

## Work environment and occupational safety for firefighters.

- **Psychological damage, cancers, prevention and preventive legislation.**

Thursday 27<sup>th</sup> of October 2016 a conference (day 2) took place in Copenhagen as a natural extension of the closed expert symposium (day 1) the day before.

The expert symposium which took place in the main fire station of Copenhagen was initiated by European Union Fire Officer Associations, FEU and hosted by the Danish Emergency Management Organization, DB. Present on day 1 was as follow:

Bjarne Nigaard, DB. Chris Addiers, FEU. Tommy Bækgaard Kjær, BFC. Alex Forrest and Derek Balcaen, UFFW. Jeffery L. Burgess, University of Arizona. Tommy Verminck, Decontex. John Guilfoyle, Dublin Fire Service. Preben Bonnén and Jeppe B.M. Rasmussen, FSB.

You can read the separate statement elsewhere.

The open conference on day 2 was carried out and hosted by BFC and took place in "3f union CF".

Present as speakers on day 2 was as follow:

Carsten Iversen, Chairman for volunteer firefighters. Denmark.

Chris Addiers, President of European Union Fire Officer Associations FEU. Belgium.

Tommy Verminck, CEO, Decontex. Belgium.

Michael Nørgård, inventor of Firestop 11. Denmark.

Steen Hilmar, UL – Underwriters Laboratories – Building and Life Safety Technologies. Denmark.

Kirsten Møller, Viking Life-Saving Equipment A/S. Denmark, Norway and Sweden.

Lars Schiøtt Sørensen, M.Sc., Ph.D. Danish Building Research Institute SBI at Aalborg University Copenhagen AAU. Denmark.

Jefferey L. Burgess, MD, MS, MPH, Associate Dean for Research and Professor Mel and Enid Zuckerman College of Public Health University of Arizona. USA.

Alex Forrest, Firefighter, Lawyer, Captain, Winnipeg Fire Department, President United Firefighters of Winnipeg UFFW and International Association of Firefighters IAFF Canadian Trustee. Canada.

Tommy Bækgaard Kjaer, President of Danish Firefighters Cancer Organization BFC. Denmark.

All biographs and presentations are available on BFC webpage [www.brandcancer.dk](http://www.brandcancer.dk)

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## Day 2 statement

Thursday 27<sup>th</sup> of October 2016 a conference took place in Copenhagen with international, European and domestic experts in working environment, long term health problems, protection and prevention for firefighters.

The purpose with this conference was to sum up the history of occupational cancer in firefighters. What does the relevant worldwide studies and research tell us? What are we doing today for prevention, what are the latest new technology and which way does the future development go in terms of PPE, research and presumptive legislation and recognition of occupational cancers in firefighting? Does the Danish authorities treat firefighters with cancer fair or do we need a presumptive legislation in Denmark and the rest of Europe as they have elsewhere in the world?

Sometimes we do not want to see and prepare ourselves for what is just in front of us. Such as major terror attacks, floods etc. Or the long term diseases such as the high rate cancer upon firefighters. It is simply too uncomfortable to think about and it could end up being a catastrophe WHEN the unpleasant happens.

*"As deferent rescue bureaus we need to work together on a long range of issues, no matter where and how we are protecting citizens, environment and society. But also for the health and safety of all our great firefighters who never turn their backs to everyone else".*

Carsten Iversen, Chairman for volunteer firefighters

As a European organization FEU has a special obligation to take good care of our European citizens' safety. And also for the health and safety for our brave firefighters. Both on a short term and in a long term. We need to continue follow up studies to ensure best practice and also make risk assessments and cost benefit analyses. We edge the European MEP's to this in order to reduce cancers and other long term diseases in firefighting. They deserve that.

*"These two days has opened up my eyes for the occupational risk for long term health problems for firefighters and I wish I had this knowledge a long time ago so I would have had a better opportunity to implement preventive measures"*

Chris Addiers, President of European Union Fire Officer Associations FEU

Studies have shown that firefighters are exposed to toxic compounds while performing their jobs. These substances (VOC's, PAH's, Dioxins...) are according the REACH regulation under the heading of 'Substances of Very High Concern'. To obtain the ÖKO-TEX label, these substances may be present to a maximum amount of 1mg/kg. The Belgian notified body CENTEXBEL found more than 10 times the allowed quantities in standard fire gear.

