

## **Abstract**

### The Effect of Overhang on Wind-Driven Rain Wetting for a Mid-Rise Building

Vincent Chiu

Wind-driven rain (WDR) is one of the main sources of water causing moisture related damage in buildings. Rainwater that is absorbed and that penetrates through the cladding may lead to failures of building materials and components. Roof overhangs are a common feature that can be used to reduce the amount of WDR on building facades. Experimental studies and CFD modeling have shown that roof overhangs shelter the building facade from WDR. However, there is limited quantitative evaluation of the effectiveness of overhangs in protecting the building facade from WDR. A six-storey mid-rise building with a flat roof located in Vancouver, British Columbia has been equipped with a retractable overhang along with a rooftop weather station and thirty-one WDR gauges that have been strategically mounted on the building facades. The spatial distribution of WDR on the building facades have been studied without and with overhang (0.6 m and 1.2 m overhangs). The effectiveness of the roof overhang under real-life conditions with respect to the most important meteorological parameters of wind speed and wind direction have been assessed using two methods: similarity and symmetry. The overhangs reduce the WDR deposition on the facade, especially the areas right below the overhangs. The effectiveness of the overhangs are highly dependent on the wind speed and direction - the effectiveness decreases with increasing wind speed and increases for oblique winds. In addition, a model of the test building and its surroundings have been placed in Concordia's atmospheric boundary layer wind tunnel to verify the exposure and wind flow near the facades.