The ANSFR Project

Workshop 3 - Roma
30th November – 3rd December 2009

"European Exchange of Good Practice in Identification, Assessment and Management of Accidental Fire Risk"

Report compiled by Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (NIA) and Northumberland Fire and Rescue Service

30th September 2010

Northumberland County Council

Emergency Services College

This report documents the sessions and findings of the Roma Workshop, the third of four workshops to be delivered during the ANSFR Project. The workshop and the ANSFR Project have been co-financed by the European Union under the Civil Protection Financial Instrument 2008 Call for Proposals (grant agreement number: 070401/2008/507848/SUB/A3).

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Executive Summary

This handbook documents the sessions delivered and the material produced during a European workshop hosted by Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (CNVVF - NIA) (Italy) on 30th November – 3rd December 2009. The workshop was the third of four workshops to be delivered over the course of the two-year ANSFR Project: ***"Accidental, Natural and Social Fire Risk (ANSFR): The prevention and diminution of the human and financial costs of fire through effective risk assessment and management".***

The ANSFR Project is being managed and coordinated by Northumberland Fire and Rescue Service (UK) working in close partnership with Frederikssund-Halsnæs Fire and Rescue Department (Denmark), Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (NIA) (Italy), the Emergency Services College (Finland), Kanta-Häme Emergency Services (Finland), and South West Finland Emergency Services (Finland). The project is co-funded by the European Commission Directorate-General for Environment under the Civil Protection Financial Instrument, 2008 call for proposals (Grant Number: 070401/2008/507848/SUB/A3). The ANSFR project aims to develop new guidelines for the identification, assessment and management of accidental, natural/environmental and social fire risk. The materials developed during the project will assist Fire and Rescue Services in Europe to protect life, property and the environment through the effective assessment and management of fire risks.

The ANSFR Project is divided into three key work themes: accidental fire risk; environmental fire risk; and social fire risk. The aim of the Roma Workshop was for participants "to develop a good understanding of the accidental fire risk assessment and management practices currently adopted by the partner organisations and to discuss and debate potential synergies and improvements to these practices for effective use in all project countries." For the purpose of the ANSFR Project and Roma Workshop, accidental fire risk is defined as: ***The threat, danger or possibility of a fire being started as a result of an accident and/or as a result of negligence[1] and/or as a result of lack of knowledge and awareness of common potential causes of fire".*** The theme of accidental fire risk encompassed five different sub-categories related to differing social and environmental contexts, namely: domestic premises; commercial premises; industrial premises; public buildings; and, transport. All of the ANSFR partners made an excellent contribution to the event content. Some of the topics covered during the event included: fire safety engineering; risk assessment matrices; risk assessment of domestic premises; risk assessment of care homes; young people and children and accidental fire risk, education to raise awareness and knowledge of accidental fire risk; and, reducing fire risks on farms and within industrial premises. The event also benefited from the exceptionally informative contributions of a number of specialists from Fire Service functions and commands across Italy, including regional commands in Roma, Latina, Sienna and Milan and the central departments of Istituto Superiore Antincendi (ISA) and the Scuola di Formazione Operativa (SFO) at Montelibretti.

Based on the evidence presented and analysed in the full Post-Event Evaluation Report, Northumberland Fire and Rescue Service and Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi have jointly concluded that the workshop was extremely

[1] The term "negligence" is defined by the ANSFR Project as: "The trait of neglecting responsibilities and lacking concern and/or failure to act with the prudence that a reasonable person would exercise under the same circumstances."

successful. The workshop successfully fulfilled all of its predefined learning objectives and delivered all three required outputs. In addition, all of the delegates who attended the event enjoyed the experience and stated that they had personally benefitted from contributing to the workshop activities. Most importantly, the ANSFR partners were able to identify good practice and begin the collaborative process of developing guidelines/recommendations for the effective assessment and management of accidental fire risk. These recommendations are not presented within this report, as they were honed and refined during other future project activities. The final recommendations/guidelines will, however, be available from the ANSFR partners in early 2011.

If you would like further information about the Roma Workshop or the ANSFR Project, please use the contact details shown on page one to contact a member of CNVVF or the ANSFR Project Manager.

Resumé

Denne håndbog dokumenterer de afholdte workshops og det materiale, som blev udarbejdet i løbet af den europæiske workshop, som blev arrangeret af Corpo Nazionale dei Vigili del Fuoco - Nucleo Investigativo Antincendi (CNVVF - NIA) (Italien), fra den 30. november til den 3. december 2009. Workshoppen var den tredje af fire workshops, der skulle afvikles i løbet af det to-årige ANSFR projekt: ***"Accidental, Natural and Social Fire Risk (ANSFR): Forebyggelse og formindskelse af de menneskelige og økonomiske omkostninger ved brand gennem en effektiv risikovurdering og ledelse ".***

ANSFR projektet administreres og koordineres af Northumberland Fire and Rescue Service (UK), i tæt samarbejde med Frederikssund-Halsnæs Brand- & Redningsberedskab (Danmark), Corpo Nazionale dei Vigili del Fuoco - Nucleo Investigativo Antincendi (NIA) (Italien), Emergency Services College (Finland), Kanta-Häme Emergency Services (Finland) og South West Finland Emergency Services (Finland). Projektet er medfinansieret af den europæiske kommissions Generaldirektorat for miljø for finansielt civilbeskyttelsesinstrument, 2008 indkaldelse af forslag (Grant Number: 070401/2008/507848/SUB/A3). Formålet med ANSFR projektet er, at udvikle nye retningslinjer for identifikation, vurdering og styring af uforsætlige, naturlige/miljømæssige og sociale brandrisici. De materialer, der er udviklet i løbet af projektet, vil bistå brand- og redningstjenester i Europa med at beskytte liv, ejendomme og miljøet gennem en effektiv vurdering og styring af brandrisici.

ANSFR projektet er opdelt i tre centrale arbejdsområder: uforsætlig brandrisiko, miljømæssig brandrisiko og social brandrisiko. Formålet med workshoppen i Rom, var for deltagerne; "at udvikle en god forståelse af uforsætlig brandrisikovurdering og forvaltningsmetoder, som i øjeblikket er vedtaget af medlemsorganisationerne og for at diskutere og debattere et potentielt samarbejde og forbedringer af disse fremgangsmåder for en effektiv anvendelse i alle projektets lande". I forbindelse med ANSFR projektet og workshoppen i Rom, er uforsætlig brandrisiko defineret som: ***"Den trussel, fare eller muligheden af en brand, der startede som følge af en ulykke og/eller som følge af***

uagtsomhed*[2] *og/eller som følge af manglende viden og forståelse af de fælles potentielle årsager til brand ". Temaet for uforsætlig brandrisiko omfattede fem forskellige underkategorier i forbindelse med forskellige sociale og miljømæssige sammenhænge, nemlig: private lokaler, forretningslokaler, industrilokaler, offentlige bygninger og transport. Alle ANSFR medlemmer har givet fremragende bidrag til workshoppens indhold. Nogle af de emner i forbindelse med arrangementet omfattede: brandsikkerhedsteknik; risikovurderingsmatricer, risikovurdering af private lokaler, risikovurdering af plejehjem, unge og børn, uforsætlig brandrisiko, uddannelse for at øge bevidsthed og viden om uforsætlig brandrisiko og mindske brandfare på gårde og i industribygninger. Arrangementet har også nydt godt af de usædvanligt informative bidrag fra en række specialister fra brand- og redningsområdet og ledere i Italien, herunder områdeledere i Rom, Latina, Siena og Milano, det centrale uddannelsesinstitution Istituto Superiore Antincendi (ISA) og Scuola di Formazione Operativa (SFO) ved Montelibretti.

Baseret på de beviser, der er præsenteret og analyseret i den fulde post-event evalueringsrapport, har Northumberland Fire and Rescue Service og Corpo Nazionale dei Vigili del Fuoco - Nucleo Investigativo Antincendi i fællesskab konkluderet, at workshoppen var en stor succes. Workshoppen opfyldte med succes alle foruddefinerede uddannelsesmål og indfriede alle tre krævede resultater. Hertil kommer at alle delegerede, der deltog i arrangementet, nød den erfaring og erkendte, at de personligt havde nydt godt af at bidrage til workshoppens aktiviteter. Vigtigst er det, at ANSFR medlemmerne var i stand til at finde frem til en god fremgangsmåde og en begyndelse på den fælles samarbejdsproces med at udvikle retningslinjer/anbefalinger for effektiv vurdering og styring af uforsætlig brandrisiko. Disse anbefalinger bliver ikke præsenteret i denne rapport, da de er blevet finpudset og forbedret i senere projektaktiviteter. De endelige anbefalinger/retningslinjer vil dog være tilgængelige fra ANSFR medlemmerne i begyndelsen af 2011.

Hvis du ønsker yderligere information om workshoppen i Rom eller ANSFR projektet, bedes du benytte kontaktoplysningerne vist på side et for at kontakte et medlem af CNVVF eller ANSFR projektmanageren.

Sintesi

Questo manuale documenta le sessioni svolte ed il materiale prodotto nel corso di un workshop europeo ospitato dal Corpo Nazionale dei Vigili del Fuoco - Nucleo Investigativo Antincendi (CNVVF - NIA) a Roma dal 30 novembre al 3 dicembre 2009. Il workshop è stato il terzo, di quattro workshop organizzati nel corso dei due anni del progetto ANSFR: ***"Accidental, Natural and Social Fire Risk (ANSFR): The prevention and diminution of the human and financial costs of fire through effective risk assessment and management"*** (trad. "Rischio d'Incendio Accidentale, Naturale e Sociale: la prevenzione e la diminuzione dei costi umani e economici dell'incendio attraverso un'efficace valutazione e gestione del rischio").

[2] Udtrykket "uagtsomhed" er defineret af ANSFR projektet som: "Den egenskab at forsømme ansvar og mangle bekymring og/eller manglende handling med den forsigtighed, som en fornuftig person ellers ville udøve under de samme omstændigheder."

Il Progetto ANSFR è gestito e coordinato dal Northumberland Fire and Rescue Service (Regno Unito) che lavora in stretta collaborazione con il Frederikssund-Halsnæs Fire and Rescue Department (Danimarca), con il Corpo Nazionale dei Vigili del Fuoco - Nucleo Investigativo Antincendi (NIA) (Italia), e con Emergency Services College, Kanta-Häme Emergency Services e South West Finland Emergency Services (Finlandia). Il progetto è co-finanziato dalla Commissione Europea, Direzione Generale per l'Ambiente sotto la Protezione Civile, richiesta progetti Nr 2008/C65/06 del 11/03/2008 (Accordo Numero: 070401/2008/507848/SUB/A3). Il progetto ANSFR mira a sviluppare nuove linee guida per l'identificazione, la valutazione e la gestione del rischio d'incendio accidentale, naturale/ambientale e sociale. Il materiale sviluppato durante il progetto aiuterà i Vigili del fuoco in Europa a proteggere la vita, i beni e l'ambiente attraverso la valutazione e la gestione efficace del rischio d'incendio.

Il Progetto ANSFR è suddiviso in tre temi principali di lavoro: il rischio d'incendio accidentale; il rischio d'incendio ambientale ed il rischio d'incendio sociale. L'obiettivo del Workshop di Roma per i partecipanti è stato: "sviluppare una buona conoscenza della valutazione e gestione del rischio d'incendio accidentale e delle pratiche attualmente adottate dalle organizzazioni partner e discutere e dibattere le possibili sinergie ed i miglioramenti a queste pratiche ai fini di un uso efficace in tutti i paesi del progetto. "Ai fini del Progetto ANSFR e del Workshop di Roma, il rischio di incendio accidentale è definito come: ***"il pericolo, la minaccia o la possibilità che un incendio possa iniziare a seguito di un incidente e/o a causa di una negligenza[3] e/o per mancanza di conoscenza e consapevolezza delle potenziali cause di incendio più comuni".***

Il tema del rischio di incendio accidentale comprendeva cinque diverse sotto-categorie relative a diversi contesti sociali e ambientali, e cioè: ambienti domestici, locali commerciali, stabilimenti industriali, edifici pubblici e trasporto. Tutti i partner ANSFR hanno contribuito in modo eccellente al contenuto dell'evento. Alcuni degli argomenti trattati durante l'evento sono: l'ingegneria della sicurezza antincendio; le matrici di valutazione dei rischi, la valutazione del rischio incendio in ambiente domestico, la valutazione del rischio nelle case di cura, i giovani e i bambini ed il rischio d'incendio accidentale, l'istruzione per aumentare la consapevolezza e la conoscenza del rischio d'incendio accidentale, e la riduzione del rischio d'incendio nelle aziende e negli edifici industriali. L'evento ha beneficiato anche del contributo eccezionalmente informativo di alcuni specialisti provenienti dai Comandi dei Vigili del fuoco di Roma, Latina, Siena e Milano e delle strutture centrali della formazione, l'Istituto Superiore Antincendi (ISA) e la Scuola di Formazione Operativa (SFO) di Montelibretti.

Sulla base dei risultati analizzati nell'ambito del rapporto di valutazione post evento, il Northumberland Fire and Rescue Service ed il Corpo Nazionale dei Vigili del Fuoco - Nucleo Investigativo Antincendi sono congiuntamente giunti alla conclusione che il workshop è stato un grande successo. Il workshop ha raggiunto con successo tutti i suoi obiettivi di apprendimento predefiniti e conseguito i tre risultati attesi. Inoltre, tutti i delegati che hanno partecipato all'evento hanno apprezzato l'esperienza e hanno dichiarato di aver personalmente beneficiato dal contribuire alle attività del workshop. Soprattutto, i partner ANSFR sono stati in grado di identificare la buona prassi e di iniziare un processo collaborativo di sviluppo di linee guida/raccomandazioni per la valutazione e la gestione efficace del rischio d'incendio accidentale. Tali raccomandazioni non sono presentate in

[3] Il termine "negligenza" è definito nell'ambito del progetto ANSFR come: "Il trascurare le responsabilità e la mancanza di attenzione e/o il mancato agire con la prudenza che una persona ragionevole avrebbe adottato nelle stesse circostanze."

questo rapporto, in quanto dovranno essere affinate durante altre attività future del progetto. Le raccomandazioni finali/linee guida, tuttavia, saranno a disposizione dai partner del progetto ANSFR nei primi mesi del 2011.

Se si desiderano ulteriori informazioni sul Workshop di Roma o sul progetto ANSFR, si prega di utilizzare i recapiti indicati in prima pagina per contattare un membro del CNVVF o il Project Manager di ANSFR.

Yhteenveto

Tämän käsikirja dokumentoi 30.11. - 3.12.2009 Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (CNVVF - NIA) (Italia) järjestämän Euroopan työpajan tapaamisen ja siellä tuotetun materiaalin. ***"Accidental, Natural and Social Fire Risk (ANSFR) - tulipalojen henkilövahinkojen ja taloudellisten vahinkojen ehkäiseminen ja vähentäminen tehokkaan riskinarvioinnin ja -hallinnan avulla"*** -projektin Rooman työpaja oli kolmas neljästä työpajasta, jotka toteutetaan kaksivuotisen projektin aikana.

ANSFR -projektia hallinnoi ja koordinoi Northumberland Fire and Rescue Service (Iso-Britannia) tehden läheistä yhteistyötä Frederikssund-Halsnæs Fire and Rescue Department:n (Tanska), Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi:n (NIA) (Italia), Pelastusopiston (Suomi), Kanta-Hämeen pelastuslaitoksen (Suomi) sekä Varsinais-Suomen pelastuslaitoksen (Suomi) kanssa. Projekti on osarahoitettu Euroopan Unionin ympäristö- ja väestönsuojelu rahoituksella vuoden 2008 määräyksellä (Avustusnumero: 070401 /2008/507848/sub/a3). ANSFR -projektin tarkoituksena on kehittää ohjesääntöjä tapaturmaisten, luonnollisten ja sosiaalisten paloriskien tunnistamiseen, arvioimiseen ja hallinnoimiseen. Projektin aikaansaama materiaali edesauttaa Euroopan palo- ja pelastustoimea ehkäisemään henkilö-, omaisuus- ja ympäristövahinkoja tehokkaan palojen riskikartoituksen ja -hallinnan avulla.

ANSFR -projekti on jaettu kolmeen avainteemaan: tapaturmaiset paloriskit; maastopaloriskit; ja sosiaaliset paloriskit. Rooman työpajaan osallistuneiden tehtävä oli "saavuttaa hyvä ymmärrys niistä yhteistyökumppaneiden käytännön toimista, joilla he kartoittavat ja hallitsevat tapaturmaisia paloja sekä keskustella synergiaeduista ja parannuksista niissä käytännön toimissa, jotka voitaisiin ottaa tehokkaaseen käyttöön kaikissa projektiin osallistuvissa maissa." ANSFR -projektia sekä Rooman työpajaa varten tapaturmainen paloriski on määritelty seuraavasti: ***Uhka, vaara tai mahdollisuus että palo alkaa tapaturman seurauksena ja/tai huolimattomuuden[4] seurauksena ja/tai tiedonpuutteen ja yleisimpien mahdollisten palon seurausten tietoisuuden puutteesta.*** Tapaturmainen paloriski teema sisältää viisi erilaista alaluokkaa liittyen erilaisiin sosiaalisiin ja ympäristöllisiin näkökulmiin eli: kotitaloudet; kaupalliset toimitilat; teolliset toimitilat; julkiset rakennukset; sekä liikenne. Kaikki ANSFR yhteistyökumppanit antoivat loistavan panoksen työpajaan. Työpajan aikana käsiteltiin mm. seuraavia aiheita: paloturvallinen rakentaminen; riskinarviointi matriisit; riskien arviointi kotitalouksissa; riskien arviointi hoitokodeissa; nuorten, lasten sekä tapaturmaisten palojen riskit;

[4] Termi "huolimattomuus" on määritelty ANSFR projektissa seuraavasti: "Luonteenpiirre, joka suhtautuu välinpitämättömästi vastuuseen eikä huolestu ja/tai toimi harkitsevasti, kuten järkevä henkilö tekisi vastaavassa tilanteessa."

tapaturmaisten palojen riskien tiedostamisen taidon kasvatus opetuksella; sekä paloriskien pienentäminen maatiloilla ja teollisissa rakennuksissa. Työpaja hyötyi myös lukuisten poikkeuksellisen informatiivisten Italian paloalan toimijoiden sekä johdon erikoisasiantuntijoiden työpanoksesta, mukaan luettuna Rooman, Latinan, Siennan ja Milanon maakunnalliset komentajat sekä keskusopetusosaston Istituto Superiore Antincendi:n (ISA) ja Montelibrettin Scuola di Formazione Operativa:n (SFO) toimijat.

Tapahtuman jälkeisessä täydellisessä itsearviointiin pohjautuen Northumberland Fire and Rescue Service ja Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi ovat tulleet siihen johtopäätökseen, että työpaja oli erittäin onnistunut. Työpaja onnistui täyttämään kaikki sen ennakkoon määritellyt opetukselliset päämäärät ja tuotti kaikki kolme vaadittua tuotosta. Lisäksi kaikki työpajaan osallistuneet edustajat nauttivat kokemuksesta ja totesivat, että he olivat hyötyneet henkilökohtaisesti osallistuessaan työpajatoimintaan. Tärkeimpänä, ANSFR kumppanit pystyivät tunnistamaan hyviä toimintatapoja ja alkoivat tehdä yhteistyötä kehittäessään ohjesääntöjä ja -suosituksia tehokkaaseen paloriskien arviointiin ja hallintaan. Näitä suosituksia ei esitellä tässä raportissa, koska ne viimeisteltiin projektin muiden myöhempien työpajojen aikana. ANSFR kumppaneiden lopulliset suositukset ja ohjesäännöt ovat kuitenkin julkisesti saatavilla vuoden 2011 alussa.

Jos haluat lisätietoa Rooman ANSFR -projektin työpajasta, ota yhteyttä sivun yksi yhteistiedoissa olevaan CNVVF:n henkilöön tai ANSFR projektipäällikköön.

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1. Introduction

This handbook documents[5] the sessions delivered and the material produced during the European workshop hosted by Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (CNVVF–NIA) 30th November – 3rd December 2009. The full title of the workshop was ***"European Exchange of Good Practice in Identification, Assessment and Management of Accidental Fire Risk",*** from this point forward referred to as the Roma Workshop. The information presented within this handbook will be of interest to all organisations in Europe with a responsibility for fire prevention and fire risk assessment and management. This handbook will be of particular interest to fire and rescue services, civil protection authorities and other government agencies in Europe. While this workshop focused on a European context, material presented within this handbook will also be of interest and practical use to fire risk assessment and management practitioners working across the World.

The Roma Workshop was the third of four workshops to be delivered during the two year European Commission-funded ANSFR Project. The ANSFR Project is currently being delivered by four partners working in four European countries: United Kingdom, Denmark, Italy and Finland. The project will develop new guidelines/recommendations form a framework for European fire and rescue services for the effective assessment and management of fire risk.

Two handbooks have been produced to document the first ANSFR Project workshop delivered in 2009 in Northumberland (United Kingdom) and the second workshop held in Frederikssund-Halsnæs (Denmark). A further handbook will be produced to document the last remaining workshop to be held in Kuopio (Finland) on 31st August – 3rd September 2010. An additional handbook has also been produced to document the "Fire Risk in Europe Conference 2010" which was hosted by Northumberland Fire and Rescue Service on 21st and 22nd June 2010. Further information about all of these project activities can be obtained upon request from the authors of this report.

This handbook is separated into six chapters. The following chapter provides a summary of the ANSFR Project, including a description of the partners, aims, objectives and outputs that will be produced. Chapter 3 outlines the aim, objectives and outputs of the Roma Workshop. The subsequent chapter presents summaries of all of the plenary presentations that were delivered during the workshop. Chapter 5 then presents information about the field visits that were integrated into the workshop schedule. The final chapter outlines the conclusions of the workshop, making specific reference to the post-event evaluation and future project activities and workshops that will be completed during the ANSFR Project.

[5] For the sake of brevity, acronyms and abbreviations have been used throughout this handbook. A full list of acronyms, abbreviations and their meanings can be found in Appendix 1 on page 135.

2. ANSFR Project Summary

2.1 ANSFR Project Partners and Funding

The ANSFR Project[6] will run between 1st January 2009 and 31st December 2010. The project will be coordinated and delivered by Northumberland Fire and Rescue Service[7] (UK) working in close partnership with Frederikssund-Halsnæs Fire and Rescue Department[8] (Denmark), Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi[9] (NIA) (Italy), and the Emergency Services College[10] (Finland). The project is co-funded by the European Union through the 2008 call for proposals under the Civil Protection Financial Instrument, which at the time was administered by the European Commission Directorate-General for Environment[11].

Northumberland Fire and Rescue Service is the coordinating partner on the project. NFRS provides fire and rescue service cover to the County of Northumberland in North East England. The Northumberland Arson Task Force, a multi-agency department within NFRS, will be responsible for managing and delivering the ANSFR Project, although multiple departments will contribute to and benefit from the project.

Frederikssund-Halsnæs Fire and Rescue Department provides fire and rescue services to the municipalities of Frederikssund and Halsnæs in the centre of the island of Seeland, in Denmark. Frederikssund-Halsnæs is a municipal fire and rescue service and its activities, like all fire and rescue services in Denmark are overseen at the national level by the Ministry of Defence.

The **Corpo Nazionale dei Vigilii del Fuoco (CNVVF)** is the Italian Fire Fighters Corps within the Ministry of Interior in Italy. The CNVVF provides fire and rescue services to the country of Italy through various central and local sub-departments and divisions. NIA is the department that will be involved in delivering the ANSFR Project. Nucleo Investigativo Antincendi (NIA) is a department based in Rome within the central technical core of the Italian Fire Fighters Corps and is responsible for fire investigation and other related issues.

The **Emergency Services College (ESC)** is situated in Kuopio in central Finland and provides education, vocational training and further training to the Finnish Rescue Services. The ESC also provides courses and consultancy in preparedness training for disturbances in normal and emergency conditions, international emergencies and civil crisis management. The Research and Development Unit at the ESC will be responsible for coordinating the ESC's contribution to the ANSFR Project. ESC will be assisted by officers from Kanta-Häme Emergency Services[12] and South West Finland Rescue Services[13].

[6] Grant number 070401/2008/507848/SUB/A3
[7] Website: http://www.northumberland.gov.uk/default.aspx?page=1304
[8] Website: http://www.fh-brand.dk/
[9] Website: http://www.vigilfuoco.it/
[10] Website: http://www.pelastusopisto.fi/
[11] Website: http://ec.europa.eu/environment/index_en.htm
[12] Website: http://www.pelastuslaitos.fi/portal/fi/
[13] Website: http://www.turku.fi/Public/default.aspx?nodeid=8600

2.2 Project Aim, Objectives and Outputs

The key aim of the ANSFR project is to reduce the human, financial and environmental costs from fire in Europe. This will be achieved by developing innovative tools and techniques for European Fire and Rescue Services. These collaboratively developed tools will aid Fire and Rescue Services to identify, assess and manage fire risks and enable them to be better prepared to prevent and reduce the factors that can contribute to high levels of fire risk within their communities.

In order to achieve this aim, the project team have devised 5 key objectives and plan to produce four key deliverables. The five project objectives are to:

1. **Undertake a comparison of research techniques and tools used by the project partners;**
2. **Develop tools, techniques and procedures for an effective and innovative risk assessment framework capable of being implemented in all European Union Member States;**
3. **Create an innovative, secure access knowledge portal with document library;**
4. **Create and develop a multilingual training tool for fire risk assessment;**
5. **Draw upon, disseminate and implement best practice and expertise in fire prevention techniques and procedures, and fire risk assessment tools from Europe.**

The four key project deliverables are:

1. **Deliver four workshops, one to be hosted by each partner organisation;**
2. **Create an electronic web-based system that will facilitate the EU wide exchange of good practice in effective fire risk assessment and management;**
3. **Create an exemplary online web-based training tool for good practice methods in fire risk assessment and management;**
4. **Deliver a conference for practitioners from across Europe to promote and debate fire risk assessment and management practices.**

2.3 Project Themes

The ANSFR Project is divided into the three key themes of: accidental fire risk, environmental[14] fire risk, and social fire risk. Each of the key themes has its own dedicated workshop. The three fire risk themes, as conceived within the ANSFR Project, are defined as:

Accidental Fire Risk: "The threat, danger or possibility of a fire being started as a result of an accident and/or as a result of negligence[15] and/or as a result of lack of knowledge and awareness of common potential causes of fire."

[14] Within the project proposal this theme was labelled as "natural fire risk", however, the ANSFR partners later mutually decided to change the theme to "environmental fire risk" to avoid confusion associated with the original terminology.

[15] The term "negligence" is defined by the ANSFR Project as: "The trait of neglecting responsibilities and lacking concern and/or failure to act with the prudence that a reasonable person would exercise under the same circumstances."

Environmental Fire Risk: "The threat, danger or possibility of a fire being started within a rural[16] or rural-urban interface environment[17] as a result of accidental/deliberate human activities or as a result of natural phenomena, such as lightning strikes, volcanic eruptions etc."

Social Fire Risk: "The threat, danger or possibility of a fire being started as a result of arson and/or as a result of factors associated with, or factors contributing to, the "high risk lifestyle(s)"[18] of an individual or social group."

The three definitions were collaboratively developed by the ANSFR Partners during the early stages of the project and have been designed to be of relevance to all of the countries involved[19]. The themes have been arbitrarily created to divide the project into three independent yet closely interrelated and interlinked themes. Some of the project findings developed through the individual fire risk categories may consequently be relevant and applicable to one or more of the other categories[20]. The fact that there may be overlaps does not reduce the value of using this distinction for organising the activities of the Project. All of the partners are aware of these overlaps and none believe that this detracts from the usefulness of deploying these three themes to structure the project into key work areas.

2.4 Project Workshops

One of the key outputs of the ANSFR Project is to design and deliver four workshops, each to be hosted by one of the project partners. The ANSFR workshops provide a unique experience for the project partners to regularly collaborate on issues related to fire risk with colleagues from a number of countries. This will enable the partners to produce outputs of significance to fire and rescue services across Europe, and potentially further afield. It also allows the contributing organisations to significantly develop their knowledge and understanding of alternative methods and strategies for fire risk identification, assessment and management.

Each ANSFR workshop has been given its own theme and focus:

- **Workshop 1: Introduction to the ANSFR Project and Fire Risk**
- **Workshop 2: Environmental Fire Risk**

[16] "Areas of a country with relatively low population densities. Rural environments are characterised by small human settlements (farms, villages etc.), and have few, if any, medium or large settlements (towns etc.)."

[17] "The boundary area between a rural and urban environment."

[18] "The term high risk lifestyle is divided into two different types of high risk lifestyle, based on a basic distinction between "choice" and "circumstance:

- The first type of high risk lifestyle is defined as: "Individuals/social groups who choose to engage in high risk lifestyles through regular participation in one or more activities that increase their risk of death, injury or ill health above the normal level of risk experienced by the wider population."
- The second type of high risk lifestyle is defined as: "Individuals/social groups who have not chosen to engage in a high risk lifestyle but who live a high risk lifestyle as a result of personal circumstances which may or may not be beyond their control. Individuals included within this category may be disadvantaged economically, socially, culturally, physically and/or mentally"."

[19] The themes were initially created during the project proposal, but were further developed and improved by the partners during the first project workshop held in Northumberland (see section 2.4).

[20] To provide one illustrative example, an accidental house fire (accidental fire risk) may occur within a house occupied by somebody living a high risk lifestyle (social fire risk).

- **Workshop 3: Accidental Fire Risk**
- **Workshop 4: Social Fire Risk**

All of the workshops have been designed to include three key elements:

- **Presentation** – of current good practice by all of the project partners and additional guest speakers.
- **Discussion and debate** – of current good practice, including critical comparison of methods and strategies implemented by all of the project partners and additional guest speakers.
- **Collaborative development and approval** – combining the knowledge and experience of all of the project partners to identify good practice and to produce recommendations for improvements and the implementation of best practice.

Workshops 2, 3 and 4 have/will involve the collaborative development of fire risk assessment and management guidelines/recommendations. These guidelines/recommendations will later be shared with and promoted to other Fire and Rescue Services in Europe. The final document of guidelines/recommendations that will be produced by the ANSFR partners will be the result of two years of intensive discussion and collaborative working. This document will provide an important blueprint for improvement for all of the ANSFR partners, for other fire and rescue services, and for other authorities with responsibility for fire risk management and reduction.

As coordinating partners of the project, NFRS hosted the first workshop in Northumberland. The first workshop provided a general introduction to the project and project themes[21]. The event was the first time that the partner organisations had met in one place to work together, so the event included some team building exercises in order to aid the development of a good work relationship between the partners. In addition, all of the partners provided a basic introduction to their organisation structure and services. The partners also openly discussed their current challenges and priorities with regards to fire risk assessment and management. It was apparent during this workshop that the partners had both similar and contrasting challenges and priorities, and that this would need to be taken into account during future project activities.

Workshop 2 was themed around the assessment and management of environmental fire risk and was hosted by Frederikssund-Halsnæs Fire and Rescue Department. A number of wildfire specialists attended the workshop from the project partner organisations and there were also additional informative contributions from specialists working in Australia and Greece. While vegetation, fuel and land-uses vary according to countries and specific localities, and each country and locality has its own specific challenges with regards to the nature and prevalence of wildfires and forest fires, there was a realisation among those present that there are generic principles and approaches that can be implemented within any country to improve the assessment and management of environmental fire risk. Risk to personnel, members of the public, property and the environment can be more effectively mitigated with some basic knowledge, understanding and training. One specific example to emerge from the workshop was that relatively simply wildfire risk prediction systems (WPS) can be implemented by fire and rescue personnel to significantly increase safety of

[21] For further information regarding the Northumberland Workshop, please download a copy of the Northumberland Handbook from the following website http://www.northumberland.gov.uk/default.aspx?page=5596, or visit the ANSFR Project website at www.fire-risk.eu .

personnel responding to wildfire incidents. WPS can also aid fire fighters and other responders to more effectively target resources, maintain resilience and, in many cases, to extinguish wildfires much more rapidly.[22]

The third workshop was hosted by CNVVF-NIA and was held in Roma, Italy. The workshop focused on the assessment and management of accidental fire risk. The workshop content covered a range of topics associated with accidental fires, including: fire safety engineering and protection; reporting, recording and analysing fire incidents; fires in dwellings; fires within industrial and commercial premises; fires within heritage/cultural buildings; transportation fires and explosions; fire safety education; school education programmes. The workshop also included some field visits to some of the specialist facilities and functions of CNVVF within Roma and its environs. Further information about this workshop is contained throughout this handbook

The remaining workshop will be hosted by ESC and the theme will be the assessment and management of social fire risk. The workshop will be held in Kuopio, in central-eastern Finland at the ESC. The ESC is the national training college for the Finnish Rescue Services and has a range of training facilities, including a substantial training ground. The event will cover a range of issues, including: reporting, recording and analysing fire incidents; arson/criminal fire-setting; high risk members of society; juvenile fire setters; fire investigation; fire inspections; fire safety and protection in care centres; fire engineering; fire risk at sports events; organised crime and the use of fire; safety education and social marketing.

[22] For further information regarding the Frederikssund-Halsnæs Workshop, please download a copy of the Frederikssund-Halsnæs Handbook from the following website http://www.northumberland.gov.uk/default.aspx?page=7651 , or visit the ANSFR website at: www.fire-risk.eu

3. The Roma Workshop

3.1 Overview of the Roma Workshop

The Location of the Workshop and Participants
The Roma Workshop was the third of four workshops to be delivered during the ANSFR Project. The event was organized and hosted by Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (CNVVF-NIA), one of four partners working on the project. The workshop was held at Istituto Superiore Antincendi (ISA), a central facility of CNVVF.

All of the ANSFR Project partners were represented at the event. In addition, representatives from Kanta-Häme Emergency Services (Finland) and South West Finland Emergency Services attended to contribute as part of the team from the ESC. All of the partners contributed to the event by delivering presentations and by participating in the other workshop sessions. The event also benefited from the exceptionally informative contributions of a number of specialists from CNVVF functions and commands across Italy, including the regional commands in Roma, Latina, Siena and Milano and the central departments of Istituto Superiore Antincendi (ISA) and the Scuola di Formazione Operativa (SFO) at Montelibretti.

Overview of Roma
Roma, sometimes referred to as the "eternal city", is the capital city of Italy. The city's population of approximately 3.7 million people live within a land area of approximately 496 square miles. Roma is located within the Lazio Region, which is situated in the central-western part of the Italian peninsula on the mouth of the River Tiber.

Roma's history spans over two and a half thousand years. It was the capital city of the Roman Kingdom, the Roman Republic and the Roman Empire. The Roman Empire was the dominant power in Western Europe and the countries bordering the Mediterranean Sea for more than 700 years between the 1st Century BC and the 7th Century AD. In 1871, Rome became the capital of the Kingdom of Italy, and in 1946 it became the capital of the Italian Republic. Since 1929 it has also been the site of the Vatican City, an independent city-state presided over by the Pope, the head of the Roman Catholic Church.

The 1957 Treaty of Rome created the European Economic Community (EEC), and since this time Rome has served as a centre for international cooperative activities. A number of worldwide organizations have located their headquarters within the city, including the World Food Programme (WFP), the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD) and the NATO Defence College.

Roma's historic centre is classified as a UNESCO World Heritage Site and contains a number of monuments and museums that are visited by more than 4 million tourists each year. Some of the most famous and visited tourist sites within Roma include:

- **The Vatican City (Citta del Vaticano)** – this is the papal residence and was built over the tomb of Saint Peter. The Vatican's position as a sovereign state within a state was guaranteed by the Lateran Treaty of 1929, which was marked by the construction of a new road, the Via della Conciliazione. The Vatican is the smallest state in the world.

- **Piazza del Poppolo (see Figure 3.1, below) –** a large square in Roma. Its name in modern Italian literally means People's Square. This was the starting point of the Via Flaminia, which was the road to *Ariminum* (modern day Rimini) and an important route to the north. For centuries, the Piazza was a place for public executions, the last of which took place in 1826.
- **The Roman Colosseum or Coliseum (see Figure 3.2, below) -** originally known as the Flavian Amphitheatre, was commissioned in AD 72 by Emperor Vespasian. It was completed by his son, Titus, in AD 80, with later improvements by Domitian. The Colosseum was built to a practical design, with its 80 arched entrances allowing easy access to 55,000 spectators, who were seated according to rank. The Coliseum is an ellipse that is 188 metres long and 156 metres wide. Vespesian ordered the Colosseum to be built on the site of Nero's palace, the Domus Aurea, to disassociate himself from the tyrant emperor. His aim was to gain popularity by staging deadly combats of gladiators and wild animal fights for public viewing. Massacre was on a huge scale: at the inaugural games in AD 80, over 9,000 wild animals were killed.
- **The Arch of Constantine (Arco di Costantino)** – Situated just outside the Coliseum (see Figure 3.1), the Arch of Constantine is a 25m high monument built in AD315 to mark the victory of Constantine over Maxentius at Pons Milvius.
- **Roman Forum (Forum Romanum)** - The Roman Forum was the central area of the city around which Ancient Rome developed. The Forum was where commerce, business, and the administration of justice took place. It was also the place where religious activities were conducted. The Arch of Titus (Arco di Tito), the Temple of Saturn, the Temple of Vesta, and the church of San Luca e Martina were all located within the Forum and were linked by the Sacra Via, the main road through the Forum. The Roman Forum was designed by the architect Vitruvius with proportions 3:2 (length to width). For centuries, the Forum was the site of the city's most important public buildings, such as the Arch of Septimius Severus, built in AD203, and the Roman Forum Rostra or platforms for public speeches.
- **The Roman Pantheon -** The Roman Pantheon is a Roman temple dedicated to all of the gods of pagan Rome. The Pantheon was built between AD 118 and 125 by the emperor Hadrian (A.D 117-138).

Figure 3.1 – Piazza del Poppolo in Roma

Figure 3.2 – The Colosseum and Arch of Constantine in Roma

Figures 3.1 and 3.2 taken by Heikki Harri

- **The Trevi Fountain (Fontana di Trevi) -** The Trevi fountain, inspired by Roman triumphal arches, is the largest and most famous Baroque fountain in Rome (standing 25.9 meters high and 19.8 meters wide). The Trevi Fountain as we know it today, was designed by Nicola Salvi in 1732 and competed in 1762. The site of the fountain marked the terminal of the Aqua Virgo aqueduct that was built in 19 BC. Tradition has it that a coin thrown into the water guarantees a visitor's return to Rome.

Overview of Corpo Nazionale dei Vigili del Fuoco
Corpo Nazionale dei Vigilii del Fuoco (CNVVF) is the Italian State Fire Fighters Corps within the Ministry of Interior in Italy. It was founded in 1941 and provides fire and rescue services across the whole of Italy through various central and local sub-departments and divisions. CNVVF employs approximately 30,000 fire fighters who complete their work with the assistance of specialists and specialist units. CNVVF consists of both centralised and decentralised departments.

Figure 3.3 – Parade Past the Colosseum in Roma by Corpo Nazionale dei Vigili del Fuoco

Along with a number of responsibilities, CNVVF has responsibility for fire prevention in Italy. Indeed, fire prevention has been a statutory responsibility of the Italian Fire Service since its foundation in 1941. It is CNVVF's aim to achieve, according to uniform criteria applied across the national territory, the protection of human life and personal safety and the protection of property and the environment through the promotion, study, preparation and testing, measurements, standards, measures, devices and modes of action designed to prevent the occurrence of a fire and the events in any way connected to it or to limit the consequences.

