

THE SFPE ETHICS CODE

By Richard Schulte

The website for the Society of Fire Protection Engineers (SFPE) indicates that one of the purposes of the Society is *“to maintain high ethical standards among its members”*. In order to accomplish this, the SFPE has developed a Canon of Ethics to govern the conduct of its members. To assist in insuring that its members adhere to the Canon of Ethics, Canon 12 reads as follows:

“Fire protection engineers having knowledge of any alleged violation of these Canons shall cooperate with the proper authorities in furnishing such information or assistance as may be required.”

In compliance with Canon 12, the Society was informed of potential violations of the Ethics Canon by Dr. Craig Beyler in a letter to the SFPE on August 20, 2009. The potential violations of the Ethics Canon included misrepresentations of either Dr. Beyler’s qualifications as an expert with regard to fire modeling and sprinkler technology or the capabilities of the LES3D fire model in litigation referred to as *Ian McAuslin, et al v. Grinnell Corporation, et al* which involved the fires which destroyed a 1 million square foot high bay warehouse, the McFrugal’s Warehouse, on March 21, 1996. Dr. Beyler’s potential violations of the SFPE’s Ethics Canon occurred in 1999.

In February 1999, Dr. Craig Beyler, together with Leonard Y. Cooper, published a paper titled *“Interaction of Sprinklers with Smoke and Heat Vents”*. (Per Beyler’s testimony in the McFrugal’s Warehouse litigation, the development of this paper was funded by the AAMA Smoke Vent Task Group.) In this paper, Beyler and Cooper addressed research work on the interaction of sprinklers and smoke/heat vents funded by the National Fire Protection Research Foundation (NFPRF) and conducted at Underwriters Laboratories, Inc. facilities in 1997/1998. This research work has been referred to as the UL/NFPRF tests. The Beyler/Cooper paper includes the following statement regarding the fire modeling:

“The most clear indication of this is the recent NFPRF re-research project. While modeling of the fluid mechanical aspects of the problem were quite successful in predicting aspects of sprinkler activation in the first heptane spray fire series, the model was unable to predict the corresponding results in the rack storage tests beyond first sprinkler activation. . .”

Craig L. Beyler/Leonard Y. Cooper
February 1999

“While there have been many attempts to model all or part of the interactions of sprinklers and vents, the issues are more complex than can be dealt with using even the most sophisticated modeling methods available today. The most clear indication of this is the recent NFPRF research project. While modeling of the fluid mechanical aspects of the problem were quite successful in predicting aspects of sprinkler activation in the first heptane spray fire series, the model was unable to predict the corresponding results in the rack storage tests beyond first sprinkler activation. . .”

It appears that at the same time that the Beyler/Cooper paper discussed above was being developed, Dr. Beyler was also preparing his expert report for the McFrugal’s Warehouse litigation. Dr. Beyler’s expert report for this litigation was dated February 5, 1999 and included the following statements:

“In a recent study sponsored by the NFPA Research Foundation, LES3D was used to predict the interaction between sprinklers and heptane spray fires. The sprinkler activation times predicted by LES3D compared well against the heptane spray fire experiments done at Underwriters Laboratories for the same study. First ring sprinkler activation times were predicted to within about 15 percent, and second ring sprinklers activation times were predicted to within about 25 percent. Predictions of the total number of sprinklers activated by the spray fires were generally very good with most predictions within 25 percent with greater deviations in three of the 21 tests. ”

Note: Beyler makes reference here to the heptane spray fire experiments, rather than the rack storage tests with Group A plastic commodities mentioned in the excerpt from Beyler/Cooper paper above.

“You and Kung (1984) and Kung, You and Spalding (1986) showed that the plumes and ceiling jets resulting from rack fires can be described using formulations presented in Beyler (1986) for simpler beds. This means that a simple representation of the burning racks as a simple surface at the top of the rack is a valid means of specifying the fire for use in performing calculations of the interaction of rack fire plumes/ceiling with the sprinkler spray.”

“For this study, the data in Beyler (1977b) were used for this purpose. The mean drop size, initial velocity, and water flow rate are dependent on the sprinkler pressure and orifice diameter. The experiments (Beyler, 1977b) used for establishing the parameters were 12.7 mm (½ inch) sprinklers flowing at 114 lpm (30 gpm). The median size was not reported in that work and a value of 1 mm was used based on the work of You (1986).”

“The standard clearance fire caused activation of four sprinklers over a period of 100 to 350 seconds. The MacFrugal’s NODC clearance resulted in a fire that activated nearly 70 sprinklers during the simulation and clearly did not control the fire.”

