Pelastusopisto

D-sarja:
Muut
[7/2017]

Exchange of Experts meeting in Kuopio Exposure control in Fire & Rescue work

Marko Hassinen (editor)

Field report for Exchange of Experts meeting held in Kuopio, Finland 12.-16.6.2017

EXCHANGE OF EXPERTS MEETING IN KUOPIO - EXPOSURE CONTROL IN FIRE & RESCUE WORK

Marko Hassinen (editor)

Pelastusopisto
PL1122
70821 Kuopio
www.pelastusopisto.fi

Pelastusopiston julkaisu
D-Sarja: Muut
7/2017

ISBN 978-952-5905-98-4
ISSN 2342-9305 (verkkojulkaisu)

Emergency Services College

Hassinen Marko, Research Scientist, Ph.D., Emergency Services College

Exchange of Experts meeting in Kuopio - Exposure control in Fire & Rescue work

Publication/Field report 32 pages

August 2017

ABSTRACT

Several studies made both in Europe and United States have shown that house fires are developing to become faster and hotter than before. Main contributors to these are artificial, oil based furniture and decoration materials, but also construction materials. Such materials produce more heat but also smoke that contains more harmful substances than before. Such substances can have severe adverse effects on people exposed to them.

Fire & Rescue personnel, who frequently get exposed to hazardous smoke are in danger of developing exposure related diseases, such as cardiovascular diseases and even cancer. To avoid such exposure and decrease the adverse effects should be a major concern in the occupational health work of this group of people. As there have been made studies and many countries have already created procedures and best practices, such information should be disseminated as effectively as possible.

The initial steps for the exchange of experts on this topic were taken during an earlier exchange in Arnhem, the Netherlands. In the Arnhem exchange, future topics to be developed in the Fire & Rescue research ecosystem were defined, exposure avoidance being one of those.

This report describes the work done on the exchange of experts in Kuopio in June 2017. This five day exchange proved to be very successful and clearly advanced both the state of the art in the research field and, also the everyday fire & rescue work in terms of shared best practices and practical work procedures. The exchange clearly was a learning occasion for all of the participant, in so ideally fulfilling the very meaning of Exchange of Experts.

ABI/INFORM: Fire Fighter Exposure, Personal Protective Equipment

Pelastusopisto

Hassinen Marko, Tutkija, FT, Pelastusopisto, Tutkimus- ja kehittämis- ja innovaatiopalvelut

Exchange of Experts meeting in Kuopio - Exposure control in Fire & Rescue work

Euroopan Unionin pelastuspalvelumekanismin asiantuntijavaihdon loppuraportti

Julkaisu/Kenttäraportti 32 s.

Elokuu 2017

TIIVISTELMÄ

Pelastusopiston tutkimus, kehittämis- ja innovaatiopalveluiden toteuttaman ja Palosuojelurahaston pääasiallisesti rahoittaman Kodinkoneiden palokäyttäytyminen ja sammutustekniikka hankkeen eräänä tavoitteena oli arvioida sammutustyön turvallisuutta erilaisten altistusten näkökulmasta. Tämän työn syventämiseksi päädyttiin hankkeen aikana esittämään EU:n pelastuspalvelumekanismille altistuksiin ja niiltä suojautumisen keskittyvää asiantuntijavaihtoa. Vaihto toteutettiin kesäkuussa 2017 Kuopiossa viikon mittaisena. Alkusysäys vaihdolle syntyi aiemmassa, hankkeen aikana Arnhemissa, Hollannissa toteutuneessa asiantuntijavaihdossa, jossa altistukset olivat yksi listauista tulevaisuuden tutkimusaiheista.

Huoneistopalojen kehittyminen on useiden Euroopassa ja Yhdysvalloissa tehtyjen tutkimusten valossa mennyt jatkuvasti kuumempien ja nopeammin kehittyvien palojen suuntaan. Suuri vaikutus tähän on erilaisten keinotekoisten sisustus- ja huonekalumateriaalien yleistymisellä. Näissä paloissa syntyy myös suuri joukko ihmiselle vaarallisia savukaasuja, jotka altistavat pelastushenkilöstöä erilaisille pitkäaikaissairauksille, kuten sydän- ja verisuonisairauksille ja jopa syövälle.

Altistusten välttäminen on olennainen osa pelastustoiminnan työhygieniaa ja siten erittäin tärkeää on pystyä integroimaan tavallisiin työrutiineihin toimintatapoja, joilla henkilöstö altistuminen terveydelle haitallisille yhdisteille saadaan mahdollisimman vähäiseksi. Kuopiossa kesäkuussa 2017 toteutuneen asiantuntijavaihdon tavoitteena oli sekä edistää aihepiirin tutkimusta että luoda käytännöllisiä toimintatapoja. Molemmissa tavoitteissa onnistuttiin erinomaisesti. Tämä raportti kuvaa vaihdossa käsitellyt asiat sekä asiantuntijoiden näkemyksiä tulevaisuuden kehittämistarpeista, mutta myös joukon päätelmiä.

Avainsanat: Altistuminen, puhdas paloasema

Sisällysluettelo

1. Introduction and the objectives of the exchange

Several studies made both in Europe [1] and United States [2] have shown that house fires are developing to become faster and hotter than before. Main contributors to these are artificial, oil based furniture and decoration materials, but also construction materials. Such materials produce more heat but also smoke that contains more harmful substances than before. Such substances can have severe adverse effects on people exposed to them.