Further information about CNVVF can be found at: http://www.vigilfuoco.it/

3.2 The Aims, Learning Objectives and Outputs of the Roma Workshop

The workshop was designed so as to promote the exchange of information and ideas, and to enable the development of a closer working relationship between the officers working on the project from the four partner organisations. With this in mind, the following aim was devised:

> **"The aim of the workshop is for participants to develop a good understanding of the accidental fire risk assessment and management practices currently adopted by the partner organisations and to discuss and debate potential synergies and improvements to these practices for effective use in all project countries."**

The project team decided that five learning objectives would need to be satisfied in order to successfully achieve the central aim of the workshop[23]. The five learning objectives for the Northumberland workshop stated that all participants attending would:

1. Demonstrate an understanding of the accidental fire risk assessment and management practices currently adopted by the project partners and other invited organisations.
2. Describe and explain the accidental fire risks and challenges that currently face the project partners and project countries (Denmark, Finland, Italy and the United Kingdom).
3. Demonstrate an understanding of some of the national priorities and strategies for accidental fire risk assessment and management and the prevention of environmental fires in the project countries.
4. Demonstrate an awareness and appreciation of examples of good practice in accidental fire risk assessment and management from the project countries.
5. Share examples of good practice in prevention of accidental fires from the project countries.

In addition to satisfying the four learning objectives, the workshop would be evaluated in terms of the production of three key outputs:

1. A list of names and contact details of all individuals participating in the workshop.
2. A handbook documenting the sessions delivered and the specific findings/conclusions of each session.
3. At least three guidelines for the assessment, management and prevention of particular types of accidental fire risk.

3.3 The Workshop Agenda

The workshop agenda was designed to provide an open forum for delegates to exchange ideas, knowledge and experiences regarding accidental fire risk identification, assessment and management. Following from the successful design and implementation of the first two ANSFR Project Workshops, it was decided that the Roma workshop would be delivered in an informal atmosphere to promote healthy debate. The full workshop schedule can be viewed in Appendix 2.

The next section of this handbook now summarises the plenary presentations that were delivered during the Workshop.

[23] The development of learning objectives, as opposed to simply objectives, is deliberate on the part of the project team. The key reason for this is that all of the ANSFR Workshops will be viewed as a learning exercise. All of the partners will attend the workshops to share and to learn from one another. The learning process will involve learning the processes and techniques that have been both successful and unsuccessful in particular circumstances. The partners will then be able to collaboratively devise improved synergetic frameworks that take into account the knowledge and experiences that have been exchanged. This method of working presents unique opportunities for the organisations and individuals involved, and the resultant outputs will be of significant importance to the ANSFR partners and all fire and rescue services in Europe.

4. Plenary Presentations

All of the partner organisations contributed to the plenary sessions of the workshop by delivering at least one presentation. Table 4.1, below, provides a list of all fifteen presentations delivered during the two day workshop.

Table 4.1 – Presentations delivered during the Roma Workshop

No.	Presentation Title	Organisation	Presenter
1	"Official Welcome and Opening Presentation"	Corpo Nazionale dei Vigili del Fuoco (ITA)	Ing. Antonio Gambardella
2	"The ANSFR Project and Workshop 3"	Northumberland Fire and Rescue Service (UK)	Dr. Robert Stacey
3	Accidental Fires in the UK and Northumberland	Northumberland Fire and Rescue Service (UK)	Dr. Robert Stacey,
4	Preventing Accidental Fires in Industrial, Commercial and Public Buildings in Northumberland and the UK	Northumberland Fire and Rescue Service (UK)	Dr. Robert Stacey with material provided by Stephen Richards
5	Improving Safety on Farms and within Agricultural Premises in Northumberland	Northumberland Fire and Rescue Service (UK)	Dr. Robert Stacey with material supplied by Mark Mather
6	Northumberland Fire and Rescue Service's Schools Education Programme	Northumberland Fire and Rescue Service (UK)	Nina Livings
7	Home Fire Safety Checks (HFSCs) by Northumberland Fire and Rescue Service	Northumberland Fire and Rescue Service (UK)	Alan Middleton
8	Accidental Fire Risk in Frederikssund-Halsnæs and Denmark	Frederikssund-Halsnæs Fire and Rescue Department (DK)	Kim Lintrup
9	Accidental Fires in Finland	Emergency Services College (FIN)	Dr. Esa Kokki
10	Preventing Accidental Fires in Finland	Emergency Services College (FIN)	Timo Loponen
11	Fire Risk Assessment for Care Centres in Finland	South West Finland Emergency Services (FIN)	Knut Lehtinen
12	Investigation into a Fatal House Fire in Naantali, South West Finland in October 2009	Kanta-Häme Emergency Services (FIN)	Heikki Harri
13	Accidental Fire Risk in Italy	Corpo Nazionale dei Vigili del Fuoco, DCPST (ITA)	Ing. Fabio Alaimo Ponziani, Ing. Saverio La Mendola, Ing. Luca Ponticelli and Ing. Biancamaria Cristini
14	Fire Prevention within Historic Buildings in Italy	Corpo Nazionale dei Vigili del Fuoco (ITA), Comando Provinciale dei Vigili del Fuoco di Siena	Ing. Luca Nassi
15	The Explosion of L.P.G. Tanks at a Railway Station in Viareggio, Italy, 29th June 2009	Corpo Nazionale dei Vigili del Fuoco (ITA), Comando Provinciale dei Vigili del Fuoco di Lombardia	Ing. Antonio Pugliano

All of the presentations delivered were extremely interesting and informative and the information presented formed the basis for many productive discussions over the course of the workshop. The informal nature of the workshop allowed delegates to ask questions during the presentations and to discuss any emergent issues as they were identified. The following sub-sections now present summaries of each of the individual presentations delivered at the workshop, beginning with the official welcome by the Capo del Corpo Nazionale dei Vigili del Fuoco.

4.1 Official Welcome and Opening Presentation by Capo del Corpo Nazionale dei Vigili del Fuoco

This presentation was delivered by Ing. Antonio Gambardella, Capo del Corpo Nazionale dei Vigili del Fuoco[24].

English translation

It's my pleasure to welcome all the delegations participating to the ANSFR project.

The CNVVF is proud to host the third workshop of the project ANSFR in Rome in the Istituto Superiore Antincendi.

Exchanging experiences and collaborating in European projects is very stimulating for the CNVVF and it's a fundamental way for a common growth.

For this reason CNVVF is really glad to take part with a delegation of technicians to the ANSFR project.

The theme of fire prevention has a strategic importance for the security and public safety.

The fire prevention in Italy has an overriding public interest with the aim to achieve, with the same application within the national territory, the safety of human life, the public safety, the protection of the property and the environmental preservation. This goal can be achieved through the promotion, study, preparation and testing of standards, norms, solutions, devices and correct behaviour to avoid the occurrence of a fire and events related to it, at least to limit the consequences of a fire.

To participate in the activity of legislating in fire prevention field is a key issue for CNVVF.

Such attention on fire prevention in our country has satisfactory results because Italy can boast a low mortality rate in case of fire. The statistics describe Italy as one of the European countries where the number of fires, and the connected consequences, is very low.

The consequence of a fire, in terms of damage to persons and property, primarily due to combustion products, depends directly on the planned and implemented measures of prevention, protection, and management in case of emergency.

Therefore, during the planning phase the quality of work of the technicians is essential to ensure the safety of citizens and rescue teams too.

I wish everyone a good job, trusting in a result useful to a common benefit.

[24] Chief of the Italian State Fire and Rescue Service.

Traduzione italiana

Mi è particolarmente gradito dare il benvenuto a tutte le delegazioni partecipanti al progetto ANSFR.

Il CNVVF è orgoglioso di ospitare il III workshop del progetto ANSFR presso la sede dell'Istituto Superiore Antincendi a Roma.

Il CNVVF ritiene di grande interesse e di stimolo lo scambio di esperienze e la collaborazione nell'ambito di progetti europei, questa strada porta ad una crescita comune.

E per questo motivo il CNVVF è lieto di partecipare con una propria delegazione di tecnici al progetto ANSFR.

Il tema della prevenzione degli incendi ai fini della sicurezza e della incolumità pubblica è di fondamentale importanza strategica.

La prevenzione incendi in Italia è una funzione di preminente interesse pubblico diretta a conseguire, secondo criteri applicativi uniformi sul territorio nazionale, gli obiettivi di sicurezza della vita umana, di incolumità delle persone e di tutela dei beni e dell'ambiente. Questo obiettivo si raggiunge attraverso la promozione, lo studio, la predisposizione e la sperimentazione di norme, misure, provvedimenti, accorgimenti e modi di azione intesi ad evitare l'insorgenza di un incendio e degli eventi ad esso comunque connessi o a limitarne le conseguenze.

Fondamentale è il ruolo del CNVVF nell'attività di normazione nel settore antincendio.

Il risultato di una tale attenzione alla prevenzione nel nostro paese è soddisfacente infatti l'Italia può vantare un basso tasso di mortalità in caso d'incendio, le statistiche ci vedono tra i paesi europei in cui il numero degli incendi, e le conseguenze ad essi collegate, sono maggiormente contenuti.

Le conseguenze di un incendio, in termini di danni alle persone ed ai beni, essendo legate alle prime fasi dello sviluppo dei prodotti della combustione, dipende nella maggior parte dei casi dalle misure di prevenzione, di protezione, di esercizio e di gestione dell'emergenza che sono state previste ed attuate.

Pertanto la qualità del lavoro dei tecnici in fase progettuale è indispensabile a garantire l'incolumità dei cittadini e delle squadre di soccorso.

Auguro pertanto a tutti un buon lavoro, certo che il risultato possa essere utile ad un progresso comune.

4.2 The ANSFR Project

This presentation was delivered by Dr. Robert Stacey, ANSFR Project Manager and Arson Task Force Project Officer at Northumberland Fire and Rescue Service.

Robert delivered a presentation that provided a summary of the ANSFR Project. He summarised the funding sources and project partners of ANSFR, the aim, objectives and projected outputs of ANSFR, and the specific aims and objectives devised for the Roma Workshop. Robert also provided the partners with a progress report concerning key project tasks to date.

ANSFR Project partners, aims, objectives and outputs
The information regarding this topic has been presented earlier in this report (pages 14-19).

The need for the ANSFR Project
Robert provided delegates with a brief instruction on the need(s) identified for the ANSFR Project. Robert began by emphasising that, traditionally all fire and rescue services around the world have been reactive, and to a degree remain a reactive emergency service. All fire and rescue services were initially created to fulfil the primary function of responding to fires and other emergencies as they occurred. Once an emergency situation was attended and all necessary fire fighting and/or rescue actions had been completed, fire and rescue personnel would then return to their base and await a call to attend the next emergency incident.

During the last decade, there has been an expansion of the responsibilities of fire and rescue services in the UK and other countries in Europe and across the world. As a consequence, many fire and rescue services are now both reactive and proactive. Responding to emergency incidents is still a key activity undertaken by the fire and rescue services in the UK and Europe; however, many are now involved, either through choice or as a result of legislative requirements[25], in a significant volume of work aimed at preventing and reducing the number of emergencies that occur within their localities. Central to this idea of fire prevention is the idea that fire and rescue services must identify, quantify, and assess fire risks. They must then use this information to manage fire risk and, thus, reduce and prevent fires occurring. The basic theory underpinning this change in approach is that “prevention is better than cure”.

The ANSFR team identified that all of the project partners were involved in fire risk identification, assessment and management but that there was little or no European cross-border exchange of information on effective practice. The ANSFR Project was therefore designed to facilitate the exchange of detailed information on fire risk identification, analysis and management practices between the partners and other external organisations. This information will be collated and developed into resources of relevance and importance to fire and rescue services across Europe. ANSFR has the potential to

[25] In the UK, legislative change was implemented through The Fire and Rescue Services Act 2004 which replaced the Fire Services Act 1947. The Act achieved Royal Assent in July 2004 and came into force on 1st October 2004. According to Communities and Local Government the Act “puts the prevention of fires at the heart of the legislation by, for example, creating a new duty to promote fire safety and by providing flexibility for fire and rescue authorities to work with others in the community to carry out this duty” (Source: http://www.communities.gov.uk/fire/firesafety/fire/) . A full copy of the provisions of the Act can be viewed at the following website: http://www.opsi.gov.uk/Acts/acts2004/ukpga_20040021_en_1

provide a stimulus for more frequent and sustained cross-border communication in this field.

ANSFR fire risk categories

The ANSFR Project is divided into three key strands of fire risk: accidental fire risk; natural fire risk; social fire risk. These three categories were developed arbitrarily during the planning stage in order to divide the project into three manageable focus areas. The category of "natural fire risk" has subsequently been renamed as "environmental fire risk"[26]. The three themes and their respective definitions have already been presented on page 9 of this report, however, it is appropriate to present them again for ease of reference:

Accidental Fire Risk: "The threat, danger or possibility of a fire being started as a result of an accident and/or as a result of negligence[27] and/or as a result of lack of knowledge and awareness of common potential causes of fire."

Environmental Fire Risk: "The threat, danger or possibility of a fire being started within a rural[28] or rural-urban interface environment[29] as a result of accidental/deliberate human activities or as a result of natural phenomena, such as lightning strikes, volcanic eruptions etc."

Social Fire Risk: "The threat, danger or possibility of a fire being started as a result of arson and/or as a result of factors associated with, or factors contributing to, the "high risk lifestyle(s)"[30] of an individual or social group."

The project team have also devised extensive lists of the "Potential Causes/Contributory Factors for Accidental, Environmental and Social Fires" (see Appendix 3), "Potential Location Types for Accidental, Environmental and Social Fires" (see Appendix 4) and "Social Groups "At Risk" of Experiencing/Causing Accidental, Environmental and Social Fires" (see Appendix 5). These lists accompany and compliment Figure 4 which provides a graphical presentation of the key project themes. The benefit of the partners collaboratively creating these lists is that they form a useful reference point for some, if not

[26] This decision was decided through unanimous agreement by the project partners during the Northumberland Workshop. The term "environmental fire risk" was deemed to be more appropriate because it was more inclusive of all of the types of fires and risks that were included within this category, including both those caused by natural phenomena and those caused by human actions.

[27] The term "negligence" is defined by the ANSFR Project as: "The trait of neglecting responsibilities and lacking concern and/or failure to act with the prudence that a reasonable person would exercise under the same circumstances."

[28] "Areas of a country with relatively low population densities. Rural environments are characterised by small human settlements (farms, villages etc.), and have few, if any, medium or large settlements (towns etc.)."

[29] "The boundary area between a rural and urban environment."

[30] "The term high risk lifestyle is divided into two different types of high risk lifestyle, based on a basic distinction between "choice" and "circumstance:

- The first type of high risk lifestyle is defined as: "Individuals/social groups who choose to engage in high risk lifestyles through regular participation in one or more activities that increase their risk of death, injury or ill health above the normal level of risk experienced by the wider population."
- The second type of high risk lifestyle is defined as: "Individuals/social groups who have not chosen to engage in a high risk lifestyle but who live a high risk lifestyle as a result of personal circumstances which may or may not be beyond their control. Individuals included within this category may be disadvantaged economically, socially, culturally, physically and/or mentally"."

most, of the important factors that influence fire risk. Fire risk identification, assessment and management strategies must incorporate a good understanding of the key characteristics and factors that influence fire risk. This includes an understanding of both those factors that increase fire risk and those factors that can decrease and perhaps protect against fire risk. Without this comprehensive understanding, practitioners cannot develop an effective approach to reducing fire risk. While the lists in themselves will not reduce fire risk, they provide a useful reference point for the project partners and for all practitioners involved in fire risk reduction.

Figure 4.1 – Key Fire Risk Categories for use during the ANSFR Project

As will be obvious to all practitioners in this field, there is scope for a significant degree of overlap between the three key fire risk categories. The fact that there may be overlaps between themes does not reduce the value of using this distinction for organising the activities of the ANSFR Project.

ANSFR Project key task progress update
Robert provided the delegates with a brief progress report regarding the ANSFR Project. The key tasks that were discussed were:

a) Interim progress reports
Robert reminded the project partners that the second of the two interim progress reports to be submitted over the life of the ANSFR Project was due for submission before 30th April 2010. Robert outlined the information and contribution required from each partner and the deadlines for submitting this information to him for inclusion within the report.

b) Publicity and promotion of the project

A key element of the ANSFR Project grant agreement is the dissemination of the project work and findings to a European audience. In essence, the ANSFR Project must have significant European-added value. Robert summarised that the project team were already working towards achieving this aim by producing informative articles about the project and submitting these for publication in relevant fire magazines. As of 29th November 2009, two articles had been published in magazines: one in the UK and one in the Republic of Ireland. In addition, CNVVF-NIA had published an article about the project on their website, ESC had uploaded information about the project within the projects area of its website, and an article had been published on the Danish Embassy in Athens (Greece) website about the Frederikssund-Halsnæs Workshop (Workshop 2). Finally, a copy of the Northumberland Workshop Handbook had been uploaded onto the ANSFR webpage on the Northumberland County Council website.[31] Robert requested that all partners continue to publicise the project through their websites and that they especially consider uploading important project documents onto their sites. Robert also requested that partners provide him and the other partners with copies of all articles published on the project for record keeping purposes.

c) Project partners collecting relevant documents

Robert reminded the partners that an ongoing task to be completed by all partners throughout the duration of the ANSFR Project is to collect fire risk assessment and management documents from their country. The documents collected by the partners will be shared during the project workshops and at other intervals. In addition, some of the documents collected will be uploaded onto the proposed web-based system so that Fire and Rescue practitioners across Europe can view them for reference purposes.

d) ANSFR Project Conference in 2010

Robert delivered a short progress report on the ANSFR Project Conference which was to be held in Northumberland in the summer of 2010. The date for the event had been agreed and finalised prior to the Roma Workshop and partners could now push forward with plans. Robert outlined NFRS's proposal for the basic format and delivery of the event. He also presented a detailed timeline of activities and deadlines related to the event. Project partners were invited to provide their input to the conference design, although the tight schedule meant that less time was dedicated to this than was required. While the Northumberland ATF within NFRS would take the lead on the event, Robert emphasised to all present that partners would need to take responsibility for publicising the event within their own countries in order to attract delegates and speakers. Robert also asked the partners to submit proposals for their contribution to the event (i.e. in the form of presentations, posters or workshops) and for partners to provide recommendations for external speakers, poster presenters and workshop leaders.

e) Internet-based web system

Robert informed delegates that NFRS had developed a detailed specification document and had gathered three quotes from prospective suppliers. The basic design for the system will include publicly accessible areas of the site and more secure areas of the site that are only visible to registered individuals. The desired system will allow administrators from one or all of the partner organisations to be able to upload documents and edit content of the site. Robert sent a copy of the full draft specification to all partners

[31] For further information regarding the Northumberland Workshop, please download a copy of the Northumberland Handbook from the following website:
http://www.northumberland.gov.uk/default.aspx?page=5596

immediately after the Frederikssund-Halsnæs workshop and gathered their opinions/suggestions regarding any required modifications. Once all suggested amendments had been considered and, where appropriate, had been integrated into the specification document, Robert had sent the finalised specification document to five prospective suppliers. Three suppliers submitted proposals and two declined due to workloads.

Project partners were reminded that a key goal of the project is to create a working web system by 1st April 2010. This deadline was set to ensure that partners would have sufficient time to upload documents and other material to the site prior to presentation of parts of the system to a European audience at the ANSFR Project Conference in the summer of 2010. The ANSFR Conference represents an excellent opportunity for the project team to gather feedback on the system and to use this feedback to implement any improvements that may be required prior to the completion of the ANSFR Project on 31st December 2010.

e) Fire risk definitions exercise

During the first ANSFR Project Workshop held in Northumberland, the project partners began an exercise related to defining fire risk and other terms within the fields of fire risk identification, assessment and management. It became apparent during the Northumberland Workshop that the partners were aware of multiple definitions of risk and terms associated with risk and it was decided that all partners would identify and collect a number of definitions that they use within their organisation for fire risk assessment and management. Robert collated definitions from all of the partners and produced and circulated the document to the partners prior to the Roma Workshop. Some minor modifications were suggested and made and the document was finally approved by all during the Roma Workshop. The document was subsequently uploaded onto the ANSFR Project pages of the Northumberland County Council website.

Workshop 3 – Roma

Robert concluded his presentation by outlining the aim, learning objectives and desired outputs for the Roma Workshop. Robert reminded delegates that the aims, learning objectives and desired outputs for the Roma Workshop, like the workshop in Frederikssund-Halsnæs, were devised to be more specific than those of Workshop 1, with the aim being that Workshops 2, 3 and 4 would build upon the generic information presented and discussed in Northumberland and focus more specifically on one of the three fire risk categories used to structure ANSFR Project work: accidental fire risk; environmental fire risk; and social fire risk. It was decided in Northumberland that Workshop 3 in Roma would focus on “Accidental Fire Risk”. The actual aims, learning objectives and desired outputs devised for Workshop 3 have been presented on page 22 of this Handbook.

4.3 Accidental Fires in the UK and Northumberland

This presentation was delivered by Dr Robert Stacey of Northumberland Fire and Rescue Service.

Presentation summary
Robert gave a statistical overview of accidental fires in the UK and Northumberland. The presentation provided context to NFRS's strategy and initiatives for preventing and reducing accidental fires (discussed in sub-sections 4.4, 4.5, 4.6 and 4.7 of this chapter).

Accidental fires in the UK
There were 82,000 accidental fires in the UK in 2007[32]. Of these:

- more than half (53%) occurred within domestic dwellings
- 23% occurred within other building types (for instance, commercial, industrial etc.)
- 20% occurred within road vehicles
- 4% occurred outdoors

The main causes of accidental fires in the UK in 2007, as shown in Table ?? (below), were: cooking appliances; other electrical appliances; smoking materials; and, electrical distribution. Smoking materials was the cause that led to the highest number of fatalities, while cooking appliances led to the highest number of non-fatal casualties.

Table 4.2 - Causes of Accidental Dwelling Fires in the UK in 2007[33]

Cause	Total Fires	Fatal Casualties	Non-Fatal Casualties
Smoking materials	**3,076**	**102**	**1,047**
Cigarette lighters	482	11	251
Matches	274	7	116
Cooking appliances	**23,805**	**36**	**4,780**
Space heating appliance	1,764	20	376
Central/water heating appliance	1,041	2	125
Blowtorches/welding equipment	473	0	39
Electrical distribution	**3,050**	9	335
Other electrical appliances	**5,389**	**22**	**976**
Candles	1,313	14	**570**
Other/unspecified	2,684	44	451

[32] Source: http://www.communities.gov.uk/publications/corporate/statistics/firestatisticsuk2007
[33] Source: http://www.communities.gov.uk/publications/corporate/statistics/firestatisticsuk2007

Accidental Fires in Northumberland 2007/08
In 2007/08, NFRS recorded a total of 839 accidental fires. This statistic was also broken down into sub-categories:

- 426 accidental primary fires
- 410 accidental secondary fires
- 3 accidental chimney fires.

Fires attended by all fire and rescue services in the UK are classified as either primary or secondary fires:

- Primary fires - include fires in buildings fit for occupation; caravans; non-derelict vehicles; outdoor storage, plant and machinery; agricultural and forestry premises and property; outdoor structures such as post-boxes, tunnels, bridges etc. Secondary fires are also classified as primary fires if they involve casualties, rescues or escapes; spread from one secondary fire location to another; or are attended by five or more appliances where either the fire fighters, appliances or equipment were employed in fighting the fire.

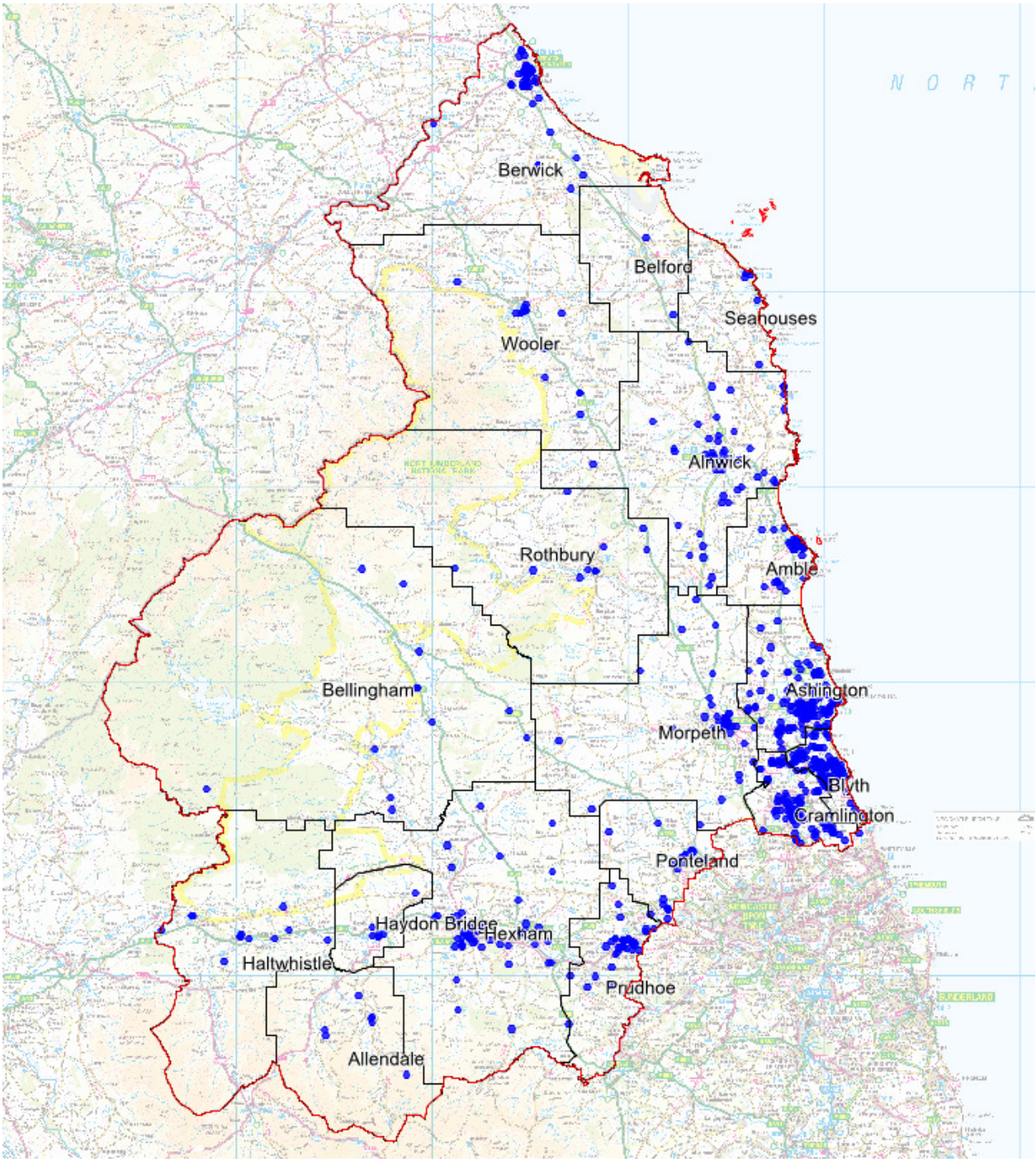
- Secondary fires - include single derelict buildings, single trees, refuse containers, etc. attended by four or fewer appliances and which did not involve casualties, rescues or escapes.

As Figure 4.3 (overleaf) shows, the accidental fires that occurred in Northumberland in 2007/08 were highly concentrated around urban areas where the majority of the population of the county reside. This concentration of incidents also influences NFRS's preventative work, which is often focused upon the South East corner of the County and the market towns in the North and West.

Like the statistics for the whole of the UK, the largest proportion of primary fires within Northumberland in 2007/08 occurred within domestic properties (40%) (see Figure 4.4, on page 36). The next most frequent types of accidental primary fires were private cars (19%) and industrial premises (10%).

As shown in Figure 4.5 (on page 36), two thirds of all accidental secondary fires recorded in Northumberland in 2007/08 were refuse/refuse containers (rubbish and rubbish containers such as bins). 24% of accidental secondary fires were grass/heathland/embankments, while trees and road furniture, straw/stubble, single derelict buildings and derelict buildings cumulatively accounted for a very small proportion of total accidental secondary fires.

Figure 4.3 – Accidental Fires in Northumberland in 2007/08[34]



[34] Source: Northumberland Fire and Rescue Service Incident Database.

Figure 4.4 - Accidental Primary Fires by Property Type Northumberland 2007/08

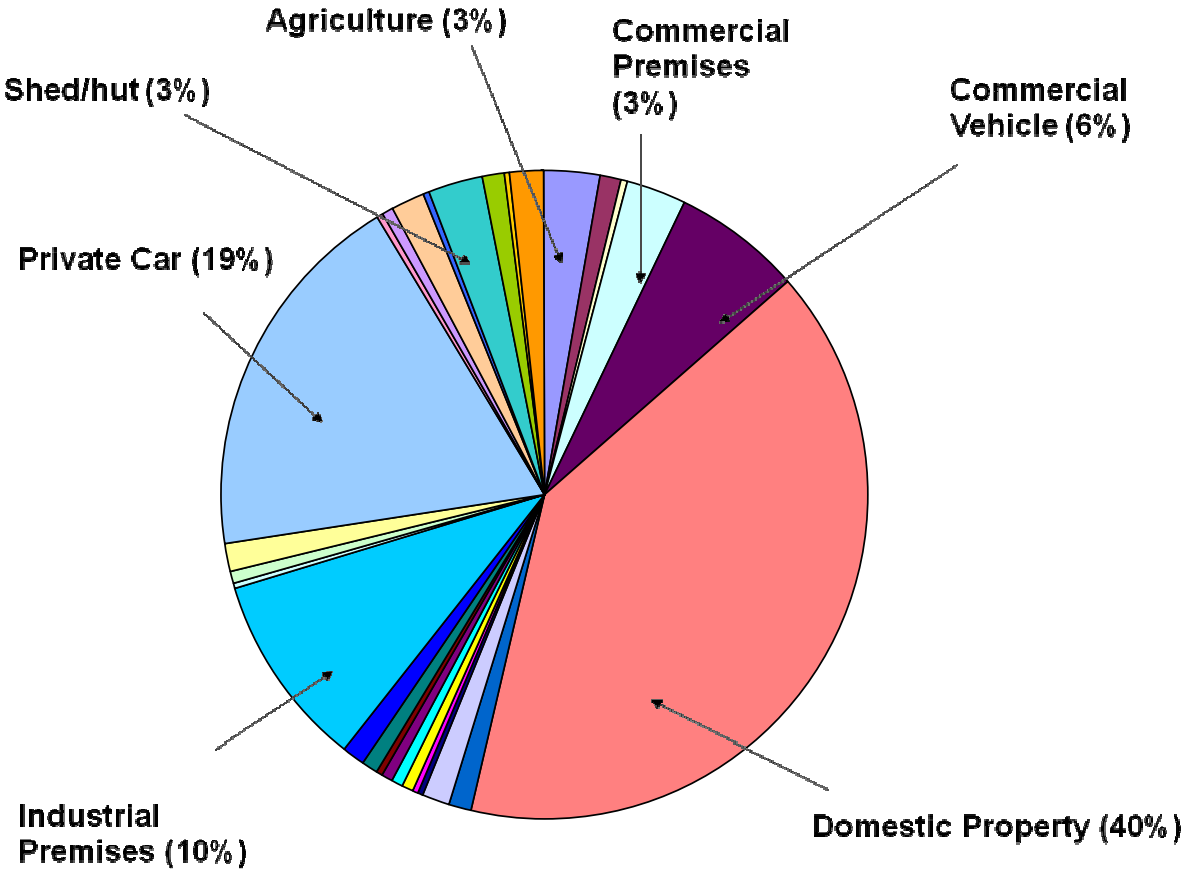
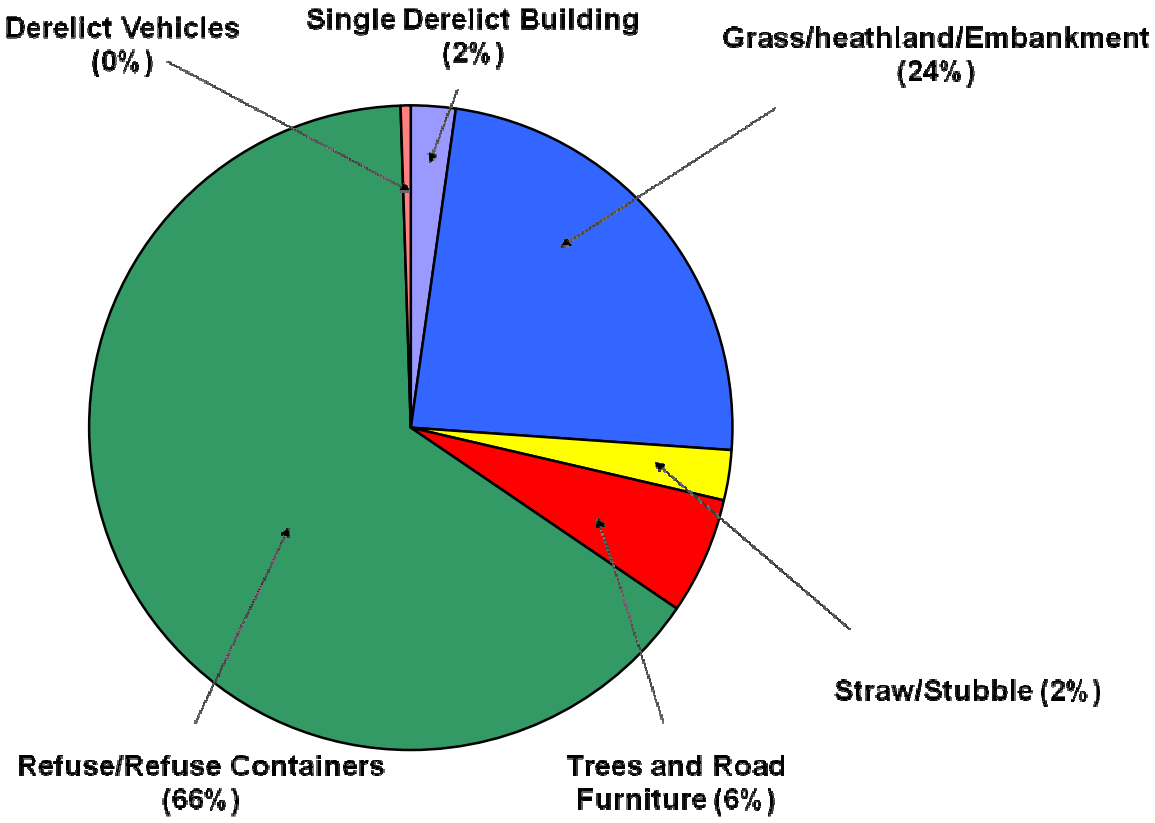


Figure 4.5 - Accidental Secondary Fires by Property Type Northumberland 2007/08



The causes of accidental fires in Northumberland in 2007/08 roughly mirror statistics gathered at the national level in the UK. Like the UK statistics as a whole, the main cause of accidental fires in Northumberland was cooking appliances (119 fires) (see Table 4.3, below). This was then closely followed by electrical appliances (92 fires) and motor vehicles (90 fires). One slight difference between Northumberland's statistics and those of the UK were the relatively lower number of fires caused by smoking materials.

Robert also briefly introduced delegates a new pattern emerging in the 2009/10 statistics. Four fatalities were caused in Northumberland during 2009/10 when individuals who were intoxicated with alcohol had returned home and started cooking food. The individuals subsequently passed out/fell asleep without turning off the cooking appliance, which led to a fire. At the time of the presentation, officers from NFRS's Community Safety Academy were devising a prevention campaign in order to prevent further fatalities from this type of fire. It was mentioned by other delegates during the presentation that this type of behaviour has also caused fire fatalities in other areas of the UK, and in Denmark and Finland, but that it is not a significant problem in Italy.

Table 4.3 - Causes of Accidental Dwelling Fires in Northumberland 2007/08[35]

Cause	Total Fires	Fatal Casualties	Non-Fatal Casualties
Smoking materials	16		5
Cigarette lighters	2		
Matches	6		
Cooking appliances	119		6
Heating appliance	16		
Motor vehicle	90	3	10
Electrical distribution	14		
Electrical appliances	92		1
Candles	6		1
Other/unspecified	64	3	7

[35] Source: Northumberland Fire and Rescue Service Incident Database.

4.4 Preventing Accidental Fires in Commercial, Industrial and Public Buildings within the UK

This presentation was delivered by Dr Robert Stacey of Northumberland Fire and Rescue Service with a significant contribution from Stephen Richards of Northumberland Fire and Rescue Service.

Presentation summary
Robert provided a brief overview of an important piece of legislation in the UK with regards to fire safety within commercial, industrial and public buildings. The Regulatory Reform (Fire Safety) Order 2005 (RRO) was created to provide one single piece of legislation for fire safety in the UK. The Act replaced a fragmented system of fire safety legislation which included fire safety provisions within numerous Acts, such as the Fire Precautions Act (1971) and the Licensing Act (1964). Robert provided delegates with an overview of the key requirements of the Act, including the five step risk assessment process that must be completed by Responsible Persons, the Fire and Rescue Service's role with regards to fire safety, and the fire safety audits that are carried out by specially trained Fire Safety Officers. The criteria that are used by fire and rescue services to devise local risk-based inspection schedules were also introduced.

Regulatory Reform (Fire Safety) Order 2005 (RRO)
The RRO exists to ensure that "any person who has some level of control in premises must take reasonable steps to reduce the risk from fire and make sure people can safely escape if there is a fire".

The RRO covers:

- Industrial buildings
- Commercial buildings
- Public buildings

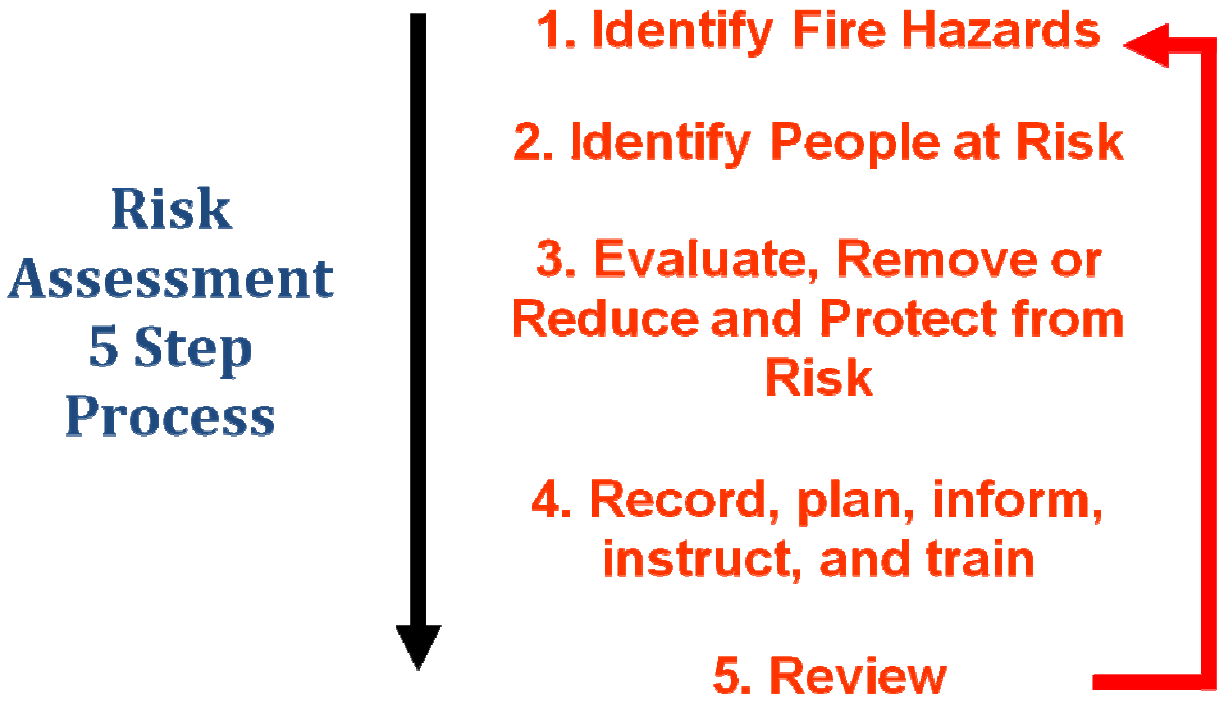
The RRO does not cover private domestic dwellings. However, the RRO does cover common areas of flats/apartments in multiple occupation. Any areas beyond common areas are considered private dwellings and are not covered by the RRO.