DECONTEX received money from the Flemish Government to search for the best methodology to decontaminate these suits to below the ÖKO-TEX limit. The outcome of the project is that water based solutions can only decontaminate the outer shell of the suits and are degrading the suits very hard. Only the LCO2 based solution is able to decontaminate the suits properly without destroying the suits. Above it is a short process and particularly environmentally friendly. More info: [info@decotex.com](mailto:info@decotex.com)

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Tommy Verminck, Decontex, Belgium.

Another way to reduce the fire fighters exposure is the time they work in the fire. FireStop-nordic had a suggestion for a solution to reduce the time of exposure with a new eco impregnation to add the extinction water. This will make the water cool up to 10 times more and prevent the fire to reignite.

"Firestop 11 is so green that it can be used directly on the ground in a forrest fire without damage the nature and environment" Michael Norregaard says.

"One of our goals is to help our hero fire fighters to a better working environment and a reduction of the time they spend in the hostile and damaging place a fire are"

Michael Nørgård, Firestop-nordic

Being a worldwide organization UL- Underwriters Laboratories has performed many tests trying to cover firefighter's expositor to deferent carcinogenic compounds in PPE as well as on the firefighter himself. The Danish department is available to all relevant fire services and others in Europe to information regarding future tastings.

"My message was that the UL wants cooperation with relevant organizations that want to promote firefighters health and safety. UL has an excellent relationship with firefighters in the United States, which I like to see established in Europe".

Steen Hilmar, UL – Underwriters Laboratories

Fire suits of the future.

There was a huge interest in the new fire suit and hood that was shown at the conference.

Development of fire suits used to be a matter of the suits ability to protect the fire fighter from open fire and heat. These parameters are still essential but today focus is just as much about reducing the fire fighters exposure to carcinogens and dangerous particles which may occur during a fire.

In 2014 Viking developed the next generation of fire suits. "This resulted in the "Viking Guardian" suit which is now available in a European as well as an American version" says Kirsten Møller.

"The inner liner can be washed separately preventing the particles from the outer shell to be mixed with the less dirty outer liner system".

What we already know is that the neck area is very much exposed to particles from a fire due to the penetration through the hood and into the skin.

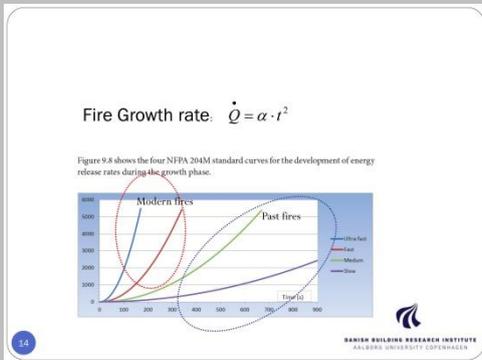
As a result of this there will soon be launched a new fire fighter hood to the European market. DuPont who is one of the world's top manufacturers of fire retardant materials has chosen Viking as one of the first to launch the new Nomex Nano Flex to the market.

*Even though we have come up with several new designs and products lately we think that this is only small steps towards the final goal which is to optimize the safety of the fire fighter.*

Kirsten Møller, Viking Life-Saving Equipment A/S

Modern furniture and building materials contain synthetic polymers that during combustion emit a large spectrum of toxic compounds, such as Acetaldehyde, Formaldehyde, Ammonia, Cyanide, Nitrogen oxides, Hydrogen chloride, Phosgene, Sulphur dioxide and Chlorine.

There is a large variety of compounds in today's fires depending on a lot of different factors such as temperatures, ventilation, synergetic effect etc. which makes it next to impossible to map all the carcinogenic compounds from a fire. However we know firefighters are exposed to harmful group 1 carcinogens through dermal uptake, inhalation, contaminated PPE etc. and that they don't have the possibility to protect themselves 100%.



Toxicity related to cell foam plastic

	Lethal exposure time <sup>1</sup>		Debilitating and lethal effects <sup>2</sup>				Temperature [°C]
	Temperature rise <sup>3</sup> (K) (based on 200 to 800 °C)	Permeation temperature at 800 °C	Combustion with flames		Combustion without flames		
			IC <sub>50</sub> <sup>4</sup>	LC <sub>50</sub> <sup>5</sup>	IC <sub>50</sub> <sup>4</sup>	LC <sub>50</sub> <sup>5</sup>	
PIR	19.8-21.2	5.6-6.0	-	-	-	-	-
PUR	23.7-25.7	7.6-12.2	5.3 ± 1.0	16.9 ± 3.3	9.6 ± 3.0	55.0 ± 14.2	570/540
PF	17.2	6.5	2.0	8.4 ± 1.1	1.5	5.9 ± 1.1	750/730
EPS/XPS	26.3	15.4	15.3 ± 3.1	29.0 ± 4.9	27.0 ± 3.1	66.0 ± 11.0	540/480

Table 4. Toxicity of combustion products. The lower the values of IC<sub>50</sub> and LC<sub>50</sub> the more toxic are the combustion products. Table values for IC<sub>50</sub> and LC<sub>50</sub> are in minutes.