Fire & Rescue personnel, who frequently get exposed to hazardous smoke are in danger of developing exposure related diseases, such as cardiovascular diseases and even cancer. To avoid such exposure and decrease the adverse effects should be a major concern in the occupational health work of this group of people. As there have been made studies and many countries have already created procedures and best practices, such information should be disseminated as effectively as possible.

The initial steps for the exchange of experts on this topic were taken during an earlier exchange in Arnhem, the Netherlands. In the Arnhem exchange, future topics to be developed in the Fire & Rescue research ecosystem were defined, exposure avoidance being one of those.

There are several people and organizations doing both research and practical development on the field of firefighter exposure. Many reports are written yearly, however, in native languages which do not support the dissemination of this knowledge to the fullest. One of the main motivations of this exchange was to bring these experts together to discuss the themes and disseminate the information. A basic principle from the beginning was to invite both researchers and practicioners to create fruitful conversation and increase the understanding on both disciplines.

This report describes the work done on the exchange of experts in Kuopio in June 2017. This five day exchange proved to be very successful and clearly advanced both the state of the art in the research field and, also the everyday fire & rescue work in terms of shared best practices and practical work procedures. The exchange clearly was a learning occasion for all of the participant, in so ideally fulfilling the very meaning of Exchange of Experts.

2. General program

Monday 12.6.2017

Excursion to the laboratories of FIOH. Finnish Institute of Occupational Health laboratories are located on Topeliuksenkatu 41 B, Helsinki.

9:30 – 10:00 Transfer by taxi from the Airport Hotel Bonus Inn to the FIOH for those who have arrived on Sunday.

9:30 - 10:00 Transfer by taxi from the ferry terminal to the FIOH for the Estonian Experts.

10:00 – 11:45 Laboratories of FIOH, Finnish Institute of Occupational Health, https://www.ttl.fi/en/ with Juha Laitinen and Marko Hassinen

10.00 Welcome and Introduction to the activities of FIOH

10.15 Visit to the Laboratory of Chemistry

Tapani Tuomi and Heli Lallukka

11.00 Work ability measurements

Presentation of the Laboratory of Physiology

Anne Punakallio and Arja Uusitalo

11.40 Testing of Protective Equipment

Mikko Hirvonen

12.00 End of visit

12:00 – 12:15 Transfer from FIOH to the airport by the conference bus.

12:15 Pickup of the arriving experts from the Helsinki airport.

12:00 – 14:30 Transfer by Bus (Conference bus, http://kokousbussi.fi/) to Hollola Fire Station, introductions.

This new fire station has been built to support the clean fire station concept and the Skellefteå model.

Local experts will guide us through the fire station. Lunch on the way at approximately 13:00.

15:30 - 19:30 Bus transfer to Kuopio, organizational introductions on the way.

Each participant introduces themselves and their organization. You may want to take with you a leaflet or a handout for the others. Discussion regarding the exchange agenda and goals.

19:30 Accommodation and dinner in Kuopio, Hotel Rauhalahti.

Tuesday 13.6.2017

Breakfast at the accommodation

08:30 Transfer to Emergency Services College, Kuopio. College Minivan ZR021

09:00 Welcome to Emergency Service College, Esa Kokki meeting in classroom A151.

09:30 Exposure studies related to Fire Fighter Health in Finland, Juha Laitinen A151

10:30 Visit to the smoke diving test track with a cup of coffee

10:45 Review of the objectives of the EoE meeting and Agenda refinements made in the bus A151

11:00 Current research and state of the art in firefighter exposure and health A151

11:15 Tommy Kjaer: Danish studies Epi-Brand and Bio-brand

11:40 Vegard Aslaksen: Current research and state of the art in firefighter exposure and health

12:15 Lunch

13:00 Current research and state of the art in firefighter exposure and health, continued A151

13:15 Kätlin Saarest: Occupational Health and Safety at Estonian Rescue Board

13:40 Maurice Kemmeren: Knowledge Center Occupational Safety: activities and an example of the present work

14:00 Maurice Kemmeren: Fire Fighter Health and Safety Experiments: Illinois Fire Safety Institute (IFSI)

14:30 Coffee break, Contamination control in maintenance and storage.

15:15 Current research and state of the art in firefighter exposure and health, continued A151

16:00 Transfer to the hotel

18:00 Dinner with networking at Hotel Rauhalahti

Wednesday 14.6.2017

9:00 Pickup at the hotel and transportation to the college

9:30 Marcus Bätge: Current research and state of the art in firefighter exposure and health in Germany

10:45 Tommy Kjaer: Long term health problems for firefighters in Europe -Focus on psychological health, CO, cancer

11:45 Short break

12:00 Maurice Kemmeren: Occupational hygiene measurement

12:30 Lunch at the college

11:00 Maurice Kemmeren: Skin barrier issues

13:30 An excursion to the very new training ground for occupational safety (www.ttha.fi) at the ESC training ground

14:00 Guided tour to ESC training ground, demonstration of different simulators

15:30 Contamination control (procedures used at ESC student training) The new Fire house class room and simulator.

15:45 Marko Hassinen: Experiments and projects done on the ESC training ground.

16:15 Demonstration of the Fire Theatre

16:45 Smoke sauna, dinner and midnight sun with networking at the training ground lakeside.