There are some additional exemptions not covered by the RRO. These are: mines, quarries, offshore installations, aircraft, ships, and locomotives.

Risk Assessment under the RRO
The RRO stipulates that the risk assessment must begin with the appointment of a Responsible Person. All requirements of the Responsible Person are covered within the Articles of the Act, mainly Articles 8 to 22.

The Responsible Person completing the risk assessment should follow the Five Step Risk Assessment Process, as shown in Figure 4.6 (overleaf). It is important to emphasise that this is an ongoing and cyclical process. Responsible Persons should continually review and amend the risk assessment.

Figure 4.6 – Five Step Risk Assessment Process



Explanation of the 5 steps of the Risk Assessment Process:

1. Identify Fire Hazards: possible sources of ignition, fuel, oxygen;
2. identify people at risk – including people in and around the premises, and people who are especially at risk;
3. evaluate, remove or reduce, and protect from risk – evaluate the risk of fires starting, evaluate the risk to people of fire, remove or reduce fire hazards, remove or reduce risks to people, protect people by providing fire precautions; Must remove and reduce risk from fire as far as is reasonably possible.
4. Record, plan inform, instruct and train – record any major findings and actions taken, discuss and work with other responsible people, prepare an emergency plan, inform and instruct relevant people, provide training;
5. Review – review risk assessment regularly, make changes where necessary.

Guidance Documents provided by the UK Government

The UK Government has produced 11 guides regarding fire safety within different building types covered under the RRO. The titles and website addresses of the various guides are provided overleaf in Table 4.4.

Table 4.4 – Fire Safety Guidance Documents Produced by the UK Government

Guide No.	Guide Name	Website Address
1	Offices and Shops	http://www.communities.gov.uk/publications/fire/firesafetyrisk2
2	Factories and Warehouses	http://www.communities.gov.uk/publications/fire/firesafetyrisk3
3	Sleeping Accommodation	http://www.communities.gov.uk/publications/fire/firesafetyrisk4
4	Residential Care Premises	http://www.communities.gov.uk/publications/fire/firesafetyrisk5
5	Educational Premises	http://www.communities.gov.uk/publications/fire/firesafetyrisk6
6	Small and Medium Places of Assembly	http://www.communities.gov.uk/publications/fire/firesafetyrisk7
7	Large Places of Assembly	http://www.communities.gov.uk/publications/fire/firesafetyrisk7
8	Theatres and Cinemas	http://www.communities.gov.uk/index.asp?id=1162111
9	Outdoor Events	http://www.communities.gov.uk/publications/fire/firesafetyassessment
10	Healthcare Premises	http://www.communities.gov.uk/publications/fire/firesafetyrisk9
11	Transport Premises and Facilities	http://www.communities.gov.uk/publications/fire/firesafetyrisk10

Fire and Rescue Service's Role with Regards to the RRO

With regards to the RRO, the Fire and Rescue Service's role is primarily enforcement. However, the Fire and Rescue Service also has responsibility under the Fire and Rescue Services Act 2004 to provide advice and assistance. This means that the Fire and Rescue Service both enforces and advises with regards to fire safety of industrial, commercial and public buildings in the UK.

Audits of Premises

Fire and rescue services are required to complete audits of premises covered by the RRO to ensure compliance. During an audit inspection, a Fire Safety Officer will visit premises to:

- Examine the risk assessment
- Hold discussions with the "Responsible person"
- Look at the physical aspects of the building
- He/she may also talk to employees or their representatives, take photographs, serve notices and take action if there is a risk to fire safety that needs to be dealt with immediately.

Audits are usually conducted as part of the risk-based inspection schedule[36] that has been devised by the local fire and rescue service. This risk-based inspection schedule determines the frequency with which audits are completed at individual premises or particular types of premises. Inspections and enforcement action will be prioritised according to the level of risk posed by individual premises. Obviously, those premises deemed to be at higher risk of loss of life from fire are of higher priority than those classified as lower risk. As an example, fires in hospitals may not be frequent but the potential for loss of life makes these buildings high risk. Consequently, relatively frequent inspections are completed. This schedule is not just devised according to risk from loss of life. The UK government also advises that other key criteria should be taken into account within a risk-based inspection schedule, including:

- Strategic importance of a property
- Potential loss of heritage
- Potential for environmental damage
- The need to assess likely fire fighting operations

Fire Safety Officers can also complete an audit of premises following a fire and subsequent fire investigation or following information or a complaint received from an employee or member of the public. The RRO gives Fire Safety Officers the legal right to enter any premises covered under the RRO at any reasonable time without giving notice (Article 27).

There are two possible outcomes of a fire safety audit:

- Broadly compliant – where no further action is required; or,
- Requires some degree of improvement

Where some degree of improvement is required, one of the following actions will be taken by the Fire Safety Officer (listed in increasing order of severity):

- **Verbal advice** - Where the breach of the law is relatively minor, the inspector may tell the Responsible Person, what to do to comply with the law and explain why. The inspector will, if asked, write to confirm any advice.

- **An enforcement notice** is issued in more serious cases. The notice will say what needs to be done, by when and why. The time period within which to take the remedial action will be at least 21 days to allow the responsible person time to appeal to a magistrates court if he/she so wishes.

- **Prohibition notice** - Where an activity involves, or will involve, a risk so serious that people are in imminent danger, emergency powers can be used to prohibit or restrict the use of the workplace until the risk has been reduced to an acceptable level. The prohibition or restriction notice will explain why the action is necessary. The Responsible Person will be told in writing about the right of appeal to a magistrate's court.

- **Prosecution through the courts**– in the most extreme cases, a Fire Safety Officer may think it is necessary to initiate a prosecution for failure to comply with the law.

[36] Guidance on devising and implementing a risk assessment based approach to managing a fire safety inspection schedule has been produced by the UK Government, a copy of which can be downloaded from the following website: http://www.communities.gov.uk/documents/fire/pdf/IRMPguidancente4

4.5 Improving Safety on Farms and Agricultural Premises within Northumberland

This presentation was delivered by Dr Robert Stacey of Northumberland Fire and Rescue Service.

The presentation concluded with an introduction to the multi-agency Northumberland Farm Safety Group which has been recently created within Northumberland in order to address and improve safety on farms across the County. Robert also provided a brief overview of two specific initiatives that have been devised and implemented by members of the Group in order to raise farm safety awareness among children living within rural areas of Northumberland.

The context of farming in Northumberland
The total area of agricultural land in the UK in 2006 was 18.7 million hectares, which is about 77% of the total land area of the UK. Farms consequently account for a significant proportion of the land area of the country.

Northumberland has the lowest population density of any County in England, with just 61 people per square mile. The population is also highly concentrated within the county, with two thirds of the population living on less than one third of the land. As has been explained during previous ANSFR Workshop presentations, the population of the Northumberland is highly concentrated in the South East area, with a much more sparse population distribution in the rural West and North of the county.

Northumberland has the largest proportion of land dedicated to farming of any County in the UK. Despite recent declines in farming Northumberland, agriculture accounts for 5% of employment. Nationally agriculture only accounts for 1.4% of employment. Consequently, Northumberland has a large farming community and farming is an important part of the county's economy. Figure 4.7 (below) shows a typical farm in Northumberland.

Figure 4.7 – Typical Farm in Northumberland

Fatalities on farms in the UK – 1997/98 – 2006/07
The statistics on fatalities on farms in the UK reinforce that farms can be dangerous places and that improving farm safety should be a priority.

The Health and Safety Executive (HSE)[37] maintains records of fatalities and injuries that occur at all places of work in the UK. During the ten years between 1997/98 and 2006/07 they recorded 464 fatalities on farms in the UK:

- 145 fatalities were employees
- 254 fatalities were self-employed individuals
- 65 fatalities were members of the public
- 28 fatalities were children (under the age of 16 years) – 26 of whom were members of the public.

There is a seasonal bias in the number fatalities recorded during this period, with the highest number of fatalities occurring during the late summer/early autumn. This shows that fatalities increase and decrease during certain seasonal activities.

In simple terms, during the ten year period between 1997/98 and 2006/07, one person was killed on a farm every week.

Factors elevating risks of fires and accidents on farms and barriers to improving farm safety
Statistics on fatalities indicate that farms could be made safer. However, there are a number of factors that make it difficult to improve farm safety.

Employment patterns within the farming sector are particularly problematic. With the decline of farming in recent years, the following problematic employment patterns have emerged:

- Fewer professional labourers are being employed on farms.
- Coupled with a decline in employment of professional labourers, is the fact that casual seasonal workers are being employed to a greater degree. Some of these workers will have little experience of farms, such as young people working for extra money.
- Migrant workers are now completing a lot of work on farms. Some of these workers will lack education and awareness of the risks posed by farming and farm machinery. In addition, migrant workers may work on a very casual basis and may move from farm to farm, which makes it difficult to deliver awareness raising education to them.
- Apprentices who would be given extensive training are no longer affordable to many farmers.

These problematic employment patterns have produced two key safety problems. The first is less maintenance. With fewer professional labourers and apprentices and a greater number of seasonal and casual workers, less maintenance is completed on farms. This is

[37] The HSE is the national independent watchdog for work-related health, safety and illness in Great Britain. The HSE is an independent regulator that acts in the public interest to reduce work-related death and serious injury across Great Britain's workplaces.

a significant problem because machines may run for 16 hours per day during peak seasons. If machines are not adequately maintained then the friction and heat of these machines can cause fires. Also, there are now a greater number of self-lubricating machines being used on farms in the UK. While this can be advantageous for farmers, it can also lead to complacency whereby less maintenance is completed. While these machines do self-lubricate they still need to be regularly checked and maintained in order to prevent accidents and fires.

The second key problem for safety on farms is that there is a lack of safety knowledge/education among farm workers and the general public. This lack of knowledge raises the risk of fires and accidents on farms.

The situation is further complicated by three key barriers to improving farm safety.

1. **Farmers are a challenging demographic** - The average age of a farmer in the UK is 58 years old. These individuals have most likely been farming all of their lives and, over the years, they have developed their won techniques and systems. These individuals may not want to change their techniques and systems and may not respond positively to others who tell them that they need to change.
2. **Economics** - Time is money and profit margins are gradually getting tighter. This provides an economic incentive to take short cuts.
3. **Statistics** – at present it is difficult to interrogate Fire and Rescue statistics with regards to fires on farms. Consequently, the whole picture cannot be ascertained.

The Northumberland Farm Safety Group
In order to breakdown some of the barriers and to ultimately work to improve safety and reduce fatalities and injuries on farms, the multi-agency Northumberland Farm Safety Group (NFSG) has been created. Multiple agencies have a vested interest in improving safety on farms which is why a multi-agency group is required.

The NFSG is Chaired by Mark Mather, a farmer and retained fire fighter for NFRS. Members of the NFSG include:

- Northumberland Fire and Rescue Service (NFRS)
- Health and Safety Executive (HSE)
- National Health Service
- Northumberland County Council
- National Farmers Union
- SureStart[38]

Since its creation, the NFSG has been involved in a number of activities, including:

- Production of posters and leaflets
- Production and circulation of fire and general safety booklets, which have been distributed to:
    - More than 570 farms
    - More than 400 holiday properties
- Conducting hot strikes following farm fires/accidents

[38] SureStart is a UK Government initiative aimed at giving children the best start in life through improvement of education, health and family support. SureStart places a strong emphasis on outreach support and community development.

One method that may be effective in raising awareness of farm safety is to inform local farmers when fires/accidents occur within their area and provide them with guidance on how they can reduce risk of fire/accidents on their farm. It is for this reason that the NFSG coordinates hot strikes. The Chair of the NFSG is informed by Fire Control of all accidents/fires occurring on farms. The Chair will then visit farms in the surrounding area (5 to 10 mile radius).

Educating children of the dangers and risks on farms

A key priority for the NFSG is to improve knowledge and awareness of safety among children living within rural communities. The NFSG has already devised two initiatives in order to achieve this goal: the Fire Fitness Programme and Farm Open Days.

The Farm Fitness Programme is a 6 week course which combines fitness with safety messages. The course consequently covers two key priorities for children in Northumberland: health and healthy lifestyles and safety. The course covers countryside safety, farm safety, rail safety, road safety, and water safety.

Farm Open Days involve farmers volunteering the use of their farm for a day. Around 80 children will attend their farm during an open day and they will be walked around by members of the NFSG and educated as to the work that occurs on the farm. Children are also presented with a number of safe and unsafe scenarios around the farm, with NFRS rescue dummies simulating the actions of a person. Children are asked whether they think the person is acting safely or unsafely and an explanation is given. The aim is for all schools within the rural North and rural West of the County to attend the farm open days. At the time of writing, six open days had been held and more were planned.

4.6 Home Fire Safety Checks completed by Northumberland Fire and Rescue Service

This presentation was delivered by Alan Middleton of Northumberland Fire and Rescue Service.

Presentation summary
Alan delivered a presentation on NFRS's Home Fire Safety Checks (HFSCs) and emphasised that HFSCs are an important part of NFRS's fire prevention strategy. Alan also described what HFSCs are, why NFRS conducts HFSCs, where NFRS receives referrals from for HFSCs, and the risk assessment that is completed during a HFSC. By completing HFSCs, NFRS is working to protect lives by reducing fire risk within homes across Northumberland.

What is a Home Fire Safety Check?
Home Fire Safety Checks (HFSCs) are an important part of the fire prevention work completed by NFRS. NFRS will complete a HFSC in any domestic property across the county where the occupants have requested a HFSC or where occupants have provided permission for NFRS to enter to conduct a HFSC.

During a HFSC, officers from NFRS will visit a residential property to:

- Provide an opportunity to educate occupants about fire safety and escape plans.
- Identify and rectify fire risks in the home.
- Provide and install 'free' 10 year smoke detectors, if required.
- Identify people who are particularly vulnerable due to medical issues e.g. limited mobility, poor mental health, hard of hearing/deaf.

Why does NFRS complete HFSCs?
NFRS conducts HFSCs in order to:

- Works towards achieving its targets for reducing fire injuries and fatalities and to ultimately make Northumberland a safer place to live.
- Work towards the national target of ensuring all properties in the United Kingdom have a working smoke alarm.
- Raise the profile of NFRS and the preventative work that it does.
- Build stronger relationships with its partners.
- Work with new partners.

Where do HFSC referrals come from?
NFRS identifies properties that require a HFSC through a number of different referral mechanisms. These include:

- **A free phone telephone number** – which that is advertised on public literature that NFRS fire fighters and Community Safety Academy staff distribute through public events and present within public buildings etc.
- **Referral forms** – which are completed and returned by residents that would like to request a HFSC. Referral forms are distributed through the doors of individuals in a particular neighbourhood who have been identified through risk mapping as being

at higher risk of fire[39]. They are also circulated by NFRS personnel during community events, and some are left displayed in public buildings such as libraries, health centres, hospitals, etc.

- **Direct from other local partners** – a number of partners that work with NFRS, such as other County Council Departments and other external agencies, refer individual properties for a HFSC.

What is covered during a HFSC?
A range of safety topics are covered by officers during a HFSC. Guidance is given by officers on the following potential fire risks:

- Candle use
- Smoking – use of lighters /matches
- Cooking – chip pans
- Heating sources e.g. open fires, portable heaters
- Electrical safety
- Fire-fighting equipment
- Bedtime routine – reducing risk
- Escape plans
- Escape behaviour
- Smoke alarms

Further details about the specific risks covered during the HSFCs are included in the NFSC Information Sheet, shown in Figure 4.8 (overleaf). At the time of writing, NFRS officers conducting HFSCs would talk through the items on the information sheet with the householder and leave a copy for their future reference. NFRS officers would also leave a copy of a Fire Safety in the Home booklet produced by the UK Government

A key part of all HFSCs is to identify potential fire risks within each home and to provide guidance on how the risk can be reduced and/or removed. Officers complete a risk assessment of the home during a HFSC. This risk assessment involves completing a standard form (see Figure 4.9, on page 49). The fields on the form provide a prompt for the officers when talking the householder through the risk assessment. Once completed, the HFSC forms are submitted to an administrator for data entry into a central database. This database provides NFRS with a lot of useful data that can be used in data analysis to identify trends. Also, when a fire occurs within a particular property, NFRS can check if a HFSC has been completed and, if so, when the check was completed. This can help NFRS to evaluate the successfulness of the HFSCs and identify any areas that may require improvement.

Another key part of each HFSC is to identify if the property has working smoke alarms and, if not, NFRS officers will install free 10 year smoke detectors in the most appropriate locations. Occupants of the house are then instructed on maintenance of the smoke alarm, with all occupants instructed to test the smoke detector(s) weekly and to vacuum the detector every 6 months. These measures help to ensure that the smoke detector continues to work correctly.

[39] See page 58 of the Northumberland Workshop Handbook. This document was produced to document the first of the ANSFR Project Workshops and was held in Northumberland, UK in May 2009. For a copy of this handbook, please contact the authors of this report (contact details on page 2) or visit the following page on the ANSFR Website: http://www.fire-risk.eu/project/workshops/northumberland2009.htm?showpage=-1.

Figure 4.8 – Northumberland Fire and Rescue Service HFSC Information Sheet

NORTHUMBERLAND FIRE AND RESCUE SERVICE

HOME FIRE SAFETY CHECK

INFORMATION SHEET

Bedtime Routine

- Switch off all electrical appliances not designed to stay on all night
- Extinguish cigarettes and empty ashtrays outside
- Switch off fires, heaters etc.
- Close the doors of rooms, especially the kitchen and living room

Candles

- Keep away from curtains and draughts
- Use a suitable, sturdy holder
- Extinguish properly before going to bed

Chimneys

- Have chimneys swept every 6 months
- Clean burning fuels will reduce the build up of soot

Chip Pans

- NEVER leave chip pans unattended at any time
- Don't overfill – max 1/3 full
- Test temperature of oil & dry food before frying
- NEVER put water in the pan when hot or on fire!

Close Doors At Night

- This will help prevent the spread of fire and smoke

Double Glazing

- Keep keys near to windows
- Provide hammer to break the window in the bottom corner in an emergency

Refuse & Rubbish

- Ensure smoking materials and other hot items are cold before putting in bins

Cooking Appliances

- Don't leave pans unattended
- Keep tea towels away from cookers and grills
- Check timer and temperatures are set correctly

Electric Blankets

- Watch for poor fitting of the blanket
- Store carefully
- Don't leave switched on unless designed to do so
- Service according to manufactures instructions
- Look for the BEAB mark

Electrical Equipment

Check for: -

- Incorrect wiring of plugs
- Wrong fuse sizes
- Appliances left on
- Worn flexes
- Overloading sockets
- Ignoring warning signs

Have wiring checked by a qualified electrician

Escape Behaviour

- If trapped, get to a front facing room if possible
- Close the door & block gaps
- Crawl on the floor to open a window & shout for help
- If you can, telephone the Fire Brigade

If the smoke and heat become too dangerous then: -

- Drop pillows, sheets, etc. from the window to give a soft landing
- Climb out feet first and to arms length
- Hang & drop as a last resort

Escape Plans

- Plan your escape route now
- Inform everyone of escape routes
- Keep escape routes clear of obstruction

Fire Resistant Furniture

- Furniture manufactured after 1988 should conform to safety regulations

Firefightinq Equipment

- Fire blankets to be correctly sited
- Is the householder aware of how to use their extinguisher?

Fires & Heaters

- Do not sit, stand or place furniture too close, be at least 1m away
- Don't sight mirrors over fireplaces
- Use a fire guard, but never dry clothes on them

Obstructions

- Keep stairways and exit routes clear for escape.

Smoke Alarms

Have a minimum of one per floor in your property
Test the alarm weekly

- Change the battery annually.

Vacuum twice annually
Look for BS kitemark
Don't fit in kitchens, bathrooms or garages

Smoking Materials

- Do not leave matches or lighters in reach of children
- NEVER smoke in bed
- Empty ashtrays outside at night

Figure 4.9 - Northumberland Fire and Rescue Service HFSC Form (v2.0)

NORTHUMBERLAND FIRE AND RESCUE SERVICE HOME FIRE SAFETY CHECK FORM				
Date of receipt/referral:		Date of visit:		
Premises ID:		Job No:		

DATA PROTECTION – YOU MUST ADVISE THE OCCUPANT OF THE FOLLOWING
The information you provide will be stored electronically by Northumberland Fire and Rescue Service (NFRS). The information will be used for research and targeting of fire service resources and may be shared with other public sector organisations involved in Community Safety partnerships with NFRS.

CONTACT DETAILS (*essential)

Title *		Forename *		Surname *	
Address *					
Town *					
Postcode *		Contact Telephone * Number / Mobile Number			
Email Address					
Gender (please tick)	Male		Female		
Preferred contact method (tick all that apply)	Post		Telephone	Email	

PARTNER AGENCY DETAILS (Only to be completed by partner agencies on behalf of NFRS)

Organisation name							
E-mail/Telephone							
Contact Name							
Type of Partner (circle one)	Education	Home Improvement Agency	Housing	Primary Care Trust	Social Services	Voluntary Sector	Other

REASON FOR INCOMPLETE HOME FIRE SAFETY CHECK

Unable to contact		No longer required		Occupier not in	
Other (state)					

RECORD OF ATTEMPTED CONTACT

1	DATE:		TIME:		METHOD:	Phone / Letter / Hse Call	Who by		Leaflet left	
2	DATE:		TIME:		METHOD:	Phone / Letter / Hse Call	Who by		Leaflet left	
3	DATE:		TIME:		METHOD:	Phone / Letter / Hse Call	Who by		Leaflet left	

DWELLING TYPE (select one)

Detached House		Semi Detached House		Flat	
Terraced House		Caravan		House Boat	
Bungalow		Sheltered Accommodation			
House In Multiple Occupation (HIMO)					

TENURE

Owned (sole)		Owned (shared)		Rented (Sole)		Rented (shared)		Private landlord?	

Total persons living in the house		specific group (tick all that apply)	Single Parent with dependant children ☐	Person over 65 ☐
			Children under 5 ☐	Disabled Person ☐

OCCUPANCY

	Disability or Impairment			
	None	Sight	Hearing	Mobility
Under 1				
1 – 4				
5 – 15				
16 – 29				
30 – 44				
45 – 59				
60 – 64				
65 – 74				
75 and over				
Lone Parent				

ETHNIC MONITORING (Ethnicity of person requesting HFSC or primary occupant)

White	British		Mixed	White and Black Caribbean	
	Irish			White and Black African	
	Other white background			White and Asian	
	Other state			Other mixed	
Asian or Asian British	Indian		Black or Black British	Caribbean	
	Pakistani			African	
	Bangladeshi			Other Black	
	Other Asian		Chinese or other Ethnic Group	Chinese	
Not stated				Other Ethnic Group	

Communication / Language (please tick)	English		Other (state)		Literacy / Learning Difficulties	
How referral was received (please tick)	Self referral		Agency referral		Offered by NFRS	
Equipment installed on this visit (please tick)	Smoke alarms		Automatic Fire Suppression System			
Numbers installed this visit (insert number)	Smoke alarms 10 year		Deaf alarm			

Existing Detectors (insert numbers)		Battery	Mains	Bad Sites
	Active			
	Inactive			
	Deaf Alarm			

Other equipment provided (Tick)				
	Deep fat fryer		Message in a bottle	
	Extension Leads		European Adapters	

HOME FIRE SAFETY RISK ASSESSMENT						
OCCUPIERS / PROPERTY	Value	**Total**	**HEALTH / IMPAIRMENT**		Value	**Total**
Single adult only	1		Mobility Impairment	Wheelchair	3	
				Walking aid	2	
				No aid required	1	
Person over 80	2		Hearing Impairment (reduce to value of 1 if deaf alarm installed)		2 / 1	
Person over 65	1		Visual Impairment		3	
Single parent with dependant children	2		Mental Health Impairment		3	
No. of Smokers in household	2		An occupier is bed bound (immobile)		5	
Household is in shared property (HIMO)	2		Not receiving required support or assistance (Care Plan) if one of the above		3	
Household is in rented property	2		Medication affecting alertness or mobility		3	
Evidence of excessive Fire loading	3		Oxygen and/or gas cylinders		3	
Restricted exits	3		Difficulty contacting help		3	
Electrical issues (overloading / wiring)	3		Occupier requested intervention for young person playing with fire – refer to CSA		3	
Open Fire (including gas)	2					
Use of Chip Pan	3		Known Alcohol Issues		3	
			Known Substance Misuse		3	
Suppression system present	-50		Additional factor(s)		16	

Final Total		**Fire Risk Assessment Rating**		
		VERY HIGH RISK (16+)	**HIGH RISK (11-15)**	
		MEDIUM RISK (7-10)	**LOW RISK (4-6)**	**VERY LOW RISK (0-3)**

OTHER HAZARDS (please tick)			
Previous Fire(s)		High Fire Loading	
Smoking in Bed		Cooking Hazards	
Candle Use (decorative)		Grill Pan Use	
Candle Use (lighting)		Heating Misuse	

Other issues		
Referral Required	Fire Safety Officer	
	Fire Control	
	Community Safety Academy	
State referral reason(s) and contact details of care manager		

AGENCIES INVOLVED IN HOUSEHOLD (e.g. Age Concern, Social Services, Police, Princes Trust, Safer Communities, Home Help, Migration Matters, Job Centre Plus, RNIB)			
VISIT DETAILS			
Declined Advice		Fire Safety Booklet left	
FIRE SAFETY ADVICE			Advice
DETECTION	**Occupiers are 6 times more likely to die in a fire if they don't have a working smoke alarm fitted in the home**		
	Test your smoke alarm every week (Demo)		
	Replace the battery every year (Manufacturers info)		
PREVENTION	**Cooking related fires** - Over 50% of fires start in the kitchen, of which nearly 30% are chip pan related – chip pan safety, cooking recommendations i.e. don't leave pans unattended, keep pans out of reach, tea towels and cloths away from the cooker/hob, electrics		
	Electrical equipment – Check the fuse, replace damaged equipment and wires, don't overload sockets – use of adaptors / extension leads and don't run cables under carpets, appliances left on, warning signs, electric blankets		
	Portable heaters – keep clear from curtains / furniture, secured		
	Smoking materials - Keep matches / lighters away from children, put out properly and dispose of smoking materials safely, don't smoke in bed and use suitable ashtray.		
	Candles – Never leave unattended, correct holders and only use in safe place not near combustible materials, keep out of reach of children		
	Fireplaces – Correct use of fireguard, mirrors and furniture, drying clothes and risk of catching fire		
	Housekeeping and fire loading – Rapid spread of fire and blocking means of escape, appropriate storage		
	Alcohol and medication – Warn that these can seriously inhibit the occupiers ability to escape a fire, escape plan considerations		
	Night time routine – Electrics, doors closed, clear escape route, extinguish candles/cigarettes, empty ashtrays safely, switch off fires/heaters		
ESCAPE	**Escape plan** – Talk through escape plan, door/window keys, exit routes clear and all residents aware of plan		
	If trapped – provide guidance if escape routes are blocked		
	How to call the Fire Service – How and where from		
Other issues (in relation to occupiers and their circumstances)			

Name of Persons/Watch carrying out Home Fire Safety Check			**Duration of visit (mins)**		
			Travel time		
Station/Department			**No. of NFRS personnel involved in HFSC**		
Service numbers of personnel attending (optional for NVQ evidence purposes)					

ST	*10/03/2010* CFRMIS HFSC Form v2.0

Why do you need a smoke detector and why do you need a HFSC?
Officers conducting HFSCs and attending community events educate members of the public of the importance of having a working smoke alarm and in requesting a HFSC. The following sobering facts presented to the public:

- If you don't have working smoke alarms you are twice as likely to die in a fire.
- 80% of fire fatalities have died before the Fire and Rescue Service have been called.
- Over 50% of home fires are caused by cooking.
- Five fires a day are started by candles.
- Every 3 days someone dies from a fire caused by a cigarette.
- Faulty electrics cause 7,000 house fires per year.

Common risks identified during HFSCs by NFRS
Some of the common risks identified during HFSCs include incorrect use of electricity, for instance, plugs of multiple appliances being plugged into a single socket or the use of non-recommended three-point multi-plug adaptor (a square adaptor with three points for plugs, as shown in Figure 4.10, overleaf). NFRS and other fire and rescue services in the UK recommend a trail multi-plug adapter, rather than a square three-point multi-plug adaptor.

Also, HFSCs may identify high fire loading which can considerably increase the risk of a serious fire within a property (an example of which is shown in Figure 4.10, overleaf).

On many occasions occupants are unaware that something within their home poses a fire risk and it is only by having a HFSC, and by talking face to face with an officer from NFRS, that they realise how they can make their home safer.

Enhanced HFSCs
It may be identified, either through a referral or the risk assessment completed during a standard HFSC, that a particular property requires an enhanced HFSC. Enhanced HFSCs are more detailed and thorough than the standard HFSC and are completed for those who are at greater risk. In some circumstances, the standard smoke detector may not be appropriate for an individual property, for instance if occupants are hard of hearing. In such cases, alternative detection devices are installed, such as vibrating smoke alarms.

Enhanced HFSCs usually involve good close partnership working between NFRS officers and other local organisations. This partnership working is vitally important for ensuring the safety of occupants living in high risk households.

Figure 4.10 – Common Fire Risks that have been identified during Home Fire Safety Checks by Northumberland Fire and Rescue Service

Incorrect or inappropriate use of electricity

High fire loading

4.7 Northumberland Fire and Rescue Service's Schools Education Programme

This presentation was delivered by Nina Livings of Northumberland Fire and Rescue Service

Presentation overview
Nina explained that education within schools is an important part of Northumberland Fire and Rescue Service's work. NFRS has a responsibility and vested interest in educating children to behave safely and responsibly and to educate them of possible dangers and risks with regards to fires and other safety issues. Nina explained the national context regarding schools education and the local context within Northumberland. Nina then provided an overview of NFRS's schools education programme. The presentation culminated with a demonstration of some of the materials that have been designed and developed by NFRS for use by teachers with classes of children studying at Key Stage 1 level (Years 1 and 2, ages 5-7 years old).

National context regarding school education
In the UK Government White Paper Government White Paper *"Saving Lives: Our Healthier Nation"* (1999), the UK Government set a target to reduce death rates from accidents by one fifth and to reduce serious injuries from accidents by one tenth by 2010.

3 specific risk groups have been targeted in order to achieve this aim:-

- Children and adolescents
- Young adults (especially males)
- Older people

There are other key documents that provide context and guidance with regards to national priorities and agendas concerning accidental fire risk and school education:

- According to *CAPT: Child Prevention Trust* (2007), house fires cause most accidental deaths of children in the home.
- Fire and Rescue Service National Framework 2008-11 makes it a priority to reduce accidental fire related deaths in the home.
- According to the Audit Commission report *Better Safe than Sorry* (2007), Fire and Rescue Services are recognised as key partners for delivering unintentional injury programmes due to their statutory duty to undertake community based preventative work.

Northumberland context regarding school education
There is a partnership of public sector organisations in Northumberland called the Northumberland Strategic Partnership (NSP). The aim of this partnership is to improve quality of life within Northumberland. NSP aims to improve quality life in four key ways:

- Economic Prosperity
- Health Care and Well Being
- Place Shaping
- Stronger Communities

Within the national and local contexts just described, NFRS has designed and developed a schools education programme in order to better educate children in Northumberland of the

risks of fire and accidents. The overall aim is to make children safer and reduce the number of deaths and injuries to children from fires and other accidents.

Overview of Northumberland Fire and Rescue Service's Schools Education Programme (SEP)

NFRS has developed education programmes for schools to deliver. Where required, NFRS will provide additional support; however, the programme has been designed so that teachers can deliver material to their classes with little need for further assistance.

The SEP has been designed so as to address a number of important fire and rescue safety themes but in a way which also satisfies National Curriculum requirements (see Table 4.5, below). The National Curriculum was established in 1989 to ensure the same standards of teaching and learning across the country. The National Curriculum covers learning for all ages between 5 and 16 years old and stipulates:

- Which subjects should be taught;
- The knowledge, skills and understanding each child should achieve in each subject (according to their age);
- Targets – so that teachers can measure how well each child is doing for each subject;
- How information on each child's progress should be passed onto their parent/guardian.

By designing the programme in line with the National Curriculum, teachers need not feel that delivering elements of, or even the entirety of the programme, represent an additional workload. The programmes are in fact a tool to assist with the delivery of key curriculum requirements. Furthermore, each programme is free of charge and fully developed with necessary resources and full guidelines.

Table 4.5 – NFRS Schools Education Programme Addresses Fire and Rescue Service Themes while Satisfying National Curriculum Requirements

Fire and Rescue Service Themes	National Curriculum Requirements
Home Fire Safety	Mathematics
Hoax Calls	English
Deliberate Fires	Information and Communication Technology (ICT)
Road Safety	Citizenship
Water Safety	Personal Social Health and Economic Education (PSHE)
Farm Safety	

NFRS's SEP has been developed to include different education packages for different age groups, based on the national curriculum requirements for the different Key Stages. The National Curriculum is divided into Four Key Stages (see Table 4.6, overleaf) that children are taken through during their school life. It is useful to provide an example to illustrate how the SEP addresses both fire and rescue themes and National Curriculum requirements. The citizenship requirement states children should develop a healthy and safer lifestyle. At Key Stage 1, this requirement is married with key fire and rescue safety

themes through education of rules for, and ways of, keeping safe, including basic road safety, and about people who can keep them safe.

The SEP has been designed to incorporate a spiral curriculum. This means that the same topic is revisited at increasing levels of sophistication over a period of years, i.e. over the Four Key Stages. A spiral curriculum is based on the principle that efficient and effective learning is achieved by overlaying multiple layers or multiple exposures. A spiral curriculum ensures that the same topic or the same idea is encountered many times, each time slightly differently, or probing more deeply.

Table 4.6 – Key Stages of the National Curriculum in the UK

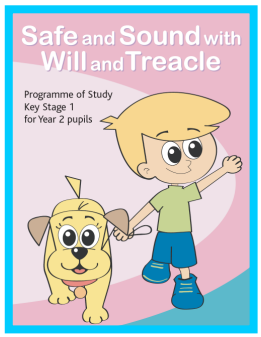
Stage	Year Groups	Age
Foundation	Nursery Reception	3-4 years 4-5 years
Key Stage 1	Years 1 & 2	5-7 years
Key Stage 2	Years 3 & 4 Years 5 & 6	7-9 years
Key Stage 3	Years 7 - 9	11-14 years
Key Stage 4	Years 10 & 11	14-16 years

Importantly, NFRS's SEP also incorporates an emphasis on life skills, whereby the programme aims to increase self-esteem through educationally developing knowledge, understanding, skills, attitudes and feelings.

Demonstration of Northumberland Fire and Rescue Service's Schools Education Programme

Nina concluded her presentation with a demonstration of some of the resources that have been developed for teachers to use to deliver the SEP. The resources at Key Stage Level 1 incorporate two cartoon characters called Will and Treacle. Some of the specific resources provided to Key Stage 1 teachers include a puppet, story book, and an interactive CD-Rom. Nina provided a walk-through of the CD-Rom and demonstrated the safety quizzes contained within the CR-Rom. Further information about Will and Treacle and the SEP is provided in Figure 4.11 (overleaf).

Figure 4.11 – Overview of Northumberland Fire and Rescue Service's Schools Education Programme for Key Stage 1 (Years 1 and 2)

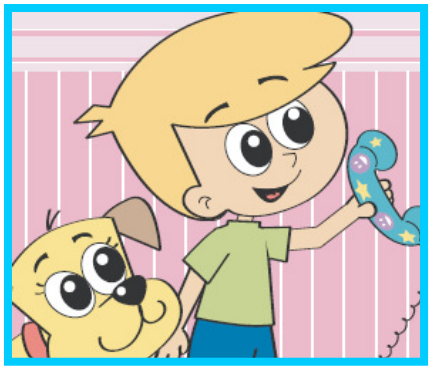


Using the characters of six year old Will and his new puppy, Treacle; safety themes are explored through a number of stories. Being a daring and excitable little puppy, sometimes Treacle gets herself into a predicament in which Will has to teach her a safety message so that she won't make the same mistake again.

There are six stories, covering the areas of **home fire safety**, **the emergency number**, **playing with matches and lighters**, **road safety**, **farm safety**, **water** and **sun safety**. To accompany the story book is a puppet of Treacle which teachers can utilise in an imaginative way with the class. There is also an interactive CD Rom containing all the stories; ideal for interactive whiteboards.

Animated and narrated in a lively and engaging way that children will respond to, the CD Rom also contains simple consolidation activities to encourage the learning of key messages. All resources fit nicely into a bright red drawstring bag. This programme is aimed at Year 2 pupils and helps class teachers to deliver against curriculum requirements for Citizenship, PSHE and ICT.

A new storybook of Will and Treacle stories has also been developed and covers the themes of **Summer Safety**, **Burns and Scalds**, **Road Safety**, **Bonfire Night Safety**, **Christmas Safety** and **Bedtime Routine**. This storybook is available for Fire and Rescue Service personnel to use when engaging with schools and each story will be accompanied by a session to expand and consolidate learning.



4.8 Accidental Fire Risk in Fredrikssund-Halsnæs and Denmark

This presentation was delivered by Kim Lintrup, Chief Fire Officer of Frederikssund-Halsnæs Fire and Rescue Department

Determining the number and type of fire units within a given locality in Denmark
Prior to the introduction of risk-based dimensioning[40], population was the sole criterion used to determine the number and type of fire units stationed within a particular locality in Denmark. The following scale was used:

- Up to 20000 inhabitants: 1 fireunit
- 20000-30000 inhabitants: 1 fireunit and 1 reduced fireunit
- 30000-50000 inhabitants: 2 fireunits
- 50000-60000 inhabitants: 2 fireunits and 1 reduced fireunit
- 60000-100000 inhabitants: 3 fireunits
- 100000-200000 inhabitants: 4 fireunits.

The system has now been changed to better appreciate the risks posed within particular localities. After all, we now know that population size is just one of a plethora of factors which can influence fire risk within a given locality. The new criteria that has been developed to determine the number and type of fire units required within a particular locality now states:

1) In urban areas with a greater number of buildings with more than 3 storeys or more industrial buildings and an expanded watersupply the fire unit consists of 1 firetruck and 1 turntable ladder.

2) in urban areas without higher settlements or major industrial settlement and an expanded watersupply the fireunit consists of 1 firetruck and 1 water tanker.

3) higher in urban areas without settlements or major industrial sprawl and without an expanded watersupply the fireunit consists of 1 firetruck and 1 water tanker and 1 hosetruck

Risk Reduction, Prevention and Preparedness by Municipal Fire and Rescue Seervices in Denmark
All municipal fire services in Denmark must be able to provide in relation to local risks sound prevention, mitigation and remedial action against damage to persons, property and environment by accidents and disasters, including acts of war.

The municipal fire brigade must identify and analyze local risks to be considered for the dimensioning of an emergency (risk).

The basis for preparedness is achieved through the municipality defining the level of the municipal emergency preparedness task performance (service) based on risk profiles.

[40] Risk-based dimensioning will be discussed in further detail later in this chapter. Risk-based dimensioning was also discussed during the first ANSFR Project workshop held in Northumberland. For further information regarding the Northumberland Workshop, please download a copy of the Northumberland Handbook from the following website http://www.northumberland.gov.uk/default.aspx?page=5596, or visit the ANSFR Project website at www.fire-risk.eu .

The municipality defines the emergency rescue organization, business, design and equipment based on risk profiles and service levels.

Risk-based dimensioning (a diagram of which is shown in Figure 4.12, below) is used to guide and inform the risk assessment and management processes that municipal fire and rescue services must complete in order to prevent and reduce fires and to prepare to respond to fires and other emergency incidents.

