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THE FUTURE OF THE FIRE PROTECTION FIELD

By Richard Schulte

The following are excerpts of notes on proceedings from a conference sponsored by the Fire Protection Research Foundation titled *“Fire Protection and Safety: The Next 25 Years”*:

“On November 17 and 18, 2008, approximately 130 fire protection and safety professionals gathered in Washington, DC for a unique meeting. This conference, titled “Fire Protection and Safety: Preparing for the Next 25 Years” (referred to herein as the “Next 25 Years Conference”), was hosted by the Fire Protection Research Foundation to celebrate the completion of its 25th year of service.” (Page 2)

“The Fire Protection Research Foundation was created in 1982 by the NFPA Board of Directors to address the growing need for an organizational resource to enhance the technical basis of NFPA’s codes and standards.” (Page 5)

“NFPA is an international nonprofit membership organization founded in 1896, and today, with more than 81,000 members representing nearly 100 nations and 320 employees around the world, NFPA serves as the world’s leading advocate of fire prevention and is an authoritative source on public safety.” (Page 6)

“The Research Foundation’s partnership with NFPA has provided practical, usable data on fire and building safety, and brings premier fire research resources to experts in code, corporate, and government arenas through objective research documentation on today’s crucial fire problems.” (Page 7)

“To help prepare for the next 25 years, fire protection and fire safety leaders gathered for the Next 25 Years Conference hosted by the Fire Protection Research Foundation on November 17-18, 2008 at the Ronald Reagan Building in Washington, DC. The one-and-a-half days of meetings included keynote speakers and panel sessions on the following three primary topics areas:

- *Future Fire Protection: the Social and Demographic Context (Section 5)*
- *Tomorrow's Materials and Technologies and Fire Safety (Section 6)*
- *Tomorrow's Sustainability Challenges and Fire Safety (Section 7)*

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"The growth of modern fire science can be traced to the early 1950s, and Emmons was in the middle of all of this. He was looking ahead and was ahead of his time. He could see that our design world needed to be more performance oriented, and that greater science needed to be applied. Limitations of the day included the necessary computer hardware and this needed to be overcome."

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"Dr. Emmons provided numerous short term predictions with a focus on a specific year. For example, in 1991 he observed that some areas had "settled science", such as structural codes and sprinkler design codes, since they only required verification because the physics are relatively settled. In fire, the computational models are not based on settled science, and this was still years off. Today, model authors are writing validation reports, but Emmons thought these should be done by other than the authors. He outlined strategies for the implementation of performance based codes, which are still open questions today." (Page 14)

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"For performance based design, Dr. Emmons thought that this would evolve around a single computer model, but that is not happening. Dr. Emmons was concerned with excessive government control on the fire codes, but this has evolved to be a non-issue." (Page 14)

"Dr. Beyler summarized by indicating that, in terms of future progress, the research community doesn't have the same level of resource commitments we had in the 1970's." (Page 15)

“Dr. McCarthy provided the context for examining the influence of demography on future fire protection by addressing four key features of U.S. population: 1) size/growth, 2) geographic distribution, 3) composition (age, ethnicity, and household composition), and 4) labor force behavior. He indicated that the U.S. population will steadily grow over the next 25 years by about 1 percent or about 3 million people per year, and immigration will account for 40% of that growth. Population increase will primarily occur in six southern and western states (with the largest growth in Arizona, Florida, Nevada, and North Carolina) and will be increasingly concentrated in urban areas.” (Page 16)

“The composition of the U.S. population is also changing. The median age of the population will grow from 35 to 38 years with a corresponding shrinkage in the working population and growth in the senior population, the latter from 12.5 percent to 20 percent. What this means is that while the population is expanding the labor force will be growing more slowly.” (Page 16)

“This was subsequently addressed by the conference panelists, who agreed that the aging and consequent increasingly disabled population will impact needed building fire protection features.” (Page 16)

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“Question: What is the response from the fire service on changing demographics, and what are the research needs?”