Thursday 15.6.2016

9:00 Pickup at the hotel

9:20 General assembly at class room A151, sharing experiences on the PPE contaminants topic

9:30 Highlights from Monday, Tuesday and Wednesday

State of the art on PPE contaminants, PPE cleaning and measurements A151

10:15 Maurice Kemmeren: Literature-and modelstudy to exposure routes of hazardous materials in smoke of fire

10:45 Coffee break

Continuing - PPE cleaning and measurements A151

11:00 Stephane Conings: Where there's smoke, there's cancer

11:30 Tommy Kjaer: New garments and equipment

12:45 Luch at the ESC restaurant

13:30 Procedures for avoiding exposure on the field on the Fire Service level and clothing development needs

14:00 Maurice Kemmeren and Juha Laitinen: Contamination of firefighting garments – Laboratory tests (phase 1 and 2)

14:30 – 16:00 Panel discussion: Future research work focus definition, hot topics A151

- Information sharing forums and future collaboration
- Future research needs
- Defining exchange conclusions

18:00 Dinner and networking at Hotel Rauhalahti, Jätkän kämppä http://www.rauhalahti.fi/en/

Friday 9.6.2017

9:00 – 10:00 Wrap up and farewell at Hotel Rauhalahti

10:00 Coffee break with light snacks

10:30 onwards Travel to Helsinki or Kuopio airport

3. Monday 12.6.2017

On Monday, two excursions were on the program. The first excursion was at the Finnish Institute of occupational health, were the experts had a chance to see the laboratories of FIOH in practice. The second excursion was at a new fire station in Hollola, the clean fire station concept has been in a key role in the planning of the facilities.

Excursion to the laboratories of FIOH, Finnish Institute of Occupational Health

The excursion started with a short general presentation of the FIOH followed with a visit to the Laboratory of Chemistry. Tapani Tuomi and Heli Lallukka presented the type of measurements that are done in the chemistry lab and the type of research that can be done there (Figure 1). The test samples are from Fire & Rescue turnout gear.

The second presentation was at the Laboratory of Physiology (Figure 2) in which work ability measurements are done. Anne Punakallio and Arja Uusitalo presented the Fire Fit system used in Finland and the type of examinations that the Fire & Rescue personnel go through in their laboratory.

Mikko Hirvonen gave an introduction to testing of protective equipment in the lab.

Figure 1. Fire fighter garment measurements

Figure 2- Physical fitness testing lab

Excursion to the Hollola Fire Department

Built in 2016, the Hollola fire station is a new facility. In the desing of the facility one major principle has been to avoin unnecessary exposure by arranging the maintenance so that the impurities of turn out gear are not spread into the station. A very hands on show (Figure 3) had been constructed for the team of experts showing the procedures for handling the turnout gear after a house fire. The procedures and the station layout were impressive and a lively discussion followed the tour and the demo.

Figure 3. Turn out gear handoling procedures after a house fire

4. Tuesday 13.6.2017

Esa Kokki: Emergency Services College RDI

Research Director Esa Kokki made a welcome note on behalf of the Emergency Services College and described the research, development and innovation efforts made at the college [3].

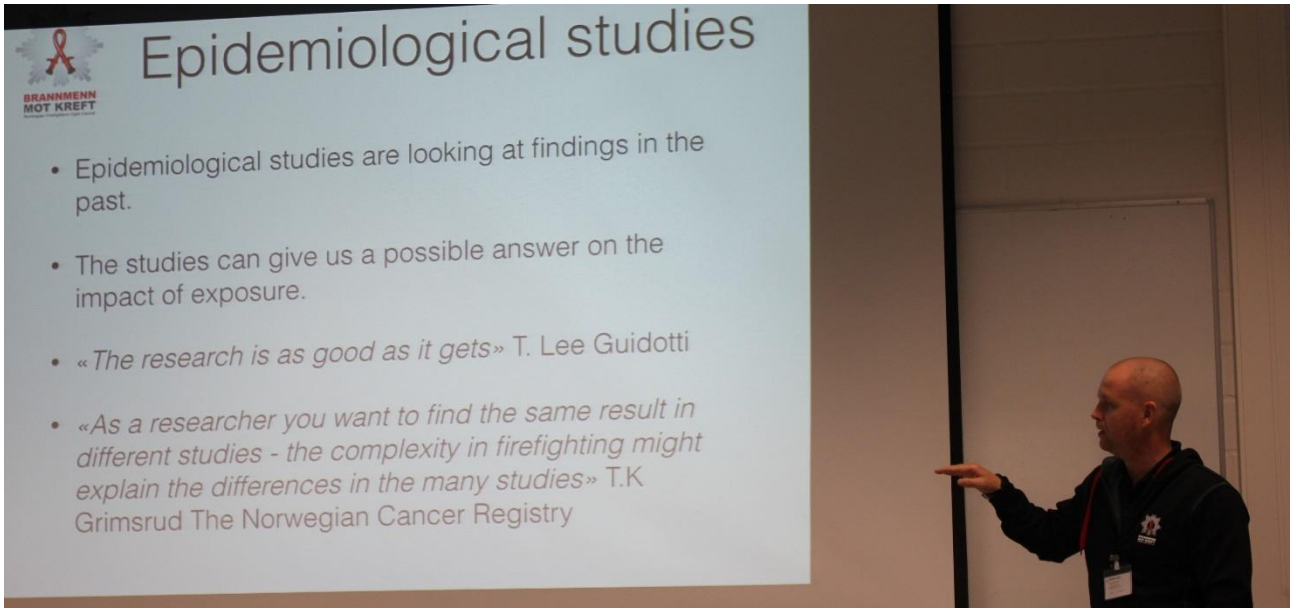
Juha Laitinen: Orientation lecture about fire fighters' cancer risk

Juha Laitinen gave an orientation lecture about fire fighters' cancer risk, why exposure based exposure assessment is so important at the moment and what kind of chemical agents firefighters exposed to and what kind of routes these chemicals use when they entering to firefighters' body. Also he gave examples of firefighers' exposure levels in operative work and behaviors of firefighters which effect on development of their total exposure.

