

SCHULTE & ASSOCIATES

Building Code Consultants
880D Forest Avenue
Evanston, IL 60202
fpeschulte@aol.com
504/220-7475

SFPE ETHICS VIOLATIONS COMPLAINT DR. CRAIG BEYLER HUGHES ASSOCIATES, INC.

SFPE ETHICS STANDARDS

Preamble

“ . . . fire protection engineers must maintain and constantly improve their competence and perform under a standard of professional behavior which requires adherence to the highest principles of ethical conduct with balanced regard for the interests of the public, clients, employers, colleagues, and the profession.”

Canon 6

“Fire protection engineers shall be honest and truthful in presenting data and estimates, professional opinions and conclusions, and in their public statements dealing with professional matters and shall not engage in improper solicitation of professional employment or contracts.”

Canon 15 (adopted 9/17/92, revised 04/03/08)

“Fire protection engineers shall perform professional services using only those engineering methods and tools which are appropriate for the specific application.”

PROFESSIONAL STANDARDS FOR “PERFORMANCE-BASED” DESIGNS WHICH UTILIZE FIRE MODELS

The Life Safety Code (NFPA 101) is considered to be “*accepted engineering practice*” by many, if not most, in the field of fire protection. The following are excerpts from the 2006 Edition of the Life Safety Code which address building fire safety utilizing “performance-based” design.

It should be noted that the following would be applicable to a “performance-based” analysis of a concept intended to be utilized in the design of buildings, as well as a “performance-based” analysis of a specific building design.

“Any assumption and design specifications that the design analyses do not explicitly address or incorporate and that are, therefore, omitted from input data specifications shall be identified, and a sensitivity analysis of the consequences of that omission shall be performed.” (Section 5.4.2.2, LSC)

“Technical References and Resources. *The authority having jurisdiction shall be provided with sufficient documentation to support the validity, accuracy, relevance, and precision of the proposed methods. The engineering standards, calculation methods, and other forms of scientific information provided shall be appropriate for the particular application and methodologies used.”* (Section 5.8.2, LSC)

“Assumptions made by the model user, and descriptions of models and methods used, including known limitations, shall be documented.” (Section 5.8.11.1, LSC)

“Documentation shall be provided to verify that the assessment methods have been used validly and appropriately to address the design specifications, assumptions, and scenarios.” (Section 5.8.11.2, LSC)

DISCUSSION OF PROFESSIONAL STANDARDS FOR “PERFORMANCE-BASED” DESIGNS WHICH UTILIZE FIRE MODELS

“CFD models can provide more accurate predictions than other deterministic models, because they divide a given space into many smaller volumes. However, since they are still models, they are not absolute in their depiction of reality. In addition, they are much more expensive to use, because they are computationally intensive. Because of their expense, complexity, and intensive computational needs, CFD models require much greater scrutiny than do zone models.” (Section A.5.6, LSC)

“Validation. Models undergo limited validation. Most can be considered demonstrated only for the experimental results they were based on or the limited set of scenarios to which the model developers compared the model’s output, or a combination of both.” (Section A.5.6, LSC)

SPECIFIC ETHICS VIOLATIONS

- **May 22, 2008.** In a debate on the issue of the use of automatic smoke/heat vents in buildings protected by standard spray sprinklers, Dr. Beyler stated that the Fire Dynamics Simulator (FDS) was capable of predicting the activation times of multiple sprinklers. Dr. Beyler's statement implied that the predictions of multiple sprinkler activation times by the FDS were accurate under all circumstances. Dr. Beyler failed to inform the ICC Code Technology Committee (CTC) that the FDS has not been validated for the purposes of predicting the activation times of multiple sprinklers. (See Page 3-2, Volume 7, NUREG-1824.)

Witnesses to Dr. Beyler's statements at the debate included Messrs. Paul Heilstedt (chairman of the CTC), Mike Pfeiffer (ICC secretary to the CTC), Carl Baldassarra (Schirmer Engineering Corporation) and Carl Wren (Austin Fire Department) and other members of the ICC Code Technology Committee.

- **May 22, 2008.** In a debate on the issue of the use of smoke/heat vents in buildings protected by standard spray sprinklers, Dr. Beyler stated that Hughes Associates, Inc. has done a modeling study of a building which is 80,000 square feet in floor area protected by a sprinkler system utilizing the Fire Dynamics Simulator. Dr. Beyler stated that the modeling study determined that automatic (individually-activated) smoke/heat vents "work" in sprinklered buildings. Dr. Beyler failed to inform the ICC Code Technology Committee (CTC) that the FDS has not been validated for the purposes of predicting operation times of automatic (individually-activated) smoke/heat vents in buildings protected by standard spray sprinklers. (See page *ii*, NISTIR 6196-1, September, 1998)

Witnesses to Dr. Beyler's statements at the debate included Messrs. Paul Heilstedt (chairman of the CTC), Mike Pfeiffer (ICC secretary to the CTC), Carl Baldassarra (Schirmer Engineering Corporation) and Carl Wren (Austin Fire Department) and other members of the ICC Code Technology Committee.

