

2015 WOOD DESIGN AWARDS - WINNER

Environmental Performance

Matheo Durfeld, BC Passive House

BC Passive House Plant, Pemberton, BC



“This building exemplifies the use of wood to achieve energy savings, and reduce environmental impact.”

- jury comments

High resolution images available. Please e-mail mmclaughlin@wood-works.ca

BC Passive House (BCPH) is a manufacturing company that prefabricates panelized building systems and heavy timber packages for high performance buildings. Completed in the summer of 2014, the BC Passive House plant is an ‘all-wood’ demonstration project. The building was the vision of a company dedicated to the concept of truly sustainable construction methodologies, typified by the international Passive House Standard. BCPH mandated that the facility design must exemplify their commitment to wood design and sustainable construction practices. With this mandate, BCPH envisioned a high quality, modern alternative to traditional warehouse and big store construction.

The building consists of a large open workspace divided into two distinct bays used for manufacturing plus a conference room and office mezzanine in the southwest corner of the plant. The envelope was constructed using BCPH’s wood-based, double wall, super insulated system that is airtight while remaining vapour diffusion open to the exterior. The use of wood enabled BCPH to achieve this efficiency with a system that was healthy, sustainable, comfortable and cost-effective. The natural daylight and exposed wood finishes within the building were key selection criteria so as to provide a warm, comfortable, and inspiring workspace. The main motivation for the project’s design was the vision that industrial or everyday buildings, which make up a vast amount of our built environment, are just as important and well-considered as our more public and ‘architectural’ buildings. The quality and design of the building brings value to BCPH in achieving a better working environment, which translates into measurable long-term benefits to the organization through greater staff satisfaction.

In addition, the building itself brings value to BCPH as a sales tool to showcase the different systems manufactured in the plant. The main structural elements of the building consist of Douglas Fir glulam post and beam, with solid wood (SPF), cross-laminated timber (CLT) panel walls, all manufactured in BC. The roof assembly consists of prefabricated ‘2x12’ panels that assisted the erection of the glulam

structure by offering permanent bracing for the columns and beams during assembly. The use of these prefabricated structural components allowed for the building’s super structure to be set-up onsite in eight days, dramatically reducing the on-site construction window. In addition, prefabrication allowed for the construction of the building components in a controlled environment increasing efficiency, quality control and precision while reducing the occurrence of changes (swelling, mold growth, warping) in the material from exposure to weather. Three-ply CLT panels were chosen for the wall elements as they provided a robust, finished surface while satisfying wind and seismic considerations. The double bay configuration of the facility created shorter spans enabling the use of simple, cambered glulam beams on glulam columns. Through the use of wood and other ecologically responsible materials, significant environmental and architectural value was achieved for a modest premium compared to conventional construction.

Products and materials were chosen for their “life cycle” low environmental impact. BCPH’s “wood first” approach resulted in the choice of materials that were sustainable, natural and de-constructible at the end of their life cycle. The main building component of the facility is wood or wood by products. Utilizing a “wood first” approach for the structure of the building avoided approximately 365 metric tons of CO2 emissions (<http://cc.woodworks.org/calculator.php>). The conference room was finished with cedar milled from trees salvaged from a 1930’s burn site. Plant storage, desks, shelves and staircases were constructed from the waste CLT panels. Pumice and recycled foam glass insulation were used for under-slab insulation to decrease the amount of XPS insulation required. The facility is the first of its kind in North America and will assist the company in its promotion of the Passive House standard and sustainable, energy efficient construction methodologies that use innovative wood based construction materials. Moreover, it demonstrates the efficacy of using wood in buildings that typically have been both plain in appearance and poor in performance.