"THOUGHTS FROM ANYONE ELSE?":
FIRE SCIENCE (Validation? We don't need no stinking validation)

By Richard Schulte

On Jul 8, 11:00 am, Stephen Olenick . . .wrote [on the FDS/Smokeview Bulletin Board]:

> "*. . . Fire dynamics are governed by the laws of science. If FDS and other computer fire models are appropriate for design, it is appropriate for use in fire investigation and reconstruction. Regardless of whether it's pre- or post-fire, the fire dynamics are the same. Of course, it is incumbent on the user to properly apply the model and use proper inputs etc. I guess my overall problem with the* [judicial] *opinion is that instead of simply excluding this particular expert and the use of computer fire modeling in this particular case (correctly or incorrectly), the judge took the stance that computer fire modeling is inappropriate for fire investigation and reconstruction as a whole. I couldn't disagree more.*"
>
> "*Thoughts from anyone else?*"

"*Of course, it is incumbent on the user to properly apply the model and use proper inputs etc.*"

"*. . .the judge took the stance that computer fire modeling is inappropriate for fire investigation and reconstruction as a whole.*"

"*This blanket dismissal* [of fire modeling]*, based largely on one person's opinion, sends the wrong message.*"

Olenick's comments above, elicited the following response:

> *From: fds-smv@googlegroups.com*
> *On Behalf Of Kevin* [McGrattan]
> *Sent: Thursday, July 08, 2010 11:08 AM*
> *To: FDS and Smokeview Discussions*
> *Subject: [fds-smv] Re: Recent* [court] *ruling on the use of fire modeling in fire investigations*

"*In my opinion, fire modeling and fire science are inseparable. The most important results of fire science are incorporated in our models. By models, I mean anything from a simple correlation to something like FDS. A model is nothing more than a calculation method, and to say that "fire models" are not generally accepted in fire investigation is akin to saying that science has no role in that practice. I agree with Stephen that the court should consider how the model is being applied, the same way that it would consider any other form of evidence. This blanket dismissal, based largely on one person's opinion, sends the wrong message.*

And by the way, Stephen is also right about our use of FDS in the NIST WTC Investigation. The temperatures predicted by FDS were used in a sequence of calculations to assess the aircraft impact, fire, thermal penetration of the steel, and eventual collapse of WTC 1, 2 and 7. This was not simply done for "illustrative purposes."

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These two posts on the FDS/Smokeview Bulletin Board bring up a topic worthy of discussion. What these two gentlemen are, in essence, addressing is the issue of whether fire protection engineering is an art or a science. With more than 30 years experience in the field (after obtaining a degree in fire protection engineering from the Illinois Institute of Technology (IIT)), there is little doubt in my mind that the present day practice of fire protection engineering is still more of an art than a science, despite all of the efforts made in the last 30 years to make the field more scientific. It is also my opinion that the field of fire protection engineering will always be more of an art than a science. Hence, "*fire science*" is much akin to the "*science of economics*", which is often referred to as the "*dismal science*".

While some in the fire protection profession use the term "fire science", it is interesting to note that the closely allied fields of architecture and construction don't utilize the term "architectural science" and "construction science" simply because there no such thing as the "science of architecture" or the "science of construction". Both the practice of architecture and construction are "arts" which involve the use of engineering principles and, in my opinion, the same applies to the field of fire protection engineering.

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Some in the field of fire protection have felt the need to justify the use of the term "fire protection engineering", hence, the move toward attempting to make the field less of an art and more scientific. In my opinion, the old saying *"you can take the boy out of the country, but you can't take the country out of the boy*" applies.

Without judgment, all the engineering calculation methods that the "fire science gurus" can devise are meaningless in my opinion.