<sup>1</sup> 10% and 50% mortality.  
<sup>2</sup> Lethal dose.  
<sup>3</sup> Ignition delay.  
<sup>4</sup> 50% mortality.  
<sup>5</sup> 50% mortality.

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*"Modern fires are more toxic than earlier and thereby they become a bigger threat for citizens and also for the health of firefighters"*

Lars Schjøtt Sørensen, M.Sc., Ph.D. Danish Building Research Institute SBI at Aalborg University Copenhagen AAU.

"I greatly appreciated the opportunity to participate in this important meeting focused on ways to reduce cancer in firefighters and to take better care of them when they do develop cancer", Jefferey L. Burgess says. "My presentation started out by discussing the increased firefighter cancer rates in recent studies in the United States, Australia and the Nordic countries. The rest of the presentation described some of our past and current research evaluating health effects and respiratory protection in firefighters, culminating in our current cancer prevention study working with the Tucson Fire Department in Arizona. A brief summary is that firefighters are exposed to products of combustion at a fire, particularly during overhaul (the period after the fire has been extinguished and the firefighters are looking for hidden sources of continued combustion) even when there is no visible smoke, and that at the present time only self-contained breathing apparatus are effective in these settings".

More recently, there is clear evidence that firefighters are absorbing chemicals through exposure to smoke and soot on their skin, and there are ongoing efforts to determine how to best prevent and mitigate the effects of these exposures. Finally, we are in the early phases of determining the effects of occupational exposures in firefighters at the cellular level in the time before cancer develop, in the hope that this information will help find ways to prevent cancer in firefighters.

*"In Denmark 25% (1.11-1.41) increase incidence all cancers, and a 37% (1.03-1.77) increase in lung cancer" Pukkala et al.*

*Jefferey L. Burgess, MD, MS, MPH.*

## No longer a debate.

Study after study shows a connection between firefighting and occupational cancer (LeMasters, Guidotti, Monash University, Korean study and many more) and our job is getting worse due to all the synthetic building materials and interior decorations in modern residences.

Too many firefighters get or die of occupational cancer and should be treated as "line of duty death or injury" by the governments throughout the European member countries through presumptive legislation.

The first legislation of its kind in Canada to recognize the link between occupational cancer & fire fighting (Bill 5, 3rd Session, 37th Legislature, THE WORKERS COMPENSATION AMENDMENT ACT OF MANITOBA - Assented to May 23, 2002).

Now 14 cancers are covered and a long list of Provinces and States throughout Canada, USA and Australia has passed similar bills by unanimous Parliaments agreeing to do the right thing and not turn their back to firefighters and their families.

*"Science is a big puzzle and every study is a piece of that puzzle showing the connection between firefighting and occupational cancer. This is no longer a debate"*

Alex Forrest, Firefighter, Lawyer, Captain, President UFFW

## In Denmark

Firefighters in Denmark are not covered by the Danish Workers Compensation Board by the same reasons as all the countries which now have the presumptive legislation before their politicians passed the bills and did the right thing.

The system of WCB is broken when it comes to long term health problems for firefighters and wants the firefighters to prove which fire and which chemicals caused the cancer. It is impossible to **prove** what causes a cancer and this reversed burden of prove is not fair.

- Firefighters cannot decide their own working environment like other occupations.
- Study after study show the connection between firefighting and cancer.
- Firefighters absorb a long variety of IARC group 1 carcinogens from every fire.
- The toxic compounds from modern fires are getting worse all the time.
- Night work has a bigger impact on firefighters.

What more "prove" do we need?

*"Danish firefighters risk their own life and health every day to protect citizens and never turn their back to society. When they are struck with cancer or psychological diseases the society and WCB turn their back to the firefighters. This is not fair and this needs to change by a presumptive legislation"*

Tommy Bækgaard Kjær, President of Danish Firefighters Cancer Organization BFC



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