



Instrumentation for monitoring performance in a six-storey building in Vancouver built for high energy performance

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Abstract:

This report documents the instrumentation installed for monitoring moisture, indoor air quality and differential movement performance in a six-storey building located in the City of Vancouver. The building has five storeys of wood-frame construction above a concrete podium, providing 85 rental units for residential and commercial use. It was designed and built to meet the Passive House standard and, once certified, will be the largest building in Canada that meets this rigorous energy standard. Although the design and construction focused on integrating a number of innovative measures to improve energy efficiency, much effort was also made to reduce construction costs. One example of the design measures is the use of a highly insulating exterior wall assembly that integrates rigid insulation between two rows of wall studs as interior air and vapour barriers.

This monitoring study aims to generate data on long-term performance as part of FPInnovations' effort to assist the building sector in developing durable and energy efficient wood-based buildings, which is expected to translate into reduced energy consumption and carbon emissions from the built environment. The monitoring focuses on measuring moisture performance of the building envelope (i.e., exterior walls, roof, and sill plates); indoor environmental quality including temperature, humidity, and CO₂; and vertical differential movement between exterior walls and interior walls below roof/roof decks. In total, 79 instruments were installed during the construction.

The next steps of this study will focus on collecting and analysing data from the sensors installed, and assessing performance related to the building envelope and vertical differential movement. FPInnovations will also collaborate with CanmetENERGY of Natural Resources Canada to monitor heat recovery ventilators and to assess whole-building energy efficiency and occupant comfort. This is expected to start after the mechanical systems are fully commissioned during occupancy. Results of these upcoming phases of work will be published in future reports.

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