed the geotechnical engineering review of the project site and confirmed with a previous report from the City that much of the park was underlain with deep layers of compressible clays, extending to depths of up to 100 feet in some locations. The design team had to review foundation strategies to mitigate large building settlements and ultimately chose to replace in-situ soils with a light weight fill to serve as the bearing substrate for the building. During construction, up to 4 feet of soil was removed from the site and replaced with the light-weight cement-based product. Once these foundation challenges were solved, the architect was tasked with positioning the building within the site constraints. The resulting “bowtie” shaped building contained almost no right angles, skewing structural framing members to their supports and creating unique joint conditions. The architectural development of the building design also called for many features of exposed structural framing. BSE suggested an engineered mass timber frame with high quality lumber to maximize the aesthetics while also providing sufficient strength. Mass timber is a building solution that is quickly gaining momentum in the US and utilizes solid timber slabs, beams, and columns in place of the more conventional light-framed construction materials. The building structure consisted of pre-fabricated wood trusses spanning to the mass timber frame which was composed of glued laminated timbers, or glulams. Due to the complex building geometry and skewed angles, BSE had to develop custom designed glulam connections. This was further complicated by the seismic design criteria for timber-framed lateral force resisting systems, as no such criteria currently exists based on the International Building Code (IBC) for the proposed rod braced system interfaced with timber elements. After substantial

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research, BSE determined the rod braces intermixed with timber elements could achieve similar seismic properties as all-steel systems and presented the findings to the City, whom ultimately approved the design. These lateral systems required BSE and the architect to utilize a connection type called a “fitch column”, to combine the wood and steel materials and achieve the exposed design details. This ½” thick steel plate is sandwiched between two glulam members and connect through a series of gusset plates and welds and provided a means to conceal most of the steel elements for aesthetic design. Beyond these hurdles of designing the Patrons Oxford Insurance Building, the project is a successful example of the promising industry of wood construction and the advancements in design and engineering that can be applied to many future mass timber projects in the state.

About Us

Becker Structural Engineers, Inc. was founded in 1994. We have built a successful practice by providing practical, cost-effective and innovative solutions on a wide range of challenging projects. Project involvement includes a mix of new and existing buildings and facilities. Our substantial experience with contemporary building design is complemented by an extensive background renovating and restoring historic structures. Our performance based engineering perspective creates efficient, reliable designs. and our broad knowledge of building structures, building components and constructability provides a wealth of information to draw on. Our staff size ensures projects receive the attention they deserve and that project milestones are met. Building and design capabilities are complimented by our expertise in the functional planning, layout, access control, structural design and construction phase services which include construction reviews for general conformance as well as implementation and administration of the IBC Special Inspections Program. We believe a strong job site presence contributes to enhanced quality and improved construction efficiency. We coordinate architectural and mechanical systems to deliver a complete building and garage design package. In addition to our parking garage design and repair experience, we also provide design services to the precast concrete industry for architectural precast, and structural precast concrete. Our synergistic ability to design buildings, parking structures, and building components, provides one source for structural engineering needs.