Figure 4.12 - Risk-Based Dimensioning in Denmark

Risk Identification

Risk identification is the first key stage of the risk-based dimensioning process. In short, risk identification should include information collection, involving correct resources and persons and brainstorming activities.

During the risk identification stage, municipal fire and rescue services should:

- provide an overview of what information is relevant and how much information to be used
- provide an overview of how the relevant information can be found
- provide inspiration for the resource persons who can contribute to gathering information and whom must participate in the further work
- Structure the collection and handling of information

There are a number of so-called inspirations that can be used by data gatherers to comprehensively identify risks within a locality. Below is a list of some examples:

- Incident/reaction data
- BBR information
- Statistics in general

- Literature and reports
- Meteorological data
- Overview of electricity, gas, water and sewers
- Companies / fire inspection databases
- ODIN
  Consultations with experts
- Contingency
- Environmental information about sensitive areas and businesses
- City maps, maps of land use
- Municipality Maps
- Reconnaissance - a tour of the municipality
- Visits to specific companies
- The Internet, for example

Reaction data statistics can be very useful for determining the risks within a locality. Some of the most important factors/variables that can be analysed during the risk identification stage include, but are not limited to:

- Distribution of reaction types
- Distribution of years / weeks / days
- Reaction Types by day
- Development of number of call outs
- Personal life
- Fire Deaths
- Blind, false and real alarms

Another key element of the risk identification stage, and indeed the whole process of risk dimensioning, is to ensure that relevant persons are involved in the process. There are a number of different organisations that are stakeholders in public safety that should be involved in the process of risk identification by a municipal fire and rescue service (see Table 4.7, below).

Table 4.7 - Involvement of relevant resource persons in risk identification in Denmark

Relevant persons	Information partners can contribute
Emergency People from own and neighboring municipalities (Falck)	Experience and preparedness technical knowledge of risks, emergency statistics, etc.
Technical management, environmental authorities and similar	Information on which companies in the municipality covered by the Environment Ministry's order approving the list of companies Planning Parameters for municipal water and heat supply, etc.
Police	Knowledge of risk concerning. terrorism, crime, etc.
Representatives from various objects such risk. Airport or hospital	Technical knowledge and experience in connection with these objects

Prevention activities can provide knowledge of:

- The risks that exist within a municipality
- What risks can arise when municipal planning and the world is changing
- What types of incidents can happen

During brainstorming activities, the following list of events could be identified as potential risks within any given municipality:

- Fire
- Explosions
- Collapse in / near buildings
- Collapse in nature (eg landslide v. cliffs)
- Significant weather events (drought, rain, heat, cold)
- Releases of hazardous substances (oil, chemicals, radioactive substances)
- Disruption of supply (water, gas, electricity)
  Traffic accidents (plane, train, ship, car expenses etc.)
- Drowning
- Crash of aircraft, helicopters, satellites, etc.

Risks Identified in Frederikssund-Halsnæs

In Frederikssund-Halsnæs, reaction/incident statistics are analysed to identify:

- An overview of the accidents happening in Frederikssund-Halsnæs Municipalities
- Where accidents frequently occur and
- What extent are the accidents that have occurred

Kim then presented specific statistics highlighting the highest risks within the Frederikssund-Halsnæs area. According to the data shown in Figure 4.13 (overleaf), fires occur most frequently in the following environments: residential (beboelse), places of multiple occupancy (steder med mange mennesker – hovedsageligt natophold), infrastructure (infrastruktur) and naturbrande (wildfires/nature fires). When the category of residential fires is divided into sub-categories, it is apparent that the most frequent type of residential fire is a two-level villa or townhouse (2-plansvilla og rækkehus). Following this, the next most frequent types of residential fire are (see Figure 4.14, also overleaf): a building of more than two storeys (etagebyggeri over 2 sal), sommerhus (summer house) and allotments, car ports and sheds (kolonihaver/carporte/udhuse).

Figure 4.13 – Incidents in Frederikssund-Halsnæs by Main Categories of Risks

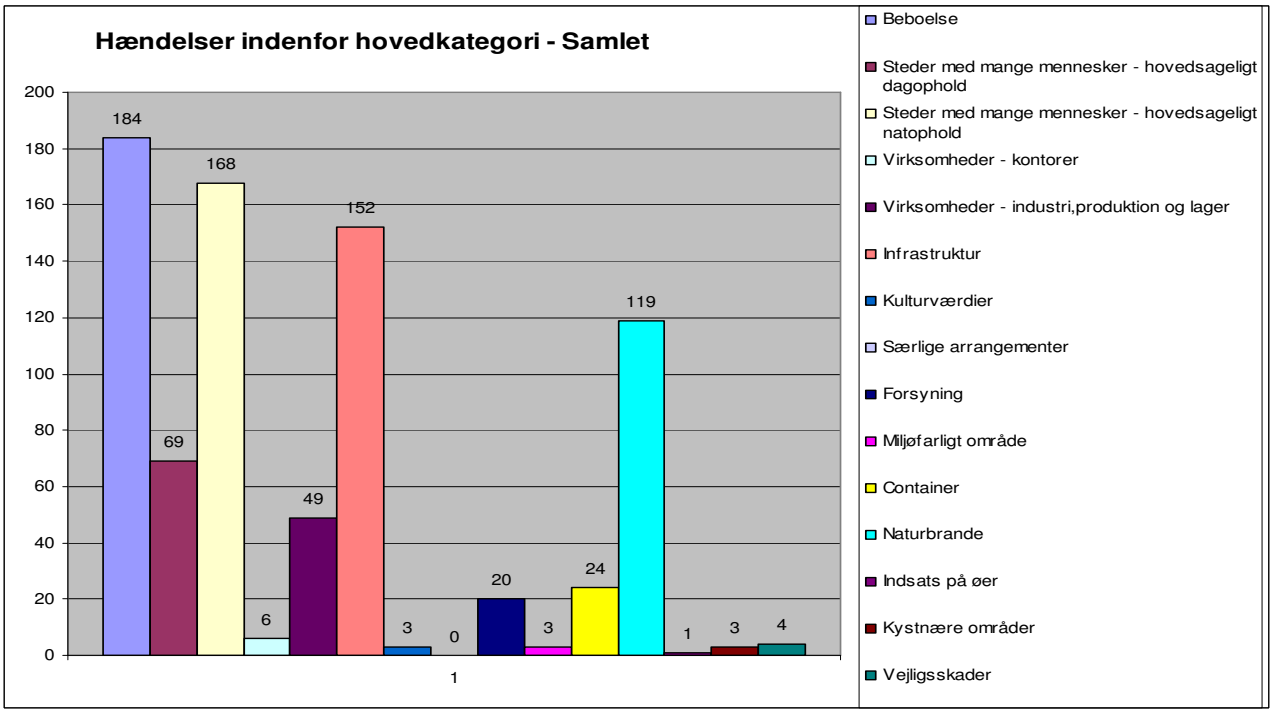
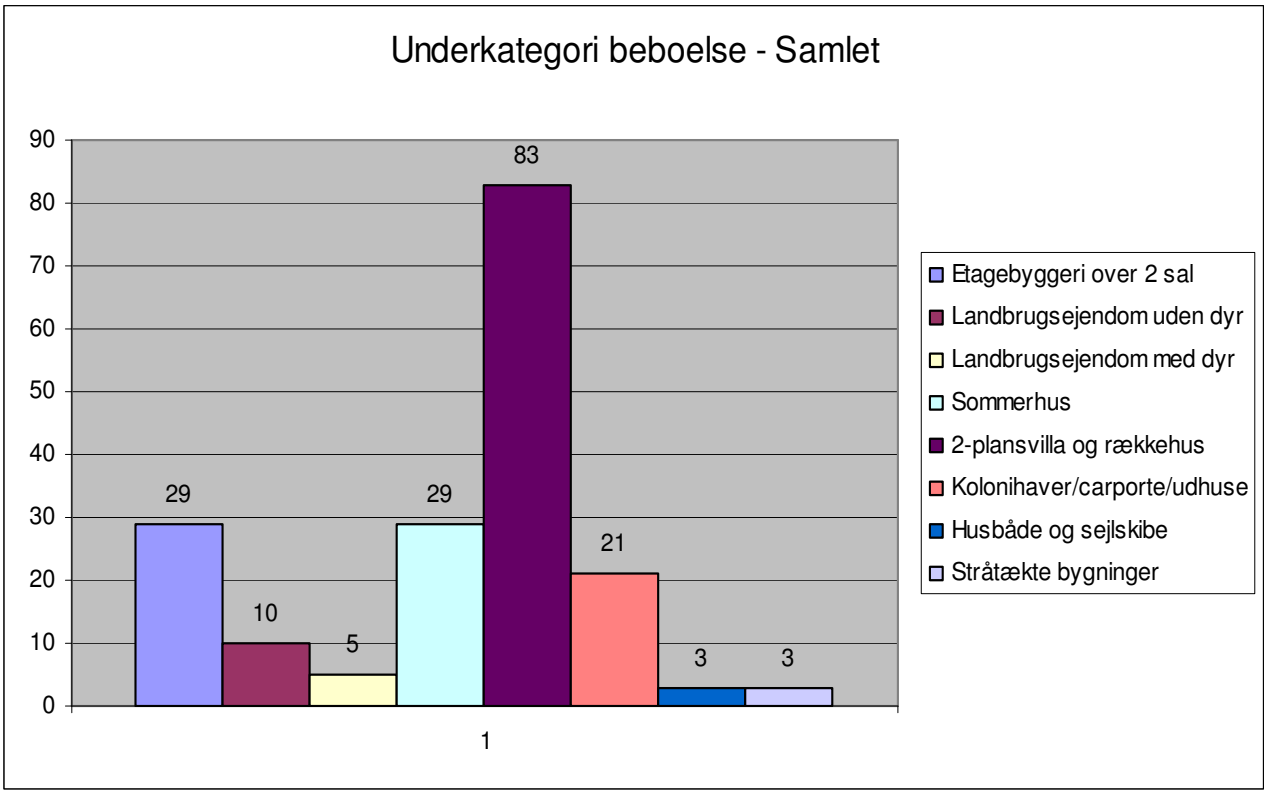


Figure 4.14 - Incidents in Frederikssund-Halsnæs by Sub-categories of Residential Buildings



Risk Analysis
Once risks have been identified through data gathering, involvement of relevant persons and brainstorming activities, fire and rescue service must then decide how the identified risks can be assessed and appropriately managed. Fire and rescue services must also decide how to plan for such scenarios.

Risk analysis is the next stage of risk-based dimensioning. Risk analysis comprises of three key elements:

- Risk matrix
- Scenario Analysis
- Capacity analysis

A risk matrix is used to define the likelihood (i.e. frequency) and impact (i.e. consequences) of a particular risk. Kim described two actual risk matrices that have been developed. The first matrix was for a residential construction of more than two floors and is presented in Figure 4.15 (overleaf). The second matrix was for car and bus traffic and this is presented in Figure 4.16 (on page 66). Each of the matrices outlines a variety of different scenarios and the likely resultant consequences of such scenarios.

Scenario analysis then involves detailed analysis of individual scenarios, including the development of a description for each scenario. Frederikssund-Halsnaes Fire and Rescue Service has analysed 84 different scenarios to date.

In order to ensure that the fire and rescue service has the capacity to adequately respond to an identified risk, scenario analysis is accompanied with a process of capacity analysis. Analysis is conducted into how scenarios can be prevented and the response capacity that would be required should the scenario still occur.

Figure 4.15 – Frederikssund-Halsnæs Risk Matrix for Residential Building of more than Two Storeys

Hyppighed - Rate							
	> 10 pr. år	5					
	> 1-10 pr. year	4	Røg fra trappe, lejlighed mv. *Smoke from the staircase, apartment, etc..*	Brandalarm Røg fra trappe, lejlighed mv. Ild/brand *Fire alarm* *Smoke and fire from the staircase, apartment,*	Røg fra trappe, lejlighed mv. Ild/brand Eftersyn Brandalarm *Smoke from the staircase, apartment, etc.* *Fire* *Inspection* *Fire alarm*	Ild/brand *Fire*	
	0,1-1 pr. year	3	Røg fra lejlighed Oliespild Dyreredning Smoke from apartment Oil spill Animal Rescue	Røg fra lejlighed Ild/brand Kemikalieudslip Fastklemning *Smoke from apartment* *Fire* *Chemical spills* *Jammed persons*		Røg fra trappe, lejlighed mv. Ild/brand **S: Lejlighedsbrand med savnet person,** *Smoke from the staircase, apartment, etc.* *Fire* ***S: Apartment Fire - missing person***	
	0,01-0,1 pr. year	2	Fare for sammenstyrtning *Danger of collapse*				
	< 0,01 pr. year	1					
			1	2	3	4	5
Relativ Relative			Ubetydelig Negligible	Mindre skader Minor injuries	Varige skader Lasting Damage	Store skader Large Damage	Kritisk/ katastrofal Critical / catastrophic
Mennesker People			Ubetydelige skader Negligible damage	Mindre kvæstelser, få personer Minor injuries to a few people	Mere end fem kvæstede More than five injured	Få livsfarligt kvæstede/ døde Get fatally injured / dead	Flere/mange døde Several / many dead
Værdier Values			< 10.000 kr.	10.000 - 100.000 kr.	100.000 - 1 mio. kr.	1-10 mio. kr.	> 10 mio. kr.
Miljø Environment			Ubetydelig påvirkning Negligible impact	Større påvirkning Greater influence	Risiko for varige skader Risk of permanent damage	Mindre varige skader Less lasting damage	Større varige skader Major permanent harm
Samfund Community			Ingen/mindre forstyrrelser. Forsinkelse på drift på < 1 dag None / minor faults. Delay in operation at <1 day	Kortere forstyrrelser. Forsinkelse af drift på < 1 måned Shorter disorders. Delay of operation at <1 month	Betydelige forstyrrelser. Forsinkelse af drift på > 1 måned Significant disturbances. Delay of operation of> 1 month	Alvorlige driftsforstyrrelser. Forsinkelse af drift på > 3 måneder Severe business disruption. Delay of operation of> 3 months	Kritisk for opretholdelse af funktion. Critical for maintaining function.
			Konsekvens - consequences				

Figure 4.16 – Frederikssund-Halsnæs Risk Matrix for Car and Bus Traffic

Hyppighed - Rate							
	> 10 pr. år	5	Småspild **S: Småspild** Small gasoline and oil spills ***S: Small gasoline and oil spills***				
	> 1-10 pr. year	4		Bil- og busbrand Trafikuheld med personskade *Fires in cars and buses* *Traffic accidents with injuries*	Bil- og busbrand **S: Ild i bil** *Fires in cars and buses* ***S. Fires in cars***	Trafikuheld med personskade **S: Trafikuheld med fastklemt** *Traffic accidents with injuries* ***S: Traffic accidents with trapped***	
	0,1-1 pr. year	3					
	0,01-0,1 pr. year	2					
	< 0,01 pr. year	1					
			1	2	3	4	5
Relativ Relative			Ubetydelig Negligible	Mindre skader Minor injuries	Varige skader Lasting Damage	Store skader Large Damage	Kritisk/ katastrofal Critical / catastrophic
Mennesker People			Ubetydelige skader Negligible damage	Mindre kvæstelser, få personer Minor injuries to a few people	Mere end fem kvæstede More than five injured	Få livsfarligt kvæstede/ døde Get fatally injured / dead	Flere/mange døde Several / many dead
Værdier Values			< 10.000 kr.	10.000 - 100.000 kr.	100.000 - 1 mio. kr.	1-10 mio. kr.	> 10 mio. kr.
Miljø Environment			Ubetydelig påvirkning Negligible impact	Større påvirkning Greater influence	Risiko for varige skader Risk of permanent damage	Mindre varige skader Less lasting damage	Større varige skader Major permanent harm
Samfund Community			Ingen/mindre forstyrrelser. Forsinkelse på drift på < 1 dag None / minor faults. Delay in operation at <1 day	Kortere forstyrrelser. Forsinkelse af drift på < 1 måned Shorter disorders. Delay of operation at <1 month	Betydelige forstyrrelser. Forsinkelse af drift på > 1 måned Significant disturbances. Delay of operation of> 1 month	Alvorlige driftsforstyrrelser. Forsinkelse af drift på > 3 måneder Severe business disruption. Delay of operation of> 3 months	Kritisk for opretholdelse af funktion. Critical for maintaining function.
			Konsekvens - consequences				

Results of Risk Analysis in Denmark
Analysis of available data reveals that there are some specific risks in Denmark with regards to accidental fires.

In Denmark, the elderly are at high risk of experiencing or being a victim of fire, while children and young people are a much lower risk group. The following two sub-sections will present some more detailed statistics concerning fire risk for these two social groups.

The Elderly and Fire Risk in Denmark
Based on statistics from Denmark concerning of older people and fire the following can be highlighted:

- The risk of dying in a fire are respectively two (67-79 years) and five (80 years or more) times higher for the two age groups as the normal risk.

- Generally speaking, most persons dying in a fire live alone. This is particularly pronounced for the two analyzed age groups shown above.

- On average 14 persons died in fires each year in the age group 67-79 years, with an average of 15 persons in age group 80 years or more. There is a big variation in the annual numbers of fire deaths for the two age groups. This apply to both when we are looking at age and gender categories.

- Women are over-represented with fire deaths in the fire statistics for the two age categories compared with the gender distribution of the total number of fire deaths.

- Smoking is the main fire cause for all age categories. Particularly high is the fire deaths for women between 67-79 years, while it is particularly low for women ages 80 or over. For men is the fire cause smoking there represents a higher proportion in the analyzed age groups than the overall proportion for all age groups.

- For women aged 80 or over is it that 20% of the reported fire causes belong to the category of candles. This category is not represented at all, in the other study.

- In terms of types of housing, multi-storey buildings are over-represented in the two age categories for men and particularly for women aged 80 or over.

The causes of fires that lead to fire deaths among the elderly are shown in Figure 4.17 (overleaf). The main cause of fire is recorded for all of the sub-age categories of elderly people as smoking (see Figure 4.18, also overleaf). This is the same pattern for male and female elderly persons. Other causes of fire identified within these statistics include: candles, carelessness during cooking, and electrical causes.

Figure 4.17- Elderly People Dying in Fires in Denmark

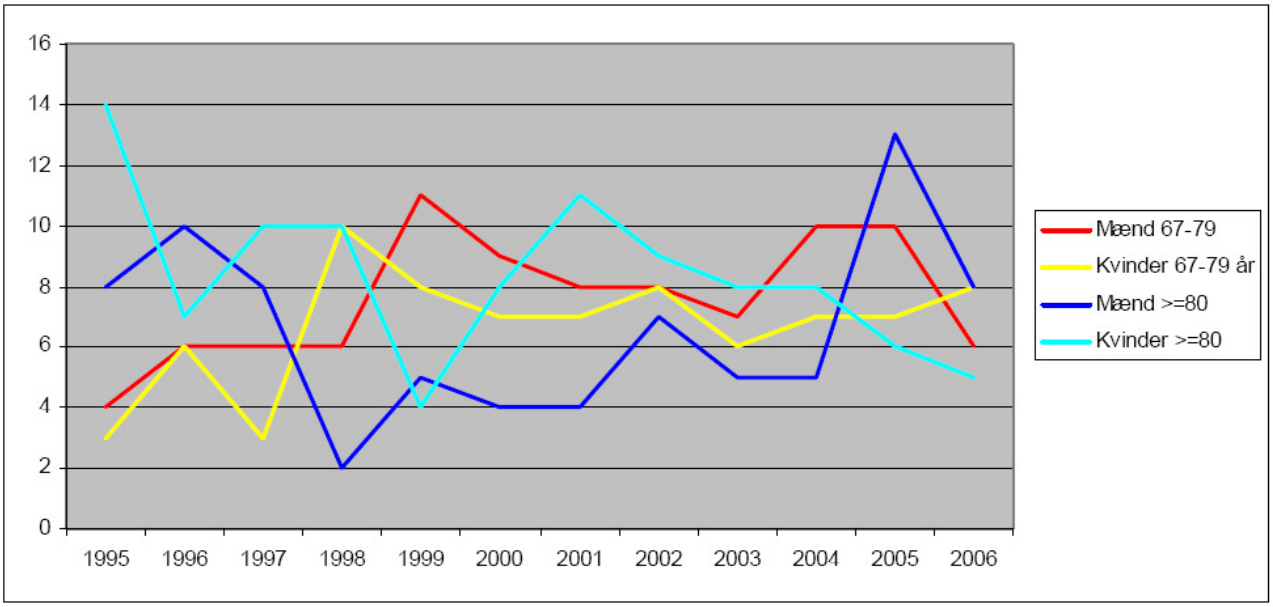
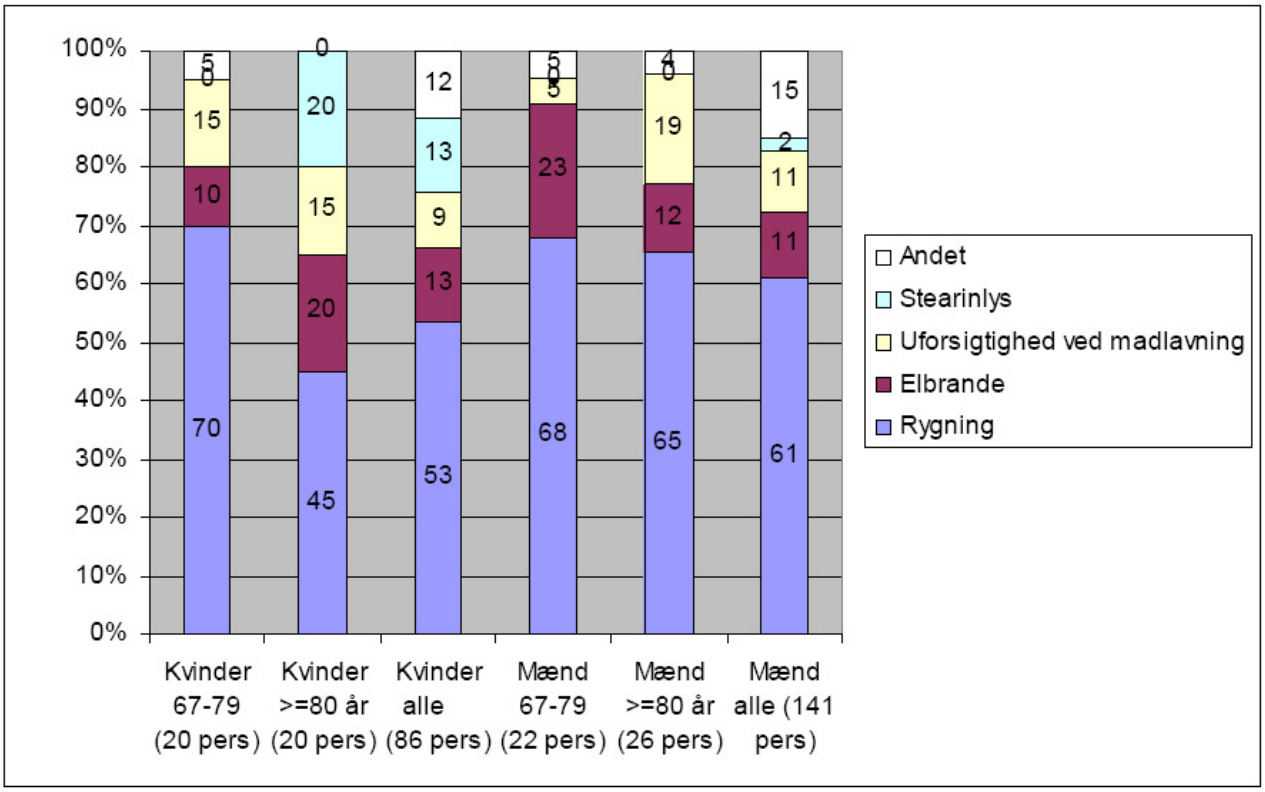


Figure 4.18 - Causes of Fires Leading to Fire Deaths in Denmark, 1995 to 2006



Legend for Figures 4.17 and 4.18 (translation of Danish labels into English):

- Andet = other;
- Stearinlys = candles;
- Uforsigtighed ved madlavning = carelessness in cooking;
- Elbrande = electrical fires
- Rygning =smoking
- Kvinder = female; Mænd = male

Young People and Fire Risk in Denmark
Based on a study of children aged 0-19 years old and fire in Denmark, the following can be highlighted:

- Children are the cause of approx. 500 fires a year, equivalent to approx. 3 percent of the total number of annual fires, where the fire department were called.

- Children injured in fire accidents leads to over 300 visits to the casualty ward in a year - equivalent to 0.14% of all visits in the casualty ward, where children are involved.

- Viewed over the past 7 years, an average of 26 children were put in hospital as a result of damage from fire accidents, representing 0.33% of all admissions to hospital where children are involved.

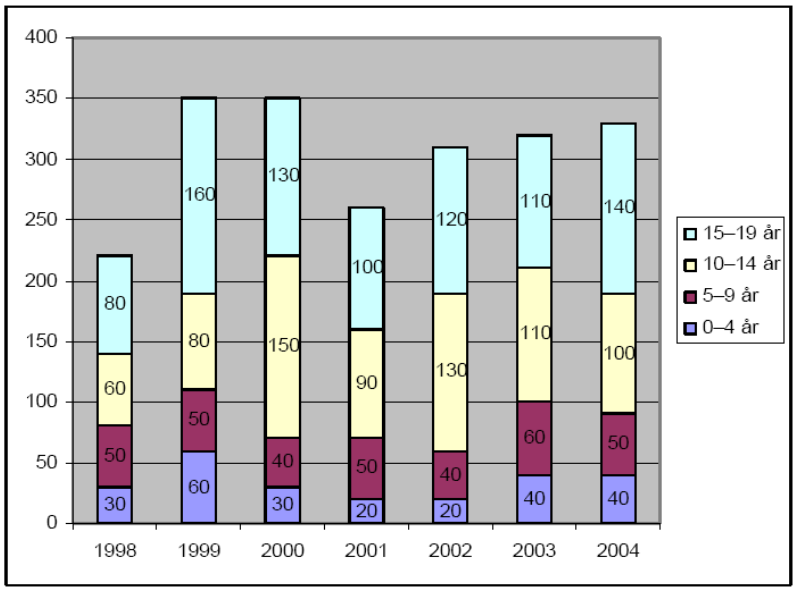
- Children injured in fire accidents is about a sixth part or less compared with other combustion accidents as accidents with hot liquids and accidents with hot objects.

- With fire accidents (category "fire and flames"), it is normal that older children get injured (10-19 years), and it is typically the very young (0-4 years) who are injured in the other combustion accidents (accidents with hot liquids and hot objects).

- Children (under 15 years) occurs with a very small proportion of fire statistics seen over the past 10 years. On average, 4 children die annually in fires - equivalent to less than 5% of all deaths seen over the past 10 years.

Figure 4.19 (below) shows the number of emergency communications as a result of fire for different age groups of young people: 0-4 years, 5-9 years, 10-14 years and 15-19 years. From this diagram it is obvious that older age groups of young people are more frequently mentioned in emergency communications as a result of a fire. So, within the risk category of young people, we can see that older young people are at greater risk of fire than the very young. As mentioned above, the very young are at greater risk of being injured by hot objects and hot liquids than older young people.

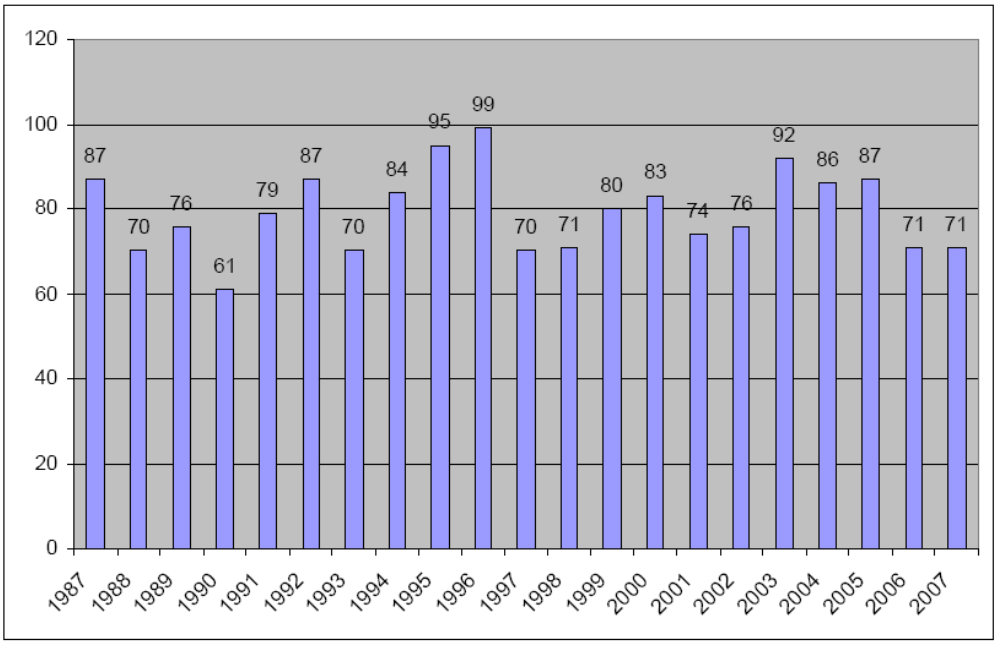
Figure 4.19 - Number of emergency communications in Denmark as a result of fire involving young people



Fire deaths in Denmark and the Nordic Countries

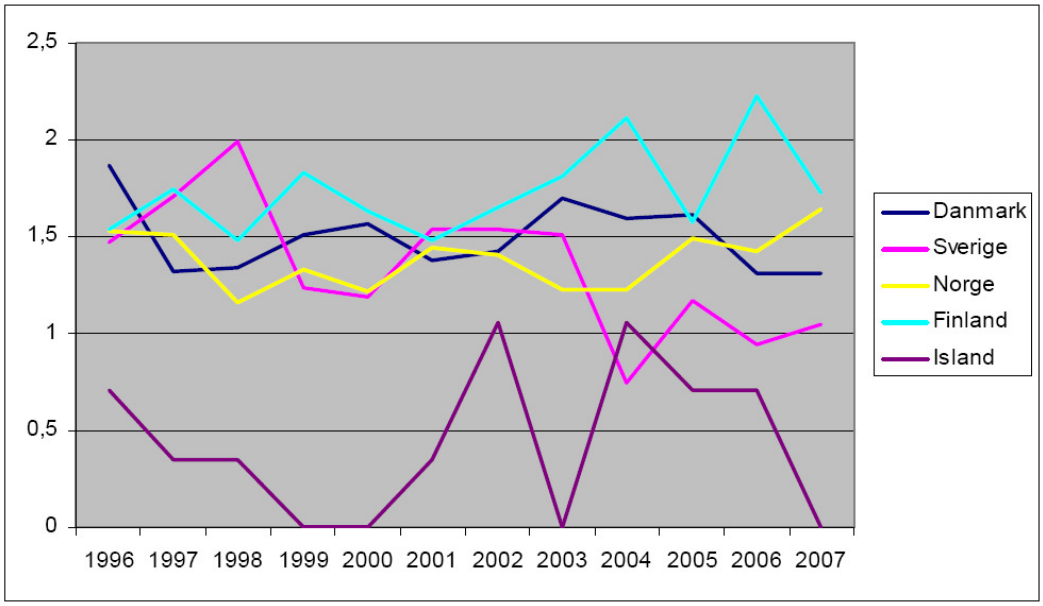
Data concerning the number of fire deaths in Denmark over a ten year period shows that the number of deaths has remained remarkably constant. This consistent trend is clearly illustrated in Figure 4.20 (below). In one way this is a good thing; the number of fire deaths has not increased significantly. In another way this is not a good thing; there have been no significant reductions in fire deaths.

Figure 4.20 - Deaths in Fires in Denmark – 1987 - 2007



When the number of fire deaths in Denmark is compared to other Nordic countries, it is apparent that Denmark appears occupies the median position (see Figure 4.21, below). Finland and Norway have a higher rate of fire deaths, while Sweden has a lower rate. Iceland has a significantly lower rate, particularly for the most recent years included in the graph. This data provides a useful benchmark for how Denmark could reduce the number of annual fire deaths.

Figure 4.21 – Deaths from Fire within the Nordic countries, 1996 - 2007



Other statistical sources of information
Kim concluded his presentation with a few links to other statistical sources of information concerning fires in Denmark. All of these data sources can provide useful information when trying to identify accidental fire risk and when trying to assess and manage the risk of accidental fires in Denmark.

- **ODIN**
  Further Information about ODIN can be found at the following website:
  https://www.odin.dk/Beredskabsstyrelsen.Odin.WebClient/login.aspx

- **Statistikbanken**
  Further Information about Statistikbanken can be found at the following website:
  https://statistikbank.brs.dk/sb/main/#page=a0002

- **Brandkampagner**
  Further Information about Brandkampagner can be found at the following website:
  http://brandkampagner.dk

- **Brandforebyggelse**
  Further Information about Brandforebyggelse can be found at the following website:
  http://www.brandforebyggelse.dk

4.9 Accidental Fires in Finland

This presentation was delivered by Dr. Esa Kokki of the Emergency Services College (Finland)

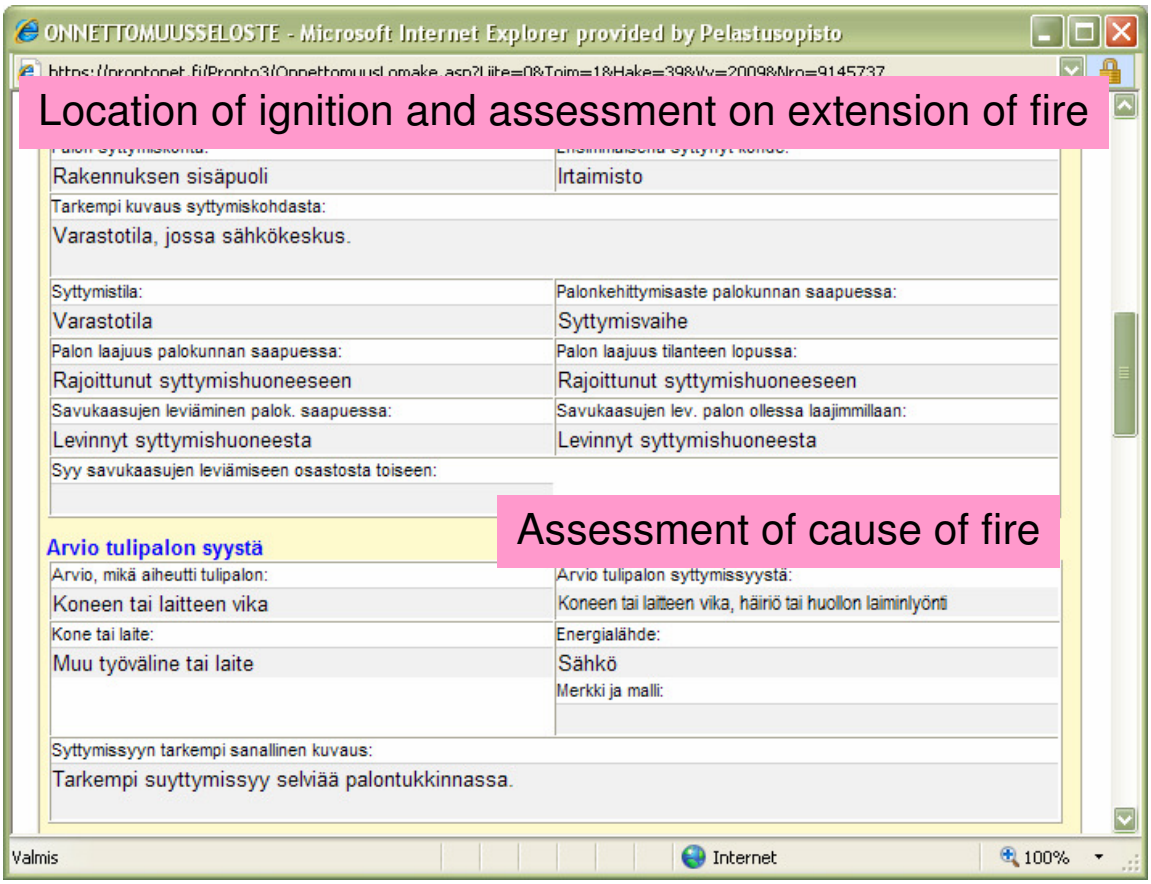
Esa Kokki began with an introduction to the Statistics Data System used by the Finnish Rescue Services. This national data system is called PRONTO. Esa then provided a statistical overview of accidental fires in Finland during 2008, highlighting the most frequent causes and the impact of these fires on life, property and the environment.

Statistical System of the Finnish Rescue Services (PRONTO)
Esa explained a few of the important features of the PRONTO system:

- It is a national data system that is accessible via the Internet.
- It contains call-out data of accidents where emergency services were notified. This data is inputted into the system by the regional Emergency Response Centres (ERCs).
- It contains reports on the operations of the Finnish Rescue Services.
- It contains an assessment of the reasons, consequences, etc. for each accident.
- In the case of a structural fire, it contains detailed information about the building.

Figure 4.22 (below) is a screen shot of a page from the PRONTO system.

Figure 4.22 – Screen Shot from the Finnish PRONTO System

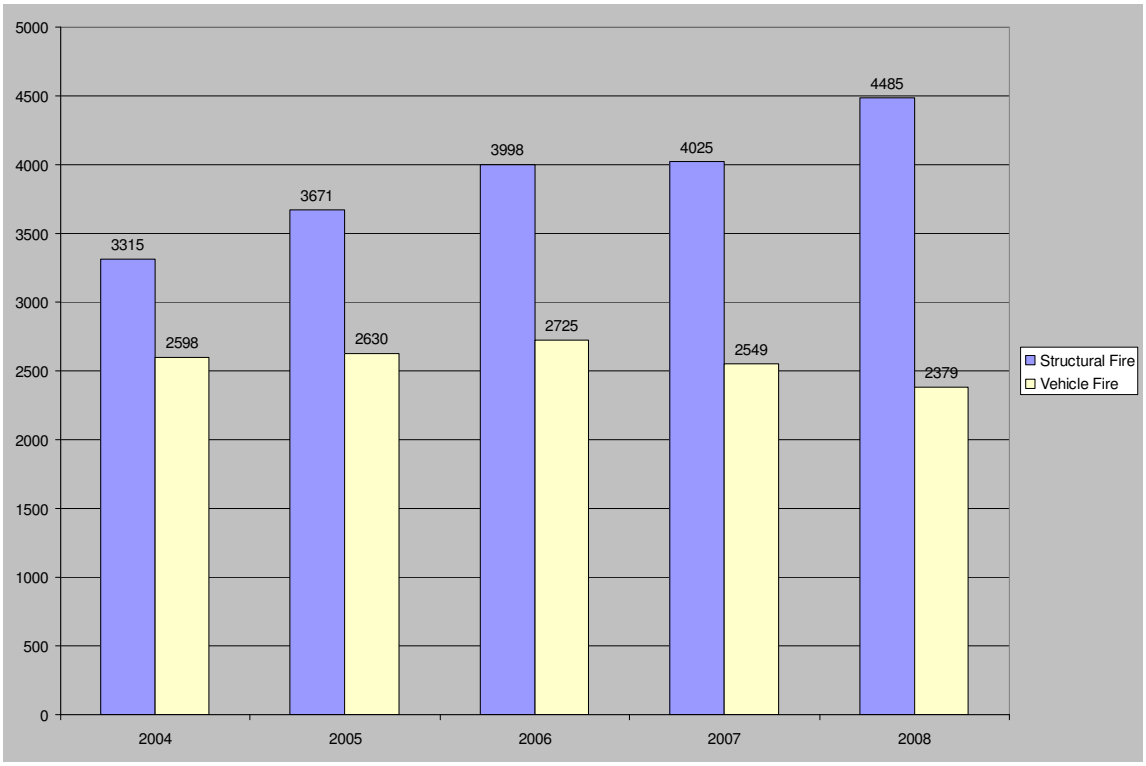


Fires Started Accidentally in Finland
Esa then continued his presentation by providing a thorough statistical overview of accidental fires in Finland. Esa began by showing a graph of all structural and vehicle fires in Finland between 2004 and 2008 (see Figure 4.23, below). Esa then informed the delegation that in 2008, accidental fires accounted for:

- 90% of structural fires (n = 4,022)
- 85% of vehicle fires (n = 2,012

Consequently, the statistics show that the majority of fires that occur in Finland are started by accident.