Tommy Kjaer: Danish studies Epi-Brand and Bio-brand

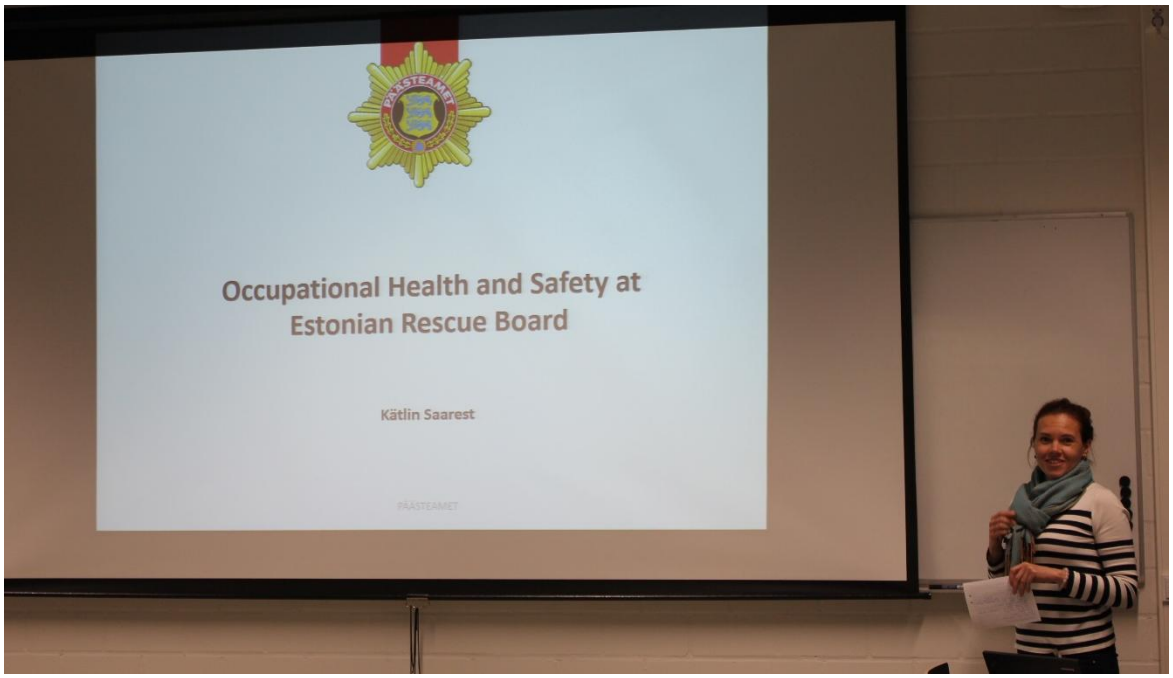
Tommy Baekgaard Kjaer talked about two ongoing Danish studies initiated by former Minister of Employment Mrs. Mette Frederiksen after a meeting with TBK. How the studies were planned, designed and carried out. The result of the studies will be ready probably late October. The studies will be published in www.brandcancer.dk [4] and through scientific channels". "I expect the studies to show what most studies done earlier also show which is a high toxic exposure and high rate of certain cancers in firefighters" Tommy says. [5]

Vegard Aslaksen: Current research and state of the art in firefighter exposure and health



Vegard Aslaksen gave a short overview on the ongoing research in Norway done by the Norwegian Cancer Registry [6] and The Norwegian Institute of Occupational Health and Safety [7]. He pointed out that the epidemiological studies are looking at the impact of exposure from the past. Advice to be hindsight in advance and to put cancer risk into your risk management system today. Carcinogenic exposure is the new hazard - build your barriers and take care of your losses!

Kätlin Saarest: Occupational Health and Safety at Estonian Rescue Board



Kätlin Saarest gave an overview how the issues of occupational health and safety are handled in Estonian Rescue Board [8]. Estonian Rescue Board started to raise the awareness of cancer risk 2016 with lectures about contamination, exposure and risk factors. Firefighters had possibility to test their prostate and colon cancer markers. At the same time were analyzed employees' health behavior and collaboration with occupational health doctors main health indicators. In 2017 focus is mainly on health requirements (including cancer risk analyses to periodical medical control) and occupational safety which includes also reducing contamination and exposure to hazards. In 2015 collaboration with National Institute of Health Development a register based cohort study of fire fighters mortality, cancer incidents and diseases was started. The results will be revealed in July 2017. Future work with reducing contamination and exposure will be continued in following years.

Maurice Kemmeren: Knowledge Center Occupational Safety: activities and an example of the present work

Maurice Kemmeren introduced the Knowledge Center for Occupational Safety and described the versatile field of activities of this center. The center has a network of excellence that has members from end users, education and research and, also[9], industry. As an example of activities he described a project that has studied cancer incidence ratio's of firefighters.

Maurice Kemmeren: Fire Fighter Health and Safety Experiments: Illinois Fire Safety Institute (IFSI)

Maurice Kemmeren showed results of a study named Firefighter Health and Safety Experiments. This study was done by Illinois Fire Service Institute (IFSI), Champaign, USA [10]. In the study, cardiovascular and chemical exposure risks in modern firefighting were investigated. Also, the effectiveness of skin cleaning procedures in reducing contamination on the skin, particularly on the neck, were studied.

