
Practical Hygrothermal Modeling for Building Enclosure Design

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ABSTRACT

This workshop will examine several hygrothermal modeling tools that a practicing designer can use to improve their understanding of enclosure performance. For example, one can use these tools to see the relative importance of air and vapor barriers and their placement in different climates, the impact of choosing different materials for the same function, the effect of rain absorption and solar heating, the time to dry out wet assemblies, dynamic heat flow, etc.

Although models ranging from spreadsheets to advanced transient hygrothermal models that account for driving rain and capillary moisture flow will be discussed, the majority of the time will be spent demonstrating the free and downloadable WUFI-ORNL/IBP model. Representatives from the developers of this model and a long-time user will be presenting. The fundamental physical principles of the model and its capabilities and limitations will be covered. Modeling tips and techniques, sources of material data, and hourly weather files will all be discussed. Finally, some advanced modeling results using commercial programs and research tools will be demonstrated.

Participants in the workshop will leave with an awareness of the range of hygrothermal modeling tools presently available, their capabilities and limitations, and a basic understanding of how to use WUFI-ORNL/IBP to solve practical enclosure analysis and design problems.

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