Figure 4.23 – Structural Fires and Vehicle Fires in Finland, 2004-2008



Accidental Structural Fires in Finland in 2008
There are a number of important patterns that are revealed through more detailed analysis of the data on accidental structural fires. The key patterns are now summarised below, however, more detailed statistics are presented in Tables 4.8, 4.9 and 4.10 and Figure 4.24 (pages 74-76).

- *Structural Fires by Building Type in 2008* (*Table 4.8, overleaf)* – Just over half of all structural fires occurred within domestic premises. The next most frequent building types were industrial premises (12%) and warehouses (12%). Other building types constituted just a small proportion of total structural fires.

- *Causes of Structural Fires in 2008 (Figure 4.24, overleaf)* – The most common cause of structural fires was human activity (43%). The second most common cause was machine or device failure (24%).

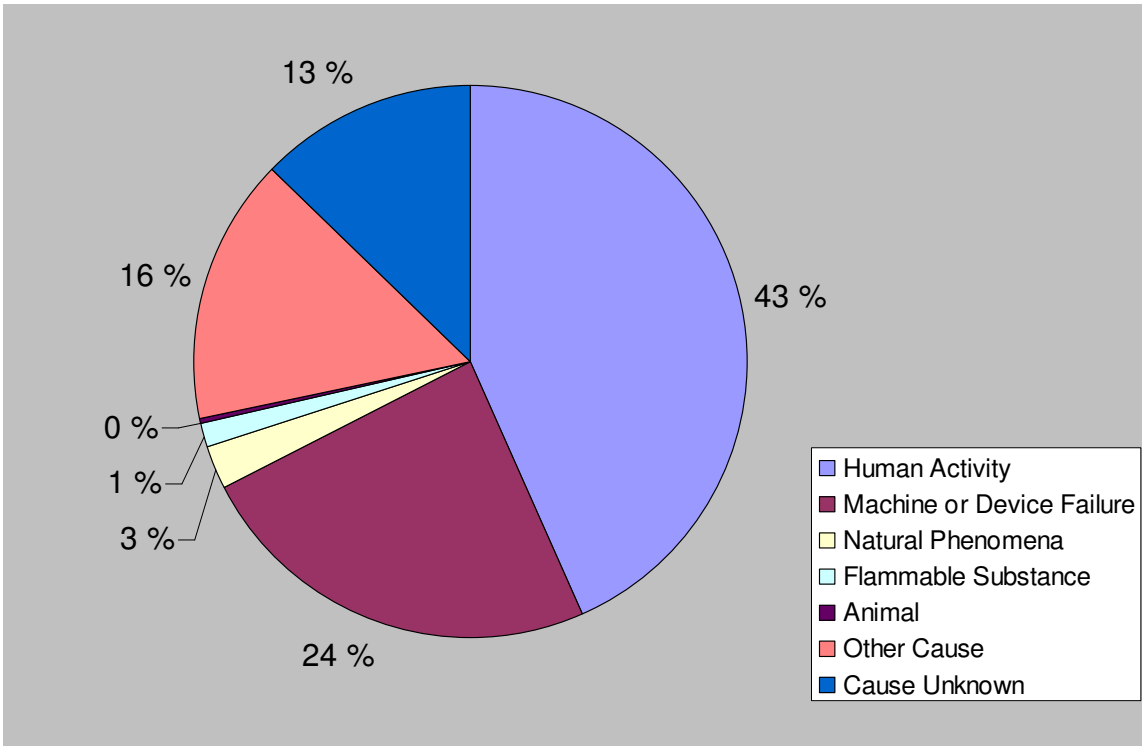
- *Cause of Ignition of Structural Fires in 2008 (Table 4.9, page 75)* – The most common causes of ignition of structural fires was Fireplace, Flue (19%), Open Flame[41] (18%), Overheating, Spark 16.5(%) and Electrical Device (14.9%).

- *The top 3 domestic appliances causing structural fires in Finland* - Washing Machine, Dishwasher, Television

Table 4.8 – Structural Fires in Finland by Building Type in 2008

	%
Residential	50,2
Free-time Residential	4,1
Commercial	4,3
Office	1,3
Transport and Communications	0,9
Institutional Care	2,0
Assembly	1,2
Educational	1,0
Industrial	12,2
Warehouses	12,2
Agricultural	4,8
Others (incl. Sauna)	4,2

Figure 4.24 - Causes of Structural Fires in Finland in 2008



[41] Such as match, cigarette, candle, firework, hot work etc.

Table 4.9 - Causes of Ignition of Structural Fires in Finland in 2008

%	Resid	Free-t	Comm	Office	Transp	Institut	Ass	Educ	Indust	Wareh	Agric	Other
Open Fire	18,1	6,1	9,2	30,2	16,2	35,4	14,9	20,5	10,6	24,4	9,0	12,3
Match, Other Firemaking Device	*2,4*	*1,8*	*0,6*	*19,0*	*5,4*	*24,2*	*4,3*	*12,8*	*0,4*	*13,7*	*4,2*	*3,8*
Cigarette, Other Tobacco Product	*10,4*	*1,2*	*2,9*	*4,8*	*0,0*	*7,1*	*2,1*	*0,0*	*0,4*	*2,0*	*0,6*	*1,8*
Hot Work	*1,1*	*0,0*	*2,3*	*3,2*	*10,8*	*2,0*	*4,3*	*5,1*	*9,8*	*3,4*	*2,4*	*1,8*
Candle, Tealight, Outdoor Candle	*2,8*	*1,8*	*2,3*	*1,6*	*0,0*	*2,0*	*2,1*	*2,6*	*0,0*	*0,0*	*0,0*	*0,4*
Firework, Pyrotechnic Products	*0,5*	*0,6*	*0,0*	*0,0*	*0,0*	*0,0*	*2,1*	*0,0*	*0,0*	*1,0*	*0,0*	*1,1*
Fireplace, Flue	19,0	20,1	4,6	0,0	10,8	2,0	4,3	0,0	6,7	4,9	16,8	29,1
Chimney Fire	*12,2*	*1,8*	*1,1*	*0,0*	*0,0*	*0,0*	*4,3*	*0,0*	*1,4*	*0,5*	*4,8*	*2,0*
Electrical Device, Other Electrical Cause	14,9	16,5	28,7	25,4	24,3	21,2	25,5	25,6	14,3	18,5	18,0	7,6
Overheating, Spark	16,5	11,6	23,6	14,3	8,1	15,2	6,4	30,8	39,8	7,8	18,6	14,4
Frictional Heat, Spontaneous Ignition, Explosion	0,6	0,6	1,7	0,0	2,7	2,0	2,1	10,3	9,2	6,8	3,6	0,5
Natural Hazard	1,8	12,2	0,6	0,0	0,0	1,0	2,1	0,0	0,2	5,9	2,4	3,2
Other Known Cause	18,7	8,5	20,1	19,0	13,5	20,2	21,3	5,1	12,4	5,4	9,0	11,6
Cause Unknown	10,4	24,4	11,5	11,1	24,3	3,0	23,4	7,7	6,7	26,3	22,8	21,3

Table 4.10 - Cause of Ignition of Structural Fires in Finland in 2008 – Machine or Device Failure, Incorrect Use of Machine or Device

%	Residential (n=510)	Industrial (n=293)	Warehouse (n=60)
Heating device	14,3	13,0	15,0
Production machine, tool	1,4	47,1	23,3
Domestic appliance	31,6	1,0	6,7
Electric fitting	13,3	14,0	28,3
Other	39,4	24,9	26,7

Accidental Vehicle Fires in Finland in 2008

As was the case for accidental structural fires, some important patterns are revealed through more detailed analysis of the data on accidental vehicle fires. The key patterns are now summarised below, however, more detailed statistics are presented in Tables 4.11 and 4.12 (below and overleaf) and Figures 4.25 and 4.26 (pages 76-78):

- *Vehicle Fires by Vehicle Type in 2008 (Table 4.11, below)* – 96.7% occurred within road vehicles, with other vehicle types constituting a very small proportion of the total.

- *Road Vehicle Fires by Specific Vehicle Types in 2008 (Table 4.12, overleaf)* – 57.9% occurred within passenger cars with other specific vehicle types constituting smaller proportions of the total number of road vehicles fires.

- *Cause of Ignition of Vehicle Fires in Finland in 2008 (Figure 4.25, overleaf)* - The most common cause of vehicle fires was machine or device failure (63%). This was followed by the following causes: cause unknown (22%); human activity (8%).

Table 4.11 – Vehicle Fires by Vehicle Type in Finland in 2008

	%
Road Vehicles	96,7
Water Vehicles	1,7
Rail Vehicles	0,5
Air Vehicles	0,1
Other Vehicles	1,0

Table 4.12 – Road Vehicle Fires by Specific Vehicle Types in Finland in 2008

Road Vehicles	%
Passenger Car	57,9
Van	7,4
Combination of Vehicles	6,4
Lorry	6,2
Engine-powered Work Vehicle	5,6
Tractor	4,4
Bus	3,8
Motor Caravan, Caravan	2,3
Moped	2,3
Off-road Vehicle	1,2
Trailer	0,9
Motorcycle	0,8
Tank Truck	0,5
Other Road Vehicle	0,5

Figure 4.25 – Causes of Vehicle Fires in 2008 in Finland

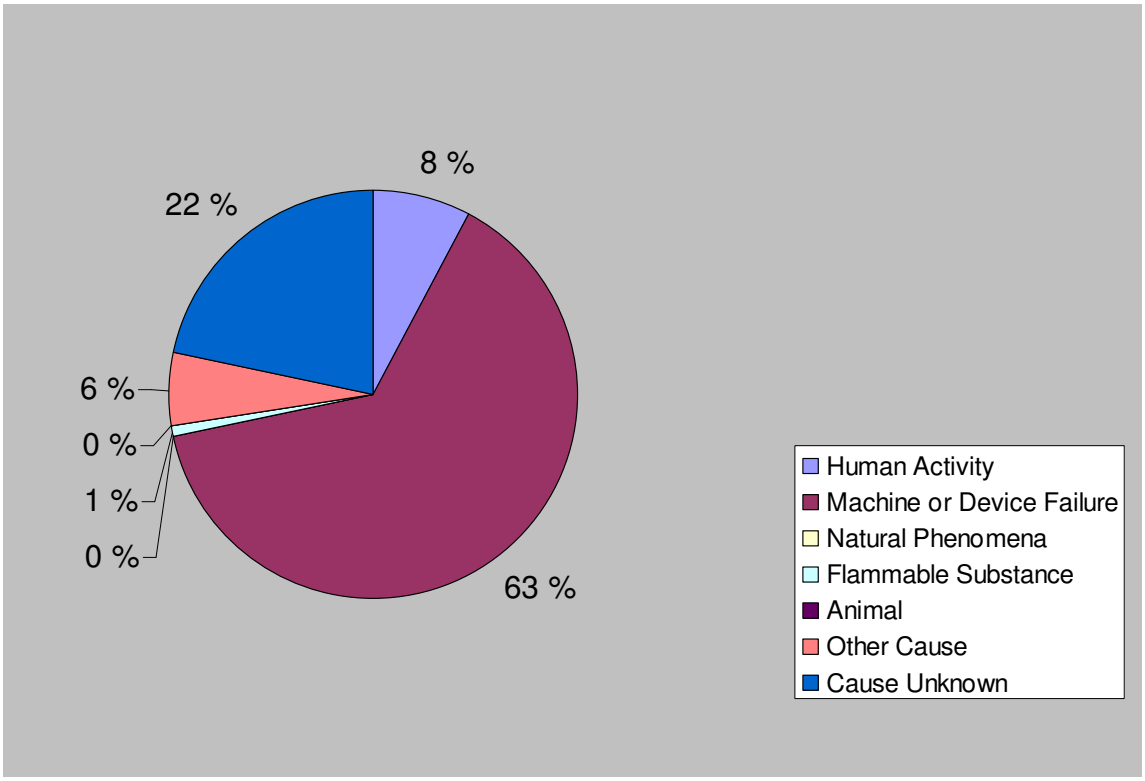
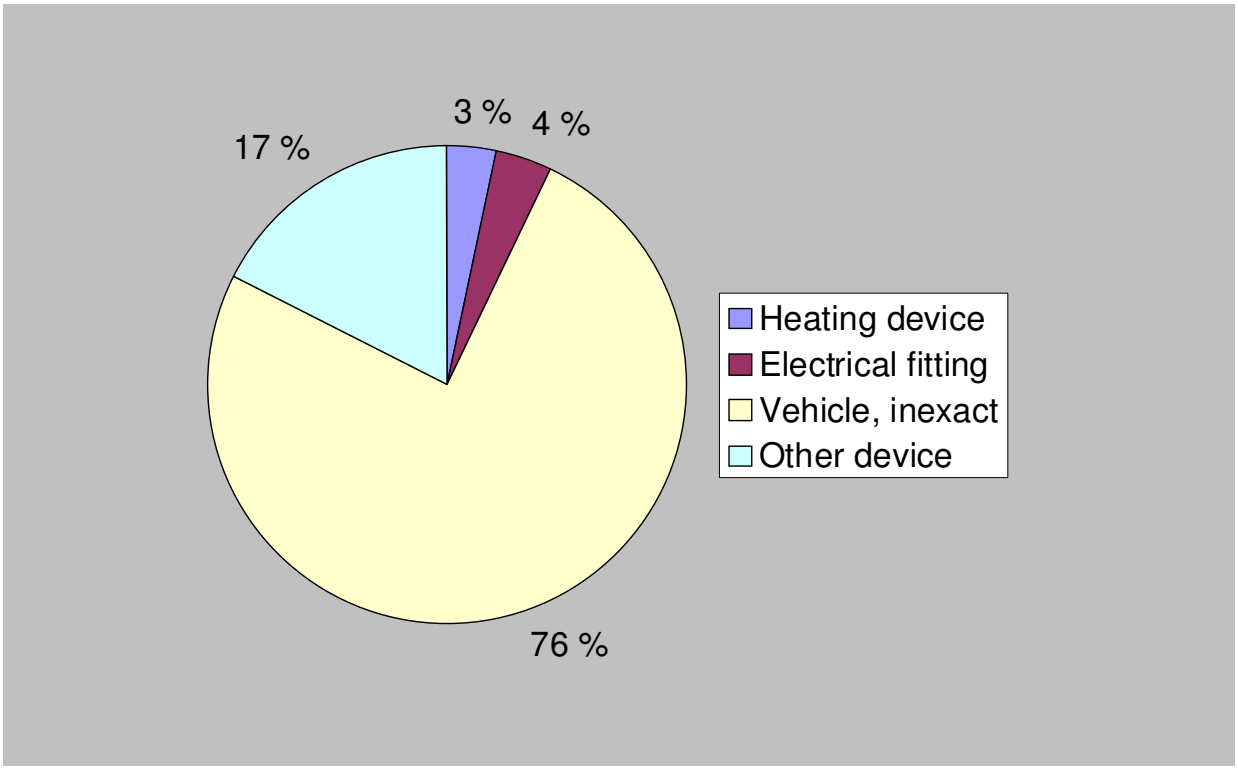


Figure 4.26 - Cause of Ignition of Vehicle Fires in Finland in 2008 – Machine or Device Failure, Incorrect Use of Machine or Device



Impacts of Structural Fires on Health, Property and the Environment in Finland in 2008

The final section of Esa's presentation included an overview of the impact of accidental structural fires in Finland. In Finland in 2008, accidental structural fires led to:

- 92 deaths
- 407 injuries
- A total area burned of 443,044 m2
- And, property losses of over 170.2 million Euros

A more detailed breakdown of these statistics is shown in Tables 4.13 (overleaf), 4.14 (overleaf) and 4.15 (page 80).

Esa's overall conclusion was that accidental structural fires in Finland have a significant impact on health, property and the environment. The Finnish Rescue Services and other organisations are working on a number of initiatives in order to reduce the impact of accidental structural fires and to make Finland a safer place to live. Further details concerning some of these initiatives will be discussed later in the Roma Workshop by Timo Loponen (page 81) and Knut Lehtinen (page 84) and during the Kuopio Workshop[42].

[42] For further information about the Kuopio Workshop, please download a copy of the Kuopio Handbook from the following website: http://www.fire-risk.eu/project/workshops/kuopio2010.htm .

Table 4.13 - Impacts of Structural Fires on Health in Finland in 2008

	Fire Deaths	Injuries
Residential	85	357
Free-time Residential	2	6
Commercial	0	10
Office	0	0
Transport and Communications	0	2
Institutional Care	1	5
Assembly	0	0
Educational	0	0
Industrial	1	13
Warehouses	1	6
Agricultural	0	2
Others (incl. Sauna)	2	6
	92	407

Table 4.14 – Area Burned in Structural Fires in Finland in 2008

	Fire Deaths	Injuries	
	Burnt Floor Area		
	total m2	on average m2	median m2
Residential	116 353	58	31
Free-time Residential	5 530	34	20
Commercial	23 140	133	73
Office	5 509	108	2
Transport and Communications	2 986	81	39
Institutional Care	5 571	71	3
Assembly	4 597	98	6
Educational	19 120	490	11
Industrial	199 932	408	12
Warehouses	24 000	123	25
Agricultural	19 494	117	20
Others (incl. Sauna)	16 812	30	13
	443 044	110	11

Table 4.15 – Property Losses in Structural Fires in Finland in 2008

	Property losses		
	total	on average	median
	Million Euros	Euros	Euros
Residential	39,1	19 400	1 200
Free-time Residential	5,5	33 500	15 900
Commercial	7,5	43 100	1 000
Office	3,4	65 800	390
Transport and Communications	1,9	50 800	6 400
Institutional Care	5,3	67 700	500
Assembly	4,1	86 500	900
Educational	4,2	107 200	500
Industrial	72,7	148 300	3 250
Warehouses	7,8	39 800	5 600
Agricultural	11,2	67 300	5 200
Others (incl. Sauna)	7,5	13 500	5 500
	170,2	42 300	2 000

4.10 Preventing Accidental Fires in Finland

This presentation was delivered by Timo Loponen of the Emergency Services College (Finland)

Timo provided an overview of the national and local level initiatives and guidelines concerning prevention of accidental fires in Finland. Timo described government guidelines and legislation (including the Finnish Rescue Services Act), and requirements for rescue plans. Timo then summarised some of the prevention work completed by the 22 Regional Rescue Services in Finland, including the delivery of safety education, completion of fire inspections according to a risk assessment strategy and the completion of fire investigations.

1. Government Guidelines on Preventing Fires
In summary, government guidelines in Finland state that:

- Accident prevention and fire safety should be prioritised for dwelling accommodation
- Fire safety procedures and fire inspections must be focused at ”risk target”
- The use of (active) fire safety technology should be increased.

Guidelines regarding the prevention of fire are produced at different levels, at the national and the local level. The different guidelines are now discussed during the following two sub-sections.

2. National guidelines in Finland for the Prevention of Fire
Guidelines concerning the prevention of fire come from two government ministries, the Ministry of Interior and the Ministry of the Environment:

- Ministry of the Interior
  - Finnish Rescue Services Act (468/2003)
  - Degree of Finnish Rescue Services (787/2003)
  - Fire inspection instructions

- Ministry of the Environment
  - National Building Code of Finland E1, E2, …

The Finnish Rescue Services Act is a key piece of legislation with regards to fire prevention. Sections 19 and 20 of the Act include the following key stipulations:

Section 19:
Accident prevention

- Co-operation with authorities
- Safety use of buildings
- Supervision of authorities
- Safety education and information
- Technical and active fire protection

Section 20:

- Rescue authorities must monitor the threats, quantities and reasons of accidents. Resulting from these conclusions rescue authorities must react to prevent accidents.

- Rescue authorities must educate residents to identify different risks, how to prevent accidents, how to act in an emergency situation.
- To prevent accidents and to maintain a good level of safety. Rescue authorities must cooperate with other authorities, regional associations and regional inhabitants.

Rescue Plans

- ”Handbook” for safety operations in the apartment or organisation
- Orientation programme for new personell at safety prosedure. And educational tool for safety prsonell.
- Includes all the essential information conserning the risks ana preparedness of risks within any organisation.
- Clarify the responsibilities of the safety issues.

Rescue Plans are needed for (Ars 8-9§ ja Drs 9§):

- Apartment buildings with 5 flats or more
- Special objects (risk assessment, industry, …)
- Assembly rooms for 30 + individuals
- Large public occasions/events

Rescue plans must include:

- Possible dangerous situations in facilities and effects for personnel and function of company (risk assessment and -analysis)
- Actions to prevent dangerous situations
- Objects for exit and shelter, assisting in rescue actions
- Training for Safety- and other personnel, clarifying responsibilities for safety issues.
- Required extinquishing-, rescue- and shelter materials
- Detailed instructions for different accident and error situations
- Information: personnel, inhabitants, surroundings, authorities…

3. Local Guidelines for the Prevention of Fire

There are 22 Regional Rescue Services in Finland. They provide:

- Areal instructions
- Accident prevention base on risk assessment

The Regional Rescue Services are responsible for safety education, which they deliver through:

- Kindergarten
- Primary schools
- Secondary schools
- Risk based training
- ”Firework” safety card

Fire inspections

Fire inpections are competed by the Regional Rescue Services and are legislative duty. Legislation dictates the frequency with which fire inspections must be carried out by the Regional Rescue Services, based on the risk assessment strategy shown in Table 4.16 (overleaf).

Table 4.16 – Risk Assessment Strategy for Fire Inspections in Finland

Frequency of Fire Inspections	Category	Inspection Targets
Once per year	Special targets	Places of employment
		Assembly/business rooms
		Residential facilities
		Medical care institutions
		Manufacturing plants and warehouses
		Garages and car park buildings
Once every three years	Smaller special targets	Garages
		Smaller markets
		Some public buildings
		Small restuarants, pubs etc.
Once every ten years	Small targets	Apartments
		Second/holiday homes (free-time apartments)

Fire investigation

When a fire occurs, a fire investigation will be completed. During these investigations, the Rescue Services try to find out what happened, why it happened and if such an event can be prevention in future. Investigations will gather evidence concerning the following:

- Actions before the fire
  - Inhabitant (living environment, age, medication, habits, …)
- Cause of fire
- Actions during the fire
  - Alarm (fire warning devices, other person, …)
  - Self rescuing
- Actions after the fire
- Structural fire prevention measures

For serious fires where individuals are injured or killed, the police may also investigate. In these circumstances, Rescue Service investigators will work in collaboration with police investigators. All major accidents/emergency incidents, including serious/major fires, are investigated by the Accident Investigation Board of Finland[43].

[43] In Finnish, Onnettomuustutkintakeskus. Website: http://www.onnettomuustutkinta.fi/2601.htm

4.11 Fire Risk Assessment for Care Centres in Finland

This presentation was delivered by Knut Lehtinen of South West Finland Emergency Services.

Knut delivered an overview of recent changes in Finland regarding care centres. Knut began the presentation with some background into a serious fire in Maaninka in 1999. This incident led to a major investigation which also looked into other fires within care centres around the same time. It was found that risk assessment procedures for care centres in Finland were not adequate as they did not take into account the fact that residents/patients living within care centres often have decreased ability to act in a fire. These findings were used to create a more robust risk assessment system and the mandatory installation of sprinkler systems in new care centre buildings. Sprinkler systems are and will be installed in all existing care centres. These measures will help to reduce the risk of fire within care centres and reduce the impact of fires on health and property.

Background to changes regarding risk assessments for care centres in Finland - The Fire at Viljami Maaninka, Finland, 4th December 1999

On 4th December 1999 there was a fire at a senior citizen service house Viljami Maaninka. During the fire, five residents died. The building was new and had only just been opened in the summer of 1999. Only one resident was able to leave the building on their own and self rescue. All other residents required assistance.

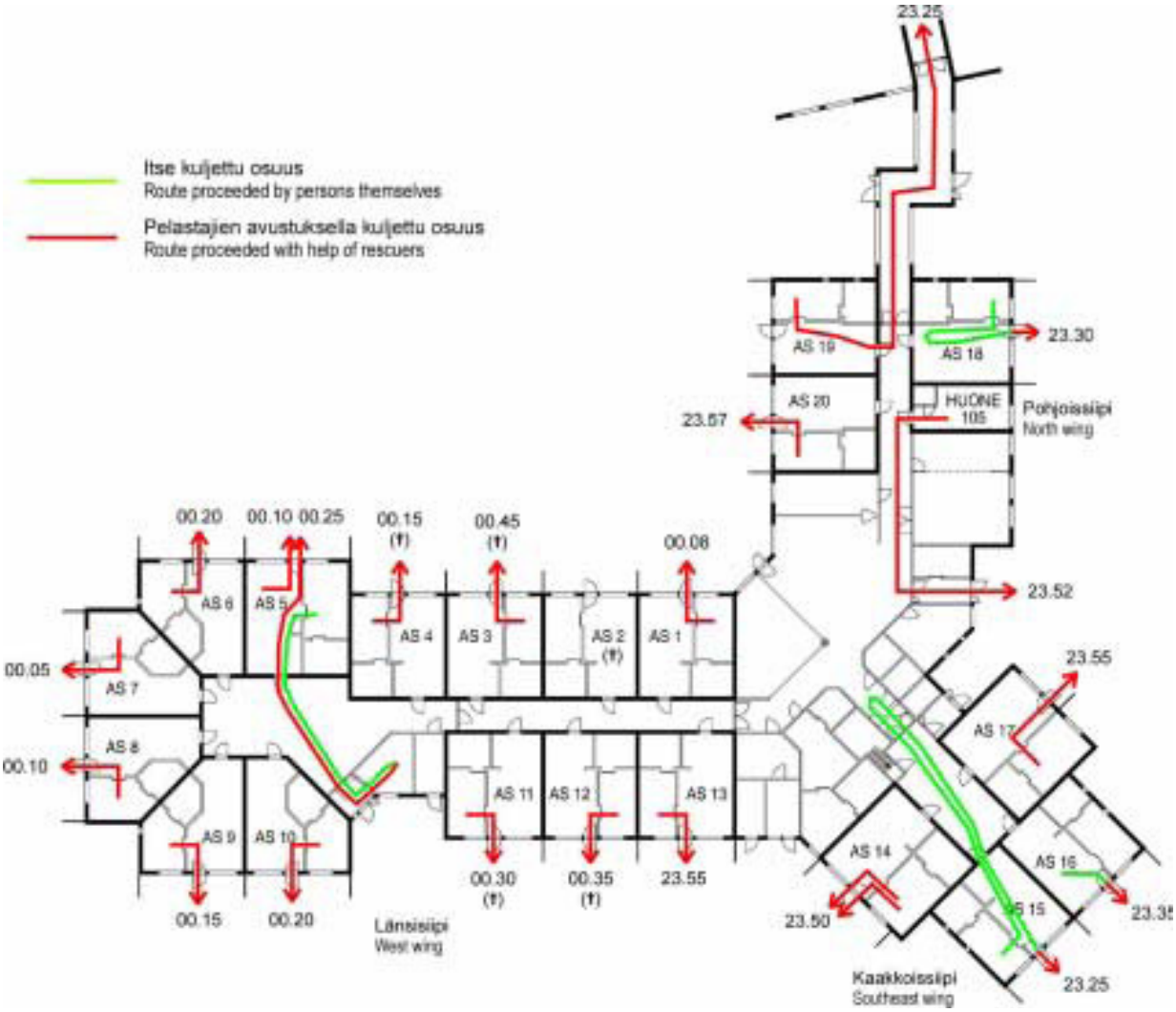
This was a very serious fire that provoked a change in the risk assessments for care centres in Finland.

Figure 4.27, below, shows the building and describes the development of the fire (in Finnish).

Figure 4.27 – The Fire at Viljami Maaninka, Finland, 4th December 1999

Fire investigators were able to approximately map the movements of residents when the fire broke out, as shown in Figure 4.28 (below). Those routes indicated in green show a route taken by resident who proceeded by themselves. Routes shown in red show routes taken by residents who were assisted by rescuers. As you can see, the red lines show residents being taken directly out of the building via the nearest exit. The green lines, however, show residents who moved without assistance and how they did not move to the nearest exit.

Figure 4.28 – Routes Taken by Residents during the Viljami Maaninka Fire



The key problem during this fire was not the fire protection measures that were in place, as the building was of new construction, but that residents/patients had decreased ability to act in the fire. Residents/patients within the centre had a decreased ability to:

- Perceive the danger
- Comprehend the danger
- Transfer to a safe place

This was a key factor contributing to the tragic deaths on 8th December 1999.

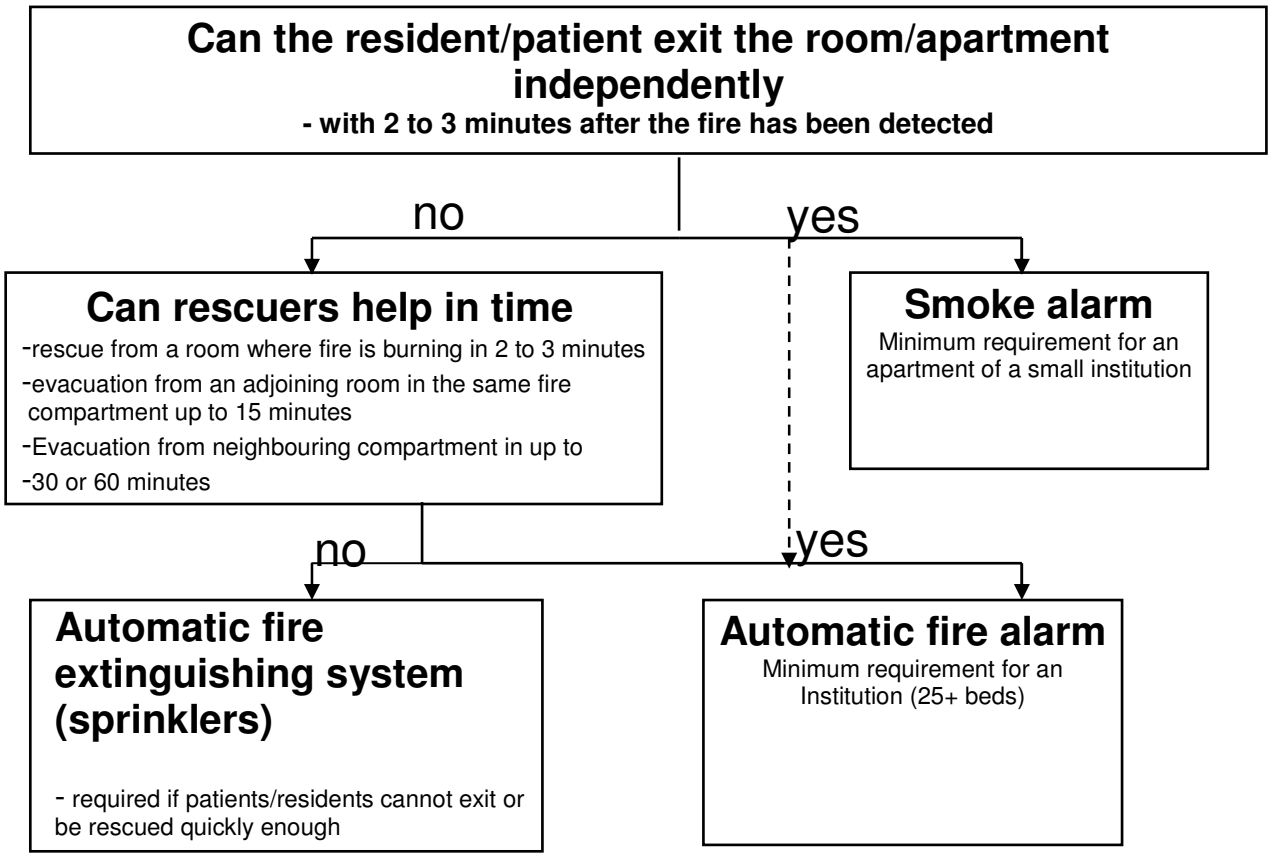
Results of the Investigation of the Viljami Maaninka Fire

The Accident Investigation Board of Finland (AIBF) investigated the fire at Maaninka along with 17 other fires in senior citizen services houses between 1st December 1999 and 28th February 2000. The Board produced a report on these fires, which led to the following legislative changes:

1. In the Rescue Act § 9. Fire risk assessment has to be done for all buildings where there are people with weakened ability to act if a fire breaks out
2. In the Finnish "National Building Code of Finland" there is a similar regulation for new buildings. The builder must include a fire risk assessment in order to obtain a building permit.

The level of fire safety required for an individual care centre is now determined by using the risk assessment process shown in the simple flow diagram in Figure 4.29 (below).

Figure 4.29 - Choosing the Level of Fire Safety Required for Care Centres using a Fire Risk Assessment



By using this fire risk assessment, it has been determined that all new care centres and similar buildings must be equipped with a sprinkler system (see Figure 4.30, overleaf) for an example of a sprinkler head within a care centre). Most of the existing care centres and similar buildings in Finland are or are going to be equipped with sprinkler systems.

It is believed that these new measures will help to reduce fire risk within care centres and will reduce loss of life, injury and damage to property due to fires within these centres.

Figure 4.30 – A Sprinkler Head of a Sprinkler System Installed in a Care System in Finland

4.12 Investigation into the Fatal Dwelling Fire in Naantali, South-West Finland, in October 2009

This presentation was delivered by Heikki Harri of Känta-Hame Emergency Services.

Heikki Harri provided the group with a verbal summary of the findings of an investigation into a fire which led to the tragic deaths of five young people in a dwelling in South West Finland. Heikki was a member of the investigation team from the Accident Investigation Board of Finland (AIBF). The AIBF had responsibility for investigating this fire as it was a serious incident with multiple fatalities.

Heikki's presentation was delivered in order to stimulate discussion and debate concerning fire investigation processes and procedures and the opportunities and constraints for preventing accidental dwelling fires. As the case is still ongoing, the findings of the investigation cannot be presented within this report.

4.13 Accidental Fire Risk in Italy

This presentation was delivered by Ing. Fabio Alaimo Ponziani, Ing. Saverio La Mendola, Ing. Luca Ponticelli and Ing. Biancamaria Cristini of Corpo Nazionale dei Vigili del Fuoco.

Fabio, Saverio, Luca and Bianca delivered a detailed account of Corpo Nazionale dei Vigili del Fuoco's fire prevention activities across Italy. Bianca began the presentation with a discussion of some overview statistics regarding fire prevention in Italy. Luca then discussed CNVVF's fire prevention and rescue activities in more detail. Fabio followed with a detailed description of the two key approaches to fire prevention that are currently adopted by CNVVF: the classical or prescriptive approach and the fire safety engineering or performance-based approach. Saverio then concluded the presentation with an overview of major industrial hazards across the Italian territory and how CNVVF assesses and manages these hazards in terms of fires and other emergency incidents.

Fire prevention and public rescue in Italy
The Department of Firefighters, of Public Rescue and of Civil Defence (CNVVF) is part of the Italian Ministry of the Interior and is divided into Central and Local Offices/Departments. Among the Central Offices, sited in Rome, are the Technical Offices of CNVVF. The local offices across the Italian territory include the fire stations/departments. Both the local and central offices share an overall responsibility for fire prevention and public rescue, although the duties and responsibilities for the local and central offices do differ.

With regard to the accidental fire risk, both the aspects of fire prevention and public rescue are interrelated, so we can refer to fire prevention concepts as an integrated system. For that reason, it is convenient to divide the subject of accidental fire risk assessment and management in Italy into three categories:

1. Classic Fire Prevention
2. Fire Safety Engineering
3. Major Industrial Hazards

Each of these categories is governed by specific legislation and typical procedures, as will be summarised below.

Statistics are of key importance for supporting fire prevention activities. Some of the useful data which is currently collected includes:

- Statistics concerning interventions by fire fighters each year for different categories of incidents– for example number of: fires, rescues, accidents in airports and harbours, road traffic collisions etc.
- Fire prevention statistics recorded per region per year - for example number of: project reviews, fire safety certificates, renewal of fire safety certificates, total activity etc…

We will now review some principal aspects of the three key categories relevant to the assessment and management of accidental fire risk in Italy.

Classic Fire Prevention

Fire prevention regulations and fire prevention supervision are some of the main tasks of the Italian Fire Service. There are a number of National Acts that fix organization, responsibilities and procedures for the Fire Service. Among these Acts, the Presidential Decree of January 12th 1998 n. 37 describes the due authorization procedure for all potentially dangerous occupancies. Citizens obtain Fire Prevention Certificates from the local fire station. A total of 97 potentially dangerous occupancies are listed within the Decree of the Interior Ministry of February 2nd 1982. Some examples are given in Table 4.17 (below).

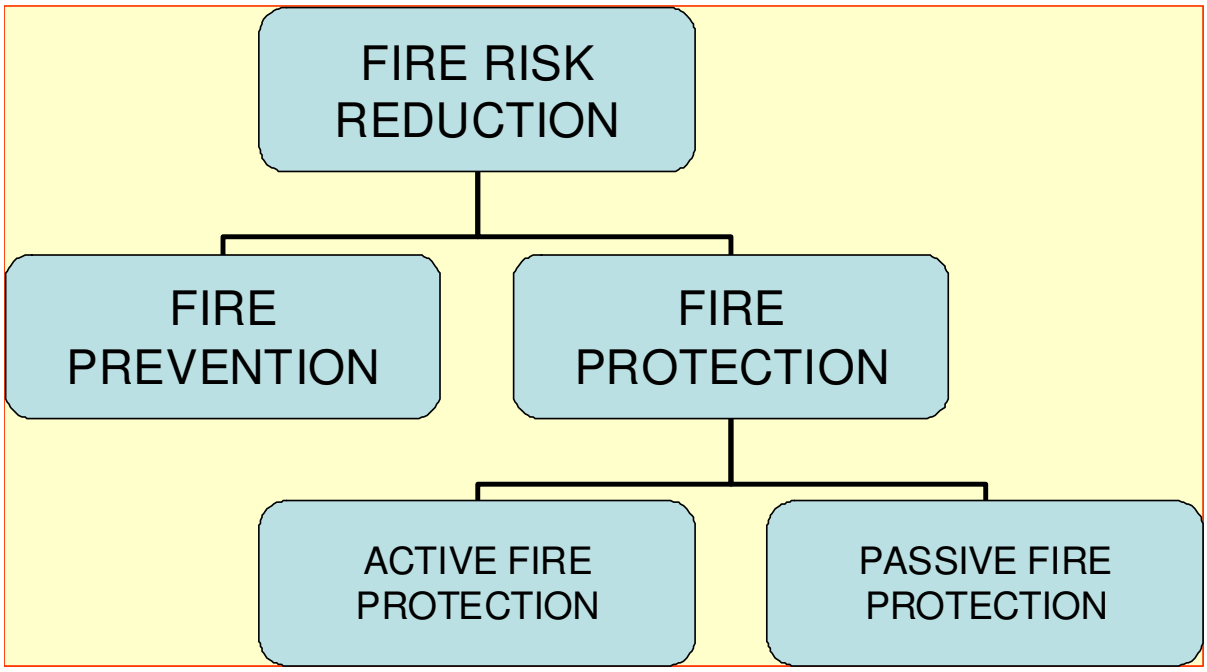
Table 4.17 – Examples of potentially dangerous occupancies listed within the Decree of the Ministry of Interior February 2nd 1982

Decree of the Interior Ministry of February 2nd 1982 Some potentially dangerous occupancies : Excerpts	
Number	**OCCUPANCIES**
4	COMPRESSED GAS (> 0,75 m3) or LIQUIFIED GAS (> 0,3 m3) TANKS
15	FLAMMABLE LIQUID TANKS (> 0,5 m3)
18	GAS FUEL STATIONS
25	ARMORIES
43	PAPER STORAGE BUILDING (> 5 tons)
64	ELECTRIC POWER PLANTS (> 25 kW)
83	PUBLIC ENTERTAINMENT BUILDINGS, SPORT FACILITIES (> 100 occupants)
84	HOTELS (> 25 occupants)
85	SCHOOLS (> 100 occupants)
86	HOSPITALS (> 25 occupants)
87	SHOPS (> 400 m2)
88	STORAGE BUILDINGS (> 1000 m2)
90	CULTURAL HERITAGE
91	THERMAL POWER SOURCES (> 100 kW)
92	PARKING AREAS (> 9 cars)
94	HIGH RISE BUILDINGS (> 24 m)
95	HIGH RISE ELEVATORS (> 24 m)

Fire fighters must follow a set procedure in order to release a Fire Prevention Certificate for a potentially dangerous occupancy. The procedure to be followed is based on an examination of the activities/projects and on on-site inspections. Some exceptions to fire regulation are admitted when explicitly stated: in such cases an alternative approach to fire prevention is possible.