Regardless of how scientific the field becomes, the fire protection profession will still be an art where judgment is more important than engineering calculations. The reason for this is rather simple-fire protection engineering is really a sub-specialty of a field known as safety engineering and safety engineering addresses the abstract concept of "safety". The issue of "safety" deals with probability and statistics. (In fact, it is my opinion that the most important course included in the fire protection engineering curriculum at IIT was the course on probability and statistics, not the course on fluid dynamics.) Without judgment, all the engineering calculation methods that the "fire science gurus" can devise are pretty much meaningless. Given this, it is my opinion that the movement toward trying to make the field of fire protection engineering more scientific is a move in the wrong direction.

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Admittedly, my jaundiced opinion regarding "fire science" and fire modeling have to do with my experience with how modeling has been utilized in the field by one of the most highly regarded "fire scientists", Dr. Craig Beyler. In the litigation referred to as *Ian McAuslin, et al v. Grinnell Corporation, et al*, Dr. Beyler improperly utilized fire modeling as the foundation for his expert opinions in the case. Had the case gone to trial, rather than being settled out of court, attorneys for the defendants intended to file a motion to have Beyler's entire testimony "thrown out of court" because Beyler's use of the model was in the realm of "junk science". If a "renowned expert" such as Dr. Beyler is not familiar with the limitations of a fire model which he helped develop, or is willing to cavalierly disregard those limitations, it is highly unlikely that "lesser mortals" than Beyler are capable of utilizing the models correctly.

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After Dr. Beyler's reputation was "saved" by the fact that the *McAuslin v. Grinnell Corporation* litigation was settled out of court, Beyler once again improperly utilized the Fire Dynamics Simulator (FDS) in Beyler/Hughes Associates' research on the concept of the "ganged" operation of roof vents (published in February 2008). In this instance, Beyler's misuse of the FDS was caught and exposed. Suddenly, Beyler went silent and refused to even defend his use of the FDS. (There was no defense-Beyler got caught "red-handed".)

> Unfortunately, "circling the wagons" around Beyler just spread the taint to other "fire scientists".

Based upon Beyler's improper use of the FDS, not once, but twice (in 1999 and in 2008), the FDS will be forever "tainted" in my mind, not because of Beyler's misuse of fire models, but because of the fire protection engineering profession's response to learning about Beyler's misuse of fire models. Rather than taking action to discipline Beyler, the "fire science gurus" instead "circled the wagons" around Beyler. This non-response to Beyler's misdeeds amounted to a passive defense of the Beyler. Unfortunately, "circling the wagons" around Beyler just spread the taint to other "fire scientists".

Perhaps the judicial ruling against the use of fire models in fire investigations discussed above will cause the "fire science gurus" to rethink their passive defense of the misuse of fire modeling by a "renowned expert" in fire science. There is more than enough cause to question whether or not fire models are in the realm of "junk science" and this opinion is more widely held than has been acknowledged by the "fire scientists".

> It is my opinion that the judge's ruling in the case discussed above supports the idea that the moratorium was a good idea.

Roughly a year ago, the idea that a moratorium on the use of the Fire Dynamics Simulator was proposed (by this writer) on the FDS/Smokeview Bulletin Board until such time as sufficient "validation" experiments of the model could be conducted. It is my opinion that the judge's ruling in the case discussed above supports the idea that the moratorium was a good idea. The use of the Fire Dynamics Simulator in the fire protection engineering profession without sufficient "validation" was, and still is, a mistake. This simply reinforces my opinion that the use of fire models is also more of an art, than a science. Once again, this would seem to infer that fire protection engineering is still more of an art, than a science, and there is absolutely nothing wrong with that in my mind.

> The "fire science gurus" need to get their act together before the "gurus" hit an iceberg and send the FDS to the bottom of the ocean like the Titanic.

The “fire science gurus” need to get their act together before the “gurus” hit an iceberg and finally send the FDS to the bottom of the ocean like the Titanic. Beyler did his best to try to sink fire modeling in 1999 and so did NIST with its “unvalidated” use of the FDS combined with structural modeling in its World Trade Center collapse investigations in 2005 and 2009.

To paraphrase a philosophical quote from the movie “Blazing Saddles”-Validation? We don’t need no stinking validation!

Validation? We don’t need no stinking validation!

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