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# CONCRETE TOPPING AND CONSTRUCTION MOISTURE ON CROSS-LAMINATED TIMBER

Jieying Wang, Ph.D.

FPInnovations conducted a laboratory test to investigate the potential wetting of cross-laminated timber (CLT) from the pouring of concrete topping, and the effectiveness of a water repellent coating and membrane in preventing such wetting.

## Material and Methods

3-ply CLT specimens made from visually graded Spruce-Pine-Fir lumber and measuring 400 mm × 400 mm × 87 mm (thickness) were provided by a Canadian manufacturer. They were conditioned to an initial 15% moisture content (MC) (“Dry CLT”). The test was conducted in damp wintertime in Vancouver. The top surface of each specimen received one of the following four treatments: 1) left untreated; 2) coated with a commonly-used water repellent (“TWS”); 3) covered with a self-adhesive vapour-permeable membrane (“MEM 1”), or 4) covered with an impermeable membrane (“MEM 2”). Another group was exposed to wet exterior weather for one month to represent construction wetting (“Wet CLT”). Moisture pin-type sensors were pre-installed in each CLT specimen to measure wood MC in the top surface, at depths of 6 mm and 12 mm, respectively. The concrete topping, a light-weight self-leveling product commonly used on wood-based floors to improve sound isolation, was poured on each specimen to a thickness of 40 mm, immediately after mixing following the manufacturer instructions (Figure 1). The specimens were afterwards stored in an open shed and monitored for changes in the MC measurements. See results in Figures 2 and 3.



Figure 1. Wood specimens with their top surfaces covered with wet light-weight self-leveling concrete using pre-built forming.

## Conclusions and Recommendations

The test showed the “Wet CLT” continued to dry after the pouring of concrete topping. The results from the “Dry CLT” specimens suggest that the moisture from the wet light-weight concrete topping did not greatly wet the CLT below. The water repellent had little effect; but pre-installing a membrane reduced the MC of the CLT below.

With any membrane, it is crucial to ensure that the moisture protection is continuous across joints. Pre-installing a water-resistant acoustic mat should provide a similar protection. Although concrete topping does not appear to significantly affect CLT moisture, designers should specify a product with a low water content to minimize extra moisture. Because it is slow for moisture trapped between the concrete and the CLT to escape, the best protection is to keep the wood dry (e.g., with a MC ideally below 16%) before installing concrete topping, or other covering.

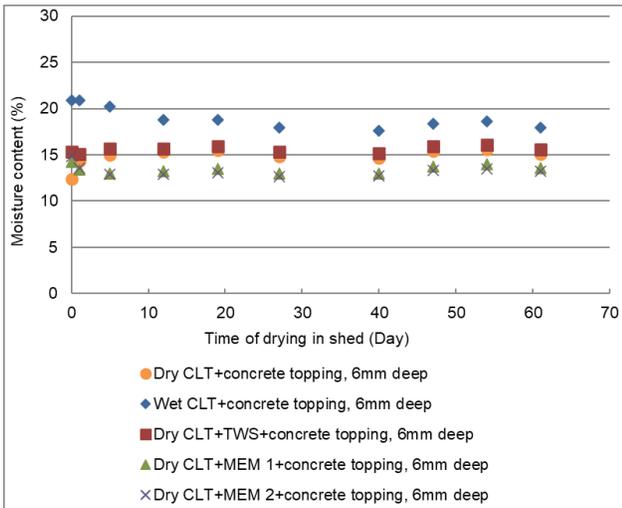


Figure 2. Measured moisture content at 6 mm below the top surface of CLT.

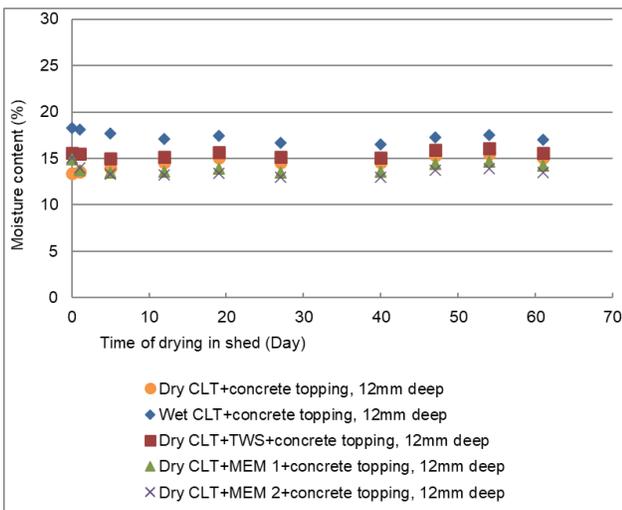


Figure 3. Measured moisture content at 12 mm below the top surface of CLT.

### References

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### For more information

Jieying Wang | (604) 222-5649  
[jieying.wang@fpinnovations.ca](mailto:jieying.wang@fpinnovations.ca)

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