“The modeling results provided in this report confirm that the excessive ceiling clearance in the NODC sprinkler design caused the failure of the sprinkler system.”

“The graphs on this page indicate the estimated operating times of sprinklers for a fire in a Class II commodity which is three tiers high with top of storage to ceiling clearances of 10 feet and 50 feet.”

“The graph for the 10 feet clearance indicates that the first operating sprinkler will activate in approximately 100 seconds and that the fire will be controlled by a total 4 operating sprinklers.”

“The graph for the 50 feet clearance indicates that the first operating sprinkler will activate in approximately 215 second and that the fire will not be controlled and will continue to grow.”

Excerpts from Beyler’s deposition testimony in the litigation include the following:

“The computational domain does not include the racks themselves. That does not mean that we aren’t predicting or otherwise know what’s going on within the racks, but that is done as a sub-model as opposed to being a part of the - - fluid mechanics domain. What has been done is the fluid mechanics domain starts at the top of the racks up to the ceiling, of course. We predict using the LES model how much water arrives at the top of the racks and we use other models to establish, one, how the fire grows within the racks, and two, what the effect of that water is. So they are - - they are modeled, but they are not modeled in the fluid dynamical part of the LES 3D.”

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“I mean the substance of the meaty, you know, the meaty part, the central portion of this, our report, are the modifications that we made to LES to allow the modeling of the effect of sprinkler sprays on the burning of the commodities. We added that, we used that. What we did would be - - is applicable to ceiling sprinkler systems, and as indicated yesterday and again today, that I don’t know how to expand that to in-rack sprinklers.”

It is very clear from just these few excerpts from Beyler’s expert report and his sworn deposition testimony that Beyler has utilized the LES3D fire model to predict the activation times of multiple sprinklers and the total number of sprinklers which will operate. In addition, with some modifications to the model, Beyler has also utilized the model to predict the effect of sprinkler water spray discharge on the fire.

Was it possible to accurately and reliably predict the activation times of multiple sprinklers, the total number of sprinklers which will operate and the effect of sprinkler water discharge spray on a fire with the LES3D model in 1999? Is it possible to accurately and reliably make these predictions today? The second question has been asked for more than 2 years now and, with the exception of Craig Beyler, nobody else in the profession has stepped forward to agree with Beyler, not even Beyler’s colleagues at Hughes Associates, Inc., Phil DiNunno and Dr. Jason Floyd. Given that DiNunno and Dr. Floyd have not stepped up to support Beyler’s claims regarding the “validated” capabilities of the LES3D/Fire Dynamics Simulator (FDS) models, it appears obvious that Beyler’s claims regarding the capabilities of the LES3D/FDS are simply in error.

Not only are Beyler’s claims regarding the LES3D/FDS in error, but Dr. Beyler contradicted his own assertions in the Beyler/Cooper paper issued in the same month (and year) as Beyler’s expert report. How does an “expert” in the field of fire protection do that?

Based upon Dr. Beyler’s statement addressing the capabilities of fire modeling made in his paper for the AAMA Smoke Vent Task Group published in February 1999, we can conclude that Beyler’s analysis and sworn testimony in *McAuslin v. Grinnell Corporation* were just “junk science”. The improper use of fire modeling by Dr. Beyler not only embarrasses the entire fire protection engineering profession, but calls into question the use of fire modeling by the entire profession.

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For the sake of the integrity of the fire protection profession, it is my opinion that the Society of Fire Protection Engineers really has no option, but to apply its Canon of Ethics to Dr. Beyler's use of fire modeling in the McFrugal's Warehouse fire case. Failure of the Society to take action against Dr. Beyler calls into question the Society's commitment to its own ethics standards and embarrasses the profession even further than it already has been.

Admitting that Dr. Beyler violated the Society's ethical standards in the McAuslin v. Grinnell Corporation litigation may be difficult for the Society given Dr. Beyler's status in the organization, but by taking action, the Society will demonstrate its commitment to the ethical standards which the Society has established. To quote the Chairman and Chief Executive of the General Electric Company, Jeff Immelt, "*real, honest, ethical leadership matters*". Since Dr. Beyler did not provide "*honest, ethical leadership*" in this matter, the Society needs to "step up" and "step in" to provide that leadership.

Of course, all of the above are just my opinions, but Beyler can't deny what the record in the McAuslin v. Grinnell Corporation litigation shows, nor can Beyler deny his statement in his paper developed for the AAMA Smoke Vent Task Group. Beyler's timing with these two pieces of evidence couldn't have been worse (or better, depending upon your perspective). It seems to me to be an "open and shut" case against Beyler.

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