A typical scheme of a Fire Prevention Decree comprises: legislative references, area of applicability, purpose, safety levels, technical rule approval, transitional rules, repealed previous norms. There is usually an Annex to the Decree where aim and definition are given, together with rules for the occupancies intended as new or existing ones. The rules for new occupancies are about position and accessibility, occupancy characteristics, structures, exodus, ventilation, smoke and heat venting, areas with specific hazards, fire systems and services, other occupancies present, prevention and protection means, safety signs, safety organization, safety management. The rules for existing occupancies relate to structural requirements, safety systems, and safety management. The rules for occupancies not included in the list of 97 potentially dangerous occupancies relate to minimum safety requirements for structures, safety systems, and safety management.
The overall Fire Prevention System defines the so called Fire Risk Reduction Tree, which is shown below in Figure 4.31.

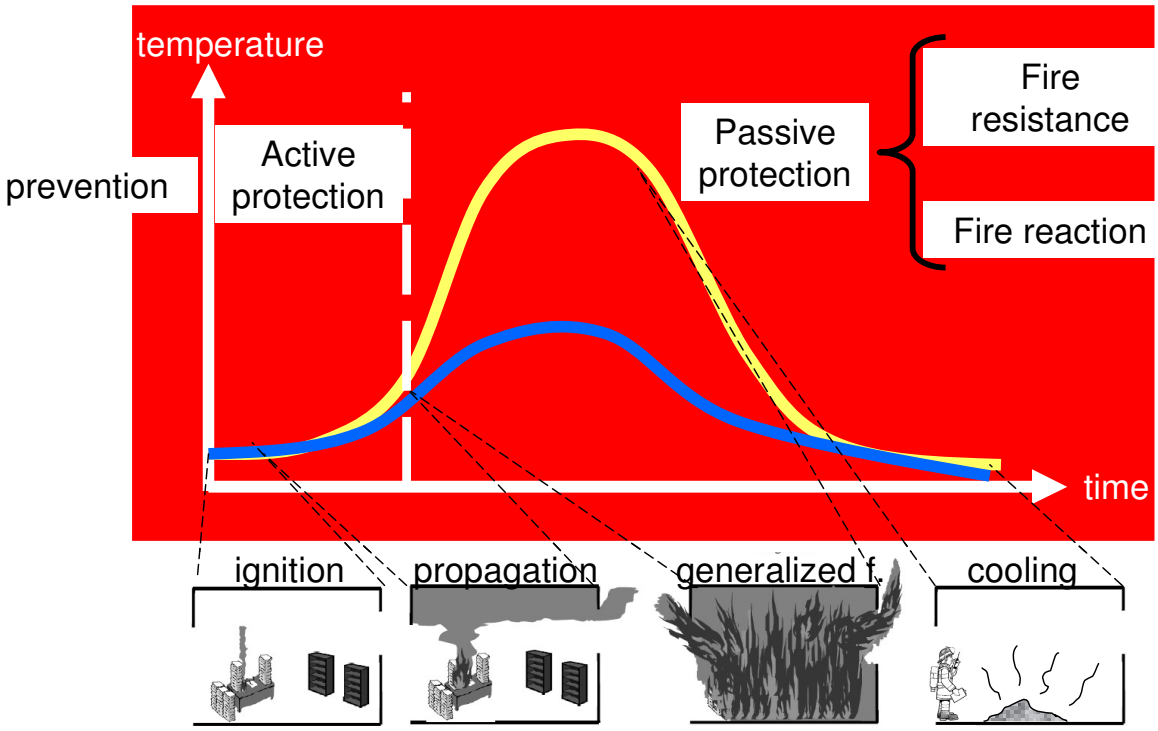
Figure 4.31 - The Fire Risk Reduction Tree in Italy



The meaning of Active versus Passive Fire Protection is explained in Figure 4.32 (overleaf), a graphical representations of the enclosure fire dynamics timeline.

It is worth noting that the words Fire Prevention can have two meanings: the Overall Fire Prevention System (the whole of the Fire Risk Reduction Tree) or the Fire Prevention (measures adopted before the fire happens) in contrast with the Fire Protection (measures adopted after the fire happens).

Figure 4.32 – Enclosure Fire Dynamics Timeline



It is also possible to examine the overall Fire Prevention System with a different viewpoint from the Classic Fire Prevention approach. The Fire Safety Engineering Approach incorporates knowledge of fire dynamics within the Fire Prevention System. This Fire Prevention System accommodates both a Prescriptive Approach (Classic Fire Prevention) and a Performance Based Approach (Fire Safety Engineering). The adoption of this new type of system means that Italy can now allow both the Prescriptive and Performance Based Approaches to be used within the overall Fire Prevention System.

Fire Safety Engineering

National Legislation regarding Fire Safety Engineering (FSE) comes from the Decree of the Ministry of the Interior May 9th 2007: Directives for the implementation of the engineering approach to fire safety.

Of paramount importance are the object and the field of application of the Decree. The object regards the definition of procedures and criteria to be adopted for the assessment of the risk level and for the design of the subsequent compensatory measures in order to satisfy the goals of fire prevention. The field of application is such that in the presence of environments of complex type or with advanced technology, of buildings of architectural and/or constructive particular relevance, including those with precious art or history or urban sites of special significance or importance, the methodology described in the present decree can be applied:

a) to find the measures to be adopted for releasing the certificate of fire prevention in the case of activities not regulated by specific fire safety rules;
b) to find the safety measures considered able to compensate the added risk in the case of the dispensation proceedings following the Decree of the Republic President January 12th 1998 n. 37.

Also in the FSE Decree are included two essential management tools: the Fire Safety Management System and the Observatory for the engineering approach to fire safety. As a matter of fact, performance-based fire engineering requires a document to be prepared containing the program for the implementation of the Fire Safety Management System since the choices and the hypotheses set as bases for the project constitute constraints and limitations that cannot be disregarded in order to exert the activity.

The Observatory for the engineering approach to fire safety (more simply: the Observatory) is instituted with the aim to favour the maximum integration among all subjects involved in the implementation of the rules related to the engineering approach to fire safety.

The FSE Decree focuses in detail on the following three aspects: Assessment and Design Process, Fire Safety Management System, Observatory for the engineering approach. Let's take a look to each of them in turn.

The Assessment and Design Process of the FSE Decree

The Assessment and Design Process is divided in two phases: Preliminary Analysis (first phase) and Quantitative Analysis (second phase). Figure 4.33 (below) shows the steps of the first phase of the process. Figure 4.34 (overleaf) shows the steps of the second phase of the process.

Figure 4.33 – The First Phase of the Assessment and Design Process of the FSE Decree

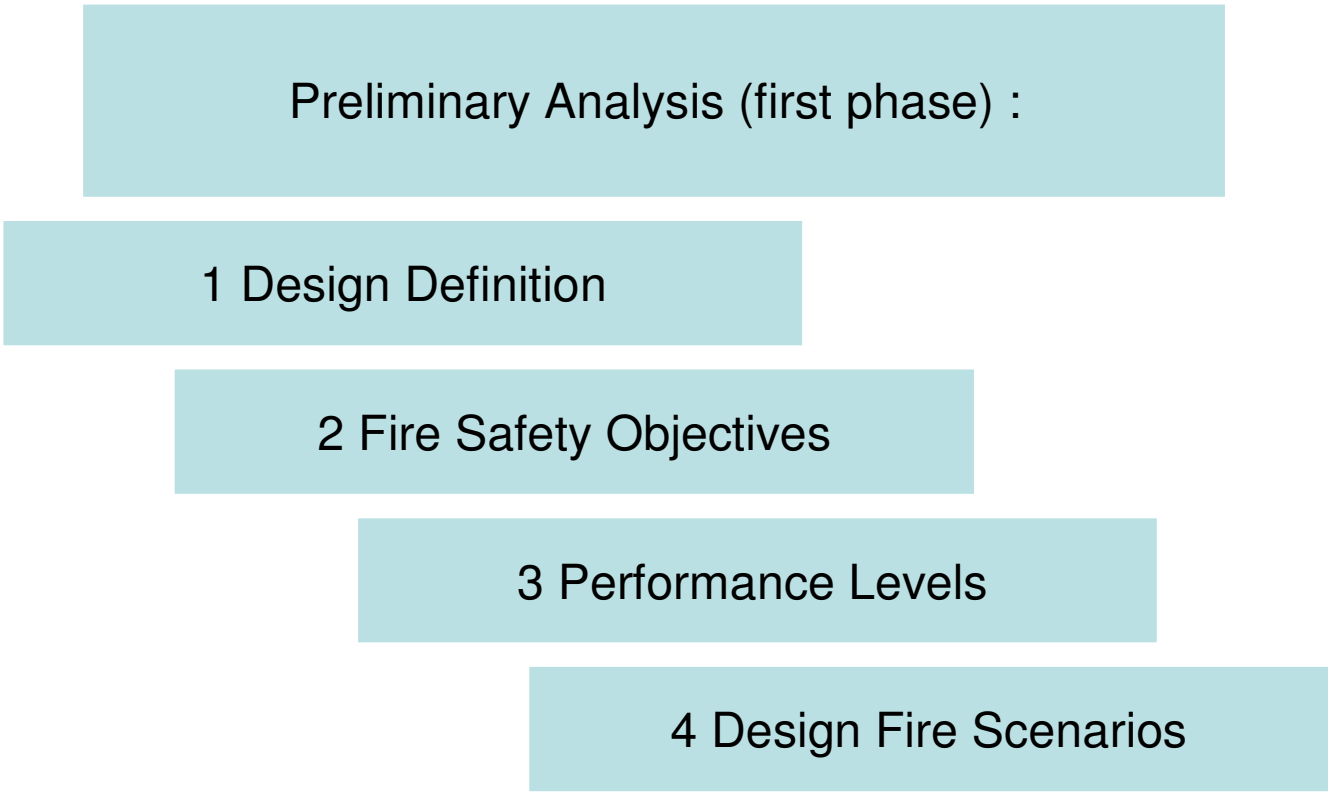
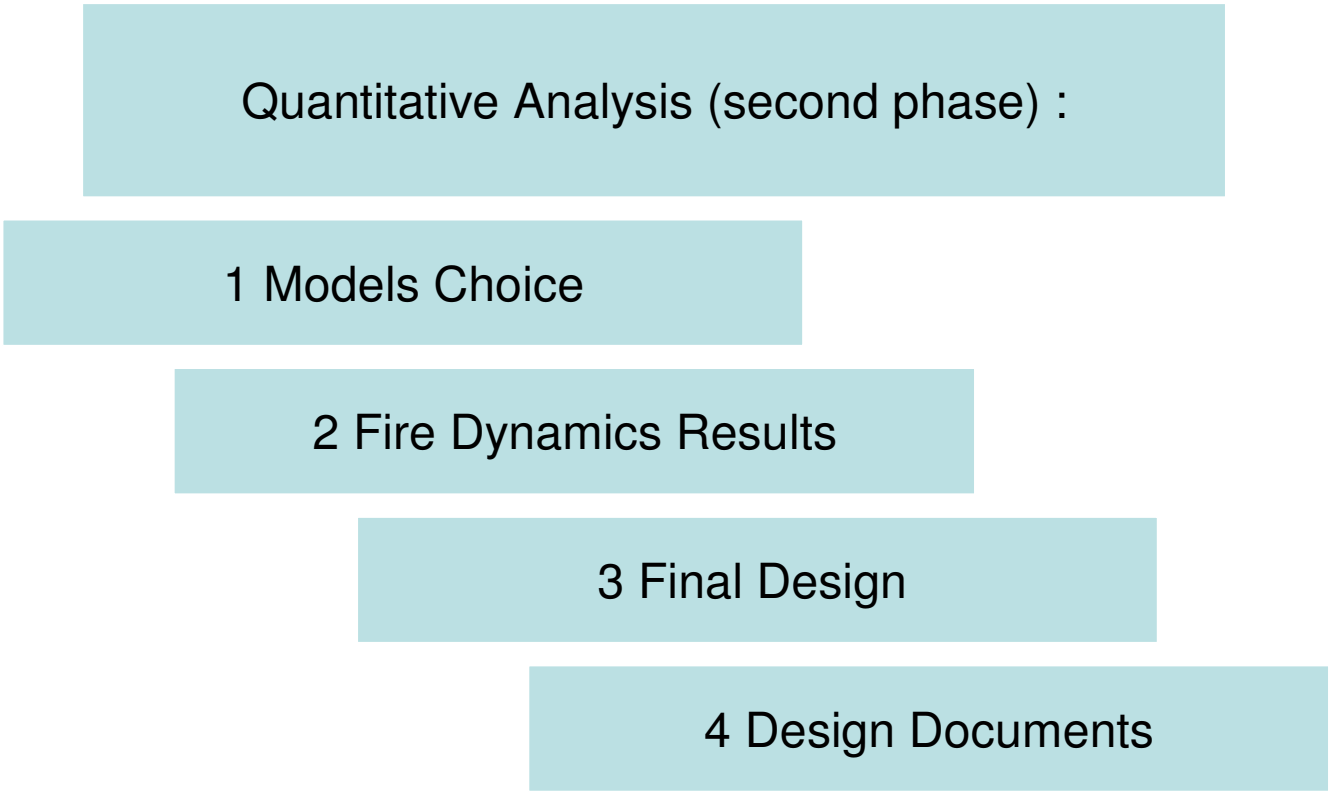


Figure 4.34 - The Second Phase of the Assessment and Design Process of the FSE Decree



The Fire Safety Management System (FSMS) is divided into two parts. The first part outlines the aims and requirements of the FSMS. The second part includes the content of the FSMS. Figure 4.35 (below) outlines the aims and requirements of the FSMS, while Figure 4.36 (overleaf) outlines the four key elements that must be included within the content of the FSMS.

Figure 4.35 – Aims and Requirements of the Fire Safety Management System in Italy

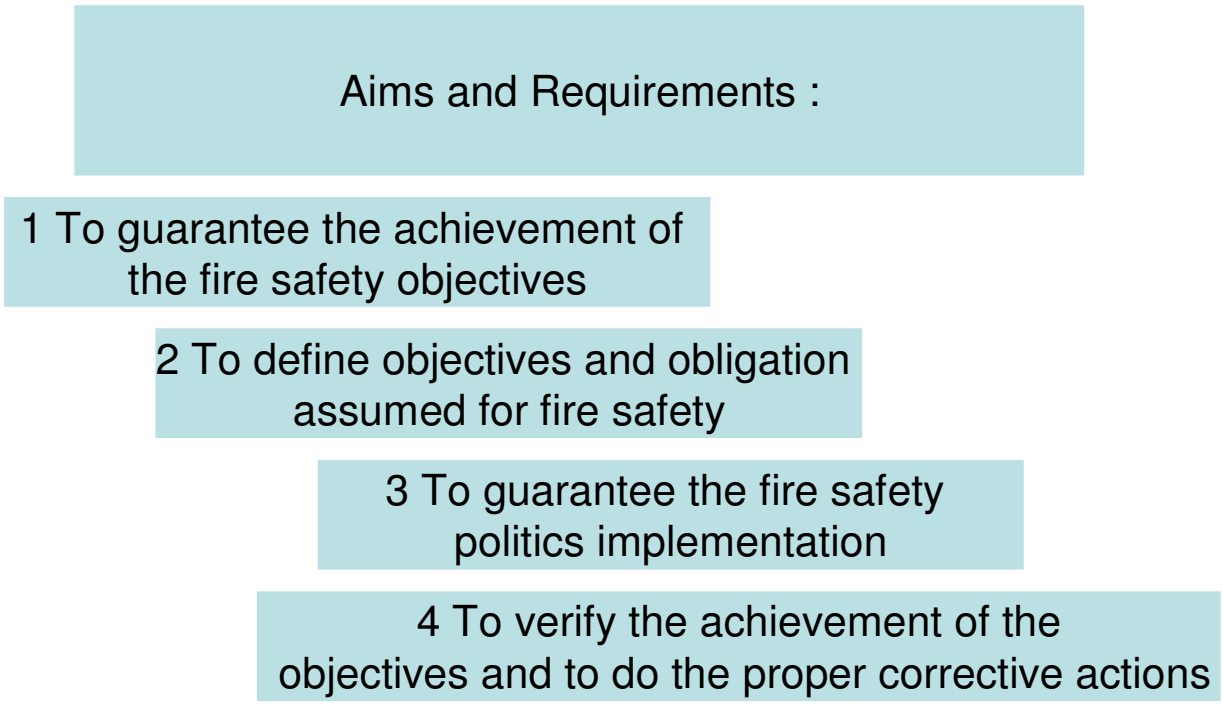
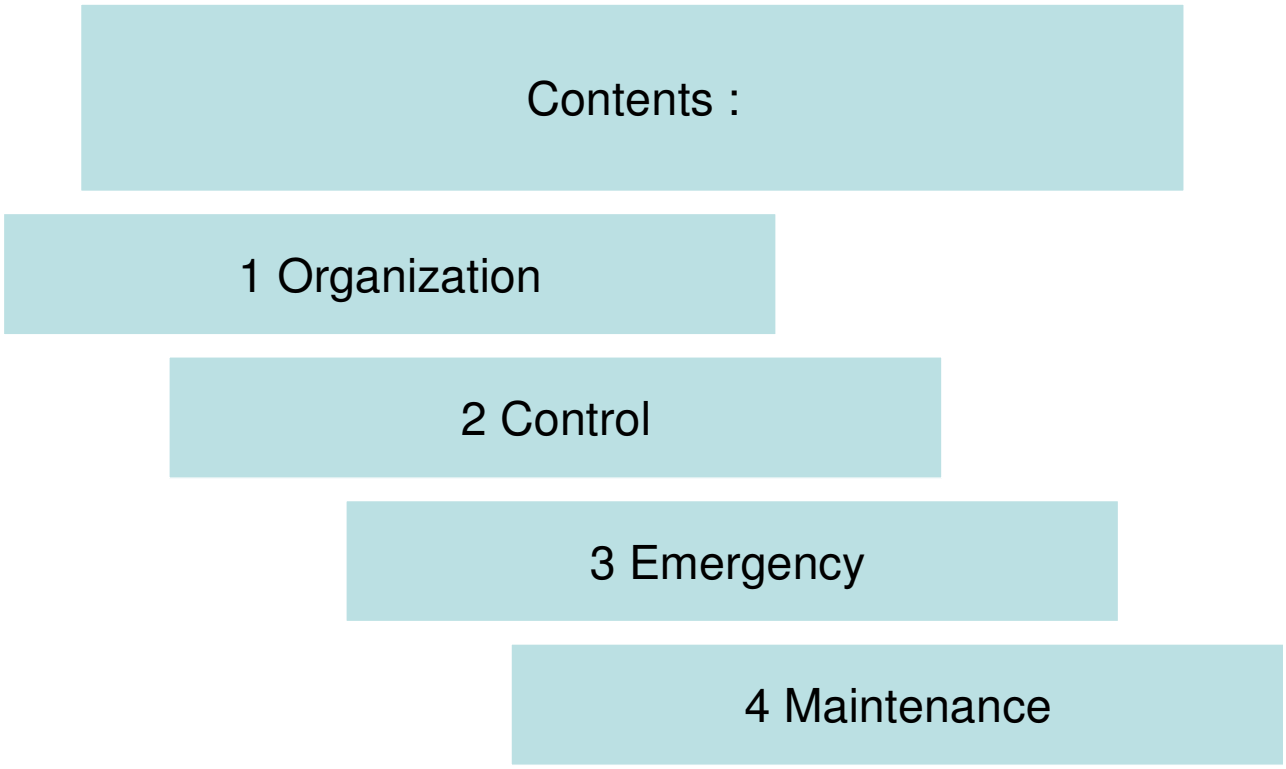


Figure 4.36 – Content of the Fire Safety Management System in Italy



The Observatory also has aims and duties. These are presented in Figure 4.37 (below). Figure 4.38 (overleaf) presents some examples of FSE applications that are monitored by the Observatory to give an idea of real life performance-based issues.

Figure 4.37 – Aims and Duties of the Observatory of the Fire Engineering Approach in Italy

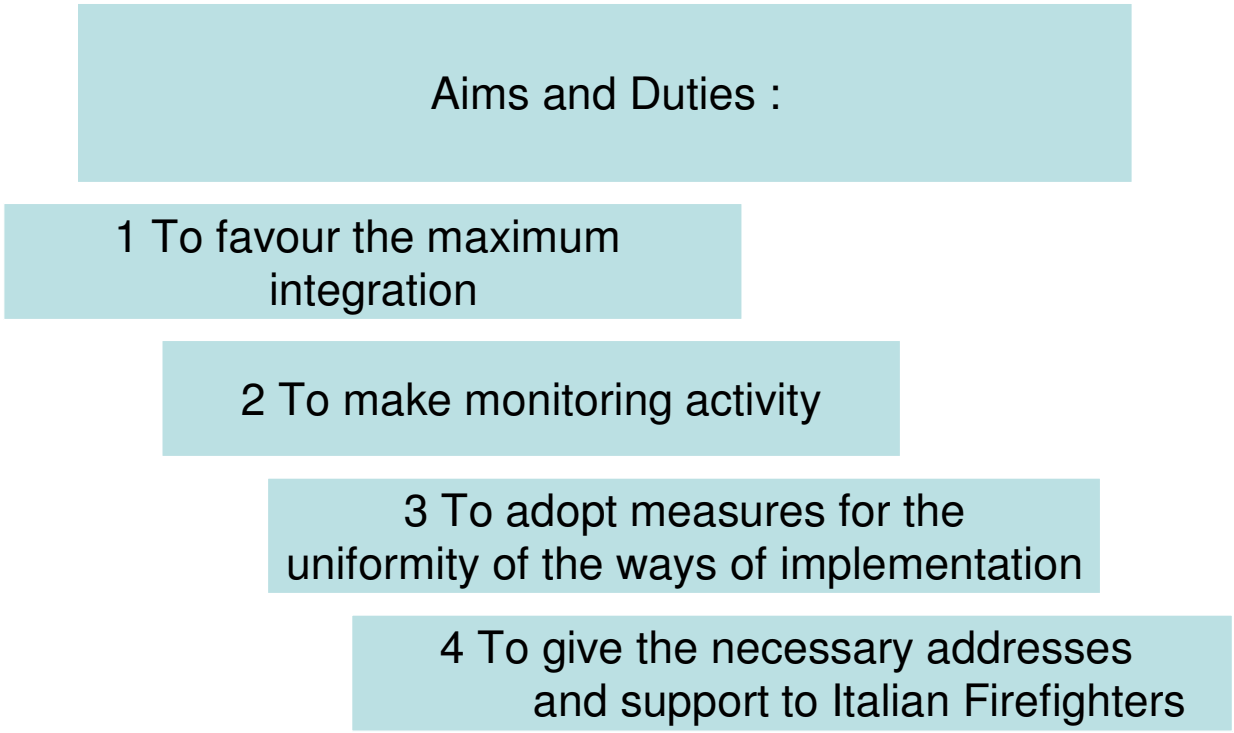
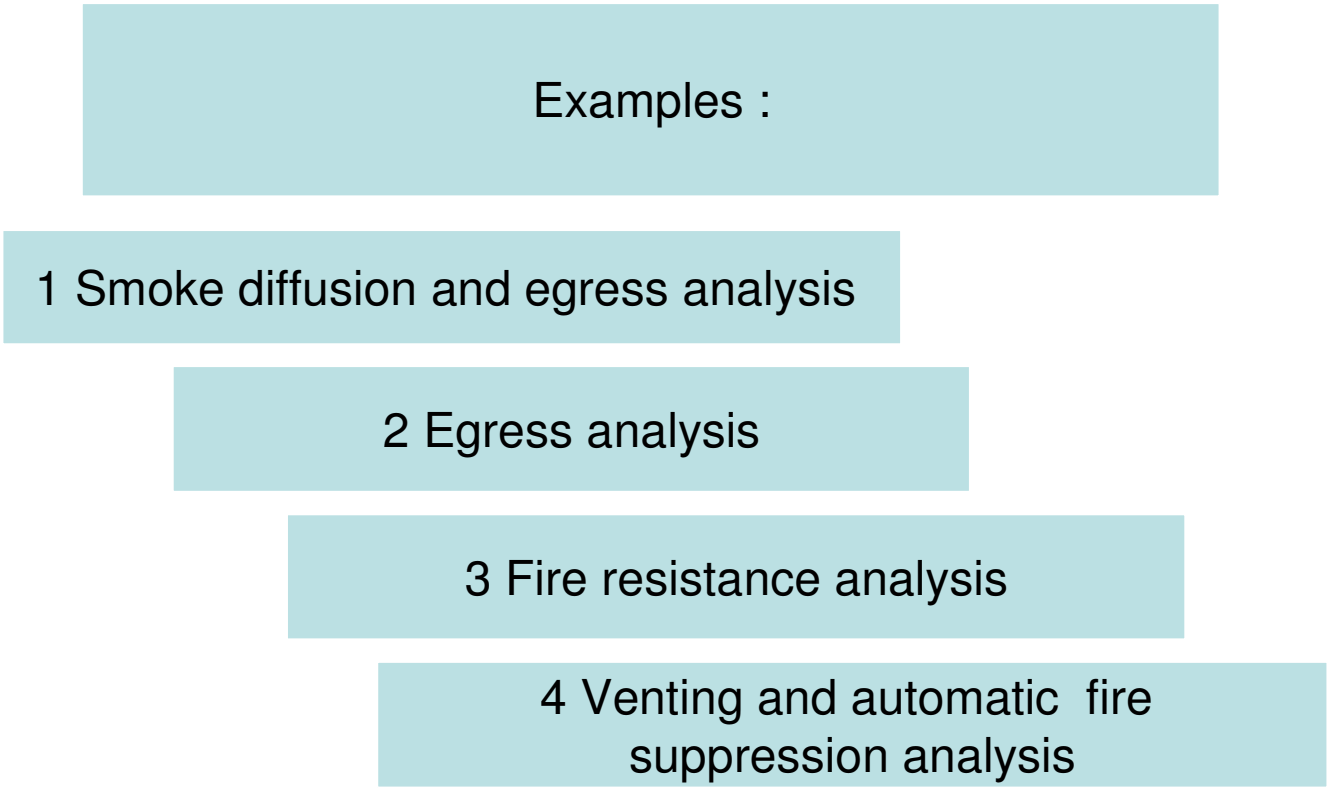


Figure 4.38 - Some Examples of Fire Safety Engineering Applications Monitored by the Observatory of the Fire Safety Engineering Approach



The FSE is based on design and management, and requires detailed knowledge of topics such as fire dynamics and Organization Management. In a similar way, there is another area of responsibility for the Italian National Firefighters, still based on design and management, which requires detailed knowledge of topics such as Critical Event Dynamics and Organization Management. This is the Major Industrial Hazards section of the overall Fire Prevention System in Italy.

Major Industrial Hazards
A “major accident” is an event such as a release, a fire or an explosion, giving cause to a serious hazard, immediate or deferred, for human health or for the environment, inside or outside a factory, where one or more dangerous substances are present.

Following a number of serious industrial accidents, the European Union set specific Directives – the so called “Seveso” (82/501/CEE), “Seveso II” (96/82/CE) and “Seveso III” (2003/105/CE) directives – with the aim of preventing major accidents within specific occupancies where hazardous substances are stored or processed, and to limit the consequent damage for people and for the environment.

The Directives have then been integrated into the Italian legal system as Legislative Decrees 334/99 and 238/05 respectively. Legislative Decree 334/99 applies to plants where dangerous substances are present in quantities equal or higher to the ones reported in Annex 1 of the Decree. Some examples are presented in Table 4.18 (overleaf)

Table 4.18 – Extract of Annex 1 of the Legislative Decree 334/99 – Plants where Dangerous Substances are present in Specific Quantities

Column 1	Column 2	Column 3
Dangerous substances	Limit quantities (in tons) for the application of:	
	clauses 6 and 7	clause 8
Ammonium nitrate (see note 1)	5 000	10 000
…	…	…
Potassium nitrate (see note 6)	1 250	5000
Arsenic Anhydride, arsenic acid (V) and/or its salts	1	2
Arsenious Anhydride, arsenic acid (III) or its salts	0,1	0,1
Bromine	20	100
Chlorine	10	25
…	…	…
LPG	50	100
Fluorine	10	20
Formaldehyde (concentration ≥ 90 %)	5	50

Clauses 6 (Notification), 7 (Major Accidents Prevention Policy) and 8 (Safety Report) of the Legislative Decree 334/99 contain fundamental legislative requirements.

As for clause 6, the notification should contain:

- Name of the plant manager and plant address, Manager office or domicile;
- Name of the person in charge of the plant;
- Information about dangerous substances, their nature and physical form;
- Operations performed in the plant or storage;
- Information about the neighbouring environment.

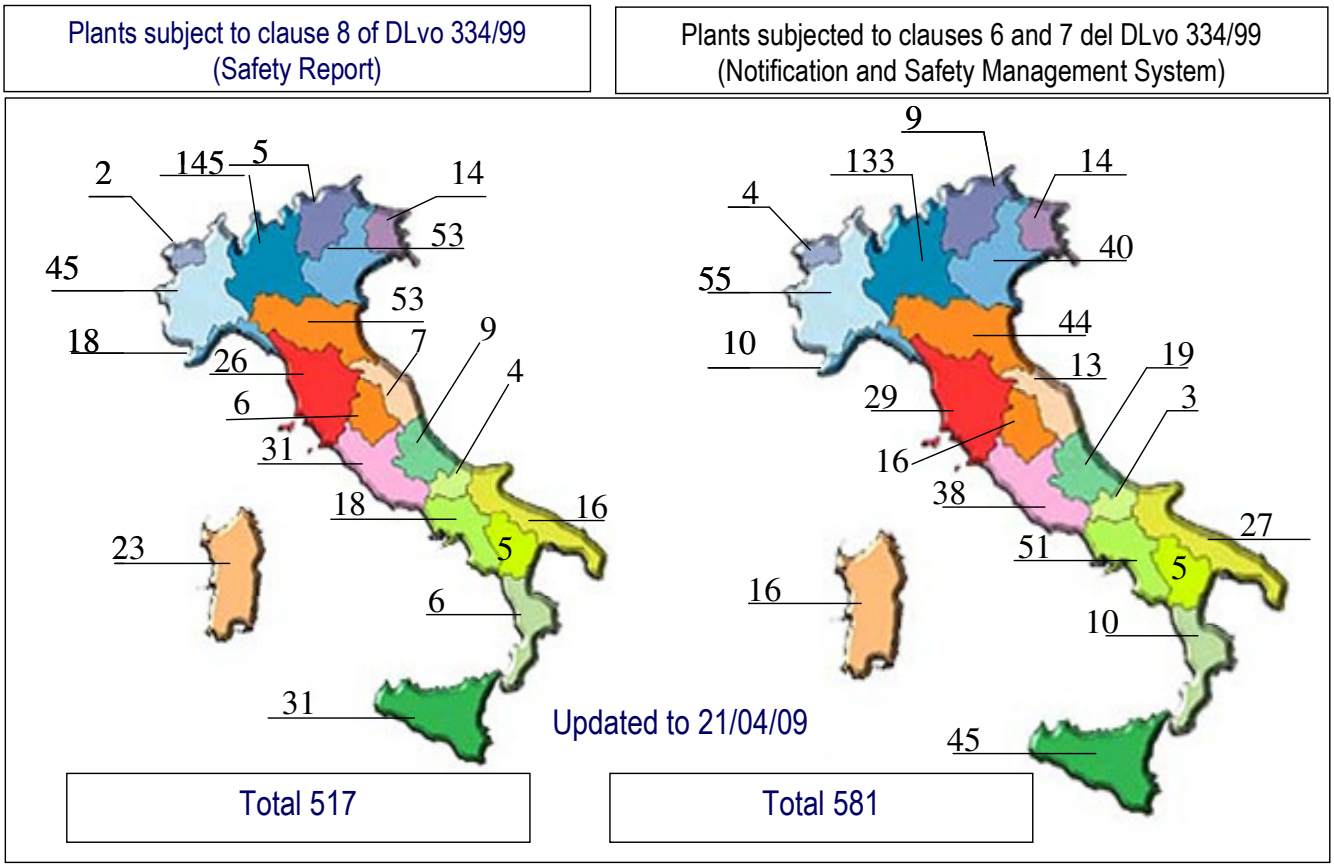
As for Clause 7, the plant manager should write a document defining the major accidents prevention policy of the plant, comprising the Safety Management System (the Italian acronym is SGS) application programme.

As for clause 8, for factories where dangerous substances are present in quantities equal or higher to the ones reported in column 3 of Annex 1, the manager should write a safety report declaring that:

- a Safety Management System is applied;
- the major accident hazards have been identified and suitable measures needed to prevent them and to limit their consequences for man and the environment have been adopted;
- the design, construction, use and maintenance of any installation, storage, equipment and infrastructure related to the operations of the factory are sufficiently safe and reliable;
- the Internal Emergency Plans (the Italian acronym is PEI) have been issued and relevant information has been transmitted to the competent authority (the prefect) for the preparation of the External Emergency Plans.

For general interest, Figure 4.39 (below) shows the distribution of major hazard industrial activities across the Italian territory.

Figure 4.39 – Distribution of Major Hazard Industrial Activities across Italy



The Validation of Safety Reports is the duty of the Regional Technical Committee (CTR), which is composed of public and private stakeholders. CNVVF is one of the public stakeholders. The main tasks of the CTR are:

- to receive the notifications (secretary) transmitted by the plant's manager;
- to start, by means of specific working groups, the examination of the safety reports;
- to issue the final provision, taking into account the judgement of the relevant working group;
- to transmit the closing papers to other authorities for specific actions.

The Safety Report is a complex document requiring detailed analysis of many interactions. Specific tools are used for this reason, such as Risk Analysis, Accident Scenario Models, and Risk Assessment. Figure 4.40 (overleaf) shows a risk analysis tool used within the Safety Report. Figure 4.41 (also overleaf) shows examples of three Accident Scenario Models. For each outcome scenario, it is possible to calculate or simulate the effects in terms of temperature, pressure, concentration of toxic substances using simple and advanced models. Damage for people, property and environment can be quantified for each scenario. So, the Major Industrial Hazards and the Fire Safety Engineering approaches to Fire Prevention share similar philosophies, both using event models and a safety management system. All of this, coupled with the Classic Fire Prevention approach, forms an Integrated Overall Fire Prevention System for Italy.

Figure 4.40 – A Risk Analysis Tool used within the Fire Safety Report

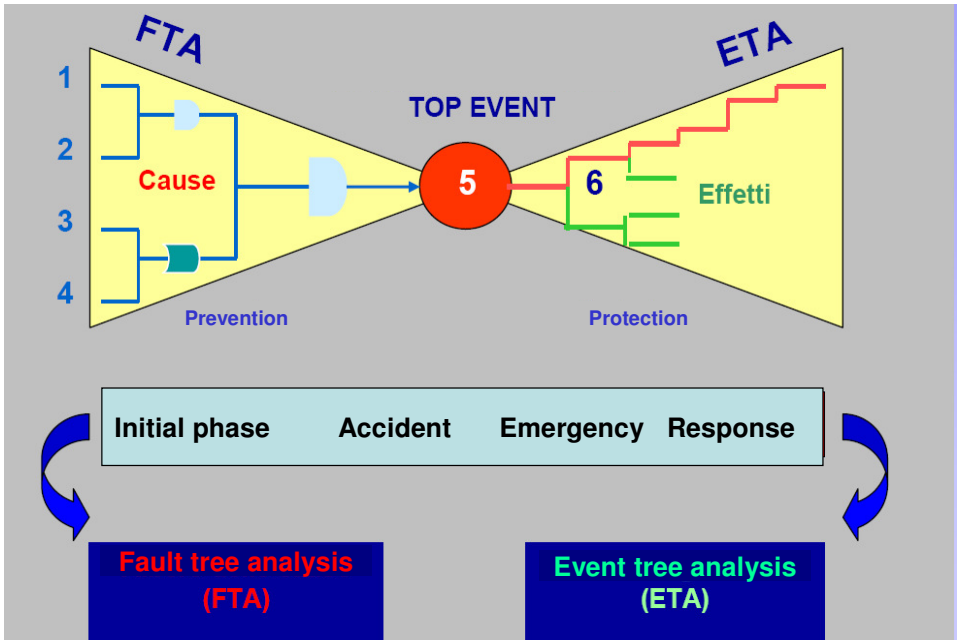
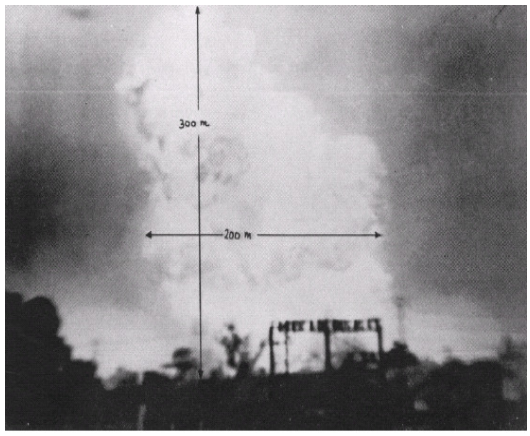


Figure 4.41 - Accident Scenario Models

Pool Fire

Fireball



Jet Fire

4.14 Fire Prevention within Historic Buildings in Italy

This presentation was delivered by Ing. Luca Nassi, Engineer and Fire Officer within Comando Provinciale dei Vigili del Fuoco di Siena.

Luca Nassi provided an introduction to some of the challenges of assessing and managing fire risk within historic buildings across Italy. On many occasions, the prescriptive approach to fire prevention cannot be used because of the complexities of these structures and their uses. Instead, a performance-based approach is now being implemented in order to better assess and manage risk of fire within some heritage buildings. Luca also described how the performance-based approach and fire safety engineering have been used at Santa Maria della Scala in Siena in order to improve safety and reduce fire risk.

Fires within Historic Buildings in Italy
Italy is a country/museum full of heritage and historic buildings and the problem of fires in these buildings is very real. Most of the major fires in historic buildings happen during renovation or during their normal life: examples are the fire in the Chapel of Guarini (Turin, 1997) where the Holy Sindon (the Shroud) is situated or the fire in the theatre "La Fenice" (Venice, 1996).

Figure 4.42 – The Chapel of Guarini and the Sindon

Figure 4.43 – The Theatre "La Fenice"

Also the necessity of new occupancies can increase the danger of fire in heritage buildings. The hotel "Molino Stucki" in Venice is an example (see Figure 4.44, overleaf). The establishment of a variety of different activities, such as restaurants, conference halls, shopping malls and so on is important to give life and access to the structure and to assure its maintenance but it can lead to problems concerning public safety and the preservation of its cultural assets.

