microclimate to which the interior brick will be subjected (combination of freeze-thaw and moisture content) was relatively modest. The successful performance of solid masonry walls from a water management standpoint include solid, full mortar joints, exterior wythes of masonry free of cracks or other distress, physical shielding to limit water exposure, and sufficient flashing systems. The design of any insulated masonry wall assembly must also include effective steps to prevent liquid-water ingress and accumulation, which will reduce the risk of masonry freeze-thaw damage.

CONCLUSIONS

For successful building retrofit projects, it is important to maintain the durability of the building and mitigate the risk of premature deterioration of its constituent materials. Insulating solid masonry walls to reduce heat loss and improve airtightness may be detrimental to the masonry durability due to the potential for freeze-thaw deterioration. Properly evaluating these risks involves understanding the masonry material properties, heat and moisture migration through the exterior wall assembly, and the risk of freeze-thaw deterioration associated with adding interior insulation and vapor retarders.

Architects and engineers must understand that the material databases may include an immense range of brick properties, which may not be representative of the project-specific brick properties. The risk associated with using generic material properties is that the predicted results are unlikely to be indicative of actual performance, possibly leading to overly conservative recommendations. Increasing the accuracy of WUFI analysis requires measuring the hygric properties of brick samples taken from the project site. Additional laboratory analysis is available to assist architects and engineers in understanding the physical properties and evaluate the freeze-thaw durability of brick samples removed from the building and bridge the gap between simulation results and relevant recommendations.

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