The Benefits of the Application of a “Monte Carlo” Methodology to Evacuation Modeling

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Abstract

Whilst other aspects of fire modeling are the product of long established principles and laws of physics, evacuation modeling has to rely on other less tangible factors such as ergonomics, psychology and group dynamics. People vary dramatically in size and shape as well as their mental and physical abilities and are influenced amongst other things by their training, culture and state of well being. Although some of these factors are measurable in isolation, a significant number of them can vary dramatically under the influence of others and unlike physical properties they therefore lack consistency. It is for this reason that a number of escape models use a “Monte Carlo” approach, involving a large number of runs within a pre-determined physical layout, in an effort to tease out some of the intangibles. The premise is that this approach can serve to encapsulate the human behavioral dynamics for any given situation. The author examines this approach in relation to a simple “ball bearing” flow model and questions whether the greater level of sophistication in models using a “Monte Carlo” methodology produce any better results and thereby practical benefits.