Figure 4.44 – Hotel Molino Stucky in Venice, Italy

In Italy both the Ministry for Cultural Heritage (Mi.B.A.C.) and the Ministry of Interior (the Italian Home Office) have responsibilities on preservation of these buildings but often conservation issues do not match with fire protection criteria (water vs paper conservation, structures vs egress stairs etc.). A way to match conservation issues and fire protection is to use the performance based approach to fire safety using fire safety engineering methods.

An example of the use of this kind of approach in Italy is the monumental structure of Santa Maria della Scala in Siena (Figure 4.45, below). This building was one of the first hospitals in Europe. The complex was built in XIII century and is composed of 9 levels, some of which are beneath direct street access. The site has a total surface area of 38000 m^2.

Figure 4.45 - Aerial View of Santa Maria della Scala in Siena, Italy

After the closing of the hospital, the goal of the intervention was to restore the historic structure and to transform it into in an integrated museum complex. For example an

Archaeological Museum was placed at the basement of the structure which consists of an intricate labyrinth of tunnels called “cunicoli” (see Figure 4.46, below).

Figure 4.46 - Map of the Intricate Labyrinth of Tunnels (“Cunicoli”) within Santa Maria della Scala in Siena, Italy

This area offers many problems in terms of way of egress and compartmentation. Due to the impossibility of using a prescriptive approach, a performance based approach was used to demonstrate the possibility to use the “cunicoli” as escape routes for people without creating significant additional danger. The use of zone models (see Figure 4.47, below left) and CFD (Computational Fluid Dynamics) (see Figure 4.48, below right) programs were very useful in demonstrating this objective.

A radio frequency system has now been implemented to monitor all visitors and to facilitate rapid egress of the “cunicoli” in the event of a fire or emergency. This has significantly improved fire safety within the museum.

Figure 4.47 – Zone Model of the “Cunicoli”

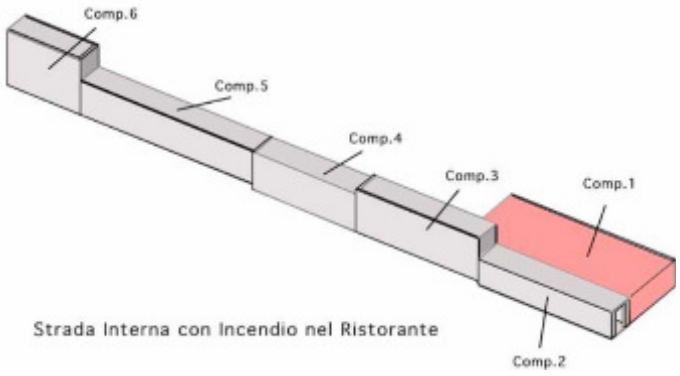
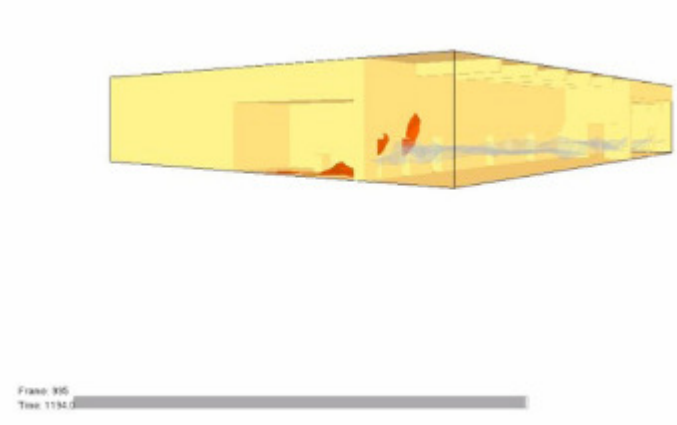


Figure 4.48 – CFD Model of the “Cunicoli”



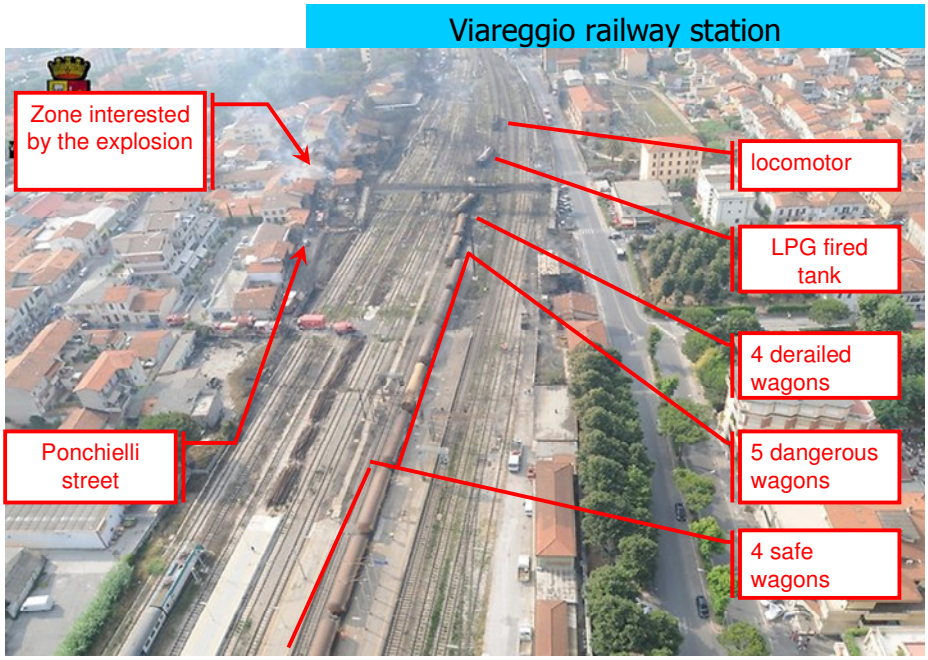
4.15 The Explosion of L.P.G. Tanks at a Railway Station in Viareggio, Italy on 29th June 2009

This presentation was delivered by Ing. Antonio Pugliano, Engineer and Fire Officer within the Regional Directorate of CNVVF in Lombardia (Italy)

Antonio Pugliano described a recent explosion that occurred at a railway station in Viareggio, Italy in June 2009. Antonio described the scene and destruction caused by the explosion and then described and illustrated how fire fighter's approached the scene to rescue victims and empty a number seriously damaged tanks of L.P.G. This was a successful intervention by fire fighters as it showed how those commanding the scene had assessed the risk of further fires and explosions and had managed the incident appropriately in order to reduce, and on this occasion prevent, the risk of further emergencies.

Overview of the Scene of the Explosion at Viareggio Railway Station
On 29th June 2009, a train carrying 14 L.P.G. tanks derailed in Viareggio railway station provoking the leakage of 90 m^3 of gas from one tank which led to an explosion and significant fires in the surrounding area. The accident caused 33 deaths and 25 injured. Figure 4.49 (below) shows an aerial photograph of the scene of the accident.

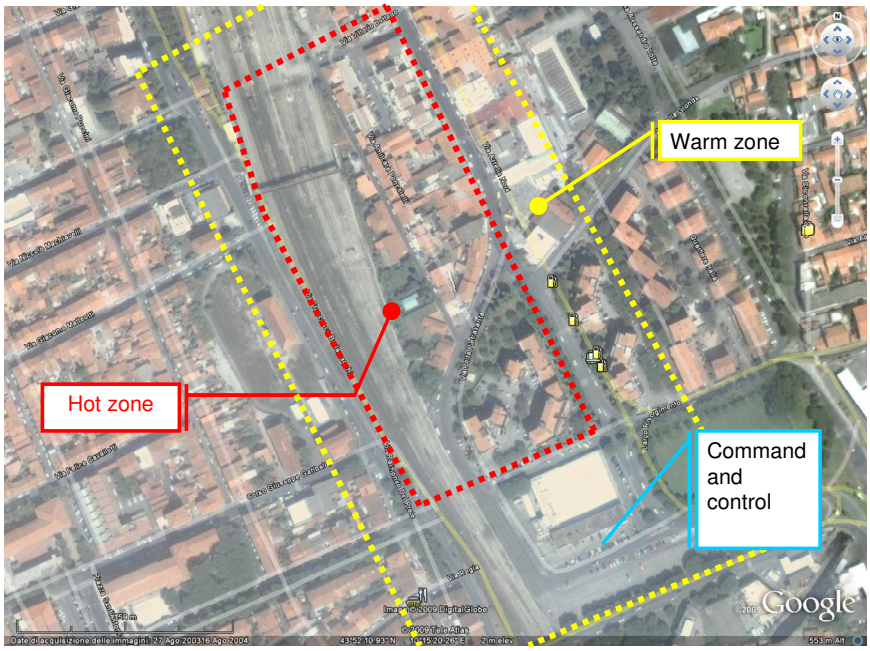
Figure 4.49 – Aerial Photograph of the Explosion at Viareggio Railway Station on 29th June 2009



Application of the Incident Command System at the Scene of the Explosion
The Italian fire brigade divided the scenario into zones and applied the Incident Command System (ICS). The three zones, the "Hot Zone", the "Warm Zone" and the "Command and Control Zone", are illustrated in Figure 4.50 (overleaf). The Hot Zone contained 13 tanks full of L.P.G. (58 tonnes), with four tanks that had rolled over and five seriously damaged tanks. The Warm Zone had experienced the direct effects of the explosion, but did not

contain any tanks of L.P.G. The Command and Control Zone was created towards the periphery of the Warm Zone and contained the Crisis Unit.

Figure 4.50 – Division of the Incident Ground at Viareggio Railway Station into a "Warm Zone" and a "Hot Zone"



The images below and overleaf (Figures 4.51, 4.52 and 4.53, below and overleaf) were taken at the scene of the incident and provide an illustration of the areas within the three different zones.

Figure 4.51 – The Command and Control Zone at the Viareggio Railway Station Explosion

Figure 4.52 – The Warm Zone at the Viareggio Railway Station Explosion

Figure 4.53 – The Hot Zone at the Viareggio Railway Station Explosion

The Objectives of the Intervention at the Scene

The aims for fire fighters attending the scene were:

- To save people in the surroundings of the station
- To make the L.P.G. safe from further explosions by the emptying the damaged tanks

Fire fighters used the standard procedure for emptying the damaged L.P.G. tanks. This procedure is shown in Figures 4.54 and 4.55 (overleaf) and was explained in further detail to workshop delegates during the field visit to Scuola di Formazione Operativa (SFO) in

Montelibretti (see Chapter 5). The intervention by fire fighters ensured that lives were saved and the damaged L.P.G tanks were emptied without any problems.

Figure 4.54 – Diagram Illustrating the Standard Procedure for Emptying L.P.G. Tanks

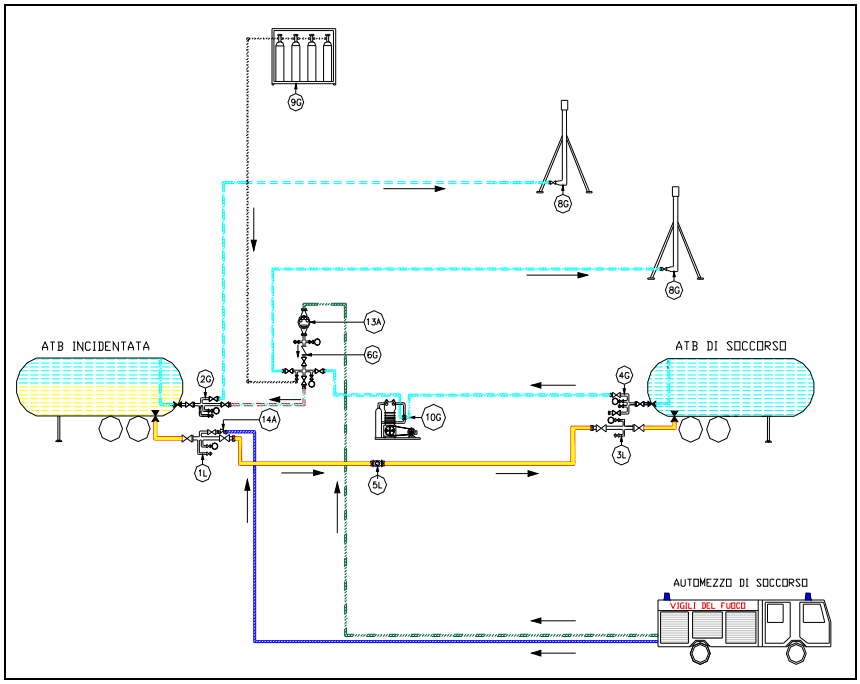


Figure 4.55 - Fire Fighters Emptying L.P.G. Tanks at the Scene of the Viareggio Railway Station Explosion

5. Field Visits

The Roma Workshop involved three field visits to different facilities owned and operated by CNVVF. The first field visit was completed on day one of the workshop and was to the Headquarters of the Comando Provinciale dei Vigili del Fuoco di Roma in central Rome. During this fieldtrip, delegates were introduced to the Roma Provincial Command and the City of Rome. Two field visits were also held on day three of the workshop and included visits to the Scuola di Formazione Operativa (SFO) in Montelibretti and the Passive Protection Office laboratory facilities of the Direzione Centrale Prevenzione e Sicurezza Tecnica (DCPST) in Rome. The three sections of this Chapter provide further information about each of the field visit locations.

5.1 Field visit to the Headquarters of Comando Provinciale dei Vigili del Fuoco di Roma

The Provincial Fire Department of Rome belongs to the Department of Firefighters, of Public Rescue and of Civil Defence of the Italian Ministry of the Interior. The Fire Department of Rome is part of the Local Offices of CNVVF situated across the Italian territory. The Fire Department of Rome has responsibility for Fire Prevention and Public Rescue.

The Provincial Fire Department of Rome constitutes of 32 Fire Stations:

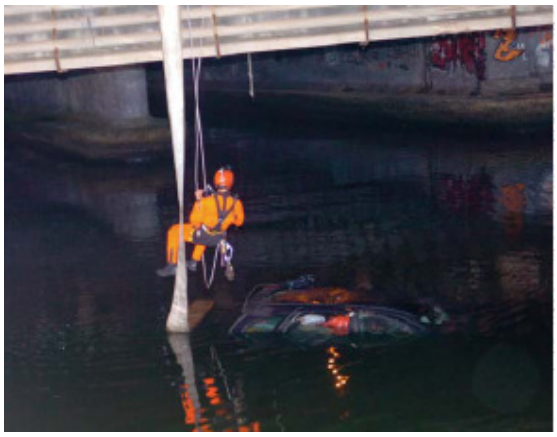
- 2 are at Rome's international airports (Fiumicino and Ciampino),
- 12 are in Rome's central and metropolitan area
- and 18 are located in the provincial surroundings of the city

This system allows the Department to realise coverage in short response times over the whole Province, optimizing the deployment of human resources. Te Department has 1,600 units, active on 4 shifts lasting 12 hours per shift. These services are provided 24 hours a day, every day of the year.

The Central Fire Station is situated downtown in Via Genova 3a (see Figure 5.1, below). Figure 5.2 (overleaf) illustrates some of the typical fire and rescue operations that the Provincial Fire Department of Rome must complete.

Figure 5.1 – The Central Fire Station at Via Genova 3a and its Operational Room

Figure 5.2 – Typical Rescue Operations Completed by Comando Provinciale dei Vigili del Fuoco di Roma



Among the other many tasks, the Fire Department in Rome cooperates with Organizations and Associations in order to spread the knowledge on fire matters and to improve the behaviour to avoid fires and to manage a fire occurrence. Three specific examples of this work include:

- Cooperation with the Ministry of Public Education to deliver courses on fire in schools;
- Creation of educational booklets and internet web-based assistance to help citizens know the fire dangers within their homes;
- One-day experience in fire danger and management of a fire occurrence.

Such a one-day experience has recently been organized and held for the United Nations through the “Fire Prevention Day” at the World Food Programme Headquarters in Rome in Winter 2009. Figure 5.3 (overleaf) shows a poster produced for the Fire Prevention Day at the WFP.

Figure 5.3 - Poster Produced for the Fire Prevention Day at the World Food Programme Headquarters in Rome

As you can see from Figure 5.3 (above), the Fire Department of Rome (we call it in Italian: “Comando Provinciale dei Vigili del Fuoco di Roma”) has number 73 as its identification number among all of the Fire Departments in Italy. This number comes from the first alphabetical order used to identify the cities in Italy where the fire departments were settled. The letters VVF stand for “Vigili del Fuoco” that is Fire Fighters in Italian.

5.2 Field visit to Scuola di Formazione Operativa in Montelibretti

On Day Three of the workshop, delegates were transported to the Scuola di Formazione Operativa (SFO) in Montelibretti for a guided tour and L.P.G. demonstration. The School is a Polyfunctional Centre situated in the Municipality of Montelibretti within the Rome district, near to Passo Corese (see Figure 5.5 for a map of the area). The Centre covers an area of more than 17.5 hectares (43.24 acres) and has a perimeter of 18 Kilometres.

Figure 5.4 – The ANSFR Project Team and officers from CNVVF at the Scuola di Formazione Operativa

According to Ministry of the Interior Decree-Law 7th March 2002, the Operational Training School of Montelibretti provides professional fire fighting training courses for all operative personnel of Corpo Nazionale dei Vigili del Fuoco (the National Fire Fighters' Service in Italy). Training course programmes are constantly developed and updated, with the help of teachers and professionally qualified instructors, who are registered on a special national board. The School provides the planning and management of training facilities and structures that are used for practical operational training. Officers at the school are responsible for management of the School property buildings, facilities and common services in the Polyfunctional Centre.

Figure 5.5 – The Location of Scuola di Formazione Operativa in Montelibretti

Figure 5.6 - Aerial Photographs of Scuola di Formazione Operativa in Montelibretti

The operational school has:

- 6 classrooms;
- 1 informatics' room;
- 1 lecture hall with 400 places;
- Accommodation for 630 students;
- Gymnasium.

The specific training facilities of the school include:

- Fire house (see Figure 5.7, overleaf);
- Water rescue training pool (see Figure 5.7, overleaf);
- Smoke chamber & confined space training;
- Well and sewerage pipes training structures;
- L.P.G. training flange and cylinder (see Figure 5.7, overleaf);
- Ship trainer (see Figure 5.7, overleaf);
- Aircraft simulator;
- Metro tunnel with the wagon;
- Car accident simulation tunnel;
- Hydrocarbon storage tank extinguishment;
- Various training areas (fire extinguishers, motor pump, base camp …);
- Outdoor training space;
- Rescue tower (for work at height training).

Figure 5.7 – Photographs of some of the Facilities at Scuola di Formazione Operativa in Montelibretti

Water Rescue Training Pool

Ship Trainer

Fire House

L.P.G. Flange

5.3 Field visit to the Passive Protection Laboratories of the Direzione Centrale Prevenzione e Sicurezza Tecnica (DCPST) in Roma

On Day Three of the workshop, delegates were given a detailed guided tour of the Passive Protection Laboratories of DCPST in Roma. The following sub-sections will present the information that was presented during this tour. This section is divided into two key parts. Part One provides an overview of the Italian Ministerial Decrees (DMs) for Fire Resistance and Reaction to Fire. Part Two then describes the main activities of the Passive Protection laboratories. Part Two also includes a number of images of the testing facilities and equipment that are used within the laboratories.

PART 1: The Italian Decrees for Fire Resistance and Reaction to Fire

1 Fire safety – general objectives and passive protection decrees

The general objectives of fire protection are to limit risks with respect to the individual and society, neighbouring property, and environment, in the case of fire by fulfilling the following main goals (ID 2 CPD 89/106/CEE):

1. The reduction to a minimum of the fire ignition probability;
2. the load bearing resistance of the construction can be assumed for a specified period of time needed to ensure the rescue of occupants;
3. the generation and spread of fire and smoke within the works and to neighbouring construction works are limited;
4. the occupants can leave the works or can be rescued by other means;
5. the safety of rescue teams is taken into consideration

Among the various measures aimed to the fulfilment of the aforementioned objectives, the ones related to fire passive protection play an important role and, in some cases, even decisive.

The new Italian decrees which acknowledged the relevant European guidelines on reaction to fire of materials and on fire resistance of products and members are today, in the passive protection field, a reality; nowadays these new decrees should be considered as tools with very high technical-scientific contents, able to offer the engineering works designer the best and more modern references in the frame of complex matters such as the fire-related ones.

These four decrees are hereafter listed.

Reaction to fire:

- Ministerial Decree (D.M.) 15th March 2005: "*Reaction to fire requirements for construction products installed in occupancies regulated by specific fire prevention technical rules according to the European classification system*";
- D.M. 10th March 2005: "*Reaction to fire classes for construction products to be used in works for which the fire safety requirement is prescribed*".

Fire resistance

- D.M. 16th February 2007: "*Fire resistance classification of construction works products and members*";
- D.M. 9th March 2007: "*Fire resistance performance of buildings for occupancies subject to a fire brigade control*".

They introduce:

- new test methods for products;
- new and more modern design criteria for engineering works (fire resistance)

They also try to conciliate all the "technical innovations" to the traditional fire prevention activity which our local Fire Brigade Headquarters are in charge of, with the aim of the **fire prevention certificate** issuing (an act provided for by a specific Italian law).

2 Reaction to fire

"Reaction to fire" is one of the main passive protection strategies and it represent the participation degree of a **material** to a fire. For **material** we intend a component (or more component variously associated) that can participate to combustion depending to its (their) chemical nature and the effective installation conditions for the final use.

According to fire tests results, a so called "reaction to fire class" is granted to a material
According to Italian regulations, this class can be 0 for incombustible materials, or 1, 2, 3, 4, 5 as the participation to combustion of the material under test increases. For padded products (sofas, mattresses, *sommier*, etc.) the Italian fire reaction class is always identified according to their participation grade to a fire, but by the marks 1IM, 2IM and 3IM.

2.1 The DM 10th march 2005 "Reaction to fire classes for construction products to be used in works for which the fire safety requirement is prescribed"

The Italian decree that, more than 23 years after its issuing, still regulates most of the materials classified for reaction to fire is the DM 26/06/84 containing "Reaction to fire classification and homologation of materials for fire prevention".

This decree defines and codifies the relevant test methods and introduces the **homologation**, which represents the marketing authorization of products to be installed, if relevant, in occupancies subject to specific fire prevention standards. With the DM 10/03/2005, issued in actuation of the "Construction Product Directive" (89/106/CEE) and with the aim of the CE marking, a deep change has happened in the relevant field since the aforementioned decree introduces new test methods (European standards) and it substantially modifies the marketing procedures of products.

The new European reaction to fire classification, introduced by the recently issued DM 10th March 2005 (for what concerns "construction products" with reaction to fire requirements), is completely different from the Italian one, not only for what concerns the test methods used for the classification but for the essential physical parameters monitored and

recorded during tests too. According to this new decree, those products are subdivided in accordance to the following classification:

A1, which identifies the material with the best fire reaction behaviour (least participation), then, in increasing order (i.e. with increasing fire participation), **A2, B, C, D, E, F**. Those classes are marked with the subscript **FL** if they refer to floor classification and with the subscript **L** when they refer to linear-shaped materials such as the ones used in thermal insulation of pipelines.

Two additional classifications should be added to those already presented: *s* (smoke) and *d* (dripping). These latter parameters are then subdivide in three different levels marked with 0, 1 or 2, according to the quantity of "substance" produced during the tests.
The field of application of the decree issued in 2005 is limited only to "construction materials or products" (i.e. limited to products which are produced for incorporation in a permanent manner in the works and placed as such on the market), therefore not including those products relevant for reaction to fire such as curtains or padded furniture.

2.2 The DM 15th March 2005 "Reaction to fire requirements for construction products installed in occupancies regulated by specific fire prevention technical rules according to the European classification system"

The DM 15th March 2005 defines the correspondence between the current Italian classes and the European ones (or Euroclasses) for what concerns the application of the new classes in occupancies subject to fire prevention inspections on the Italian territory.

3 Fire resistance

Fire Resistance is the other main passive protection strategy. It includes "**Loadbearing capacity**" for structural elements and structures as a whole, as well as "**separating function**" in case of fire for separating elements both structural, like walls or floors, and non structural like doors and partitions.
By adopting fire resistance strategies it is possible to avoid, in case of a sudden structural failure due to fire:

- Damage to occupants during their stay in the building;
- Delayed or impossible rescue intervention as well as danger for fire rescue teams;
- Unsuccessful performance of fire systems and their components.

3.1 The DM 16th February 2007: "Fire resistance classification of products and members in construction works"

It originates from the basic exigency to fulfil the European duties related to the actuation of the EU Commission decision n. 2000/367/CE and 2003/629/CE concerning fire resistance tests and classification, and of the EU Commission recommendation n. 2003/887/CE concerning the use of Eurocodes for the design of fire resistance structures.
It consists in a normative part as well as four technical annexes, which in turn make reference to EN standards for tests and classification of fire resistant products and building members, and to UNI and EN standards for the structural design (Eurocodes)

This decree applies to all those products / members that are required to fulfil the fire resistance requirements.

The DM 16th February 2007 introduces in Italy:

- 22 EN test standards;
- 3 EN standards for fire resistance products and structural members classification;
- 6 EN standards for the experimental characterization of fire protection materials;
- 7 EN standards for structural design (Eurocodes fire-parts);
- 15 tables for a quick design/verification of fire resistance members.

3.2 The DM 9th March 2007: "Fire resistance performance of buildings for occupancies subject to a fire brigade control"

It applies to buildings where occupancies subject to the Italian National Fire Brigade control are present. It represents a reference of general validity both for the modernity of the exposed approach and for the close relation with the contents of the EN 1991-1-2 "Action on structures exposed to fire".

This provision:

- summarizes in one document all of the provisions issued in the course of years in Italy on fire resistance, updating them and harmonizing them to the European regulation;
- it introduces, for the verification of structures exposed to the action of fire, some principles typical of the Fire Safety Engineering (natural fire curves).

This decree settles different Performance Levels that may be required to a building according to the fire safety goals to be met (see Table 5.1, below).

Table 5.1 – Performance Levels of the Ministerial Decree 9th March 2007 - Fire Resistance Performance of Buildings for Occupancies Subject to a Fire Brigade Control

Level I	No specific fire resistance requirement where the consequences of failing the requirements are acceptable or where the fire risk is negligible
Level II	**Maintenance of fire resistance requirements for a period adequate for the evacuation of occupants in a safe space outside the building**
Level II	**Maintenance of fire resistance requirements for a period adequate for the conduction of the emergency**
Level VI	Fire resistance requirements such that, after the end of a fire, the damage of building is limited
Level V	Fire resistance requirements such that after the end of fire the building is fully functional

Performance level III is generally the most adequate to occupancies subject to Fire Fighters inspections.

The fire resistance classes required for level III are function of design fire load density ($q_{f,d}$), determined by the following formula:

$$q_{f,d} = \delta_{q1} \cdot \delta_{q2} \cdot \delta_n \cdot q_f$$

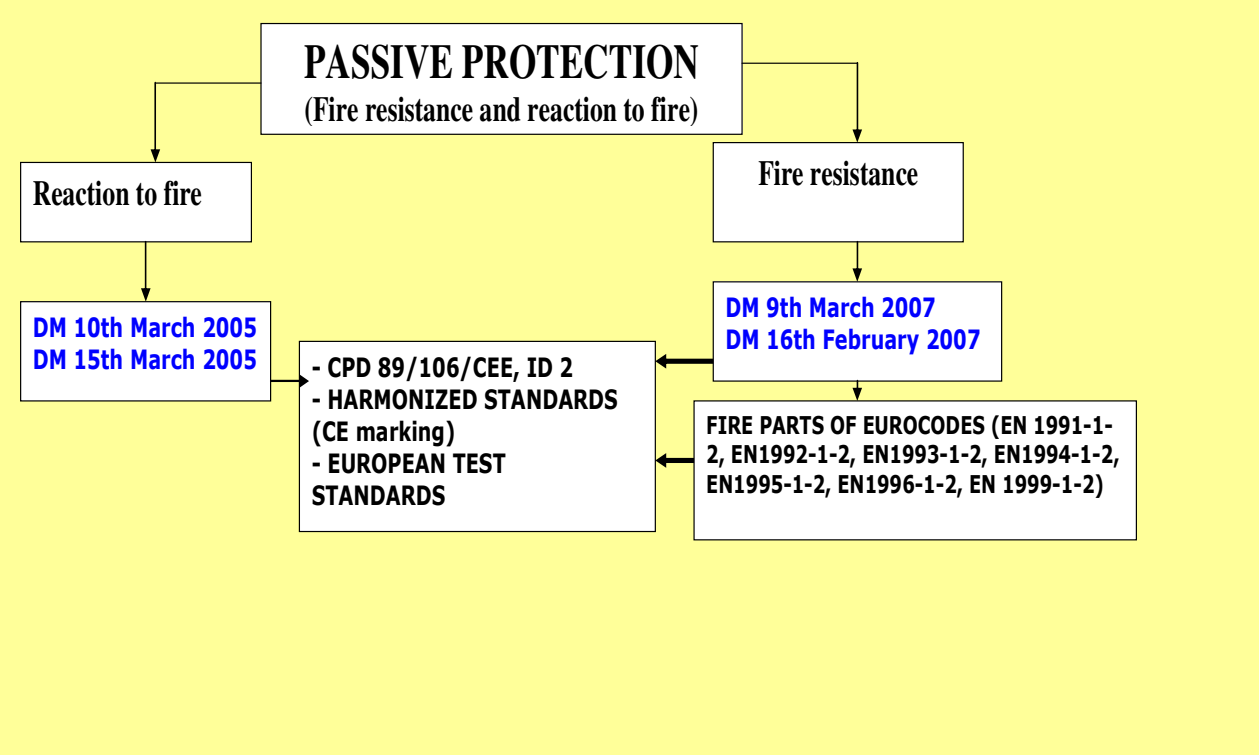
where fire load density is measured in MJ/m^2.

Specifically, q_f represents the fire load density to be determined by the following formula:

$$q_f = \frac{\sum_{i=1}^{n} g_i \cdot H_i \cdot m_i \cdot \psi_i}{A} \qquad \left[MJ / m^2 \right]$$

Figure 5.8 (below) summarizes what has been described so far.

Figure 5.8 - Summary of Legislative Decrees Concerning Passive Protection



PART 2: Passive Protection Office – Activities and Laboratories

4 Main activities

The Passive Protection Office is one of the eight offices of the Central Direction for Prevention and Technical Safety (DCPST), while DCPST is one of the Central Directions of the Department of Fire fighters, Public Rescue and Civil Defence (see Figures 5.9 and 5.10, below).

Figure 5.9 – Organization Structure of Corpo Nazionale dei Vigili del Fuoco

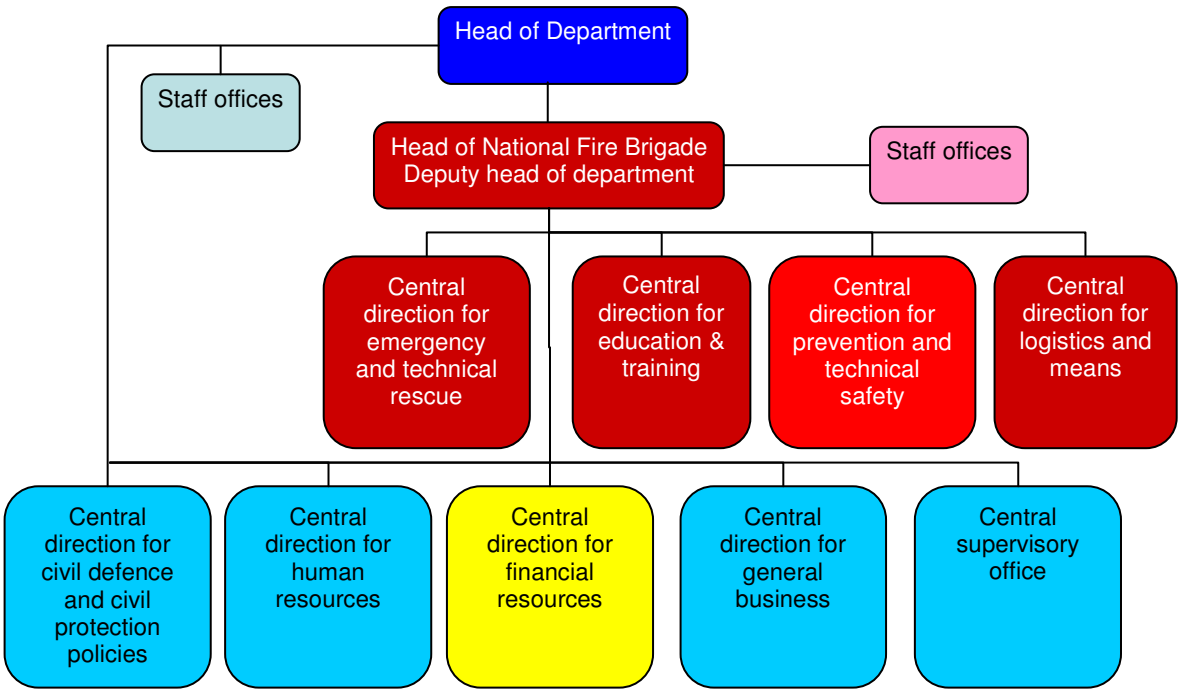
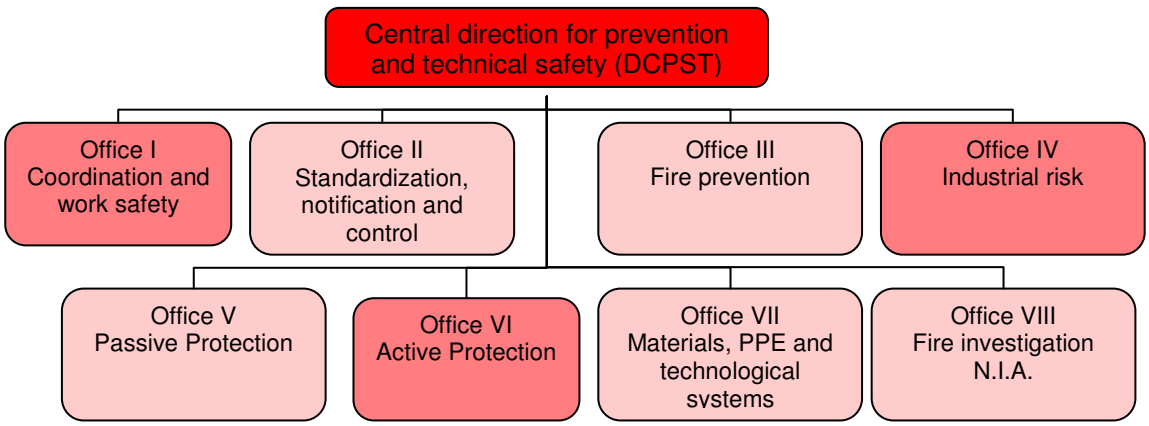
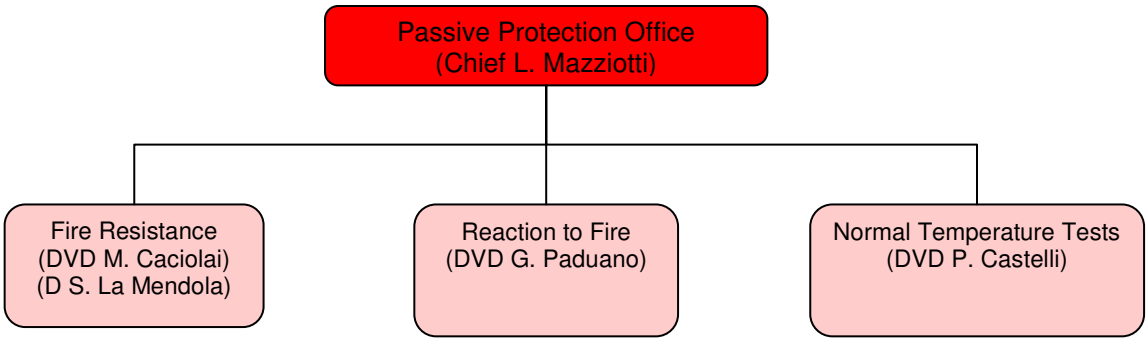


Figure 5.10 – Organization Structure of the Central Direction for Prevention and Technical Safety (DCPST)



The Passive Protection Office is organized into three main sectors (as shown in Figure 5.11, below), each one provided with a specific laboratory.

Figure 5.11 – Organization Structure of the Passive Protection Office within the Central Direction for Prevention and Technical Safety (DCPST)



The main activities carried out by the Reaction to Fire and Fire Resistance laboratories are:

- to perform tests according to Italian test standards;
- to perform tests according to European test standards;
- to provide an accreditation service to third-party agencies, according to the inter-ministerial decree 156/2003, related to the Construction Products Directive (CPD 89/106/CEE);

Delegates from Passive Protection Office also participate to/coordinate relevant working groups of the Italian standardization body (UNI) as well as specific working groups of CEN (European Committee for Standardization).

DCPST, through Office II (Standardisation, Notification and Control), is also member of EOTA (European Organization for Technical Approval), and Passive Protection officers usually cooperates with it providing technical assistance in writing specific guidelines or in issuing technical approvals. Moreover, the Passive Protection Office is also a member of EGOLF (European Group of Organisations for Fire Testing, Inspection and Certification), open to all independent nationally recognised organisations that test, inspect or certify materials, components and products in support of legislation.

Other activities carried out by the laboratories of Passive Protection Area are:

- to provide technical support to NIA for fire investigation activities (fire ignition, propagation and development analyses, structural assessments, etc.);
- to develop scientific researches and studies, also in partnership with universities, research centres, etc.;
- to provide technical support and advices when requested by the Public Prosecutor Office.

5 Testing activities

5.1 Italian reaction to fire tests

UNI 8456:2008: Combustible materials subject to flame exposition on both faces. Reaction to fire by the application of a small flame

UNI 8457:2008: Combustible materials subject to flame exposition on one face. Reaction to fire by the application of a small flame

Figure 5.12 - UNI 8456/8457 – Combustible Materials Subject to Flame Exposition

Figure 5.13 - UNI 9174:2008 Reaction to Fire of Materials Subject to Flame Ignition under Radiative Heat Exposition

Figure 5.14 - UNI 9175:2008: Reaction to Fire of Padded Furniture (armchairs, sofas, etc..) Subject to the Action of a Small Flame

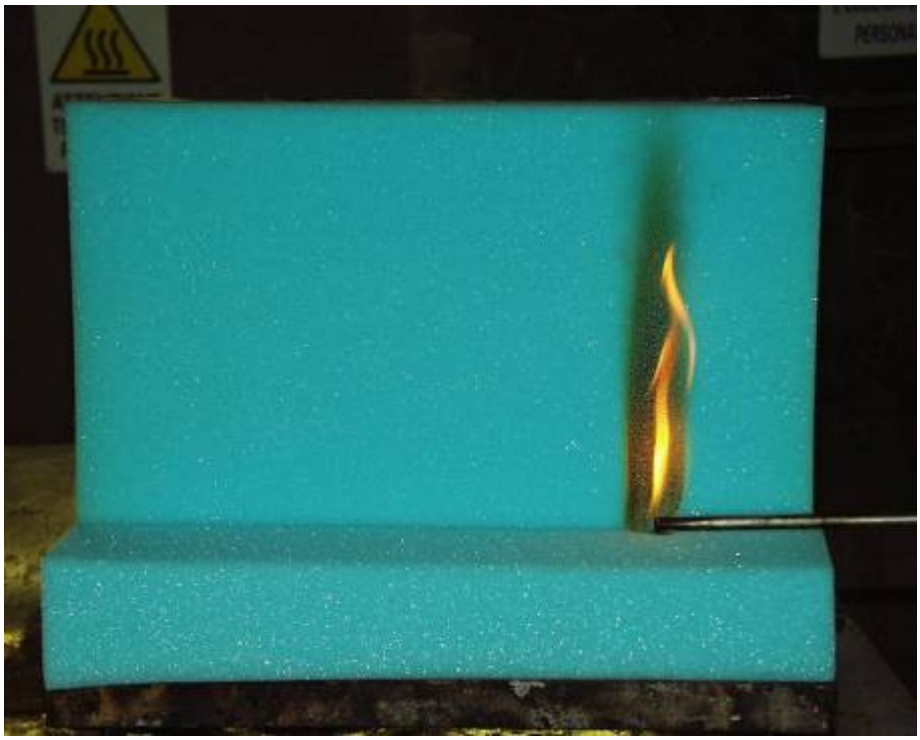


Figure 5.15 - UNI – ISO 1182 Non-Combustibility Test for Construction Products

5.2 European reaction to fire tests

Figure 5.16 - EN ISO 1716 - Determination of the Heat of Combustion for Construction Products

Figure 5.17 - UNI EN ISO 11925-2 European Small Flame Test for Flammability Tests on Construction Products

Figure 5.18 - UNI EN 13823 Single Burning Item (SBI) Equipment for Medium-Scale Tests on Construction Products

Figure 5.19 - UNI EN ISO 9239-1 Radiative Panel for Tests on Construction Products to be Installed at Floor

ISO 5660
Cone calorimeter. **Small scale** materials characterization by determination of:

- Heat Release Rate
- Gasification heat
- Time to ignition
- Ignition temperature
- Smoke production rate

Figure 5.20 – Cone Calorimeter

ISO 9705
Room corner test. **Full scale** characterization of materials by the determination of:

- Heat Release Rate
- Gasification heat
- Time to ignition
- Ignition temperature
- Smoke production rate

This system, in addition to the standard room (dimension 3,6 x 2,4 x 2,4 m), is also equipped by a second larger room and by a corridor. Therefore it is possible to simulate real fires for more complex geometrical configurations.

