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“A Smart Instrument to Evaluate Roofing System Performance in Hurricanes.”

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The objective of this paper is to describe a recently developed decision support system that aids non-engineering professionals, mainly insurance appraisers, in evaluating the quality of roofing systems in residential and commercial structures. It also describes the requirements, theoretical background, and architecture of the system. The paper compares the predicted quality levels of thirteen roofing systems with the observed quality based on their performance in Hurricane Andrew in 1992.

Findings

The expert rating of the roof covering is provided by the answers to twenty three questions related to the perceived design of the roof covering system, the quality of the installation of the covering system, the quality of existing test methods to evaluate roofing materials, and the quality of the materials themselves. A verbal rating of Very Low (VL), Low (L), Moderate (M), High (H), and Very High (VH) was assigned to each basic condition, consisting of materials, test methods, installation, and design. If the program rated the roofing system as acceptable, then the roofing system experienced minor or no damage. If the program rated the roofing system to be marginal, then the roofing system sustained major damage ranging from a 50% loss of roofing to the complete collapse of the roofing system.

Implications

The described roofing evaluation decision support system shows the potential to be used as a practical tool for identifying roofing systems that might be at risk of experiencing damage in a high wind environment. The recently developed decision support system can aid non-engineering professionals in evaluating the quality of roofing systems in residential and commercial structures. The roof evaluation decision support system applies to existing major roofing systems that are used in the United States, such as spray polyurethane foam, build-up-roof fastened with adhesives, single ply membrane with mechanical fasteners, wood shingles and others.