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Examining the Case for the E³ Drying Metric

A review of an industry whitepaper identifying three conditions that can determine relative evaporation rates from construction materials highlights some discrepancies, errors and omissions that warrant closer inspection. | **By Patricia L. Harman**

Effective water damage mitigation is a mix of art and science and requires a foundation of sound science.

A whitepaper authored by Chuck Dewald, III, of the E³ Drying Academy, entitled Enthalpy Evaporation Evaluation – A Case for the E³ Drying Metric identifies three factors he believes can help restoration contractors predict the evaporation rate of water from building materials. He says each has an important but slightly different role, focusing on ambient condition energies, dew point temperature energies, and wet bulb temperature energies.

Dewald states in the whitepaper that "the restoration industry has never had a singular metric to evaluate the drying or evaporation rate. This has been a huge problem in the restoration industry since its inception. We needed a metric that could evaluate any ambient condition and provide a proportionate drying or evaporation rating. E³ provides this metric."

Based on this premise, the whitepaper contends that the E³ metric "evaluates any ambient conditions and predicts the relative drying or evaporation rate that will be created on the wet materials by the ambient air. The system performs a thorough energy evaluation and provides a proportionate number – meaning an E³ number of 200 would dry or evaporate water from all materials twice as fast as an E³ number of 100."

Employing the E³ metric for restoration

A review of the whitepaper and some of the claims and presumptions on which it is based led to the development of a formal rebuttal document which identifies several issues that could lead to errors and other problems with the use of the E³ metric. One concern is the contention that "E³ evaluates any ambient conditions and predicts the relative drying or evaporation rate that will be created on the wet materials by the ambient air" can actually be disproved when used across all conditions.

The reviewers found that none of the third-party data offered in the whitepaper provided statistically relevant results supporting the author's claims about

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the efficacy of the E^3 metric. Their concerns stem from the number of values cited in the whitepaper as being derived from third-party data that does not correlate to the figures actually cited. They found that some of the E^3 values were presented for ambiguous conditions but there were no clarifications as to how the values were calculated.

In addition, terminology identified in the whitepaper also raises some concerns for the reviewers because they are not used in published studies or established scientific materials. The enthalpy metrics identified as "dew point sensible energy," "dew point latent energy," "wet bulb latent energy," "wet bulb sensible energy," "dew point humidity ratio," and "wet bulb humidity ratio" are used exclusively in the Dewald whitepaper and not in any other scientific journals.

A question of independent evaluation

Multiple industry studies are cited in Dewald's whitepaper, including a 2017 study by Jerry Blaylock, who was a previous partner in the American Drying Institute in Morristown, Tenn., with Dewald and collaborated with him on a patent application for a method of assessing "evaporation rate potentials" in ambient air. Dewald does not disclose their collaborations in the whitepaper and the timing surrounding the release of Blaylock's study in relation to the development of E^3 raises some questions about the validity of third-party testing of the formula.

In Blaylock's study, the materials used have an irregular moisture content which Dewald's study does not adjust for, and both studies fail to have a defined goal or objective regarding the drying process. The materials used in Blaylock's study also were not equilibrated before the experiment began, nor was data tracking the materials as they changed temperature presented, making a meaningful comparison to Dalton's law of evaporation difficult.

The review uncovered multiple areas of the whitepaper that require closer scrutiny and validation of the contentions included. Several of their concerns apply to how some of the data was averaged, the failure to compare multiple experimental situations in the cited works to real-world environments in the restoration industry, and that some of the values presented for "average mass flux" do not correlate to other data presented.

Throughout the rebuttal are multiple tables and illustrations to highlight the issues the reviewers identified and an appendix at the end of the paper lists multiple sources and other references to be considered in relation to the assertions in the E^3 whitepaper.

Restoration contractors are responsible for adhering to an industry standard of care and the documentation on which they base their decisions must be supportable by science as well as withstand the scrutiny of other professionals.

Each water damage project is unique, and the mitigation approach will require consideration of multiple variables. The reviewers applaud the efforts to create industry standards and methods that will improve the drying process for all but believe that further industry efforts are required to validate new methodologies to ensure they are scientifically sound and can indeed be accurately applied to the realities restoration professionals encounter daily.

Patricia L. Harman is the former editor-in-chief of C&R magazine and has covered the restoration industry for over 30 years.