

# Moisture Vapour Emissions

## Overview

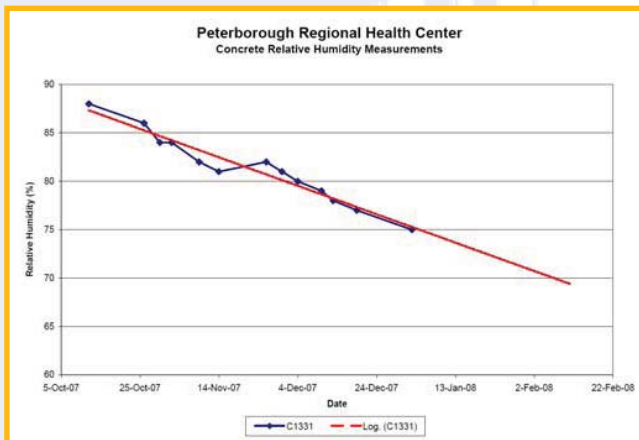
Peterborough Regional Health Centre is a 494-bed hospital facility in Peterborough, ON. The slab-on-grade was predominantly finished with resilient flooring, which is impermeable to moisture. In order to ensure the slab was adequately dry to receive the flooring, a moisture content monitoring program was initiated to regularly measure the slab's relative humidity, in order to determine when the slab would be ready to receive the flooring.

## Site Specifics

The ground floor slab-on-grade was poured with an underslab 10 mil polyethylene vapour retarder to prevent the transmission of moisture vapour from the subgrade into the slab, therefore any excess moisture would be from water added during



Above: Wagner RH probe installed in a slab  
Below: Moisture content in slab between Oct 07 and Jan 08



batching. Slab moisture measurements were made by embedding Wagner Relative Humidity Probes within the slab. When the slab's moisture content was first recorded, it had a %RH higher than recommended (75%) for impermeable flooring (ACI 302.2R). Between October 2007 and January 2008, the moisture content of the slab was observed to be decreasing. To expedite the drying process, many temporary heaters were used to provide warm, dry air to increase the moisture vapour drive from the slab to the ambient air. By the end of January, the slab relative humidity readings were all below 75% RH, low enough to proceed with the safe installation of resilient flooring.

## General Notes

Many types of flooring finishes can be affected by moisture vapour emissions:

- Resilient flooring can begin to bubble when exposed to moisture vapour emissions, as the new generation of water-based adhesives bonding flooring to substrates re-emulsify and fail.
- Wood flooring can become cupped or warped when exposed to moisture
- Carpeting may begin to manifest mould

These problems can be prevented by using an underslab vapour retarder and allowing the slab to dry before installing flooring. The purpose of an underslab vapour retarder is to prevent moisture vapour from the subgrade from being introduced into the slab. A 10 mil polyethylene sheeting is recommended to avoid punctures in the vapour retarder during construction. This will prevent vapour from entering the slab, but concrete slabs will have excess water content from batching, and this water must be allowed to leave the slab. Overtime, the water content in the slab will

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equilibrate with the ambient conditions, so to dry the slab quicker, the environment above the slab should be warm and dry. The rate of slab drying is affected by the water cement ratio of the concrete mix design and the thickness of the slab. As the slab is drying, the rate it will do so is dependent on the ambient conditions, so the moisture content of the slab should be monitored to ensure it is low enough to safely install the flooring finish.

## Recommendations

Implement a slab RH measurement program. Moisture vapour emissions can cause major problems to the finished flooring, but by measuring the moisture in the slab and ensuring the slab is dry enough to receiving finish flooring, future deficiencies and remediation can be avoided.

## Further Reading

ACI 302.2R: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials, and Concrete Floors and Moisture by PCA