

The Science of Firefighter Safety

By Dr. Stefan Svensson

I made a presentation at a conference in Atlanta a couple of years ago. About 70 people were in the audience. It was a small but great audience and, because of the reporting of a journalist who attended the presentation, the rumor about my presentation spread like wildfire across the United States (and the rest of the world, too). You might even have been engaged in the discussions flourishing on the Internet and probably in a lot of fire stations. A couple of weeks after the event, I visited the fire service in New Zealand, and even the members in a small volunteer fire station knew all about it. It's a small world, isn't it?

I believe it was a very refreshing discussion, and I hope it still is. Some cursed everything related to Sweden and called me names. But some got the message: Firefighters are getting killed in the line of duty, and it shouldn't be like that!

In the introduction to my presentation, I clearly stated that I was going to say things that the audience wasn't going to like, that I was going to be impolite and insolent, and that some in the room would probably be angry at me. I'm sorry if I offended anyone. But for those of you (70!) who listened to it--wasn't that the point? Didn't I make that very clear and give fair warning? I think that the audience will agree with me when I say I had a very harsh but at the same time very respectful presentation. I'm well aware that it is dangerous, and in this case it was stupid of me (yes, I did use the word "stupidity" during my presentation, but let me get back to that later) to make sweeping statements. My intention was to get a discussion going about [firefighter safety](#). And please keep in mind that most of the discussions after the presentation were based on something a journalist wrote, which not necessarily the same as what I said.

But, and this is a key issue, if I have offended someone and that perhaps saves the life of a single firefighter, Swedish or American, wouldn't that be worth it? Is ego worth more than the life of a firefighter? Why don't you ask your wife, husband, children, or parents and hear what they think about this?

I truly admire the work, effort, and courage of all firefighters. It's a job; it may not be any ordinary job; sometimes it's a dangerous job and, unfortunately, we have to accept this fact. That's why we have equipment and training to do it. We will probably never get to zero line of duty deaths, but it sure is a great thought and something well worth striving for. If you would like to call me names or curse me and my fellow Swedes--fine! I will still work for the international firefighting community, in an attempt to make us better

and safer!

I am well aware that there are safe fire departments and not-so-safe fire departments around the world. Sweden certainly isn't the safest country; we don't have the best training, we don't have the safest houses, and we don't have the best firefighters.

We have a lot to learn from each other on all levels and aspects. Over the years, I have thought a lot about firefighter safety and why there are differences in [line-of-duty deaths \(LODDs\)](#). There are so many differences among countries, which makes it almost impossible to compare. But there are also similarities. These differences and similarities include, among other things, [training](#), [building construction](#), and attitude.

Training is, of course, the first item to address. We need basic and continuous training. We all need it. A day I haven't learned something new, changed my way of thinking, or had a new idea is not a very good day. Training involves knowledge, which is generated through experience. However, experience needs to be processed before it is transformed into knowledge. Knowledge can also be generated through science. But, as with experience, it doesn't automatically transform into knowledge; it has to be processed in a similar way as experience. But science is still a more precise way of producing knowledge--there's no room for subjectivity, arbitrariness, or myths. Scientists don't draw conclusions from single observations. They don't make statements about things they haven't investigated. They don't make up things just because it seems like a good idea (if they do, it's called a hypothesis and it's supposed to be tested and investigated). They produce knowledge based on what they actually know.

At this point, some of you may be thinking: "We don't do science; we do firefighting." But, please keep in mind that science is responsible for the progress we have seen in communications, fire trucks, breathing apparatus, turnout gear, thermal imagers--name it. Considering that we have all this useful stuff developed through science, why is it so hard to bring more science into the training of firefighters and fire officers? I'm not talking about rocket science, but rather knowledge based on scientific facts, things that we actually have investigated and looked at thoroughly from all sides. You have some great scientists in the United States looking into firefighting problems, and you have some great people within the U.S. fire service transforming their science into knowledge. Use them and their expertise to develop knowledge you can use. Bring questions to the scientists, and they will help you find the answers--sometimes the correct answers, especially if you do it together.