Panel: there will be a lot of impact on the fire service. Staffing levels will go down, but demand for their service will go up.” (Page 20)

Panel: Limited resources are the current and future problem. Policies will have to motivate our behaviors. What if we totally redirect our resources away from simply buying expensive fire apparatus? This would be a new paradigm. We need to have discussions like we’re having here, because we need to think beyond simply buying fire apparatus. (Page 20)

Panel: We are under-resourced today. If we had a more uniform approach to this problem, we could better address it.” (Page 20)

“Question: If we don’t understand the status quo, how will we solve problems? We might think there is a problem, when society is telling it’s not a problem. We should not resort to a scare tactic approach.

Panel: An example of this is the fire death rate, which has dropped dramatically.

Panel: Regarding fire death rates, yes we have been successful in reducing fatalities, but it is still unacceptable for our gross national expenditure.”

“Even with our advances, how did we have the Station fire?”

(Page 21)

“Comment: Even with our advances, how did we have the Station fire? Even after this fire, we still have to fight with owners to install sprinklers. It’s not the mindset of people to install sprinklers.” (Page 21)

“Dr. Anton began his address by stressing the importance of global technology and its implications. There will be significant challenges with new technology, such as the new hazards it creates (e.g. health or environmental hazards), as well as privacy and ethical concerns.” (Page 22)

“Fire fighting will benefit from robotics, decisions support and communications technologies, and advanced sensors. The ability to “design” materials and fire protection systems will lead to hazard mitigation and more efficient use of fire protection resources.” (Page 23)

“Computer modeling of fire has been significantly advanced in recent years, and the further development of these models needs to continue. These computational models are a yardstick for the current state of the science, and they have strong promise for applications with design and investigation applications, and long term with reducing the need for full scale fire testing.” (Page 26)

“Much of what is done in industry today is not required by code, and is voluntary. This will suffer as financial managers cut corners. Those not knowledgeable in fire safety are making unwise decisions, and these decisions are being made in unrealistic time frames.” (Page 27)

“New and unproven methods will be implemented with insufficient testing and approval.” (Page 27)

“Comment: These are good points about lack of data. However, we did build nuclear power plants and we did land people on the moon. We can do it without data.”
(Page 30)

“Question: Currently we are in an economic crisis. Is this good training for what we will see in the future?”

Shere Abbott: Yes, we need to become more efficient, and the economy will have to adjust.” (Page 33)

“Recognizing that the greenest of all fire safety technologies is already here through automatic sprinkler systems. Fires in unsprinklered buildings create 36 times more damage than sprinklered building fires.” (Page 35)

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“What does sustainability mean for fire protection and fire safety? There are many other threats in our world, and some other than fire safety are more significant.”
(Page 36)

“Overall risk analysis is needed. Risk can never be reduced to zero, but we need to lower it to acceptable levels. We need to approach it collectively. We need to address all our safety efforts collectively, and find the right balance. You’re more likely to die or be injured from a fall, rather than in a fire. We need to stop reacting violently to trigger events and ignoring the long term. We need to be less reactionary and more focused toward the long term and the collective good. Sustainability is based on the long term.” (Page 36)

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“Cost is based on anticipation to fire, reaction to fire, and fire losses. These are all the summary costs of fire. We’re probably spending too much. We are going to need to do more with less. The Fire Protection Research Foundation needs to help with this. We need to focus on collectively solving all our problems.” (Page 36)

“We have made great strides with technology and the integration of technology into new buildings through the adoption of building codes and standards. A major challenge for the profession is, “What do we do with the existing buildings to improve fire safety?”” (Page 38)

“We spend considerable time debating the “necessary” level of fire safety, often without adequate data. The fire loss data we gather as a country is clearly inadequate to assess the probable impact of various fire protection strategies. We frequently do not know the “real” impact of various protection features in buildings which have undergone a fire event because we do not accurately know the features in the building, and we do not receive an analysis of those factors in the typical fire loss reports prepared by the fire service. In fact, we do not even know the real “success” rate of automatic sprinklers since NFPA stopped keeping detailed statistics after about 1970.” (Page 38)