5. Wednesday 14.6.2017

Marcus Bätge: Current research and state of the art in firefighter exposure and health in Germany

Marcus Bätge (FeuerKrebs gUG) [11] presented the current research and state of the art in firefighter exposure and health in Germany.

Tommy Kjaer: Long term health problems for firefighters in Europe -Focus on psychological health, CO, cancer

"There is a long list of long term occupational health problems for firefighters. Of course cancers are a major issue as we discuss in this EoE". "However we need to address two other important health problems as well" says TBK after request from the EoE group for issues of importance for the future work, and continues "one issue it CO damage which is mostly overlooked and wrongly diagnosed be course it looks like stroke but can have a invalidating effect on the firefighter. And the other important issue to address is the psychological damages firefighters face in the career such as PTSD, anxiety disorder, burn out etc. often triggered by bad leadership" TBK explain "We need to break this taboo". TBK provided EoE with facts and solutions on these matters.

Maurice Kemmeren: Occupational hygiene measurement

Maurice Kemmeren described a study that made measurements after action and during maintenance. The measurements contained surface swipe (particles) SCBA on location, immediately after use, measurements (gas and particles) during cleaning equipment in workshop and a 24-hour measurement on outgassing in hermetic closed deposit.

Maarit Manninen: Excursion to the very new training ground for occupational safety (www.ttha.fi) at the ESC training ground

Project coordinator Maarit Manninen showed the group a novel approach to occupational safety in a form of a training facility. In this facility local companies build sites to train their staff for various risky work procedures [12].

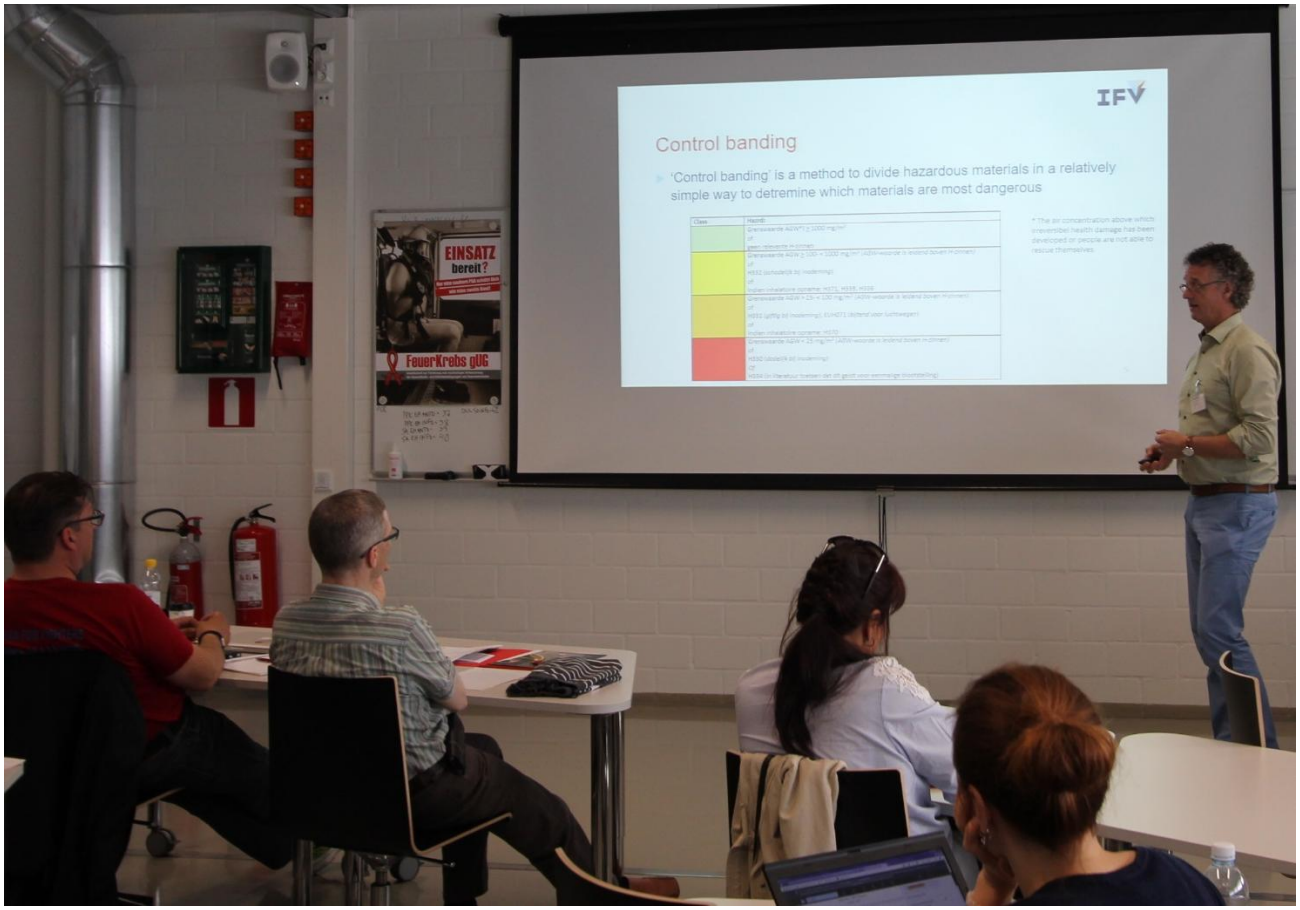
Marko Hassinen: Guided tour to ESC training ground, demonstration of different simulators

Marko Hassinen led a walking tour around the Emergency Services College training ground. Along the way the group visited different simulators paying attention contamination control procedures used at ESC student training. A highlight on the tour was the new Fire house simulator that uses artificial smoke and natural gas to create a realistic house fire scenario. Also, a live exercise was followed.