The second item to address is building construction. During the 19th century, we had a series of fires in Sweden that destroyed large parts of our major cities. As a consequence, a national building code was developed, including rather strict fire safety regulations. To describe it in simple terms--and you can see a similar development in large parts of Europe--in the late 19th century, the principle was to prevent cities from burning down. And this principle has evolved ever since, from protecting cities to protecting (in chronological order) city blocks, buildings, apartments, rooms, and objects. Fire protection in European buildings is to a very large extent based on passive protection: fire

walls, compartmentation, safety distances between buildings, and noncombustible construction. And we have been pretty successful. Today, we are even trying to prevent fires from starting, through developing technology and public education.

This brings me to firefighting procedures. Because of our building construction, it's pretty safe for firefighters to enter a building on fire in Europe. Buildings won't collapse for quite a while, and fire won't spread in an uncontrollable way between rooms or floors. I get the impression that the U.S. fire service has adopted European firefighting procedures that are not always applicable in U.S. buildings. It seems to me as if you have a lot more lightweight construction and a lot more active fire protection, such as sprinkler systems. Lightweight construction burns through a lot faster than heavy timber or stone/brick construction. Sprinkler systems need to be activated to give [protection](#); fire walls don't.

Finally, the third item I would like to address is attitude. In my presentation in Atlanta in 2007, I identified attitude as one of the biggest problems in the U.S. fire service. I won't go into all of the details, but I often hear, even in Sweden, that firefighters are heroes. I believe it's okay if the public thinks that we are heroes, but it's not very professional to remind ourselves of this as often as we get the chance. No, we are not heroes--it's a job! It may not be an ordinary job, but it's still a job. And it's not okay to die when you are doing your job. This is my professional opinion. My personal opinion, of course, is that it is a lot more than a job. It's my life! Ask my wife; she will tell you. But it doesn't matter: It's still not okay to die from anything but old age!

But, and this is the key to it all, over the past couple of years, I can see a change in attitude within the U.S. fire service, and it makes me very pleased! I believe the debate on firefighter safety has become sounder and occur more frequently, addressing leadership as one of the important issues in reducing LODDs. The U.S. fire service has become more open in talking about attitude problems leading to mishaps and fire service LODDs. Prominent and distinguished firefighters, fire officers, and members of the firefighting community talk openly about their failings and how scientifically based training is the key to success. And, they talk about the need for changes in the firefighting culture. Take their word for it! It will probably take some time to see any actual changes, but I strongly believe you are on the right track.

Firefighting is very complex, but it is not rocket science. Firefighter safety depends on a lot of things--some we can control, some we can't. But together, we might save the life of a colleague and reduce LODDs. And we will still be able to save and protect the public, probably even better than we have been doing so far.

For the record, I have worked for the Swedish fire service for more than 20 years. I have a Ph.D. in fire science, I do research on firefighting tactics, and I am an instructor for the Swedish fire service. But I am also a firefighter. I am on duty every fourth week, so I have had my share of fires, car accidents, and civilian fatalities.

Regarding my alleged statement in Atlanta regarding the [rapid intervention team \(RIT\)](#)

and stupidity, I did compare the RIT with safety systems in cars, as follows: The more safety you put into a system, the more people will think that nothing dangerous will happen. And if something dangerous does happen, the system will take care of the problem--you don't have to solve the problem yourself. By focusing on RIT, the message to firefighters might be that it is okay to end up in dangerous situations, because there is always someone that will get you out.

Wrong: If you're in trouble, the only one you can depend on is yourself and the knowledge you gained through scientifically based training. If you really need an intervention team, should you be there in the first place? I believe sending more firefighters into highly dangerous situations in many cases is plain stupidity. I get the impression that the U.S. fire service focuses a lot on saving fellow firefighters in its training. Training should focus, of course, on not getting into those situations in the first place! For that, you need knowledge and understanding of [fire dynamics](#) and how this relates to [firefighting](#).

I would love to discuss this with each and every one of you in person. This might seem impossible, but if you see me the next time I visit the United States, talk to me. I would appreciate that a lot! Believe it or not, we are all on the same side.

Dr. Stefan Svensson began his career as a firefighter in the Swedish Air Force in 1986. In 1989, he earned a bachelor's degree in fire protection engineering and in 2002 a Ph.D. at Lund University in Sweden. During the past 15 years, he has been involved in experimental and theoretical investigations of firefighting tactics, including firefighting methods as well as problems of command and control. The safe and effective use of firefighting resources is a particularly important feature of his work. He is the author of several books, scientific articles, and reports. He is a firefighter/officer in a local fire brigade as a firefighter/officer.

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