Figure 5.21 – Room Corner Test Facility

Figure 5.22 – Other Equipment - Spectrophotometric analyser FT-IR

5.3 European fire resistance tests facility

Figure 5.23 – Horizontal Furnace within the Fire Resistance Laboratory

Horizontal furnace – internal view

Horizontal furnace – external view

A vertical furnace is also present in the fire resistance laboratory.

Figure 5.24 – The System Command/Control Panel for the Furnace

5.4 Some examples of fire resistance test methods

Figure 5.25 - Test on a glazed fire door – Unexposed face before test

Figure 5.26 - Test on a Glazed Fire Door – exposed face after test

Figure 5.27 - Fire Resistant Floor Test – Unexposed face before test

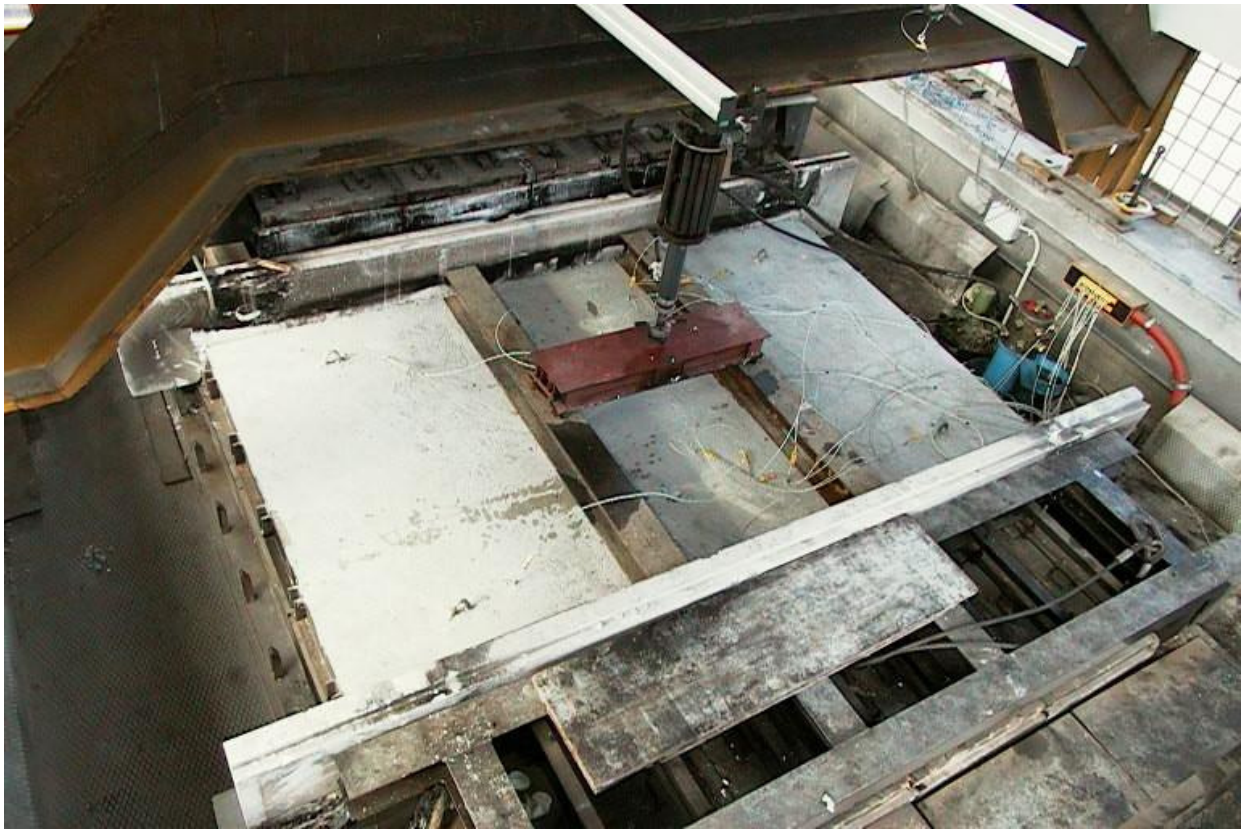


Figure 5.28 - Fire Resistant Floor Test – Side view after test

5.5 Normal temperature tests laboratory

The main activities carried out by this laboratory are:

- testing equipment and material for the National Fire Brigade, in order to verify the fulfilment of requirements fixed in specific tenders issued by the Fire Fighter Department;
- testing mechanical strength of members made of concrete, steel, etc.;
- testing the functionality of fire doors according to the European regulations;
- testing the opening devices of fire doors.

5.4 Field visit to the Chemical Product Laboratory within the Materials PPE and Technological Systems of the Direzione Centrale Prevenzione e Sicurezza Tecnica (DCPST) in Roma

After being taken on a tour of the Passive Protection Laboratories at Campennelle, workshop delegates were then taken on a short tour of the Chemical Product Laboratory (CPL), which is located on the same site. This section will provide a brief overview of how and why the CPL was created and introduce the key responsibilities and competencies of the CPL.

In 1974, the General Directorate for Civil Protection and Fire Services of the Ministry of the Interior established, by decree of the pro-tempore Minister of the Interior Taviani, the chemical product laboratory. From the legislative point of view, it was in fact necessary to deepen the studies and to standardize the criteria for the national clothing and equipment supplies of the Italian Fire Organization. But, according to the specific rules issued, it only created an “office” with limited administrative competences and without an appropriate product laboratory for tests and analysis of materials. Later, with the reorganization of the Ministry of the Interior, of the Fire fighters’ Department and the creation of the Central Directorate for Fire Prevention and Technical Safety (DCPST), new competencies in the field of personal protective equipment (PPE) have been assigned to the VII Area of the Central Directorate. In this way, apart from the administrative and legislative point of view, it has been possible to develop the chemical-product field, by performing experiments and doing tests. This is how the CPL was created: studying its competencies first, and than building it. The competencies of the CPL consist of study, research and product tests, as well as in preparing rules useful for experiments, advice and technical evaluations of the rescue equipment used by CNVVF.

Accordingly, three sections have been identified:

- **I Section** competent for the study, research and laboratory tests, as well as for the advices and technical/analytical evaluations
- **II Section** competent for the quality system assessment and the relations with the National Fire Organization
- **III Section** competent for the national and European legislative production, as well as for the training and professional refreshing activities

Two years ago the CPL began to be realized and today it is going to be completed in the buildings of the DCPST, located in the area of the Basic Training School (SFB) of CNVVF in Capannelle, Roma. The laboratory has been equipped with a series of test machines: a high precision digital dynamometer used to evaluate the behaviour of textile materials under loads; a machine for perforation tests on textile materials based on the “Persoz” method; the so-called “Elmendorf” machine used to evaluate the tearing of textile materials and many others such as the Martindale abrasion tester (see Figure 5.29, overleaf), the autowash, the pilling box (see Figure 5.29, overleaf) and so on.

Step by step the equipment of the laboratory will include the supply of machines related to textile material tests, such as biological and stereo microscopes, and those for washing tests. The complete set up of the CPL is still to come. The competencies of the product laboratory within Area VII of DCPST will first concern the clothing materials used by firefighters in rescue operations and will then include other equipment used by fire fighters (helmets, gloves, safety belts, etc).

Figure 5.29 – The Chemical Product Laboratory and some of its Specialist Equipment

Laboratory

Dynamometer

Martindale abrasion tester

Pilling box

6. Conclusions

This final chapter of the handbook presents the conclusions of the Roma Workshop. The Chapter is divided into two sections. The first section discusses the results of the post-event evaluation, including analysis of the feedback from delegates who attended. The second section presents some concluding comments with regards to the workshop and briefly discusses the final ANSFR Project workshop to be hosted in Finland.

6.1 Results of the post-event evaluation

An important element of the workshop was the completion of a post-event evaluation. This thorough evaluation looked at all key elements of the workshop design and delivery to assess whether the workshop aim learning objectives and outputs had been achieved.

Evaluation of the event by the workshop participants
A key part of any workshop event is to collect feedback from the delegates who attend and participate. In order to collect this feedback, the workshop organisers gave each delegate a one page evaluation form to complete (see Appendix 6). This same form was used to gather feedback from delegates attending the Northumberland and Frederikssund-Halsnæs Workshops and will also be used to gather feedback from delegates attending the future workshop to be held in Kuopio. The form presented 7 statements and participants were requested to rate the degree to which they agreed with each statement using an attitudinal measurement scale. The responses available to them were: unsure; strongly agree; agree; disagree; strongly disagree. A space for additional comments was also provided on the form. Evaluation forms were completed anonymously to ensure that participants felt secure providing their true opinions about the event. The strategy employed for this evaluation process is widely regarded as good practice for obtaining constructive feedback on this type of event.

Evaluation forms were completed by 10 individuals who attended the workshop. Responses were provided by delegates from the United Kingdom, Denmark and Finland. Workshop participants and organisers from CNVVF did not complete the evaluation forms because they hosted the event.

Figures 6.1 and 6.2 overleaf present the results of the evaluation forms completed by those who attended. In general terms, all of the responses were very positive, with most participants either “agreeing” or “strongly agreeing” with the statements presented to them on the form. From the results presented in the two graphs, it is reasonable to conclude that those who attended the event believed that:

- The workshop aims and objectives were clearly outlined
- The workshop presenters were engaging and informative
- The activities were stimulating and relevant
- They had learnt something from the event
- They would recommend the workshop to others

In addition:
- Most members of the delegation had their interest held throughout the workshop
- The workshop was relevant to the roles of most of the delegates present

Figure 6.1 – Responses to Evaluation Form Statements (1)

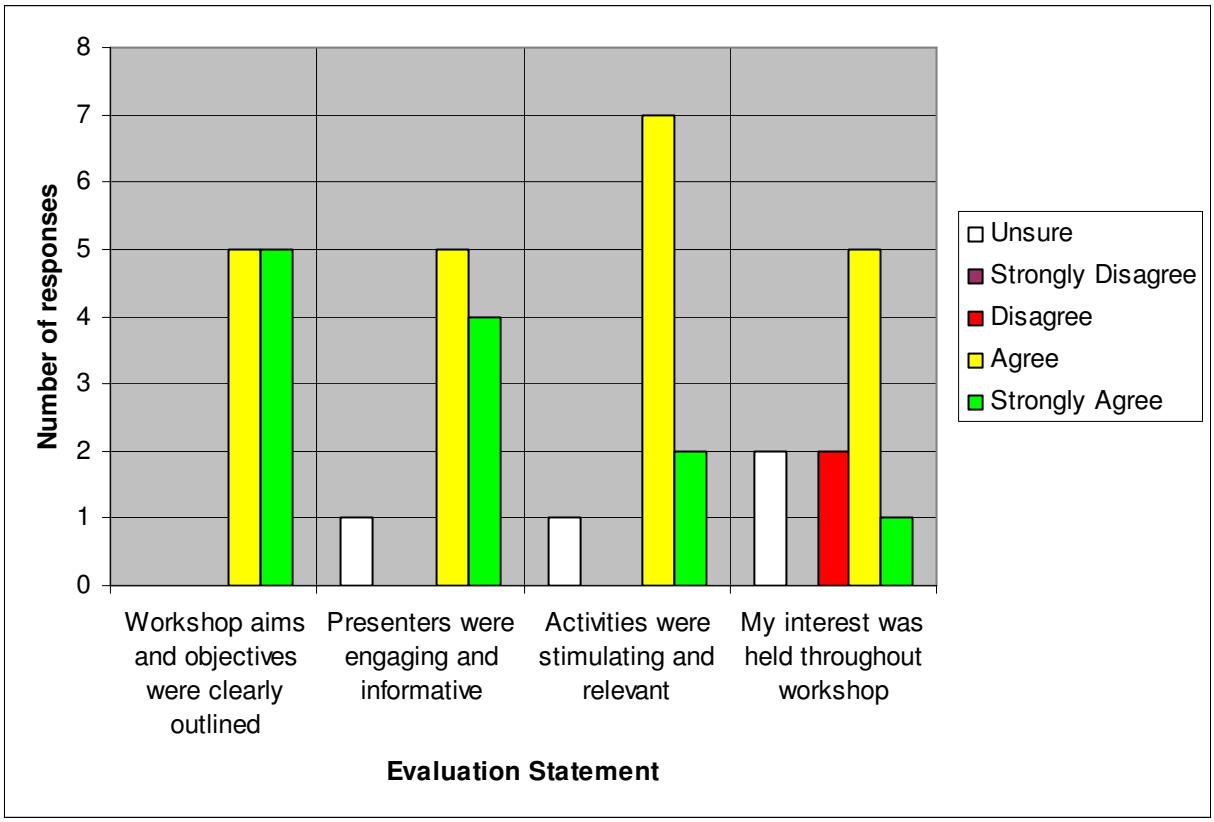
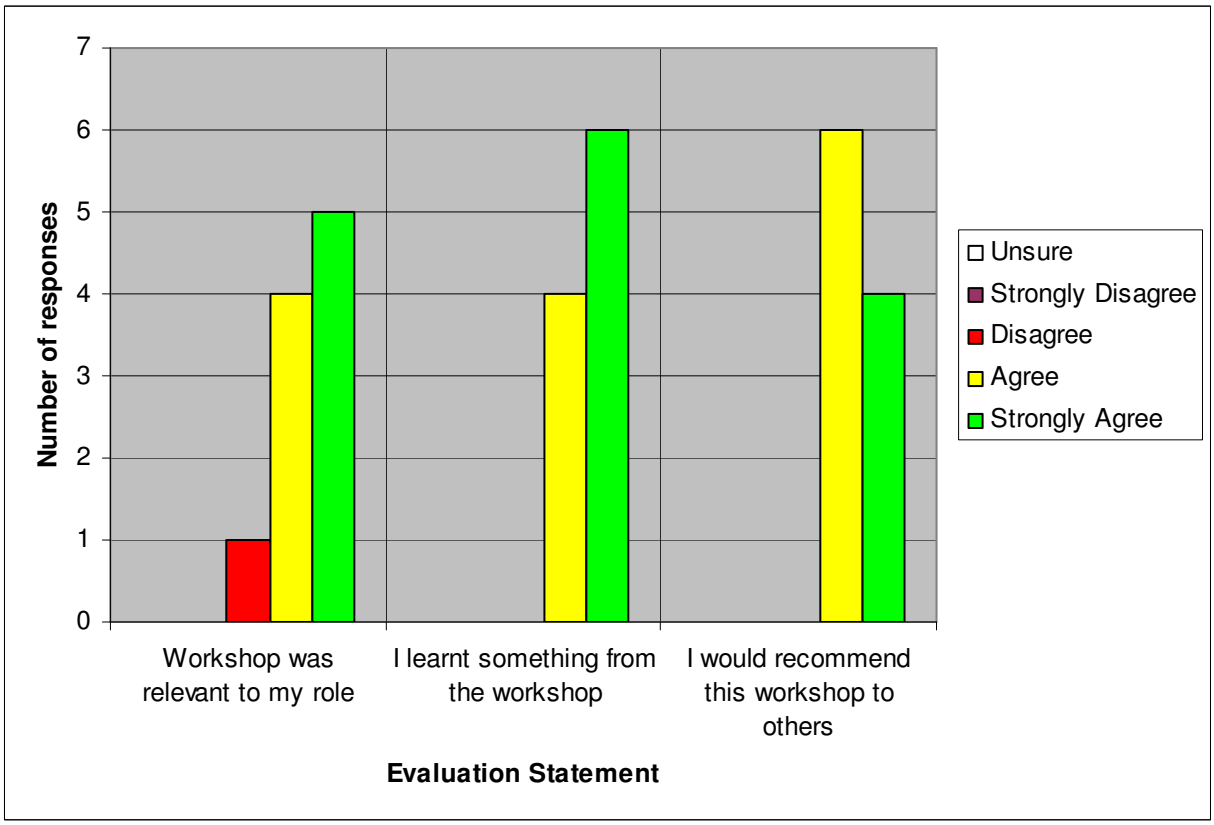


Figure 6.2 – Responses to Evaluation Form Statements (2)



Evaluation of the event by the workshop organisers

Corpo Nazionale dei Vigili del Fuoco – Nucleo Investigativo Antincendi (CNVVF-NIA) had the responsibility for planning, coordinating and delivering the workshop. Support and assistance for this role was provided by Northumberland Fire and Rescue Service, the coordinating partner on the ANSFR Project. The CNVVF organisation team met after the event to evaluate the pre-, during and post-event elements of the workshop to identify strategies and plans that had been effective/successful and those that may require improvement for future workshops.

The findings of the debrief meeting were divided into two key headings: successful elements of the workshop; and, areas for improvement for future workshops. The five key successful elements of the workshop that were identified were:

- Pre-event planning was detailed and effective and helped ensure a successful event.
- The organisers were successful in filling all available delegate spaces to achieve maximum capacity for the workshop.
- All sessions and activities ran to time. There were no significant over-runs or under-runs in any of the presentation sessions delivered during the event.
- The workshop achieved all of its pre-determined aim and objectives (further details to follow in the subsequent sub-section of this report).
- Different departments within CNVVF (fire stations, specialized teams, schools and laboratories) contributed to the workshop events allowing the exchange of specialized practice and experience.
- The workshop pointed out the differences between ANSFR delegate organizations giving the opportunity to understand work in specific risk assessment and management fields within each country.
- As an extension of the first and second ANSFR workshops, the potential for information and experience sharing was maximised during this workshop with the inclusion of social events in the evening and during the day of arrival. Indeed, a lot of information was shared outside the formal work sessions. The evening social events were well planned in order to facilitate the exchange of information and experience by all delegates present.

The organisers identified two areas of improvement for future workshops, one of which was very minor and concerned notification of dress code:

- Conversations between the partners were easily facilitated in this workshop because all ANSFR participants were well acquainted with one another after having attended the Northumberland Workshop and Frederikssund-Halsnæs Workshop. However, it is suggested, that the workshop would have benefited from a greater number of small group work sessions as the workshop did lack some of the really productive group activities that were delivered in Northumberland and Frederikssund-Halsnæs. Future ANSFR workshops should incorporate a number of small group work sessions.
- Organisers of the Roma Workshop attempted to address an area of improvement identified in the post-evaluation report of the Frederikssund-Halsnæs Workshop. The dress code for the Roma Workshop meals was outlined prior to the workshop and some guidance was given during the workshop sessions. On most occasions, delegates felt that they were informed about the requested dress code. It is still recommended, however, there were some delegates who were a little unsure as to

the expectations of the organisers. It is recommended that workshop organisers should be very specific when informing delegates of the expected dress code for individual workshop sessions, meals and other social events incorporated into the workshop. Ideally, delegates should receive this information prior to the event. This will ensure that all delegates feel prepared and at ease.

Conclusions of the post-event evaluation

No event is perfect and it is important for those involved in designing and delivering any event to critically reflect upon and learn from their experiences. The organisers of the Roma Workshop did critically reflect on their experiences and in so doing identified two areas of improvement for similar future events.

By holding workshops in each of the four project countries, each ANSFR partner has been given the opportunity to provide their own perspective on issues associated with fire risk identification, assessment and management. This has always been a central aim of the ANSFR project, because it provides partners with the ability to focus their workshop on issues related to their areas of expertise. It is a significant challenge to design and deliver a workshop meeting expectations and interests of all organisations and individuals involved. It stands to reason that no workshop will hold the interest of all delegates in attendance and there will be some deviation in the relevance of some of the topics and issues discussed. It was evident in some of the delegate evaluation forms that some of the discussions about CNVVFs work, particularly in fire safety engineering, were not of strong relevance to all delegates present. This is a product of the fact that CNVVF is a nationalised fire and rescue service. The other three ANSFR countries do not have nationalised fire and rescue services and are not responsible for centralised functions such as fire safety engineering. A key element of the collaborative working involved in the ANSFR Project is to understand the work of those working in other specialist fields. The organisers are not concerned that there were a very small number of delegates who commented that their interest was not held and/or that the workshop topics were not relevant to their role. The majority of delegates present provided positive responses about these elements of the workshop and all information discussed during the workshop was relevant to the topic of fire risk assessment and management.

With the assistance of those who attended the event, CNVVF-NIA and NFRS determine that all four of the event's learning outcomes were successfully achieved to a satisfactory level. Consequently, it was determined that those who attended could:

1. Demonstrate an understanding of the accidental fire risk assessment and management practices currently adopted by the project partners and other invited organisations.
2. Describe and explain the accidental fire risks and challenges that currently face the project partners and project countries (Denmark, Finland, Italy and the United Kingdom).
3. Demonstrate an understanding of some of the national priorities and strategies for accidental fire risk assessment and management and the prevention of environmental fires in the project countries.
4. Demonstrate an awareness and appreciation of examples of good practice in accidental fire risk assessment and management from the project countries.
5. Share examples of good practice in prevention of accidental fires from the project countries.

The workshop also delivered all of its three anticipated outputs*:*

1. A list of names and contact details of all individuals participating in the workshop.
2. A handbook documenting the sessions delivered and the specific findings/conclusions of each session. All workshop participants have agreed for their documents and presentations to be included in this document.
3. The basis/foundation for developing at least three guidelines for identifying, assessing, managing and preventing accidental fire risk.

Based on the evidence presented here and within the full Post-Event Evaluation Report, it is the conclusion of the organisers that the Roma Workshop was successful in achieving its key aim. The workshop successfully ensured that:

> **"participants developed a good understanding of the environmental fire risk assessment and management practices currently adopted by the partner organisations and involved discussions and debates concerning potential synergies and improvements to these practices for effective use in all project countries".**

The organisers identified that the success of the Roma workshop was attributable to at least four key factors:

- the detailed design, planning and preparedness work completed by officers from Corpo Nazionale dei Vigili del Fuoco;
- the significant contributions to the workshop and workshop schedule supplied by numerous specialist departments within Corpo Nazionale dei Vigili del Fuoco, including (but not limited to): Nucleo Investigativo Antincendi; Comando Provinciale dei Vigili del Fuoco di Roma; Comando Provinciale dei Vigili del Fuoco di Latina; Comando Provinciale dei Vigili del Fuoco di Siena; Comando Provinciale dei Vigili del Fuoco di Milano; Istituto Superiore Antincendi (ISA); Scuola di Formazione Operativa (SFO); Direzione Centrale Prevenzione e Sicurezza Tecnica (DCPST).
- the high quality presentations delivered by the ANSFR Partners.
- the enthusiasm of all those who attended and their willingness to share knowledge and experience and to contribute to discussions and debates.

These key factors, along with the suggestion for improvement, will be incorporated into the design and delivery of the final ANSFR Project workshop in Kuopio (Finland).

6.2 Concluding comments of the Roma Workshop

The ANSFR Partners have continued to build upon their excellent working relationship through the successive workshops. All of the partners have been open, honest and critical about their current fire risk assessment and management practices. Debates and discussions have been extremely productive, and this has been achievable because the successive workshops have facilitated strong interaction among the participants. The activities completed during the Roma Workshop (including classroom sessions, field visits and social events), along with the previous two ANSFR Workshops, have all helped to develop a strong ANSFR team.

No one organisation has the answer about how to most effectively assess and manage accidental fire risk. Each partner has its success stories, and each partner has its failures. One of the main strengths of the ANSFR Project is that it involves practitioners from multiple countries with different backgrounds and professional experience coming together

to critically discuss issues and to solve problems. The Roma Workshop has enabled the ANSFR Partners to look at the topic of accidental fire risk in detail, look at the problems and issues facing the partners, look at the success stories and failures and, through discussion and debate, identify ways that all of the partners can improve the way they assess and manage accidental fire risk. The mutual benefits to all of the partners for participating in such an exercise are huge.

Through the initial work completed in the workshop and the subsequent follow-up work to be completed by all of the partners, the ANSFR Project team will produce a concise and meaningful document of recommendations that can be utilised by Fire and Rescue Services across Europe. This valuable document will assist Fire and Rescue Services to make a real difference to their communities by reducing the risk of loss of life and damage caused to the built and natural environment as a result of accidental fires. While ANSFR focuses on the four project countries, the outputs that will be produced will have a much wider positive influence.

The one remaining ANSFR Project Workshop will address the last of the three project themes: social fire risk assessment and management. Corpo Nazionale dei Vigili del Fuoco – NIA, Frederikssund-Halsnæs Fire and Rescue Department and Northumberland Fire and Rescue Service will now provide advice and assistance to the Emergency Services College who will be organising and hosting the final workshop in Kuopio on 31st August – 3rd September 2010. Onnea seminaarissa Kuopiossa!

Appendix 1 – List of Abbreviations

AIBF	Accident Investigation Board of Finland
ANSFR	Accidental, Natural & Social Fire Risk Assessment & Management
ATC	Air Traffic Control
ATF	Arson Task Force
CEN	European Committee for Standardization
CFD	Computational Fluid Dynamics
CFOA	Chief Fire Officers Association (UK)
CNVVF	Corpo Nazionale dei Vigili del Fuoco (Italian National Fire and Rescue Service)
CPD	Construction Products Directive (Italy)
CPL	Chemical Product Laboratory (a laboratory within DCPST, Italy)
CTR	Regional Technical Committee (Italy)
DCPST	Direzione Centrale Prevenzione e Sicurezza Tecnica (Central Direction for Prevention and Technical Safety)
DM	Ministerial Decree (Italy)
EEC	European Economic Community
EGOLF	European Group of Organisations for Fire Testing, Inspection and Certification
EOTA	European Organization for Technical Approval
ESC	Emergency Services College (Finland)
FAO	Food and Agriculture Organization
FSE	Fire Safety Engineering
FSMS	Fire Safety Management System
HSE	Health and Safety Executive (UK)
ICT	Information and Communication Technologies
IFAD	International Fund for Agricultural Development

ISA	Istituto Superiore Antincendi
L.P.G.	Liquefied Petroleum Gas
Mi.B.A.C	Ministry for Cultural Heritage (in Italy)
NATO	North Atlantic Treaty Organization
NIA	Nucleo Investigativo Antincendi
NFRS	Northumberland Fire and Rescue Service
NFSG	Northumberland Farm Safety Group
PEI	Emergency Plans (Italy)
PSHE	Personal Social Health and Economic Education
RRO	Regulatory Reform (Fire Safety) Order 2005 (UK)
SBI	Single Burning Item
SEP	Schools Education Programme
SFB	Scuola di Formazione di Base (Basic Training School of CNVVF)
SFO	Scuola di Formazione Operativa
SGS	Safety Management System (Italy)
UK	United Kingdom
UNESCO	United Nations Educational Scientific and Cultural Organization
UNI	Italian standardisation body
VVF	Vigili del Fuoco (Fire Fighters in Italian)
WFP	World Food Programme
WPS	Wildfire Prediction System

Appendix 2 – The Roma Workshop Schedule

Workshop 3 – European Exchange of Good Practice in Identification, Assessment and Management of Accidental Fire Risk

Hosted by Corpo Nazionale dei Vigili del Fuoco, Italy
Host facility: Istituto Superiore Antincendi, Via del commercio, 13 – Rome
30th November – 3rd December 2009

Workshop Schedule

Monday 30th November 2009 – Arrival into Rome

Times to be confirmed with partners (dependent upon flight arrival times) – Officers from CNVVF – NIA will meet workshop participants arriving into Fiumicino and/or Ciampino Airport (TBC by participants) and provide transport between the airport(s) and Istituto Superiore Antincendi (http://www.vigilfuoco.it/speciali/isa/chisiamo/default.asp), in Rome. This will be the venue for the workshop. Delegates travelling from England, Denmark and Finland have rooms and meals reserved as detailed below for the nights of **30th November, 1st and 2nd December 2009 at ISA.**

16.00 Visiting Rome Fire Department Headquarters.

20.30 Evening meals for overseas delegates (arrangements to be made by Rome Fire Department).

Tuesday 1st December 2009 – Day One of the Workshop

08.00 – 08.50: Breakfast served at Istituto Superiore Antincendi (ISA).

08.50 – 09.00: The workshop begins. Housekeeping and name badges to be distributed.

09.00 – 09.30:	Workshop participants will be welcomed by the ISA director, by the Chief of the Italian National Fire Brigade and by the Central Director of Prevention and Technical Safety (DCPST).
09.30 – 10.00	Delivery of presentation by Rob Stacey (NFRS) about the status of ANSFR project.
10.00 – 11.00	Delivery of presentation by Northumberland Fire and Rescue Service.
11.00 – 11.30	*tea/coffee break.*
11.30 – 12.30	Delivery of presentation by Frederikssund Fire Department.
12.30 – 13.30	Delivery of presentation by Emergency Services College.
13.30 – 15.00	*Lunch at ISA.*
15.00 – 16.00	Delivery of presentation by Corpo Nazionale dei Vigili del Fuoco.
16.00 – 17.00	Delivery of presentation by Mr. Luca Nassi, officer at Siena fire station, about fire risk in cultural heritage buildings.
17.00	The day one of workshop ends.
20.00	Evening meal for overseas delegates (arrangements to be made by CNVVF – NIA).

Wednesday 2nd December 2009 – Day Two of the Workshop

08.00 – 09.00	Breakfast served at Istituto Superiore Antincendi (ISA).
09.00 – 10.30	Trip to Scuola di Formazione Operativa, the CNVVF Operating Training School located in Montelibretti (approx. 60 km from Rome).
10.30 – 11.00	Presentation of Scuola di Formazione Operativa (SFO).
11.00 – 11.30	*tea/coffee break.*
11.30 – 13.00	Practical exercise by CNVVF staff.
13.00 – 14.00	Lunch at Scuola di Formazione Operativa (SFO).
14.00 – 15.00	Transfer to the Central Direction for Prevention and Technical Safety (DCPST), located in Capannelle (South-East outskirts of Rome).
15.00 – 15.30	Welcome speech by the Central Director of DCPST.
15.30 – 17.30	Visiting DCPST laboratories: products, reaction to fire and fire resistance.

17.30 – 18.00 Concluding comments concerning the workshop. Discussion about Kuopio workshop, the project conference and other key project tasks – to be led by Rob Stacey (NFRS).

18.00 The workshop ends.

Thursday 3rd December 2009 – Departure from Rome

8.00 – 9.00 Breakfast served at Istituto Superiore Antincendi (ISA).

9.00 Officers from CNVVF will meet workshop participants at ISA and provide transport to the Airport(s) for departure.

This workshop is co-funded by the European Commission Directorate-General for Environment, under the 2008 Call for Proposals in Civil Protection. The workshop forms an important part of the "ANSFR Project", Grant No. 070401/2008/507848/SUB/A3.

Appendix 3 – Potential Causes/ Contributory Factors for Accidental, Environmental and Social Fires

- Access to fire safety knowledge and education
- Alcohol consumption
- Animals and pets (e.g. rodents biting through cables)
- Ash
- Biological (e.g. peat)
- Boredom
- Buildings of multiple occupancy
- Building ownership (e.g. owner occupier or rented to tenants)
- Buildings of sole occupancy
- Burning of waste/rubbish
- Camping
- Candles
- Civil unrest (e.g. riot)
- Controlled burning
- Coal and wood burning stoves
- Chemical
- Cigarettes and smoking materials
- Chimneys and flues
- Climate
- Cooking (inside and outside)
- Deliberate fire-setting (arson/fire crime)
    - a) Organised arson
        - Crime concealment
        - Extremist motivated
        - Profit motivated
        - Revenge motivated
    - b) Disorganised arson
        - Crime concealment
        - Excitement motivated
        - Revenge motivated
        - Serial arson
        - Spree and mass arson
        - Vandalism motivated
- Drug taking
    - a) Illegal drugs
    - b) Prescription drugs
- Electricity/Electrical
- Empty/void properties
- Excluded members of society
- Explosions/explosives (e.g. gas explosions, nuclear explosions etc.)
- Failure to apply common sense
- Fascination with fire/play with fire
- Fire work (i.e. welding)
- Fireworks
- Frictional heat
- Hazardous substances (e.g. flammable and explosive substances)
- Heat
- Human error
- Lighting (artificial)
- Maintenance of equipment
- Marital status
- Mechanical
- Mental health difficulties
- Misuse of equipment/machinery
- Negligence
- Non-compliance with building regulations
- Non-compliance with health and safety regulations
- Open fires
- Overheating of an object (for instance, of a machine and/or electrical appliance)
- Ownership of fire safety measures
- Personal/domestic crises
- Physical impairment
- Poor (or no) maintenance (i.e. of machines, of chimneys/fire places, saunas etc.)
- Prescribed burning
- Racial/hatred
- Recession (economic downturn)
- Re-ignition of earlier fire
- Religious practices
- Saunas and steam rooms
- Self-excluded members of society (e.g. hermits, some homeless people etc.)
- Self immolation
- Smoking materials (cigarettes, tobacco, lighter, matches etc.)
- Spark (for instance, from fire place or machine)
- Suicide
- Sunlight (refracted)
- Terrorism and Extremist groups
- Weather conditions (including: storms and high winds, lightning, volcanic eruptions, earthquakes, draught, cold)
- Other

Appendix 4 – Potential Location Types for Accidental, Environmental and Social Fires

Property Types

- Agricultural buildings (barns etc.)
- Care homes for the elderly
- Caravans
- Camp sites
- Club rooms
- Community centres/buildings
- Day care centres
- Dormitories/other residential properties
- Electricity sub stations
- Empty/void properties
- Festivals/events
- Holiday/summer homes
- Hospitals
- Hotels/Guest Houses
- Homes/dwellings
- Illegal drug farms (cannabis farms etc.)
- Leisure centres/sports halls
- Libraries
- Museums
- Oil rigs/extraction plants
- Offices
- Entertainment venues (cinemas, theatres, dance halls/discos and nightclubs)
- Petrochemical processing plants
- Places of worship (for instance, churches, synagogues, mosques etc.)
- Power plants
- Prisons
- Pubs and restaurants
- Shops
- Storage facilities (other than warehouses)
- Temporary/mobile homes
- Transport centres (airports, bus stations, train stations, ports)
- Warehouses
- Waste centres (for instance, waste storage sites, recycling facilities etc.)
- Other

Landscapes/Environments

- Coastland
- Grassland
- Heathland
- Moorland
- Peat
- Wildland (Wildfire)
- Woodland/forest (both natural and man-made/managed)
- Other

Modes of Transport

- Aeroplanes
- Bicycles
- Bulk carrier ships (for instance, container ships, oil tankers etc.)
- Buses/coaches
- Car transporters
- Cars
- Construction vehicles (i.e. excavators, cranes etc.)
- Cross-country vehicles (snowmobile, quad bike etc.)
- Ferries/Cruise Ships
- Fishing boats
- Inshore boats/ canal boats
- Jet ski
- Lorries/heavy goods vehicles
- Motorbikes
- Offshore pleasure boats
- Tractors and farm vehicles (including combine harvesters)
- Trains
- Trailers
- Other

Appendix 5 – Social Groups "At Risk" of Experiencing/Causing Accidental, Environmental and Social Fires

- Alcohol/drug abusers
- Divorced
- Economically/socially deprived
- Landowners and land managers
- Mentally impaired
- Migrant workers[44]
- Neo-unskilful[45]
- Physically impaired
- Single
- Smokers
- Elderly
- Very young (infants, children)
- Working in high risk occupations (for instance, steel smelting/production, oil rig workers, quarry workers, miners (particularly those blasting for stone or other minerals) etc.
- Unemployed
- Widowed

[44] The term "migrant worker" refers to a person who is to be engaged, is engaged or has been engaged in a remunerated activity in a State of which he or she is not a national" (UN Convention on the Rights of Migrant Workers, 1990. Last accessed on 3.07.09 at http://www2.ohchr.org/english/law/pdf/cmw.pdf).

[45] The category "neo-unskilful" refers to a group of individuals who have not learnt and/or are not interested in learning the knowledge and skills required to act and behave safely particularly (although not solely) around fires, the safe use of fire and fire prevention. The knowledge and skills that were traditionally passed on from generation to generation, and to a degree via closer contact with fire during everyday life (for instance, cooking on open fires, open fires for heating etc.), are no longer widely possessed by the general public. This social group has been identified as 'at risk' in Finland and also in other European countries.

Appendix 6 –Workshop Evaluation Form

Workshop Evaluation Form
Corpo Nazionale dei Vigili del Fuoco - NIA

Event title: The ANSFR Project Accidental Fire Risk Workshop – hosted by Corpo Nazionale dei Vigili del Fuoco - NIA	Date: 31st November – 3rd December 2009

Please answer the following as honestly as possible, rating areas of the workshop from 1-4
1 – Strongly Disagree, 2 - Disagree, 3 – Agree, 4 – Strongly Agree

The workshop aims and objectives were clearly outlined

Unsure 1 2 3 4

The workshop presenters were engaging and informative

Unsure 1 2 3 4

The activities were stimulating and relevant

Unsure 1 2 3 4

My interest was held throughout the workshop

Unsure 1 2 3 4

The workshop was relevant to my role

Unsure 1 2 3 4

I have learnt something from the workshop

Unsure 1 2 3 4

I would recommend this workshop to others

Unsure 1 2 3 4

Please provide any additional comments or suggestions below e.g., suggested changes about particular sessions?

Corpo Nazionale dei Vigilii del Fuoco (CNVVF) is the Italian State Fire Fighters Corps within the Ministry of Interior in Italy. CNVVF provides fire and rescue services across the whole of Italy through various central and local sub-departments and divisions. Nucleo Investigativo Antincendi (NIA) is the department responsible for delivering CNVVF's contribution to the ANSFR Project. NIA is a department based in Rome within the central technical core of CNVVF. NIA is responsible for fire investigation and other related activities.

Northumberland Fire and Rescue Service (NFRS) provides fire and rescue cover to the County of Northumberland in northern England. The County covers an area of almost 2,000 square miles (approximately 500,000 hectares) and is home to approximately 310,000 residents. NFRS has a long term strategic aim of improving the social, economic and environmental well being of the residents of the county it serves. Central to this is "preventing fires and other emergencies happening" and in doing so "reducing death, injury and damage to property". It is NFRS's aim to share knowledge and expertise, and to learn from the successful practices and initiatives implemented by other organisations, in order to improve safety and quality of life for those living and working in Northumberland.

Northumberland
Northumberland County Council

Pelastusopisto
Emergency Services College