In the class room Marko Hassinen made a presentation about the experiments and projects done on the ESC training ground simulators and demonstrated the Fire Theatre that is used for student training and various research projects and studies [13].

6. Thursday 15.6.2017

Maurice Kemmeren: Literature -and model study to exposure routes of hazardous materials in smoke of fire



Maurice Kemmeren showed results of a study named Literature-and modelstudy to exposure routes of hazardous materials in smoke of fire. The study concentrated on exposure routes, contamination of turn-out gear and skin barrier change due to sweat and temperature. The study concluded that inhalation is the most critical way during a one-time exposure. Also for repeated exposure the inhalation route is the most likely route. Skin exposure is a real route for a small selection of materials

Stephane Conings: Where there's smoke, there's cancer

Stephane Conings gave a summary from Amsterdam fire department starting August 2014 until today. His main theme was from awareness to practical implementation with the bottom-up approach.

Stephane also demonstrated the gear bad used at the Amsterdam Fire Department after an incident involving smoke exposure.

Tommy Baekgaard Kjaer: New garments and equipment

Tommy Baekgaard Kjaer demonstrated the newest PPE for protection against hazardous substances from fires. The fire suit where inner and outer layer can be separated and washed separately and the benefit by using membrane in the suit. Also he demonstrated the new fire hood with Nano Flex for protection as the only one in Europe. TBK introduced also the most effective LCO2 decontamination system [14] as the way to remove hazardous substances from the PPE to a minimum according to the Oeko-Tex standard level system.

Maurice Kemmeren and Juha Laitinen: Contamination of firefighting garments – Laboratory tests (phase 1 and 2)

Juha Laitinen showed preliminary results of Dutch-Finnish study, where was measured absorbed chemical agents from different layers of contaminated and new firefighting garments. Chemical agents, which tend to be in vaporous form, such as SVOC and VOC, existed predominantly in the middle layer. Water soluble compound such as nitric acid, hydrochloric acid, sulphuric acid and phosphoric acid existed mainly in inner layer. Agents which exists in particular form, such as dioxins and furans, were mainly found from the upper layers.

7. Friday 16.6.2017

On Friday morning it was time for a wrap up and farewell at Hotel Rauhalahti. The conclusions and future work discussion from Thursday afternoon was continued and finalized. Also, a discussion regarding the future collaboration of the network was very fruitful and cooperation was considered highly necessary.

8. Future work

- Ongoing process requiring new information on future hazards
- Occupational health, how to recognize a disease
- Identify new hazards to adapt the barriers accordingly
- Recommendation on medical checks and a guideline
- Is the current knowledge of current hazards good enough?
- Standardization can help but we have to raise the risks and the needs in the context
- Cooperation with the manufacturers to produce suitable gear
- Different gear for different purposes
- Better cleanable clothing and gear
- Gear standard is already done, coming out at the end of the year
- Post retirement follow-up
- More exposure data and documentation is needed for the employee
- Development of fast and cheap exposure measurement method for firefighters for checking performance of their personal protective equipment and own behaviors after each firefighting task.

Future collaboration

The group will stay in contact through email. Future work of the network will be in informal collaboration and possible meetings and seminars. The exchange should be ongoing process in the future.

9. Conclusions

1. Cancer should be recognized as an occupational disease
2. The employers MUST make a personal exposure log (the incident, type, time etc.)
3. The employee should have the possibility to view and handle his/her personal log, also to report psychological stress and feelings.
4. Exposure should be reported also on the exposure log
5. Garments should be recognized as technical equipment
6. Definitions must be made for what is clean and what is clean enough in garments
7. The research work should be targeted to Europe, as there are quite many differences, such as environment, culture and work procedures affecting the results of research made elsewhere.
8. There is no need to wait for more evidence to enhance the work on preventive measures and change our behavior. Bring it on!
9. The Fire Fighter work will always have risks that you cannot totally remove.
10. The clean working procedures education must start in education in the beginning of the career.

10. Acknowledgements

This exchange was made possible by the Exchange of Experts in Civil Protection Programme. We wish to show our gratitude to the exchange program and the Technisches Hilfeswerk for supporting and making the exchange happen. Also, the efforts of our national coordinator, Ville-Veikko Pitkänen from the CMC Finland and Planning Officer Tuomas Kuikka, Head of Research Esa Kokki and Secretary of Research Riikka Salmela from the Emergency Service College were crucial for making the event happen. Thank you for your dedication.

10. List of Participants

Vegard Aslaksen

Name: Vegard Aslaksen
Age: 37 y
Position: Vice President of "Norwegian Firefighters Fight Cancer"

Vegards is of the founders of "Norwegian Firefighters Fight Cancer". Together with president Tommy Kristoffersen they have worked, since 2012, with the Norwegian government to highlight the cancer risk in the fire service. They have participated in different arenas both national and abroad to learn more about exposure and cancer risk. At present they have developed a cooperative relation with both, The Norwegian Cancer Society, The Norwegian Cancer Registry and The Norwegian Institute of Occupational Health.