- **February 18, 2008.** Hughes Associates, Inc. released a report titled "*Analysis of the Performance of Ganged Operation of Smoke and Heat Vents with Sprinklers and Draft Curtains*" on February 18, 2008. The report implies that the Fire Dynamics simulator has been validated for the purpose of predicting the activation times of multiple sprinklers. (See pages 14 and 15 in the attached report.) No where in the report is it indicated that the FDS has not been validated for the purposes of predicting activation times of multiple sprinklers, nor does the report make any reference to conclusions regarding the prediction of the activation times of multiple sprinklers contained in Volume 7 of NUREG-1824. The principal author of this Hughes Associates, Inc. report is Dr. Craig Beyler.

- **Code Change Proposal F197 -07/08-International Fire Code .** Code change F197-07/08 proposes to include an option to allow the use of the concept of the “ganged” operation of smoke/heat vents in buildings protected by standard spray sprinklers. Although the proponent of this code change is Rick Thornberry of The Code Consortium, representing the AAMA Smoke Vent Task Group, the supporting statement for this proposal makes reference to the Hughes Associates, Inc. study dated February 18, 2008 previously referenced. The supporting statement for this code change proposal does not state that the Hughes Associates, Inc. study is based upon predictions of the activation times of multiple sprinklers utilizing the Fire Dynamics Simulator and that the use of the FDS for this purpose has not been validated. Dr. Craig Beyler is a consultant to the AAMA Smoke Vent Task Group and the Hughes Associates, Inc. study released on February 18, 2008 was prepared for and funded by the AAMA Smoke Vent Task Group.

PERTINENT FACTS RELATING TO THE ETHICS VIOLATIONS

The following facts are relevant to the ethics violation allegations:

- Dr. Craig Beyler is listed as a peer reviewer for Volumes 1, 2, 3 and 7 of a report titled “*Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications*” (NUREG-1824). Page 3-2 in Volume 7 of NUREG-1824 indicates that insufficient experimental data is available to validate the use of the Fire Dynamics Simulator for purposes of predicting sprinkler activation times. NUREG-1824 is dated May, 2007.
- Dr. Craig Beyler is listed as a contributor to Volume 3 (Validation) of the Fire Dynamics Simulator (Version 5) Technical Reference Guide dated July 30, 2008.

SUMMARY

Given that Dr. Craig Beyler is listed as a peer reviewer of Volumes 1, 2, 3 and 7 of NUREG-1824 and that page 3-2 in Volume 7 of NUREG-1824 indicates that insufficient experimental data is available to validate the use of the Fire Dynamics Simulator for purposes of predicting the activation times of multiple sprinklers, it can be concluded that Dr. Beyler should have been aware that the use of the FDS for the purpose of predicting the activation times of multiple sprinklers is, at the very least, questionable. Dr. Beyler failed to inform the ICC Code Technology Committee that the validation study of the FDS conducted by the National Institute of Standards and Technology (NIST) for the Nuclear Regulatory Commission (NRC) had concluded that the use of the FDS to predict the activation times of multiple sprinklers has not been validated.

Similarly, there is a lack of experimental data that the Fire Dynamics Simulator is capable of predicting the operation times of automatic (individually-activated) smoke/heat vents in buildings protected by standard spray sprinklers. Dr. Beyler also failed to inform the ICC Code Technology Committee that the use of the FDS for this purpose has not been validated.

The Preamble to the SFPE Canon of Ethics states that members of the SFPE are to adhere “*to the highest principles of ethical conduct*”. Canon 6 states that “*fire protection engineers shall be honest and truthful in presenting data and estimates, professional opinions and conclusions*”. Canon 15 states that “*fire protection engineers shall perform professional services using only those engineering methods and tools which are appropriate for the specific application.*” Dr. Beyler’s failure to clearly state that the validation study conducted by NIST for the NRC had concluded that there is insufficient experimental data to validate the use of the FDS to predict the activation times of multiple sprinklers both at the ICC Code Technology Committee debate on May 22, 2008 and in the Hughes Associates, Inc.’s study dated February 18, 2008 appear to be violations of the Canon of Ethics Preamble, Canon 6 and Canon 15.

Similarly, Dr. Beyler’s failure to clearly state that the use of the Fire Dynamics Simulator to predict the operation times of automatic (individually-activated) smoke/heat vents in buildings protected by standard spray sprinklers has not been validated in his presentation at the ICC Code Technology Committee debate on May 22, 2008 also appears to be a violation of the Canon of Ethics Preamble, Canon 6 and Canon 15.

Volume 7 of NUREG-1824 clearly indicates that the use of the FDS to predict the activation times of multiple sprinklers has not been validated. To conceal such information in a debate or in a code change hearing where the validity of the Hughes Associates, Inc.’s study dated February 18, 2008 is at issue appears to be an attempt to deliberately hide pertinent facts. Concealing pertinent facts in a debate or in a code change hearing would generally be considered to be unethical conduct, regardless of whether or not this conduct is addressed in the SFPE Canon of Ethics.

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