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“Similar to the above, the profession would benefit greatly from a “black box” methodology of evaluating the impact on fire losses that various fire protection features would provide if added to a building. This, essentially, is a risk-based analytical method using the “systems concepts” developed by Nelson in the 1970s. This measurement system would greatly aid the debate about what and how much fire protection is truly necessary for providing a reasonable level of safety in various buildings. We in the profession could then better debate where society should spend FP dollars.” (Page 38)

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“Inadequacies in fire protection are almost always well publicized and successes, while typically reported, are somewhat less well publicized. The challenge with a database of this type in our society would be visibility, anonymity, and the potential for follow-up.” (Page 39)

“The United States government taking equity positions in United States corporations could radically change the landscape regarding voluntary standards vs. federal regulations.” (Page 40)

“Probably one of the trends impacting the way industrial fire safety is implemented in the United States is the radical change in the property insurance industry (this was also a large source of fire protection engineering training that has all but dried up.)” (Page 40)

“One trend I believe that will be reinforced (if not exacerbated) by the economic down turn is that large companies tend to be less innovative than smaller less risk adverse companies.” (Page 41)

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“As a follow-up to the statistical references and cost comparisons mentioned during the first panel discussion, here are some additional numbers that deserve attention:

The \$294 billion cost of fire per year is 42% of the cost for the recently proposed \$700 billion economic bailout package.

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(Page 41)

*“Emergency preparedness for other forms of incidents including terrorism and natural disasters is now a major focus for emergency planning. There is a need to **integrate design for other types of emergencies** into fire safety design and vice versa. This has an impact on emergency planning, fire service resources, mass notification, protection of lifeline resources, etc.” (Page 44)*

*“The **changing furnishings** in today’s buildings and building contents are creating changing and potentially for more challenging fire scenarios. This has an impact on fire fighter tactics, protective clothing and equipment, tenability conditions, and challenges some basic assumptions in the design of buildings for fire.” (Page 44)*

*“The performance of aging fire and electrical safety systems has not been evaluated in many cases and there will be an increased **need for inspection and maintenance** as part of an overall fire safety strategy.” (Page 45)*

*“Globally, the percentage of the population working and living in **high rise buildings** will continue to grow. Existing NFPA standards for fire safety in high rise buildings are premised on North American fire safety infrastructure and cultural norms. Modified approaches to high rise fire safety may be required for global applications.” (Page 52)*

*“As a society we are increasingly **less risk tolerant** and there is a higher baseline safety assumption (rather than reliance on personal action) which is an environment amenable to litigation and regulation. Further, there is a trend toward **higher risk taking behavior** (particularly with youth) which may necessitate new fire ground tactics.” (Page 53)*

*“As we become a more **safety oriented culture**, our regulatory structure will present conflicting environmental, workplace and fire safety objectives.” (Page 53)*

*“There is a general trend toward an emphasis on technology as opposed to labor for design solutions. The fire implications are a move toward **hardware based solutions** as opposed to inspection based solutions.” (Page 54)*

*“Manufacture and shipment will change as the form of energy source changes. This will likely result in more local and smaller manufacturing facilities which require unique emergency response tactics as well as industrial plant design. **Distribution networks and shipping patterns** will change with changes in storage protection needs, and transportation hazards again with consequent emergency response issues.” (Page 55)*

Commentary

The notes on the “**Next 25 Years Conference**” sponsored by The Fire Protection Research Foundation make for interesting reading. Perhaps, the most interesting, at least from my perspective, are the comments addressing our national fire/fire protection budget. These comments include the following:

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Today, our national fire/fire protection budget exceeds \$300 billion. In other terms, that's more than \$3 trillion in 10 years. Surely, it seems that we can trim our national expenditures on fire and fire protection, while at the same time achieving equal or better results. The United States, as a nation, simply can't afford to be spending more than \$3 trillion on fire/fire protection in the next decade.

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