Work experience:
- Firefighter/Rescuediver Bergen Firedept: 2009 - present
- Firefighter/Rescuediver Oslo Firedept: 2007 - 2009
- Instructor Royal Norwegian Airforce Fire training academy: 2004 - 2007
- Instructor/platoon leader Airforce Combat Engineers: 2001 - 2004

Education:
- Firefighter (Norwegian fire training academy/ Royal Norwegian Airforce Fire training academy)
- Rescuediver (Norwegian School of commercial diving)
- Building and construction engineer/officer (Norwegian Army College of engineering)

Marcus Bätge

Marcus Bätge, born on the 1st of July in 1969, in Hamburg. Married, 2 Children

Since 1991 Firefigter in the Firebrigade of the City of Hamburg, lso paramedic. Since 2010 staff council, Member of the board of a Firefighters Union.

Expert in the issue of occupational cancer among Firefighters since 2014. It started on the 3rd global seminar for occupational cancer in Bergen/Norway.

Grounding the FeuerKrebs society, following BFC and brakemen mot kraeft. Started the discussion by writing a letter to chancellor Merkel. We had many meetings in federal institutions like ministry of labour and social. Also talked with the responsible german statutory accident insurance.

Stephane Conings

Stephane Conings

Captain at Fire Station 'Hendrik' in Amsterdam.

Joined the fire brigade of Amsterdam/Netherlands in 1999 and serving as a professional firefighter since then. Always curious and eager to improve the safety and working conditions of my fellow firefighters.

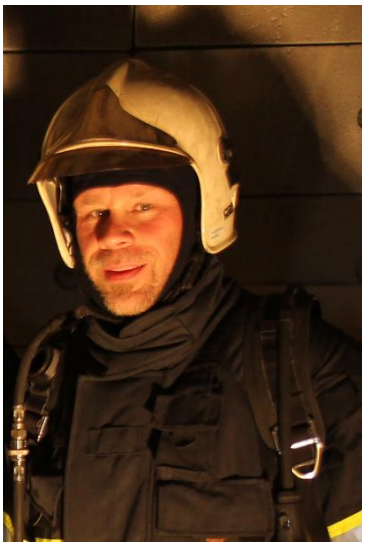
Stephane visited the 3th international conference on occupational cancer among firefighters in 2014 Bergen/Norway with two other colleagues (Barry Douma and Bald Sicking). Immediately they started introducing some simple measures with a bottom-up approach and step by step adopted the Skellefteå-model.

At the same time, Amsterdam spread the word with a few other Dutch fire departments and they are happy to witness everything the firefighter-community in the Netherlands has achieved in just 3 years. Also politicians and mayors have been informed and have been asked to take good care of their firefighter-community. Not only in providing equipment and measures to prevent us from getting this horrible disease but also to take very good care of the firefighters who do get work-related cancer. The Amsterdam-Amstelland fire department has done so for a few colleagues already and is giving the example for other fire departments within the Netherlands.

Now Stephane's main goal is to share knowledge and experiences in this matter to make sure that awareness is followed by action and a change of behavior. For the benefit of all firefighters.

Marko Hassinen

Research Scientist at Emergency Services College, Finland



Marko Hassinen received his Ph. D. in Computer Science. Thesis by the title "Studies in Mobile Security". He is also certified CISSP (Certified Information Systems Security Professional) and has more than 10 years of experience in lecturing at University level.

He also has more than 25 years of experience emergency rescue services with thousands of fire rescue responses.

At the Emergency Services College he has been running many research and development projects, the latest ones being New fire extinguishing methods for Fire & Rescue first response and Fire behavior of modern household appliances.

He also works as a specialist in the Data Security issues in Fire Rescue Services project and ran a project on Utilizing Unmanned Aerial Vehicles in rescue operations.

Maurice Kemmeren

Maurice Kemmeren (50) has worked now for 25 years in the Netherlands fire services and the last six for the Knowledge Institute Occupational Safety (IFV) for first responders. In addition to his regular work as a Project Manager he sees as his task especially in establishing the connection between the practice of the firefighter and applied science. Together with his colleagues, he is very active in the field of standardisation. Unfortunately, we still see that on international level the Fire Departments as end users are still missing. In general the feeling is that there are difficulties to explain to other stakeholders their needs. He tries to build a bridge between the field and for instance R&D.

His organisation has now been for four years active in the field of occupational hygiene and they try mainly to investigate the missing parts of available knowledge. Maurice is currently working on a research project together with Finland to investigate which parts of the smoke attach to garments, what is left after cleaning, what are the risks of contact with the left contamination, what is the barrier of the skin, what is the route through the body and what are the risks for the people of care and maintenance. For him the key questions are; how clean is clean and what is clean enough?

Tommy Bækgaard Kjær

Public Firefighter for 27 years from early 1987 to late 2014 included:
- Educated ant trained as fire officer and instructor from State Fire service.
- Special trained as:
- Professional rescue diver.
- High rescue.
- Chemical diver.
- Certified in “Reconstruction and Integration of Traumatic Stress”.

