A review of different methods for prediction of smoke conditions in buildings

ABSTRACT

In order to study the nature of smoke in compartment, a few methods had been developed and proposed in previous studies. This paper provides a review of various methods in the area of quantitative fire risk assessment (QRA) and its application to predict a smoke layer height and temperature of the fire compartment in consequences analysis. Considering full-size experiment with real people and assets is impracticable, there are other methods that could be used to assess the severity of fire events including; historical data, disasters and near misses, experiments and fire tests, and modeling. The advantages and drawbacks of each method were discussed in this paper as a reference among researchers. Most of the methods are time consuming and expensive which requires skillful operator and may not be repeated. Nevertheless, smoke conditions could be quantified using mathematical modeling which is more timesaving especially when assessing multiple fire scenarios in fire safety design. However, existing mathematical model only applicable for single compartment and there are only a few models that has been developed from previous scholars for smoke prediction in multi-compartment and multi-story building. Finally this review conclude a necessity of developing a new simplified mathematical correlation model for smoke prediction in multi-story building to assist fire safety engineer explored different methods for the risk reduction as well as fire prevention.