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Firefighter Thermal Exposure Workshop: Protective Clothing, Tactics, and Fire Service PPE Training Procedures Gaithersburg, Maryland June 25-26, 1996

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5. TECHNICAL PRESENTATIONS

Fire Service Needs

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Firefighter burn injuries are, to say the least, a very complicated issue. Many different factors can contribute to an injury. These include incident management, risk management, tactics, equipment, training, and discipline. Although we often look to the protective clothing for answers when a firefighter is burned, the clothing may or may not have contributed to the injury. It is possible that the protective clothing provided the level of protection for which it was designed. The thermal conditions may, however, have exceeded the limitations of the garments.

Consider for a moment our injury and burn experience over a ten year period. In 1984 there were 62,700 fireground injuries, 27.0 per 1,000 fires. Of these, 10.6% (6,640) were burns. In 1993 there were 52,885 fireground injuries, 27.1 per 1,000 fires. Of these, 11.3% (5,990) were burns.* Although there were fluctuations during this period, the number of injuries per 1,000 fires and the percentage of burn injuries in 1993 were about the same as in 1984. We know there have been improvements in protective clothing during this period, yet there has been no corresponding decrease in burn injuries. We must consider the possibility that one or more of the other factors listed above contribute to the problem.

Unfortunately, thorough investigations are not usually conducted on burn injury incidents. Thus, it is difficult to determine the factors that contributed to the injury. We can, however, learn from firefighter fatalities which are typically investigated very thoroughly. In these cases, breakdowns in incident management, accountability, company integrity, and communications seem to be common. There are also indications that firefighters sometimes do not take their own safety as seriously as they should. One obvious example is the failure to activate their pass devices before entering a hazardous environment. If these factors contribute to fatalities, they probably also contribute to injuries.

The issue of firefighter burn injuries is further complicated by a factor we have not yet discussed, risk management. In my opinion, assessing and then managing risk during an incident as dynamic as a fire is one of the more difficult things we do. I believe it is made even more difficult because firefighters and incident commanders do not fully understand the environment extremes they are facing or the limitation of protective clothing. As a result, I fear that we may sometimes expose firefighters to more risk than is justified for what they are trying to save.

*Source: National Fire Protection Association

If we are to reduce burn injuries, we must look not only at the clothing we wear, but also how we operate, and how we train firefighters about the environment they face and the limitations of their gear.

What can NIST do?

- Conduct additional research to revalidate the Project Fires findings and to help us better understand the environment we face. We must clearly understand the thermal conditions we face in the structural fire fighting environment to write appropriate standards, procedures, etc. The information published in the Project Fires Report is excellent, but it is several years old.

- Conduct additional research to help us better understand the limitations of protective clothing and how burns occur. The way in which thermal energy is transmitted through protective clothing to firefighters is difficult to understand and even more difficult to explain.

What can the fire service do?

- Be disciplined enough to follow our own procedures. Often, appropriate procedures are in place but we chose not to follow them.

- Recognize that protective clothing and equipment have limitations. Firefighters can be burned while wearing their protective clothing.

- Determine the thermal conditions we have to face. We must stop taking unnecessary risks and stop tolerating those who do.

What can we do?

- Develop a comprehensive training program that includes both text and video. Show firefighters what various thermal environments look like and explain how their protective clothing can be expected to perform in each of these environments.