

Recent Work on 5 Storey Heavy Timber Structure UBC Earth Science and Systems Building

The recent Building Code amendment in British Columbia to allow the construction of mid-rise wood residential buildings has sparked a new momentum for the use of wood in the construction industry. In our recent experience, we saw multiple wood frame residential projects break ground as a direct result of the change in the regulation. However, the process leading to the Code amendment has also benefited the fire engineering profession: it has revealed and brought consensus to some of the most fundamental requirements of the Building Code, and suggested an approach based on risk analysis for studying the performance of buildings in fire. This newfound clarity in the application of the objective-based Building Code could potentially increase the use of Alternative Solutions for greater flexibility and creativity in architecture, including extending the use of wood in other major occupancies, as demonstrated through our recent 5 storey heavy timber project at UBC.

In light of these exciting opportunities in the fire engineering profession, we remain diligent in our practice and continue to advocate for a matured peer-review process. The consulting work that has gone into the process of amending the Building Code to permit mid-rise wood frame residential buildings has provided the important consensus and knowledge that could greatly strengthen the use of Alternative Solutions in British Columbia and together create a synergy for extending the use of wood to various building classifications.

Our recent work at UBC's Earth Science and Systems Building (ESSB) is an example of using the Alternative Solution to permit the use of exposed heavy timber as the building structure and interior finish in this new academic facility designed by Busby Perkins + Will.



The ESSB building is a 5 storey structure of Assembly (Group A-2) occupancy. To promote and exemplify the use of wood, roughly 35% of the building is constructed entirely of heavy timber - exposed wood floor slabs, beams and columns. Although the Code has been amended to permit mid-rise wood buildings, the amendment is currently limited to residential occupancies. Therefore, in order to use wood in an Assembly occupancy, we developed a performance-based Alternative Solution. A comprehensive analysis was undertaken to evaluate the combustibility and structural capacity of the heavy timber structure with respect to fire. Through risk analysis, it was shown that in a pre-flashover fire environment, the building can be designed to provide an equivalent level of safety as provided in a noncombustible building.

Working in conjunction with structural engineer Equilibrium, it was substantiated that exposed wood members can attain the same fire resistance as noncombustible structures.

Importance of the Peer-Review Process

As the Building Code completes its first successful cycle in the objective-based format, practitioners, architects and building owners are enthusiastic about the capabilities and prospects of Alternative Solutions. On the fire front, scientific research in the last century has enhanced the understanding of enclosure fire dynamics and created methods for undertaking state-of-the-art designs and analyses. However, while the regulatory framework and fire engineers are ready, there remains a need to develop a matured peer-review process for administering Alternative Solutions. In the recent ESSB project, we found great value in having an independent fire engineering firm acting as the Authority Having Jurisdiction (AHJ) / peer reviewer. As the fire engineering discipline advances and buildings become more sophisticated, the competence and independence of a peer-reviewer becomes a critical factor in determining the strategic advancement of this industry.

The information in this letter is for guidance only. Refer to applicable Building Codes and Fire Codes for actual requirements. The designer should always check with the AHJ for local policies and interpretations regarding the foregoing.

Owner – UBC Properties Trust; Architect – Busby Perkins + Will; Structural Engineer – Equilibrium Consulting Inc