Editor of firefighter magazine since 2005.
Union leader since 2010. Member of board since 2006.
Board member (Vice president) for European Firefighter Unions Alliance EFFUA since 2008.
Founder and president of “Danish Firefighter´s Cancer Organization” BFC since 2013.
Author of numerus articles about occupational health and safety for fire fighters.
Speaker to fire fighter organizations, Universities and Parliaments around the world about occupational health and safety for fire fighters.
Member of deferent expert and working groups working for a fire safe Europe.
Member of honor upon “The Nordic Firefighters” NBS 2015.
Winner of “The Danish Community Awards 2015

Peeter Kuhi

Estonian Rescue Board, Administrative Department, expert

Peeter Kuhi is educated in engineering and information technology. He has worked 6,5 years as engineer of working environment in occupational health service. In 2007 he started work in the rescue field. During the first 7 years he worked in different positions from specialist to head of the administrative division. In the last 3 years he is an expert of the assets division, in other words, he is responsible for managing (like planning, budgeting, purchasing, quality control, development) the clothing service at Estonian Rescue Board. The clothing service includes all garments and personal protective equipment needed by the fire-fighters and other rescue workers in Estonia.

Juha Laitinen

Finnish Institute of Occupational Health, Kuopio, Finland

Juha Laitinen is educated as an environmental hygienist, and holds a PhD in occupational hygiene and the biomonitoring of chemical agents and their health effects. He works as a Senior Research Scientist at the Finnish Institute of Occupational Health and has 25 years of experience in chemical risk characterization, evaluation and management. He also holds the title of Docent in
Occupational Toxicology at the University of Eastern Finland. With his research group, he has published about 30 international peer-review articles on chemical exposure at different worksites.
His research group is currently working on exposure studies among fire fighters and workers in the bioenergy supply chain, and actors who are exposed to theatrical smoke.

Kätlin Saarest

Estonian Rescue Board, Rescue Work Department, adviser

Kätlin Saarest is educated in public relations and health promotions. She has worked 4 years in transportation taking care of occupational health and safety of truck drivers. In 2015 she started as an expert of occupational health and safety at Estonian Rescue Board. During the two years main focus was on occupational safety by reducing the number of work accidents.

She also implemented psychological help system and compiled Estonian's Rescue Board health policy till 2025. She has ran different analysis with Estonian universities and National Institute of Health Development. At the moment she works at Rescue Work Department and takes care of different analysis about rescue work.

Katrin Spiegel

Katrin Spiegel is educated in Political Science and Governance. In 2015 she graduated Master's degree in Tallinn University. Currently she works at the Estonian rescue board.

Earlier she has worked as a Labour inspector of occupational health at the Labour Inspectorate and as a Chief Specialist an the Ministry of Social Affairs of Estonia.

Contact information

Name	Email	Contry
Tommy Bækgaard Kjær	tk@brandcancer.dk	DK
Vegard Aslaksen	vegard.aslaksen@brannmennmotkreft.no	NO
Marcus Bätge	marcus.baetge@feuerkrebs.de	DE
Kätlin Saarest	katlin.saarest@rescue.ee	EST
Peeter Kuhi	peeter.kuhi@rescue.ee	EST
Katrin Spiegel	katrin.spiegel@rescue.ee	EST
Stephane Conings	s.conings@brandweeraa.nl	NL
Maurice Kemmeren	Maurice.kemmeren@ifv.nl	NL
Marko Hassinen	Marko.Hassinen@pelastusopisto.fi	FIN
Juha Laitinen	Juha.Laitinen@ttl.fi	FIN
Riikka Salmela	Riikka.Salmela@pelastusopisto.fi	FIN
Tuomas Kuikka	Tuomas.Kuikka@pelastusopisto.fi	FIN
Esa Kokki	Esa.Kokki@pelastusopisto.fi	FIN

References

1. Ricardo Weewer et al.: It depends - Descriptive research into fire growth and the chances of survival http://www.ifv.nl/advieseninnovatie/Documents/20150116-BA-UL-FSP-It-depends-Descriptive-research-into-fire-growth-and-the-chances-of-survival.pdf

2. Stephen Kerber: Analysis of Changing Residential Fire Dynamics and Its Implications on Firefighter Operational Timeframes. Fire Technology (2012) 48: 865. doi:10.1007/s10694-011-0249-2

3. Emergency Services College, Research, Development and Innovation. https://www.pelastusopisto.fi/en/research-and-information-services/research/

4. Brandfolkenes Cancerforening. http://www.brandcancer.dk/

5. Brandfolks helbredsricisi. https://arbejdstilsynet.dk/da/om%20arbejdstilsynet/arbejdsmiljoforskningsfonden/projekter/igangvaerende-projekter/brandfolks-helbredsrisici

6. The Cancer Registry of Norway, https://www.kreftregisteret.no/en/

7. The Norwegian Institute of Occupational Health and Safety. https://stami.no/en/

8. The Estonian Rescue Board. https://www.rescue.ee/?language_id=3

9. Knowledge Center Occupational Safety; activities and an example of the present work https://www.ifv.nl/advieseninnovatie/Documents/Enprotex/Ronald-Heus-Knowledge-Center-ENPROTEX2015.pdf

10. IFSI Research https://www.fsi.illinois.edu/content/research/

11. FeuerKrebs guGhttp://www.feuerkrebs.de/

12. Training area for Occupational Safety http://www.ttha.fi/

13. Fast and Agile Fire Extinguishing methods for Fire & Rescue Services. http://info.smedu.fi/kirjasto/Sarja_B/B1_2017.pdf

14. Fire Fighter PPE Cleaning. https://static1.squarespace.com/static/543d4707e4b084468157895e/t/58596099f7e0abb08708639a/1482252443113/TERSUS+Fire+Decontamination_FINAL.pdf

15. Exchange of Experts in Civil Protection Programme. https://www.exchangeofexperts.eu/EN/Home/home_node.html